FINALTERM EXAMINATION
Spring 2010
CS402- Theory of Automata (Session - 1)

Question No: 1 (Marks: 1) - Please choose one
If r1 = (aa + bb) and r2 = (a + b) then the language (aa + bb)(a + b) will be generated by

- **(r1)(r2) (Page 10)**
- (r1 + r2)
- (r2)(r1)
- (r1)*

Question No: 2 (Marks: 1) - Please choose one
"One language can be expressed by more than one FA". This statement is _____

- **True (Page 14)**
- False
- Some times true & sometimes false
- None of these

Question No: 3 (Marks: 1) - Please choose one
Who did not invent the Turing machine?

- Alan Turing
- **A. M. Turing (Page 140)**
- Turing
- None of these

Question No: 4 (Marks: 1) - Please choose one
Which statement is true?

- **The tape of turing machine is infinite. (Page 140)**
- The tape of turing machine is finite.
- The tape of turing machine is infinite when the language is regular
- The tape of turing machine is finite when the language is nonregular.

دنیا میں سب سے مشکل کام اپنی اصلاح اور سب سے آسان کام دوسروں پر نکتہ چینی کرنا ہے

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Question No: 5 (Marks: 1) - Please choose one

A regular language:

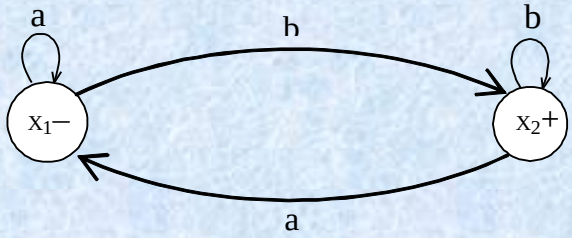
- ► **Must be finite (Page 11)**
- ► Must be infinite
- ► Can be finite or infinite
- ► Must be finite and cannot be infinite

Question No: 6 (Marks: 1) - Please choose one

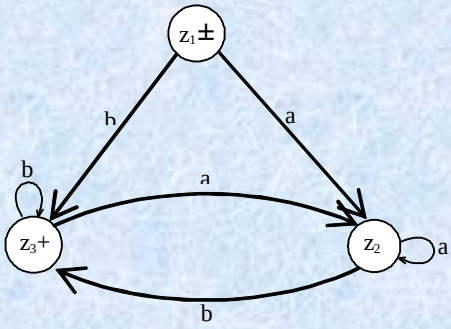
Every regular expression can be expressed as CFG but every CFG cannot be expressed as a regular expression. This statement is:

- ► Depends on the language
- ► None of the given options
- ► **True (Page 97)**
- ► False

Question No: 7 (Marks: 1) - Please choose one



Above given FA corresponds RE r. then FA corresponding to r* will be



This statement is

- ► **True (Page 38)**
- ► False
- ► Depends on language
- ► None of these

بری صحبت سے تنہائی بہتر ہے اور تنہائی سے نیک صحبت بہتر ہے

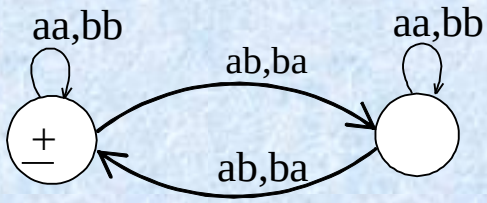
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Question No: 8 (Marks: 1) - Please choose one

Consider the language L of strings, defined over Σ = {a,b}, ending in a

- **There are finite many classes generated by L, so L is regular (Page 76)**
- There are infinite many classes generated by L, so L is regular
- There are finite many classes generated by L, so L is non-regular
- There are infinite many classes generated by L, so L is non-regular

Question No: 9 (Marks: 1) - Please choose one



Above given TG has _____ RE.

- (aa+aa+(ab+ab)(aa+ab)*(ab+ba))*
- **(aa+bb+(ab+ba)(aa+bb)*(ab+ba))* (Page 22)**
- (aa+bb+(ab+ba)(aa+bb)(ab+ba))*
- None of these

Question No: 10 (Marks: 1) - Please choose one

The word 'formal' in formal languages means

- The symbols used have well defined meaning
- They are unnecessary, in reality
- **Only the form of the string of symbols is significant** Click here for detail
- None of these

Question No: 11 (Marks: 1) - Please choose one

Let A = {0, 1}. The number of possible strings of length 'n' that can be formed by the elements of the set A is

- n!
- n^2
- n^m
- **2^n**

Question No: 12 (Marks: 1) - Please choose one

Choose the correct statement.

- A Mealy machine generates no language as such
- A Moore machine generates no language as such
- A Mealy machine has no terminal state
- **All of these** click here for detail

اللہ کا خوف سب سے بڑی دانائی ہے

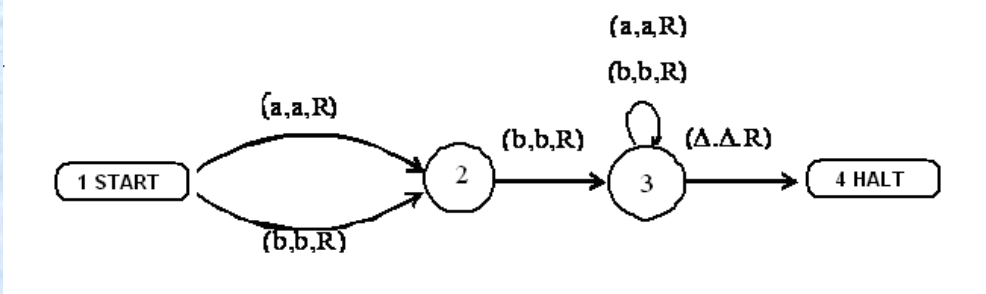
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Question No: 13 (Marks: 1) - Please choose one
TM is more powerful than FSM because
- ► The tape movement is confined to one direction
- ► It has no finite state control
- ► **It has the capability to remember arbitrary long sequences of input symbols** Click here for detail
- ► None of these

Question No: 14 (Marks: 1) - Please choose one
If L1 and L2 are expressed by regular expressions r1 and r2, respectively then the language expressed by r1 + r2 will be _____
- ► **Regular (Page 10)**
- ► Ir-regular
- ► Can't be decided
- ► Another Language which is not listed here

Question No: 15 (Marks: 1) - Please choose one
Like TG, a PDA can also be non-deterministic
- ► **True (Page 111)**
- ► False

Question No: 16 (Marks: 1) - Please choose one



The above machine is a/anTG _____
- ► Finite Automata
- ► **Turing machine (Page 141)**
- ► FA
- ► TG

Question No: 17 (Marks: 1) - Please choose one
The language of all words (made up of a's and b's) with at least two a's can not be described by the regular expression.
- ► a(a+b)*a(a+b)*(a+b)*ab*
- ► (a+b)* ab* a(a+b)*
- ► b*ab* a(a+b)*
- ► **none of these**

a^nb^n {where n>0} is the language will at least one a and b and cannot be described by RE.

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Question No: 18 (Marks: 1) - Please choose one
In FA, if one enters in a specific state but there is no way to leave it, then that specific state is called
- ► Dead State
- ► Waste Basket
- ► Davey John Locker
- ► **All of these (Page 17)**

Question No: 19 (Marks: 1) - Please choose one
If L is a regular language then, L^c is also a _____ language.
- ► **Regular (Page 66)**
- ► Non-regular
- ► Regular but finite
- ► None of the given

Question No: 20 (Marks: 1) - Please choose one
In CFG, the symbols that can't be replaced by anything are called___
- ► **Terminal (Page 87)**
- ► Non-Terminal
- ► Production
- ► All of given

Question No: 21 (Marks: 1) - Please choose one
Which of the following is NOT a regular language?
- ► String of 0's whose length is a perfect squere
- ► Set of all palindromes made up of 0's and 1's
- ► String of 0's whose length is a prime number
- ► **All of the given options** Click here for detail

Question No: 22 (Marks: 1) - Please choose one
Choose the incorrect (FALSE) statement.
- ► A Mealy machine generates no language as such
- ► A Mealy machine has no terminal state
- ► **For a given input string, length of the output string generated by a Moore machine is not more than the length of the output string generated by that of a Mealy machine** click here for detail
- ► All of these

Question No: 23 (Marks: 1) - Please choose one
Pumping lemma is generally used to prove that:
- ► A given language is infinite
- ► **A given language is not regular** Click here for detail
- ► Whether two given regular expressions of a regular language are equivalent or not
- ► None of these

دنیا کی سب سے بڑی فتح نفس پر قابو رکھنا ہے

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Question No: 24 (Marks: 1) - Please choose one
Which of the following is a regular language?
- ► **String of odd number of zeroes** Click here for detail
- ► Set of all palindromes made up of 0's and 1's
- ► String of 0's whose length is a prime number
- ► All of these

Question No: 25 (Marks: 1) - Please choose one
Choose the incorrect statement:
- ► (a+b)*aa(a+b)* generates Regular language.
- ► **A language consisting of all strings over ∑={a,b} having equal number of a's and b's is a regular language**
- ► Every language that can be expressed by FA can also be expressed by RE
- ► None of these

Question No: 26 (Marks: 1) - Please choose one
Left hand side of a production in CFG consists of:
- ► One terminal
- ► More than one terminal
- ► **One non-terminal (Page 87)**
- ► Terminals and non-terminals

FINALTERM EXAMINATION
SPRING 2007

Question No: 1 (Marks: 1) - Please choose one
PDA is only used to represent a regular language.
- ► True
- ► **False** Click here for detail

Question No: 2 (Marks: 1) - Please choose one
If L is a regular language then LC is also a regular language.
- ► **True (Page 66)**
- ► False

ایماندار کو غصہ دیر سے آتا ہے اور جلدی دور ہو جاتا ہے

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Question No: 3 (Marks: 1) - Please choose one
A production of the form non-terminal ⇾ string of two non-terminal is called a live Production.
► **True (Page 127)**
► False

Question No: 4 (Marks: 1) - Please choose one
We can find a CFG corresponding to a DFA.
► **True (Page 97)**
► False

Question No: 5 (Marks: 1) - Please choose one
START, READ, HERE and ACCEPTS are conversions of the machine
► **True (Page 122)**
► False

Question No: 6 (Marks: 1) - Please choose one
A CFG is said to be ambiguous if there exists at least one word of its language that can be generated by different production trees
► **True (Page 95)**
► False

Question No: 7 (Marks: 1) - Please choose one
Syntax tree or Generation tree or Derivation tree are same tree
► **True (Page 92)**
► False

Question No: 8 (Marks: 1) - Please choose one
The symbols that cannot be replaced by anything are called terminals
► **True (Page 87)**
► False

Question No: 9 (Marks: 1) - Please choose one
The production of the form non-terminal ⇾ one non-terminal is called unit production
► **True (Page 100)**
► False

Question No: 10 (Marks: 1) - Please choose one
DFA and PDA are equal in power.
► True
► **False (Page 105)**

زندگی میں کامیابی کا یہی راز ہے کہ پریشانیوں سے پریشان مت بنو

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FINALTERM EXAMINATION
Spring 2006
CS402- Theory of Automata

Question No. 1
A production of the form non-terminal ⇾ non-terminal is called a dead Production.
True
False (Page 127)

Question No. 2
Semi-word is a string having some terminals and one non-terminal at the right of string.
True (Page 97)
False

Question No. 3
Two FAs are equivalent if they have same no. of states.
True (Page 15)
False

Question No. 4
There exist exactly two different derivations in an ambiguous CFG for a word.
True (Page 93)
False

Question No. 6
Regular languages are closed under Union, Concatenation and Kleene star.
True (Page 10)
False

Question No. 7
CFG may also represent a regular language.
True (Page 97)
False

Question No. 9 Marks : 1
PDA is stronger than FA.
True (Page 105)
False

جھوٹ انسان اور ایمان دونوں کا دشمن ہے

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FINALTERM EXAMINATION
Spring 2005
CS402- Theory of Automata

Question No. 1
A Total Language Tree has
All languages over Σ
All strings over Σ (Page 96)
All words of all languages over Σ
All words of one language over Σ

Question No. 2
What Turing Machine does not have?
Stack
Tape
Head
Word
Turing machine has stack but insertion and deletion can be done from both sides. Tape and head to.

Question No. 3
CFG given S ⇾ bS|Sb|aa represents language
b*aa
aab*
b*aab*
b*(aa)*b*

Question No. 4
A Language that is finite but not regular
Λ
(a+b)*
Φ (not sure)
All strings of a's in Σ = {a,.b}

عقل مند کہتا ہے میں کچھ نہیں جانتا جبکہ بے وقوف کہتا ہے کہ میں سب کچھ جانتا ہوں

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CS402 – Quiz No.3

Question # 1 of 10 (Total Marks: 1) **Select correct option:**
The values of input (say a & b) does not remain same in one cycle due to
NAND gate
Click plus
OR gate
NOT gate

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
Set of all palindromes over {a,b}is regular

True
False **(Page 74)**

Question # 3 of 10 (Total Marks: 1) **Select correct option:**
In CFG, the symbols that cannot be replaced by anything are called

Terminals **(Page 87)**
Non terminals
Productions
None of the given options

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
a^n b^n generates the …… language

regular
non regular
EQUAL and non regular **(Page 71)**
EQUAL and regular

Question # 5 of 10 (Total Marks: 1) **Select correct option:**
The grammatical rules which involves meaning of words are called:

Semantic **(Page 87)**
Sytactics
Alphabets
None of he given options

خود کو تمھیں سے بڑھ کر کوئی اچھا مشورہ نہیں دے سکتا

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Question # 6 of 10 (Total Marks: 1) **Select correct option:**
The reverse of the string sbfsbb over { sb, f, b }

bbsfbs
bsbfsb
sbbfsb
bsfbsb

Question # 7 of 10 (Total Marks: 1) **Select correct option:**
If an FA has N state then it must accept the word of length

N-1
N+1
N+2N

Question # 8 of 10 (Total Marks: 1) **Select correct option:**
Two languages are said to belong to same class if they end in the same state when they run over an FA, that state

Must be final state
May be final state or not (Page 75)
May be start or not
None of the given options

Question # 9 of 10 (Total Marks: 1) **Select correct option:**
In pref(Q in R) Q is …… to (than) R

Equal
Not Equal (Page 79)
Greater
Smaller

Question # 10 of 10 (Total Marks: 1) **Select correct option:**
According to Myhill Nerode theorem, if L generates finite no. of classes then L is.....

Finite
Infinite
Regular (Page 76)
Non Regular

جو شخص ناکامیوں سے ڈر کر بھاگتا ہے کامیابی اُس سے ڈر کر بھاگتی ہے

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Question # 1 of 10 (Total Marks: 1) **Select correct option:**
If the intersection of two regular languages is regular then the complement of the intersection of these two languages is also regular

True (Page 68)
False

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
In pumping lemma theorem (x y^n z) the range of n is

n=1,2,3,4..... (Page 74)
n=0,1,2,3,4....
n=-3,-2,-1,0,1,2,3,4.....
n=-3,-2,-1,1,2,3,4.....

Question # 3 of 10 (Total Marks: 1) **Select correct option:**
The complement of a regular language is also a regular

True rep
False

CS402 – Quiz No.3

Question # 1 of 10 (Total Marks: 1) **Select correct option:**
For a non regular language there exist …… FA

One
At least one
At most one
No (Page 71)

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
The strings or words which do not belong to a language is called…… of that language

Intersection
Union
Complement (Page 66)
Quotient

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Question # 3 of 10 (Total Marks: 1) **Select correct option:**
A non regular language can be represented by
RE
FA
TG
None of the given options (Page 71)

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
For language L defined over {a, b},then L partitions {a, b}* into …… classes

Infinite
Finite
Distinct (Page 75)
Non distinct

Question # 5 of 10 (Total Marks: 1) **Select correct option:**
If an FA accept a word then there must exist a path from

Initial to final state (Page 81)
Initial to each state
Initial to each state but not to final state
Initial to final state by traversing each state

Question # 6 of 10 (Total Marks: 1) **Select correct option:**
Does the empty string match the regular expression |y+a|?

Yes
No (Page 3)

Question # 7 of 10 (Total Marks: 1) **Select correct option:**
If an FA already accepts the language expressed by the closure of certain RE, then the given FA is the required FA.

True (Page 37)
False

Question # 8 of 10 (Total Marks: 1) **Select correct option:**
Which of the following statement is true about NFA with Null String?

Infinite states
Infinite set of letters
Infinite set of transitions
Transition of null string is allowed at any stage (Page 71)

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Question # 9 of 10 (Total Marks: 1) **Select correct option:**
If R is a regular language and L is some language, and L U R is a regular language, then L must be a regular language.

True (page 10)
False

Question # 10 of 10 (Total Marks: 1) **Select correct option:**
FA corresponding to an NFA can be built by introducing an empty state for a letter having

no transition at certain state (Page 43)
one transition at certain state
two transition at certain state
more than two transitions at certain state

Question # 1 of 10 (Total Marks: 1) **Select correct option:**
Let FA3 be an FA corresponding to FA1FA2, then the initial state of FA3 must correspond to the initial state of

FA1 only (Page 35)
FA2 only
FA1 or FA2
FA1 and FA2

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
(a* + b*)* = (a + b)* this expression is _____
True
False

Question # 3 of 10 (Total Marks: 1) **Select correct option:**
If S = { x }, then S* will be
{x,xx,xxx,xxxx,…}
{^ ,x,xx,xxx,xxxx,…} (Page 10)

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
The states in which there is no way to leave after entry are called
Davey John Lockers
Dead States
Waste Baskets
All of the given options (Page 17)

جو لوگوں کے سامنے فخر کرتا ہے وہ لوگوں کی نظروں سے گر جاتا ہے

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Question # 5 of 10 (Total Marks: 1) **Select correct option:**
If S = {ab, bb}, then S* will not contain
Abbbab
Bbba
ababbb
bbbbab

Question # 6 of 10 (Total Marks: 1) **Select correct option:**
According to theory of automata there are _____ types of languages

1
2 (Page 3)
3
4

Question # 7 of 10 (Total Marks: 1) **Select correct option:**
What do automata mean?
Something done manually
Something done automatically (Page 3)

Question # 8 of 10 (Total Marks: 1) **Select correct option:**
What is false about the term alphabet?
It is a finite set of symbols.
It is usually denoted by Greek letter sigma
It can be an empty set. (Page 3)
Strings are made up of its elements

Question # 9 of 10 (Total Marks: 1) **Select correct option:**
Formal is also known as _____
Syntactic language (page 3)
Semantic language
Informal language
Nsone of these

Question # 10 of 10 (Total Marks: 1) **Select correct option:**
Following are types of languages

Formal Languages (Syntactic languages)
Informal Languages (Semantic languages)
Both (Page 3)
None of above

عقل مند اپنے عیب خود دیکھتا ہے اور بیوقوفوں کے عیب دنیا دیکھتی ہے

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CS402 – Quiz No.4

Question # 1 of 10 (Total Marks: 1) **Select correct option:**
Consider the following production (of a CFG): S->XYZ Here _____ is left most nonterminal in working string. Note: S, X, Y and Z are all nonterminals
S
X
Y
Z

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
A PDA is called nondeterministic PDA if _____

There are more than one outgoing edges at READ or POP states with one label (Page 111)
There are more than one PUSH states
There are mroe than one POP states
All of the given options

Question # 3 of 10 (Total Marks: 1) **Select correct option:**
A PDA consists of the following:

An alphabet (Sigma) of input letters.
An input TAPE with infinite many locations in one direction
One START state with only one out-edge and no in-edge
All of the given options (Page 105)

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
The CFG S --> aSa | bSb | a | b | ^ represents the language

EVEN-EVEN
PALINDROM (Page 91)
EQUAL
ODD-ODD

Question # 5 of 10 (Total Marks: 1) **Select correct option:**
Halt states are

Start and Accept
Accept and Reject (Page 105)
Start and Reject
Read and Reject

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Question # 6 of 10 (Total Marks: 1) **Select correct option:**
Choice of path can be determined by left most derivation of the string belonging to CFL at…… state

Accept (Page 104)
Reject
Push
POP

Question # 7 of 10 (Total Marks: 1) **Select correct option:**
The unit and null productions can be deleted from a CFG

True (Page 99-100)
False

Question # 8 of 10 (Total Marks: 1) **Select correct option:**
Identify the TRUE statement about following CFG:
S -> SB|AB
A -> CC
B -> b
C -> a

The given CFG has 8 Nonterminals
The given CFG has 8 Terminals
The given CFG is in CNF (Page 101)
The given CFG is not in CNF

Question # 9 of 10 (Total Marks: 1) **Select correct option:**
The structure given below is called _____ S -> aA|bB A -> aS|a B -> bS|b

RE
TG
CFG (Page 87)
PDA

Question # 10 of 10 (Total Marks: 1) **Select correct option:**
Which of the following states is not part of PDA

START
ACCEPT
WRITE (Page 107)
REJECT

بد صورت چہرہ بد صورت دماغ سے بہتر ہے

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CS402 – Quiz No.4

Question # 1 of 10 (Total Marks: 1) **Select correct option:**
The production of the form: nonterminal --> one nonterminal is called the _____

Unit production (Page 100)
NULL production
Terminal production
Non Terminal production

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
A _____ is the one for which every input string has a unique path through the machine.

Deterministic PDA (Page 111)
nondeterministic PDA
PUSHDOWN store
Input Tape

Question # 3 of 10 (Total Marks: 1) **Select correct option:**
In the null production N --> ^ , N is a

Terminal
Non terminal (Page 99)
Word
None of the given options

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
The major problem in the earliest computers was

To store the contents in the registers
To display mathematical formulae (Page 87)
To load the contents from the registers
To calculate the mathematical formula

Question # 5 of 10 (Total Marks: 1) **Select correct option:**
In polish notation, (o-o-o) is the abbreviation of……?

Operand - Operator – Operand
Operand - Operand- Operator
Operator -Operand – Operand (Page 94)
Operand -Operand – Operand

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Question # 6 of 10 (Total Marks: 1) **Select correct option:**
The CFG is said to be ambiguous if there exist at least one word of its language that can be generated by the …… production trees

One
Two
More than one (Page 95)
At most one

Question # 7 of 10 (Total Marks: 1) **Select correct option:**
The input string is placed, before it runs, in

Stack
Memory
Tape (Page 105)
Ram

Question # 8 of 10 (Total Marks: 1) **Select correct option:**
The production S --> SS | a | b | ^ can be expressed by RE

(a+b)+
(a+b)
(a+b)* (Page 88)
(ab)*

Question # 9 of 10 (Total Marks: 1) **Select correct option:**
The locations into which we put the input letters on "Input Tap" are called _____

words
alphabets
cells (Page 105)
elements

Question # 10 of 10 (Total Marks: 1) **Select correct option:**
"CFG" stands for _____

Context Free Graph
Context Free Grammer (Page 87)
Context Finite Graph
Context Finite Grammer

عقل مند آدمی اس وقت تک نہیں بولتا جب تک خاموشی نہیں ہو جاتی

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Question # 1 of 10 (Total Marks: 1) **Select correct option:**
In a CFG the nonterminal that occurs first from the left in the working string, is said to be _____

Least Significant nonterminal
Most Significant nonterminal
Left most nonterminal (Page 103)
Left most derivate

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
The unit production is

Terminal --> Terminal
Terminal --> Non Terminal
Non terminal --> Terminal
Non terminal --> Non Terminal (Page 100)

Question # 3 of 10 (Total Marks: 1) **Select correct option:**
A _____ operator adds a new letter at the top of STACK

PUSH (Page 107)
POP
READ
APPEND

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
PDA stands for _____

Push and Drop Automaton
Pop and Drop Automaton
Push Down Automaton (Page 112)
None of given options

Question # 5 of 10 (Total Marks: 1) **Select correct option:**
The production of the form: Nonterminal-> ^ is said to be _____ production

NULL (Page 99)
UNIT
Chomsky form production
None of the given options

انسان دکھ نہیں دیتے بلکہ انسانوں سے وابستہ امیدیں دکھ دیتی ہیں

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Question # 6 of 10 (Total Marks: 1) **Select correct option:**
If a CFG has a null production, then it is _____

Posiible to construct another CFG without null production accepting the same language with the exception of the word ^ (Page 99)
Not possible to construct another CFG without null production accepting the same language with the exception of the word ^
Called NULL CFG
Called Chmosky Normal Form (CNF)

Question # 7 of 10 (Total Marks: 1) **Select correct option:**
In a STACK:

The element PUSHed first is POPed first
The element PUSHed first is POPed in the last (Page 107 concept)
The element PUSHed in last is POPed in last
None of given options

Question # 8 of 10 (Total Marks: 1) **Select correct option:**
Kleene star closure can be defined
Over any set of string (Page 7)
Over specific type of string

Question # 9 of 10 (Total Marks: 1) **Select correct option:**
While finding RE corresponding to TG, we connect the new start state to the old start state by the transition labeled by
A
B
null string (Page 26)
None of the given options

خوبصورتی علم وادب سے ہوتی ہے لباس و حسن سے نہیں

بہترین تجربہ وہ ہے جس سے نصیحت حاصل ہو

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Some More Quizzes

Question # 1 of 10 (Total Marks: 1) **Select correct option:**
For a given input, it provides the compliment of Boolean AND output.

NAND box (NOT AND) **(Page 63)**
DELAY box
OR box
AND box

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
It delays the transmission of signal along the wire by one step (clock pulse).

NAND box (NOT AND)
DELAY box **(Page 63)**
OR box
AND box

Question # 3 of 10 (Total Marks: 1) **Select correct option:**
For the given input, it provides the Boolean OR output

NAND box (NOT AND)
DELAY box
OR box **(Page 63)**
AND box

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
For the given input, AND box provides the Boolean AND output.
True **(Page 63)**
False

Question # 5 of 10 (Total Marks: 1) **Select correct option:**
The current in the wire is indicated by 1 and 0 indicates the absence of the current.
True **(Page 63)**
False

Question # 6 of 10 (Total Marks: 1) **Select correct option:**
Any language that can not be expressed by a RE is said to be regular language.
True
False **(Page 71)**

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Question # 7 of 10 (Total Marks: 1) **Select correct option:**
If L1 and L2 are regular languages_____ is/are also regular language(s).

L1 + L2
L1L2
L1*
All of above (Page 10)

Question # 8 of 10 (Total Marks: 1) **Select correct option:**
Let L be a language defined over an alphabet Σ, then the language of strings, defined over Σ, not belonging to L, is called Complement of the language L, denoted by Lc or L'.
True (Page 66)
False

Question # 9 of 10 (Total Marks: 1) **Select correct option:**
To describe the complement of a language, it is very important to describe the ---------- of that language over which the language is defined.

Alphabet (Page 66)
Regular Expression
String
Word

Question # 10 of 10 (Total Marks: 1) **Select correct option:**
For a certain language L, the complement of Lc is the given language L *i.e.* (Lc)c = Lc
True
False (Page 66)

Question # 1 of 10 (Total Marks: 1) **Select correct option:**
If L is a regular language then, --------- is also a regular language.
Lm
Ls
Lx
Lc (Page 66)

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
Converting each of the final states of F to non-final states and old non-final states of F to final states, FA thus obtained will reject every string belonging to L and will accept every string, defined over Σ, not belonging to L. is called
Transition Graph of L
Regular expression of L
Complement of L (Page 66)
Finite Automata of L

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Question # 3 of 10 (Total Marks: 1) **Select correct option:**
If L1 and L2 are two regular languages, then L1 U L2 is not a regular.
True
False (Page 65)

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
De-Morgan's law for sets is expressed by,
$(L_1^c \cap L_2^c)^c = L_1^c \cap L_2^c$
$(L_1^c \cap L_2^c)^c = L_1^c \cap L_2^c$
$(L_1^c \cap L_2^c)^c = L_1 \cap L_2$
$(L_1^c \cap L_2^c)^c = L_1 \cup L_2$ **CORRECT (page 68)**

Question # 5 of 10 (Total Marks: 1) **Select correct option:**
If L1 and L2 are regular languages, then these can be expressed by the corresponding FAs.
True (Page 68)
False

Question # 6 of 10 (Total Marks: 1) **Select correct option:**
L= language of words containing even number of a's. Regular Expression is

(a+b)*aa(a+b)*
(b+ab*a)* (Page 68)
a+bb*aab*a
(a+b)*ab(a+b)*

Question # 7 of 10 (Total Marks: 1) **Select correct option:**
The regular expression defining the language $L_1 \cap L_2$ can be obtained, converting and reducing the previous ---------- into a ---------- as after eliminating states.

GTG, TG
FA, GTG (Page 69)
FA, TG
TG, RE

Question # 8 of 10 (Total Marks: 1) **Select correct option:**
The language that can be expressed by any regular expression is called a Non regular language.
True
False (Page 71)

تم اچھا کرو زمانہ تم کو برا سمجھے یہ اس سے بہتر ہے کہ تم برا کرو اور زمانہ تم کو اچھا سمجھے

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Question # 9 of 10 (Total Marks: 1) **Select correct option:**
The languages ---------- are the examples of non regular languages.

PALINDROME and PRIME (Page 71)
PALINDROME and EVEN-EVEN
EVEN-EVEN and PRIME
FACTORIAL and SQURE

Question # 10 of 10 (Total Marks: 1) **Select correct option:**
Let L be any infinite regular language, defined over an alphabet Σ then there exist three strings x, y and z belonging to Σ* such that all the strings of the form xy^nz for n=1,2,3, … are the words in L. called.

Complement of L
Pumping Lemma (Page 72)
Kleene's theorem
None in given

Question # 1 of 10 (Total Marks: 1) **Select correct option:**
Languages are proved to be regular or non regular using pumping lemma.
True (Page 74)
False

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
---------- is obviously infinite language.
EQUAL-EQUAL
EVEN-EVEN
PALINDROME (Page 75)
FACTORIAL

Question # 3 of 10 (Total Marks: 1) **Select correct option:**
If, two strings x and y, defined over Σ, are run over an FA accepting the language L, then x and y are said to belong to the same class if they end in the same state, no matter that state is final or not.
True (Page 75)
False

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
Myhill Nerode theorem is consisting of the followings,

L partitions Σ* into distinct classes.
If L is regular then, L generates finite number of classes.
If L generates finite number of classes then L is regular.
All of above (Page 75)

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Question # 5 of 10 (Total Marks: 1) **Select correct option:**
The language Q is said to be quotient of two regular languages P and R, denoted by--- if PQ=R.
R=Q/P
Q=R/P (Page 78)
Q=P/R
P=R/Q

Question # 6 of 10 (Total Marks: 1) **Select correct option:**
If two languages R and Q are given, then the prefixes of Q in R denoted by Pref(Q in R).
True (Page 78)
False

Question # 7 of 10 (Total Marks: 1) **Select correct option:**
Let Q = {aa, abaaabb, bbaaaaa, bbbbbbbbbb} and R = {b, bbbb, bbbaaa, bbbaaaaa} Pref (Q in R) is equal to,

{b,bbba,bbbaaa} (Page 78)
{b,bba,bbaaa}
{ab,bba,bbbaa}
{b,bba,bbba}

Question # 8 of 10 (Total Marks: 1) **Select correct option:**
If R is regular language and Q is any language (regular/ non regular), then Pref (Q in R) is ---------.

Non-regular
Equal
Regular (Page 79)
Infinite

Question # 9 of 10 (Total Marks: 1) **Select correct option:**
_____ states are called the halt states.
ACCEPT and REJECT (Page 105)
ACCEPT and READ
ACCEPT AND START
ACCEPT AND WRITE

Question # 10 of 10 (Total Marks: 1) **Select correct option:**
The part of an FA, where the input string is placed before it is run, is called _____

State
Transition
Input Tape (Page 105)
Output Tape

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Question # 1 of 10 (Total Marks: 1) **Select correct option:**
In new format of an FA (discussed in lecture 37), This state is like dead-end non final state

ACCEPT
REJECT (Page 105)
STATR
READ

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
Between the two consecutive joints on a path

One character can be pushed and one character can be popped
Any no. of characters can be pushed and one character can be popped (Page 122)
One character can be pushed and any no. of characters can be popped
Any no. of characters can be pushed and any no. of characters can be popped

Question # 3 of 10 (Total Marks: 1) **Select correct option:**
The PDA is called non-deterministic PDA when there are more than one out going edges from…… state

START or READ
POP or REJECT
READ or POP (Page 111)
PUSH or POP

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
Identify the TRUE statement:
A PDA is non-deterministic, if there are more than one READ states in PDA
A PDA is never non-deterministic
Like TG, A PDA can also be non-deterministic (Page 111)
A PDA is non-deterministic, if there are more than one REJECT states in PDA

Question # 5 of 10 (Total Marks: 1) **Select correct option:**
There is a problem in deciding whether a state of FA should be marked or not when the language Q is infinite.
True (Page 79)
False

Question # 6 of 10 (Total Marks: 1) **Select correct option:**
If an effectively solvable problem has answered in yes or no, then this solution is called ---------

Decision procedure (Page 80)
Decision method
Decision problem
Decision making

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Question # 7 of 10 (Total Marks: 1) **Select correct option:**
The following problem(s) ---------- is/are called decidable problem(s).

The two regular expressions define the same language
The two FAs are equivalent
Both a and b (Page 80)
None of given

Question # 8 of 10 (Total Marks: 1) **Select correct option:**
To examine whether a certain FA accepts any words, it is required to seek the paths from ------- state.

Final to initial
Final to final
Initial to final (Page 81)
Initial to initial

Question # 9 of 10 (Total Marks: 1) **Select correct option:**
The high level language is converted into assembly language codes by a program called compiler.

TRUE (Page 87)
FALSE

Question # 10 of 10 (Total Marks: 1) **Select correct option:**
Grammatical rules which involve the meaning of words are called ----------
Semantics (Page 87)
Syntactic
Both a and b
None of given

Question # 1 of 10 (Total Marks: 1) **Select correct option:**
Grammatical rules which do not involve the meaning of words are called ----------
Semantics
Syntactic (Page 87)
Both a and b
None of given

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
The symbols that must be replaced by other things are called _____

Productions
Terminals
Non-terminals (Page 87)
None of given

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Question # 3 of 10 (Total Marks: 1) **Select correct option:**
The grammatical rules are often called_____

Productions (Page 87)
Terminals
Non-terminals
None of given

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
The terminals are designated by _____ letters, while the non-terminals are designated by _____ letters.
Capital, bold
Small, capital (Page 87)
Capital, small
Small, bold

Question # 5 of 10 (Total Marks: 1) **Select correct option:**
The language generated by _____ is called Context Free Language (CFL).
FA
TG
CFG (Page 87)
TGT

Question # 6 of 10 (Total Marks: 1) **Select correct option:**
$\Sigma = \{a,b\}$ Productions $S \rightarrow XaaX$
$X \rightarrow aX$
$X \rightarrow bX$
$X \rightarrow \Lambda$
This grammar defines the language expressed by_____

(a+b)*aa(a+b)* (Page 89)
(a+b)*a(a+b)*a
(a+b)*aa(a+b)*aa
(a+b)*aba+b)*

Question # 7 of 10 (Total Marks: 1) **Select correct option:**
$S \rightarrow aXb|b$
$XaX \rightarrow aX|bX|\Lambda$
The given CFG generates the language in English _____

Beginning and ending in different letters (Page 91)
Beginning and ending in same letter
Having even-even language
None of given

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Question # 8 of 10 (Total Marks: 1) **Select correct option:**
The CFG is not said to be ambiguous if there exists atleast one word of its language that can be generated by the different production trees,

TRUE
FALSE (Page 95)

Question # 9 of 10 (Total Marks: 1) **Select correct option:**
The language generated by that CFG is regular if _____

No terminal → semi word
No terminal → word
Both a and b (Page 97)
None of given

Question # 10 of 10 (Total Marks: 1) **Select correct option:**
The production of the form no terminal → Λ is said to be null production.

TRUE (Page 99)
FALSE

Question # 1 of 10 (Total Marks: 1) **Select correct option:**
CNF is stands for

Context Normal Form
Complete Normal Form
Chomsky Normal Form (Page 102)
Compared Null Form

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
Proof(Kleene's Theorem Part II)
If a TG has more than one start states, then

Introduce the new start state (Page 26)
Eliminate the old start state
Replace the old start state with final state
Replace the old final state with new start state

Question # 3 of 10 (Total Marks: 1) **Select correct option:**
Which of the following regular expression represents same language?
a. (a+ab)*
b. (ba+a)*
c. a*(aa*b)*
d. (a*b*)* (a+b)*a(a+b)*b(a+b)*+ (a+b)*b(a+b)*a(a+b)*.

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{ x}*, { x}+, {a+b}*

Select correct option:
a and b (correct)
a and c
c and d

Question # 4 of 10 (Total Marks: 1) Select correct option:
Let FA3 be an FA corresponding to FA1+FA2, then the initial state of FA3 must correspond to the initial state of

FA1 only
FA2 only
FA1 or FA2 (Page 32)
FA1 and FA2

Question # 5 of 10 (Total Marks: 1) Select correct option:
Which of the following statement is NOT true about TG?

There exists exactly one path for certain string (Page 19)
There may exist more than one paths for certain string
There may exist no path for certain string
There may be no final state

Question # 6 of 10 (Total Marks: 1) Select correct option:
Kleene's theorem states

All representations of a regular language are equivalent.
All representations of a context free language are equivalent.
All representations of a recursive language are equivalent
Finite Automata are less powerful than Pushdown Automata. (Page 105)

Question # 7 of 10 (Total Marks: 1) Select correct option:
A language accepted by an FA is also accepted by

TG only
GTG only
RE only
All of the given (Page 25)

انسان کے لئے بری صحبت سے بڑھ کر بری کوئی چیز نہیں

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FINALTERM EXAMINATION
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What is the concept of the Union of FA's ?
Answer:- (Page 32)
FA3 be an FA corresponding to r1+ r2, and then the initial state of FA3 must correspond to the initial state of FA1 and the initial state of FA2.

What does mean the LANGUAGE IS CLOSED?
Answer:- (Page 90)
Closed w.r.t. concatenation i.e.the language expressed by RE of type r*.

Stack consistence means that in the PDA?
Answer:- (Page 123)
when a row pops a character it should be there at the top of the STACK

-Where Null string is use the most?
Answer:-
The choice of null string depends on the requirements of the language. In some case we need to have null string to be accepted by the FA.

PUSHDOWN AUTOMATON (PDA)?
Answer:- (Page 119)
PUSHDOWN STACK or PUSHDOWN STORE
PUSHDOWN STACK is a place where the input letters can be placed until these letters are referred again. It can store as many letters as one can in a long column.
Initially the STACK is supposed to be empty i.e. each of its storage location contains a blank.

دنیا میں سب سے مشکل کام اپنی اصلاح اور سب سے آسان کام دوسروں پر نکتہ چینی کرنا ہے

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Prefixes of a language in another language?

Answer:- (Page 78)

Prefixes of a language in another language

If two languages R and Q are given, then the language the prefixes of Q in R denoted by Pref(Q in R) is the set of strings of letters that, when concatenated to the front of some word in Q to produce some word in R i.e. Pref(Q in R) = the set of all strings p such that there exists words q in Q and w in R such that pq = w. Following are the examples in this regard

Example

Let Q = {aa,abaaabb,bbaaaaa,bbbbbbbbbb} and R = {b,bbbb,bbbaaa,bbbaaaaa}

It can be observed that aa and bbaaaaa occur at the ending parts of some words of R, hence these words help in defining the language pref(Q in R). Thus pref(Q in R) = {b,bbba,bbbaaa}

Conversion form of PDA?

Answer:- (Page 119)

Conversion form of PDA

A PDA is in conversion form if it fulfills the following conditions:

There is only one ACCEPT state.

There are no REJECT states.

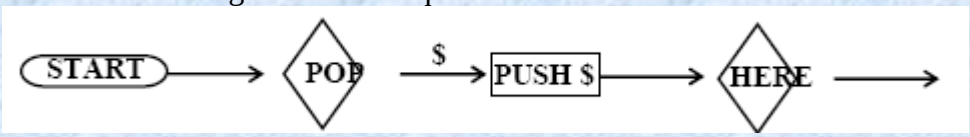
Every READ or HERE is followed immediately by a POP i.e. every edge leading out of any READ or HERE state goes directly into a POP state.

No two POPs exist in a row on the same path without a READ or HERE between them whether or not there are any intervening PUSH states (i.e. the POP states must be separated by READs or HEREs).

All branching, deterministic or nondeterministic occurs at READ or HERE states, none at POP states and every edge has only one label.

Even before we get to START, a "bottom of STACK" symbol $ is placed on the STACK. If this symbol is ever popped in the processing it must be replaced immediately. The STACK is never popped beneath this symbol. Right before entering ACCEPT this symbol is popped out and left.

The PDA must begin with the sequence



The entire input string must be read before the machine can accept the word.

Is automata is a programming subject or theoretical ??? marks 3

Answer:-

In theoretical computer science, automata theory is the study of mathematical objects called abstract machines or automata and the computational problems that can be solved using them. Automata mean "self-acting".

Automata theory is also closely related to formal language theory. An automaton is a finite representation of a formal language that may be an infinite set. Automata are often classified by the class of formal languages they are able to recognize.

بری صحبت سے تنہائی بہتر ہے اور تنہائی سے نیک صحبت بہتر ہے

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Parsing Techniques (5 number)

Answer:- (Page 136)

Recall the CFG for arithmetic expression

S→S+S|S*S|number

It was observed that the word 3+4*5 created ambiguity by considering its value either 23 or 35. To remove this ambiguity, the CFG was modified to S→(S+S)|(S*S)|number

There arises a question that whether a new CFG can be defined without having parentheses with operator hierarchy (i.e. * before +)? The answer is yes. Following is the required PLUSTIMES grammar S→E, E→T+E|T, T→F*T|F, F→(E)|i

Where i stands for any identifier i.e. number or of storage location name (variable). Following is the derivation of i+i*i

S ⇒E

⇒T+E

⇒F+E

⇒i+E

⇒i+T

⇒i+F*T

⇒i+i*T

⇒i+i*F

⇒i+i*i

-What are live and dead productions. (5 number)

Answer:- (Page 127)

Live production: A production of the form nonterminal → string of two nonterminals is called a live production.

Dead production: A production of the form nonterminal → terminal is called a dead production.

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1: How can we define languages elaborate any five ways.

Answer:- (Page 4)

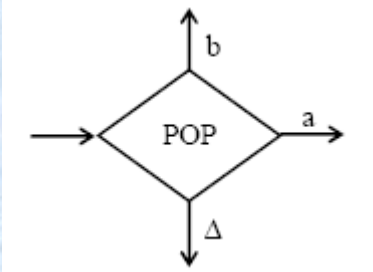
Defining Languages

The languages can be defined in different ways , such as Descriptive definition, Recursive definition, using Regular Expressions (RE) and using Finite Automaton (FA) etc.



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2: Describe the POP operation and draw symbol for POP state in context of Push down stack.
Answer:- (Page 107)
POP :
POP is an operation that takes out a letter from the top of the STACK. The rest of the letters are moved one location up. POP state is expressed as



3: Write two difference and two similarities between DFA and NFA.
Answer:- Click here for detail
Difference
1-In FA Finite number of states, having one initial and some (maybe none) final states. While in NFA Finite many states with one initial and some final state. 2-In FA for each state and for each input letter there is a transition showing how to move from one state to another while in NFA there may be more than one transition for certain letters and there may not be any transition for certain letters. 3-In FA □ is valid while in NFA □ is not valid.

Common
Every Language that can be recognized by a DFA can also be recognized by a NFA. The reverse is True.
Both DFA and NFA can only have one start state. But they can have multiple Final states.
Finite set of input letters

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Spring 2012
CS402- Theory of Automata

Concept of unit production in CFG? [3 marks]
Answer:- (Page 100)
The productions of the form nonterminal → one nonterminal, is called the unit production.
Unit production is removed in CFG

دنیا کی سب سے بڑی فتح نفس پر قابو رکھنا ہے

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While converting mealy to Moore num of states remain same or not? justify [5]
Answer:- (Page 61)
Theorem
Statement
For every Mealy machine there is a Moore machine that is equivalent to it (ignoring the extra character printed the Moore machine).

. Proof
. Let M be a Mealy machine. At each state there are two possibilities for incoming transitions
. The incoming transitions have the same output character.
. The incoming transitions have different output characters.
. If all the transitions have same output characters, then shift that character to the corresponding state.
.
. If all the transitions have different output characters, then the state will be converted to as many states as the number of different output characters for these transitions, which shows that if this happens at state q then q will be converted to qi^1 and qi2 i.e. if at qi there are the transitions with two output characters then qi1 for one character and q2 for other character.
.
. Shift the output characters of the transitions to the corresponding new states qi and qi. Moreover, these new states q1 and q2 should behave like q as well. Continuing the process, the machine thus obtained, will be a Moore machine equivalent to Mealy machine M.
.

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Consider the language L which is EVEN-EVEN, defined over Σ = {a,b}. In how many classes does L may partition Σ*. Explain briefly.(MArks 3)
Answer:- (Page 77)
Consider the language L which is EVEN'EVEN, defined over Σ = {a,b}. It can be observed that L partitions Σ* into the following four classes
C1= set of all strings with even number of a's and odd number of b's.
C2= set of all strings with odd number of a's and odd number of b's.
C3= set of all strings with odd number of a's and even number of b's.
C4= set of all strings with even number of a's and even number of b's.

Q.3: What does mean the LANGUAGE IS CLOSED?(MArks 3)
Answer:- Rep

ایماندار کو غصہ دیر سے آتا ہے اور جلدی دور ہو جاتا ہے

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Q7: If two FA have no final state how the intersection of those FA will have final state? (marks 2)
Answer:- (Page 83)
If Both the FAs have no final state, so these FAs accept nothing. This implies that their union will not also accept any string. Hence FA corresponding to the language (L1∩ L2c) ∪ (L1c∩ L2) accepts nothing. Thus both the languages are equivalent.

Q:8 give RE for EVEN - EVEN language. (Marks 2)
Answer:- (Page 16)
Consider the EVEN) EVEN language, defined over Σ = {a, b}. As discussed earlier that EVEN)EVEN language can be expressed by the regular expression (aa+bb+(ab+ba)(aa+bb)*(ab+ba))* b

use of push and pop states
Answer:- (Page 107)
A PUSH operator adds a new letter at the top of STACK,
POP is an operation that takes out a letter from the top of the STACK. The rest of the letters are moved one location up.

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Write point of kleen's theorem? 2marks
Answer:- (Page 25)
Kleene's Theorem
If a language can be expressed by
FA or
TG or
RE
Then it can also be expressed by other two as well.
It may be noted that the theorem is proved, proving the following three parts

Kleene's Theorem Part I
If a language can be accepted by an FA then it can be accepted by a TG as well.
Kleene's Theorem Part II
If a language can be accepted by a TG then it can be expressed by an RE as well.
Kleene's Theorem Part III
If a language can be expressed by a RE then it can be accepted by an FA as well.

زندگی میں کامیابی کا یہی راز ہے کہ پریشانیوں سے پریشان مت بنو

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What is meant by decidable problem? 2marks

Answer:- (Page 80)

. Decidable problem

. A problem that has decision procedure is called decidable problem e.g. the following problems

. The two regular expressions define the same language.

. The two FAs are equivalent.

Define strings. With example. 3marks

Answer:- (Page 3)

Concatenation of finite number of letters from the alphabet is called a string.

Write regular expression contain even words defined over sigma={a, b} 3marks

Answer:- (Page 9)

((a+b)(a+b))*

Find Pref (Q in R) for:

Q = {10, 11, 00, 010}

R = {01001, 10010, 0110, 10101, 01100, 001010} 3 marks

Answer:-

. Pref (Q in R) ={10,01,011,001}

Explain Semi word and word with example?

Answer:- (Page 97)

Semiword

A semiword is a string of terminals (may be none) concatenated with exactly one nonterminal on the right i.e. a semiword, in general, is of the following form

(terminal)(terminal)⋯ (terminal)(nonterminal)

S→aaaaS

word

A word is a string of terminals. Λ is also a word.

S→aaaa

a) Write RE defined over Σ ={a, b} strings not ending on aa, ab. 5marks

Answer:-

(a+b)*(ba+bb)

b) Write RE defined over Σ = {a, b} strings must end on aa,ab

Answer:-

(a+b)*(aa+ab)

جھوٹ انسان اور ایمان دونوں کا دشمن ہے

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What does mean the LANGUAGE IS CLOSED? 3marks
Answer:- Rep

Explain CFG and even-even language. 5marks
Answer:- (Page 87-90)
CFG
CFG is a collection of the followings
An alphabet Σ of letters called terminals from which the strings are formed, that will be the words of the language.
A set of symbols called non-terminals, one of which is S, stands for "start here".
A finite set of productions of the form
Non-terminal → finite string of terminals and /or non-terminals.
Following grammar generates EVEN-EVEN language.
Σ = {a,b}
productions:
S → SS
S → XS
S → Λ
S → YSY
X → aa
X → bb
Y → ab
Y → ba

OR

Consider the following CFG
S → aaS|bbS|abX|baX|Λ
X → aaX|bbX|abS|baS,
The corresponding language is EVEN-EVEN.

Differentiate b/w FA, TG and GTG?
Answer:-
FA
A Finite automaton (FA), is a collection of the followings
Finite number of states, having one initial and some (maybe none) final states.
Finite set of input letters (Σ) from which input strings are formed.
Finite set of transitions i.e. for each state and for each input letter there is a transition showing how to move from one state to another.

عقل مند کہتا ہے میں کچھ نہیں جانتا جبکہ بے وقوف کہتا ہے کہ میں سب کچھ جانتا ہوں

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TG
A Transition graph (TG), is a collection of the followings
Finite number of states, at least one of which is start state and some (maybe none) final states.
Finite set of input letters (Σ) from which input strings are formed.
Finite set of transitions that show how to go from one state to another based on reading specified substrings of input letters, possibly even the null string (Λ).

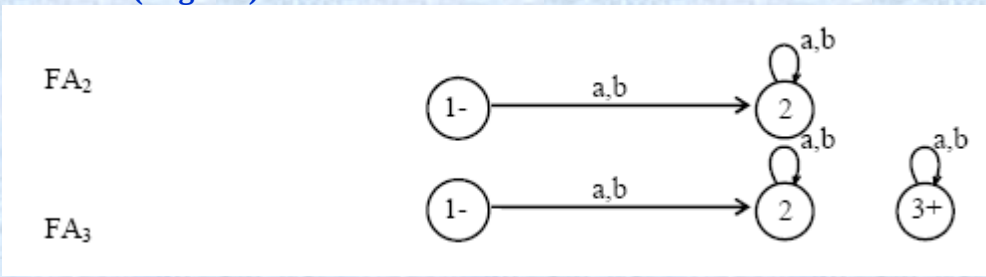
GTG
A generalized transition graph (GTG) is a collection of three things
Finite number of states, at least one of which is start state and some (maybe none) final states.
Finite set of input letters (Σ) from which input strings are formed.
Directed edges connecting some pair of states labeled with regular expression.
It may be noted that in GTG, the labels of transition edges are corresponding regular expressions

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1. Can we accept the string going from final to initial state?
Answer:- (Page 81)
NO…
To examine whether a certain FA accepts any words, it is required to seek the paths from initial to final state.

2. State uses of PDA in computing?
Answer:-
It provides theoretical basis for how computing machine can perform computation. It is uses for constructing compiler parser design.

3. if there is no initial state in FA then that FA does not accept any language Discuss two situations when an FA does not accept any string not even the null string?
Answer:- (Page 15)



In FA2, there is no final state and in FA3, there is a final state but FA3 is disconnected as the states 2 and 3 are disconnected.

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4. Describe pop operation?and draw symbol for pop state in contex of push down stack?
Answer:- Rep

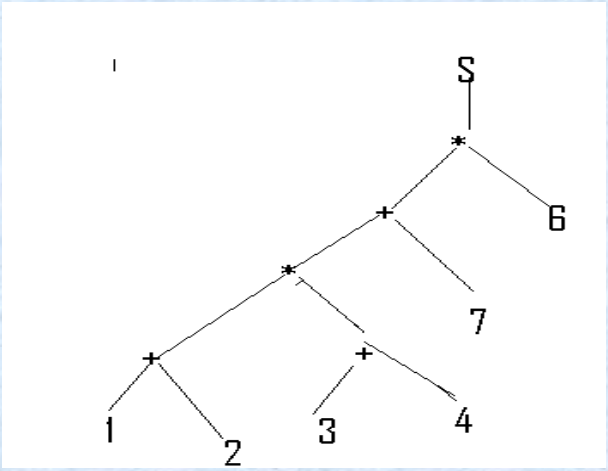
5. Describe unit production in detail?
Answer:- Rep

6. Push and pop operation?
Answer:- Rep

7. Prove kleens theorem part two?
Answer:- (Page 25)
Kleene's Theorem Part II
If a language can be accepted by a TG then it can be expressed by an RE as well.

8. Difference between push down stack and push down store?
Answer:- (Page 107)
There is no difference between PUSHDOWN STACK or PUSHDOWN STORE
PUSHDOWN STACK is a place where the input letters can be placed until these letters are referred again. It can store as many letters as one can in a long column.
Initially the STACK is supposed to be empty i.e. each of its storage location contains a blank.

9. calculate this tree



Answer:- (Page 95)
It can be written as *+*+1 2+3 4 7 6)
The above arithmetic expression in (o'o'o) form can be calculated as
++1 2+3 4 7 6 = *+*3+3 4 7 6
= *+*3 7 7 6 = *+21 7 6 = *28 6 = 168

خود کو تمھیں سے بڑھ کر کوئی اچھا مشورہ نہیں دے سکتا

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10. Five conditions of PDA conversion?
Answer:- (Page 119)
A PDA is in conversion form if it fulfills the following conditions:
There is only one ACCEPT state.
There are no REJECT states.
Every READ or HERE is followed immediately by a POP i.e. every edge leading out of any READ or HERE state goes directly into a POP state.
No two POPs exist in a row on the same path without a READ or HERE between them whether or not there are any intervening PUSH states (i.e. the POP states must be separated by READs or HEREs).
All branching, deterministic or nondeterministic occurs at READ or HERE states, none at POP states and every edge has only one label.

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Q1: what is POP stake and draw it diagram.
Answer:- Rep

Q6 : Consider the following CFG
S aXb|bXa
XaX|bX|
What does it mean?
Answer:- (Page 91)
The above CFG generates the language of strings, defined over ={a,b}, beginning and ending in different letters.

Q7: Explain Distinguishable strings and Indistinguishable strings?
Answer:- (Page 53)

Distinguishable strings and Indistinguishable strings

Two strings x and y, belonging to Σ^*, are said to be **distinguishable** w.r.t a language $L \subseteq \Sigma^*$ if there exists a string z belonging to Σ^* s.t. $xz \in L$ but $yz \notin L$ or $xz \notin L$ but $yz \in L$.

Two strings x and y, belonging to Σ^*, are said to be **indistinguishable** with respect to a language $L \subseteq \Sigma^*$ if for every string z belonging to Σ^*, either both xz or $yz \in L$ or both don't belong to L.

جو شخص ناکامیوں سے ڈر کر بھاگتا ہے کامیابی اُس سے ڈر کر بھاگتی ہے

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1. What is Row Language?
Answer:- (Page 123)
Row language whose alphabet is Σ = {Row1, Row2, ⋯, Row7} i.e. the alphabet consists of the letters which are the names of the rows in the summary table.

2. What does FA stands for?
Answer:- (Page 11)
Finite Automaton

3. What are live and dead productions.
Answer:- (Page 123)
Live production: A production of the form nonterminal → string of two nonterminals is called a live production.
Dead production: A production of the form nonterminal → terminal is called a dead production.

4. What do you mean by wanted and unwanted branches?
Answer:- (Page 137)
wanted branches (the branches that lead to the required word)
unwanted branches (the branches that don't lead to the required word)

5.Given the CFG, had to write the language (EQUAL)
Answer:- (Page)
Σ = {a,b}
productions:
S → aB
S → bA
A → a
A → aS
A → bAA
B → b
B → bS
B → aBB
This grammar generates the language EQUAL(The language of strings, with number of a' s equal to number of b' s).

جو لوگوں کے سامنے فخر کرتا ہے وہ لوگوں کی نظروں سے گر جاتا ہے

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6. Construct corresponding CFG for the given language
(1) All words of even length but not multiple of 3.

Answer(page 90)
Example
$\sum = \{a,b\}$
productions:
$S \rightarrow SS$
$S \rightarrow XS$
$S \rightarrow \Lambda$
$S \rightarrow YSY$
$X \rightarrow aa$
$X \rightarrow bb$
$Y \rightarrow ab$
$Y \rightarrow ba$
This grammar generates EVEN'EVEN language.

(2) Palindrome (both even and odd palindrome). (5 mark)
Answer(page 91)
Example
The CFG for odd length of Palindrom is given as:

$S \rightarrow aSa \mid bSb \mid a \mid b$
The CFG for even length of Palindrom is given as:
$S \rightarrow aSa \mid bSb \mid aa \mid bb \mid \wedge$

7.Who invented Turing m/c
Answer:- (Page 140)
Alan Mathison Turing developed the machines called Turing machines.

8.Equivalent /non-equivalent langages
Answer:- (Page 80)

Determining whether the two languages are equivalent or not ?

If L_1 and L_2 are two regular languages, then they can be expressed by FAs. As shown earlier, L_1^c , L_2^c , $L_1 \cup L_2$, $L_1 \cap L_2$ are regular languages and the methods have already been developed to build their corresponding FAs. It can be observed that $(L_1 \cap L_2^c) \cup (L_1^c \cap L_2)$ is regular language that accepts the words which are in L_1 but not in L_2 or else in L_2 but not in L_1 . The corresponding FA cannot accept any word which is in both L_1 and L_2 i.e. if L_1 and L_2 are equivalent, then this FA accepts not even null string. Following are the methods that determine whether a given FA accepts any words

عقل مند اپنے عیب خود دیکھتا ہے اور بیوقوفوں کے عیب دنیا دیکھتی ہے

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9. What are formal languages?
Answer:- (Page 3)
Formal Languages are Syntactic languages.

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What is Transition?
Answer:- (Page 11)
Transition showing how to move from one state to another.

Alternative form of this production
Σ = {a,b}
productions:
S→aS| bS |a|b| Λ
Answer:- (Page 88)
This grammar also defines the language expressed by (a+b)*.

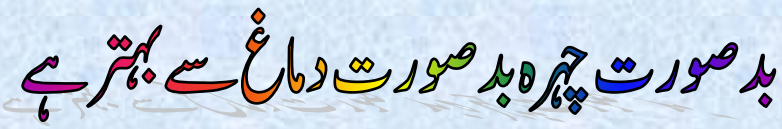
What is input Tap?
Answer:- (Page 105)
The part of an FA, where the input string is placed before it is run, is called the input TAPE.
The input TAPE is supposed to accommodate all possible strings. The input TAPE is partitioned with cells, so that each letter of the input string can be placed in each cell.

What is live production?
Answer:- Rep

Differentiate between Distinguishable and Indistinguishable strings.
Answer:- Rep

What is wanted and unwanted branches
Answer:- Rep

What is unit of production?
Answer:- Rep



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Define two rules ……(Row Language.).

Answer:- (Page 125)

Following are the three rules of defining all possible productions of CFG of the row language
The trip starting from START state and ending in ACCEPT state with the NET style
Net(START, ACCEPT, $) gives the production of the form S → Net(START, ACCEPT, $)

(L1UL2^C) intersection (L1^{C}U L2) the language or accept any thing or not…

Answer:- (Page 80)

(L1 ∩ L2c) ∪ (L1c ∩ L2) is regular language that accepts the words which are in L1 but not in L2 or else in L2 but not in L1 .

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ambiguous grammer,

Answer:- (Page 95)

The CFG is said to be ambiguous if there exists atleast one word of it's language that can be generated by the different production trees.

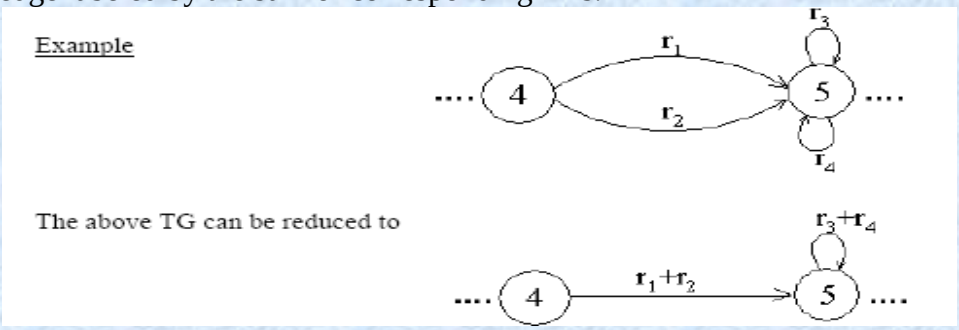
Difference between semi-word and word with example?

Answer:- Rep

If there are more than one edges between two states then we can replace them by one edge in a TG. Explain it with examples?

Answer:- (Page 27)

If a state has two (more than one) incoming transition edges labeled by the corresponding REs, from the same state (including the possibility of loops at a state), then replace all these transition edges with a single transition edge labeled by the sum of corresponding REs.



عقل مند آدمی اس وقت تک نہیں بولتا جب تک خاموشی نہیں ہو جاتی

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How can you say that two FAs are equivalent?
Answer:- (Page 15)
It is to be noted that two FAs are said to be equivalent, if they accept the same language

What is a production?
Answer: - (Page 87)
Productions: The grammatical rules are often called productions.

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If L1,L2 and L3 be any three finite languages over Sigma = {a,b}, then how will be
$(L1 \cap L2) \cup (L2 \cap L3) \neq \emptyset$
Answer: -
$(L1 \cap L2) \cup (L2 \cap L3) \neq \emptyset$ is not always true. It depends on all the languages. If L1 has some common words with L2 or L2 has some common words with L3, then this will not be equal to empty. However if L1 does not have common words with L2 or L2 does not have common words with L3 then this statement will be wrong.

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two different method for converting the NFA to FA 5marks
Answer: - (Page 43)
Method 1: Since an NFA can be considered to be a TG as well, so a RE corresponding to the given NFA can be determined (using Kleene's theorem). Again using the methods discussed in the proof of Kleene's theorem, an FA can be built corresponding to that RE. Hence for a given NFA, an FA can be built equivalent to the NFA

Method 2: Since in an NFA, there may be more than one transition for a certain letter and there may not be any transition for certain letter, so starting from the initial state corresponding to the initial state of given NFA, the transition diagram of the corresponding FA, can be built introducing an empty state for a letter having no transition at certain state and a state corresponding to the combination of states, for a letter having more than one transitions

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Explain the decidability and examples. 5marks
Answer: - (Page 80)
Decidability
Effectively solvable problem
A problem is said to be effectively solvable if there exists an algorithm that provides the solution in finite number of steps e.g. finding solution for quadratic equation is effectively solvable problem, because the quadratic formula provides an algorithm that determines the solution in a finite number of arithmetic operations, (four multiplications, two subtractions, one square root and one division).

similarity and dif b/w DFA and NFA 3 marks
Answer: - Rep

RE for Even-even 2 marks
Answer: - (Page 10)
(aa+bb+(ab+ba)(aa+bb)*(ab+ba))*

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Question No: 27 (Marks: 2)
Differentiate between Regular and Non regular languages?
Answer: - (Page 10 & 71)
The language generated by any regular expression is called a regular language.
The language that cannot be expressed by any regular expression is called a Nonregular language.

Question No: 28 (Marks: 2)
What is meant by a "Transition" in FA?
Answer: - Rep

Question No: 29 (Marks: 2)
What are the halt states of PDAs?
Answer: - (Page 105)
ACCEPT and REJECT states are called the halt states.
Reject state is like dead non final state.
Accept state is like final state.

خوبصورتی علم وادب سے ہوتی ہے لباس و حسن سے نہیں

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Question No: 30 (Marks: 2)
Identify the null productions and nullable productions from the following CFG:
S -> ABAB
A -> a | /\
B-> b | /\
Answer: - (Page 102)
Here S → ABAB is nullable production and A → Λ, B → Λ are null productions.

Question No: 31 (Marks: 3)
Describe the POP operation and draw symbol for POP state in context of Push down stack.
Answer: - Rep

Question No: 32 (Marks: 3)
What does the the following tape of turing machine show?

FROM Where	TO Where	READ What	POP What	PUSH What	ROW Number
$READ_9$	$READ_3$	b	b	abb	11

Answer: - (Page 124)
Row11 is not Net style sentence because the trip from READ9 to READ3 does not pop one letter form the STACK, while it adds two letters to the STACK. However Row11 can be concatenated with some other Net style sentences e.g. Row11Net(READ3, READ7, a)Net(READ7, READ1, b)Net(READ1, READ8, b) Which gives the nonterminal.
Net(READ9, READ8, b), now the whole process can be written as
Net(READ9, READ8, b) → Row11Net(READ3, READ7,a) Net(READ7, READ1, b)Net(READ1, READ8, b)
Which will be a production in the CFG of the corresponding row language.

Question No: 33 (Marks: 3)
Find Pref (Q in R) for:
Q = {10, 11, 00, 010}
R = {01001, 10010, 0110, 10101, 01100, 001010}
Answer: - Rep

Question No: 35 (Marks: 5)
Consider the language L which is EVEN-EVEN, defined over **Σ** = {a,b}. In how many classes does L may partition **Σ***. Explain briefly.
Answer: - Rep
Question No: 36 (Marks: 5)
What are the conditions (any five) that must be met to know that PDA is in conversion form?
Answer: - Rep

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Question No : 23 of 52 Marks: 1 (Budgeted Time 1 Min)

A regular language _____ .

Answer (Please select your correct option)

- Must be finite
- Must be infinite
- Can be finite or infinite
- Complex Language

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Question No : 24 of 52 Marks: 1 (Budgeted Time 1 Min)

If a language can be expressed by a regular expression, then its complement is _____.

Answer (Please select your correct option)

- Regular
- Non Regular
- Finite
- Infinite

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Question No : 25 of 52 Marks: 1 (Budgeted Time 1 Min)

For every Context Free Grammar (CFG), we can make the corresponding _____.

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Answer (Please select your correct option)

- FA
- TG
- PDA
- Regular Grammar

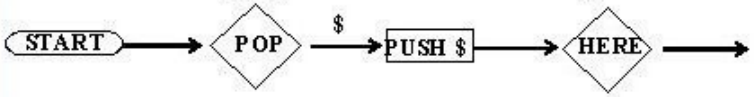


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Question No : 26 of 52 Marks: 1 (Budgeted Time 1 Min)

Look at the following diagram and select the correct option:



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Answer (Please select your correct option)

- The PDA must not begin with the sequence
- The PDA may begin with the sequence
- The PDA must begin with the sequence
- The PDA may not begin with the sequence

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Question No : 27 of 52 **Marks: 1 (Budgeted Time 1 Min)**

Consider the following Context Free Grammar (CFG) and select the correct choice

S→AB

A →BSB | a | b

B→CC

C→SS | b | bb

Answer (Please select your correct option)

- abb is a word in the corresponding CFL.
- abb is not the word of corresponding CFL.
- Any word can be accepted from the corresponding CFL.
- b is a word in the corresponding CFL.

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Question No : 28 of 52 **Marks: 1 (Budgeted Time 1 Min)**

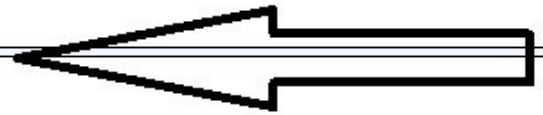
Which of the following statement(s) is/are true or false?

1) The turing machine is similar to a finite automaton but with an unlimited and unrestricted memory.
2) A Turing machine is a much more accurate model of a general purpose computer.

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Answer (Please select your correct option)

- Statement 1 is true
- Statement 2 is true
- Both statements (1 & 2) are false
- Statement 2 is false



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Question No : 29 of 52 Marks: 1 (Budgeted Time 1 Min)

Language of strings having even number of a's is considered to be:

Answer (Please select your correct option)

- Regular
- Irrelgular
- Irregular and infinite
- Irregular and finite

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Question No : 30 of 52 Marks: 1 (Budgeted Time 1 Min)

If we have two transiton graphs then their union will be expressed by:

Answer (Please select your correct option)

- taking a common start state and joining them by two null transitions
- just connecting both start states by null transitions
- connecting final state of first TG to the initial state of second TG
- connecting the final state of first TG to the final state of second TG



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Question No : 31 of 52 Marks: 1 (Budgeted Time 1 Min)

A language of strings of prime length is considered to be:

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Answer (Please select your correct option)

- regular but infinite
- regular
- irregular
- regular but finite



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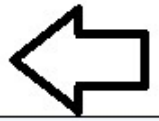
Question No : 32 of 52 Marks: 1 (Budgeted Time 1 Min)

_____ and _____ are removed in order to make a CFG in Chomsky Normal Form (CNF).

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Answer (Please select your correct option)

- Null, nullable productions
- Nullable, unit productions
- Null, unit productions
- Strings of length 0, null



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Question No : 33 of 52 Marks: 1 (Budgeted Time 1 Min)

The languages are supposed to be _____ in case of testing pumping lemma.

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Answer (Please select your correct option)

- context free
- irregular
- both regular and irregular
- regular

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Question No : 34 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following refers to an effectively solvable problem having answer in "Yes" or "No"?

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Answer (Please select your correct option)

- Decision procedure
- Logical problem
- Analytical problem
- Binary procedure

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Question No : 35 of 52 Marks: 1 (Budgeted Time 1 Min)

Consider the following Context Free Grammar (CFG):

S ---> SX|XY
X ---> ZZ
Y ---> 0
Z ---> 1

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Answer (Please select your correct option)

- 110
- 11011
- 1101111
- 11101

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Question No : 36 of 52 **Marks: 1 (Budgeted Time 1 Min)**

Consider the following Context Free Grammar (CFG):

S → SX|XY
X → ZZ
Y → 1
Z → 0

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Answer (Please select your correct option)

- 001
- 00010
- 0010000
- 00100



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Question No : 37 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following is a regular Context Free Grammar:

Answer (Please select your correct option)

- S→abS | baS | ^
- S→aSb | baS |^
- S→abS | bSa | ^
- S→aSb | Sa | ^

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Question No : 38 of 52 Marks: 1 (Budgeted Time 1 Min)

Concatenation of r1 and r2 will be shown as:

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Answer (Please select your correct option)

- r1+r2
- r2+r1
- r2r1
- r1r2



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Question No : 39 of 52 Marks: 1 (Budgeted Time 1 Min)

A nonterminal is said to be self-embedded, if in a given derivation of a word, it ever occurs as a tree _____ of itself.

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Answer (Please select your correct option)

- ascendant
- descendant
- top
- bottom

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Question No : 40 of 52 Marks: 1 (Budgeted Time 1 Min)

_____ is always Deterministic.

Answer (Please select your correct option)

- Finite Automaton
- Transition Graph
- Generalize Transition Graph
- Non-deterministic finite automaton

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Question No : 41 of 52 Marks: 2 (Budgeted Time 4 Min)

Write alternative form of this production.

$S \rightarrow aS,\ S \rightarrow bS,\ S \rightarrow \Lambda$

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Answer (Please click here to Add Answer)

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Question No : 42 of 52 Marks: 2 (Budgeted Time 4 Min)

What are the uses of Push Down Automata (PDA) in computing?

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Answer (Please click here to Add Answer)



The PDA is used in theories about what can be computed by machines. PDA described with a formal grammar, it can be used in parser design. The deterministic pushdown automaton can handle all deterministic context-free languages while the nondeterministic version can handle all context-free languages.

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Question No : 43 of 52 Marks: 2 (Budgeted Time 4 Min)

What is meant by Row language?

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Answer (Please click here to Add Answer)

row language whose alphabet is $\sum = \{Row_1, Row_2, \ldots, Row_7\}$ *i.e.* the alphabet consists of the letters which are the names of the rows in the summary table.

that the Row language is the language whose alphabet $\sum = \{Row_1, Row_2, \ldots, Row_7\}$,

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Question No : 44 of 52 Marks: 2 (Budgeted Time 4 Min)

Write down regular expression for a language L of strings defined over $\Sigma = \{a, b\}$ that neither ends in "a" nor with "b".

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Answer (Please click here to Add Answer)



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Question No : 45 of 52 Marks: 3 (Budgeted Time 6 Min)

What are the steps of Recursive Definition of Languages?

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Answer (Plea

Normal

Recursive definition of languages

The following three steps are used in recursive definition

Some basic words are specified in the language.

Rules for constructing more words are defined in the language.

No strings except those constructed in above, are allowed to be in the language.

Examples

Defining language of INTEGER

Step 1: 1 is in **INTEGER**.

Step 2: If x is in **INTEGER** then x+1 and x-1 are also in **INTEGER**.

Step 3: No strings except those constructed in above, are allowed to be in **INTEGER**.

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Question No : 46 of 52 **Marks: 3 (Budgeted Time 6 Min)**

What does the following arbitrary summary table show?

FROM Where	TO Where	READ What	POP What	PUSH What	ROW Number
$READ_9$	$READ_3$	b	b	abb	11

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Answer (Please click here to Add Answer)

Consider the following row from an arbitrary summary table

FROM Where	TO Where	READ What	POP What	PUSH What	ROW Number
$READ_9$	$READ_3$	b	b	abb	11

which shows that Row_{11} is not Net style sentence because the trip from $READ_9$ to $READ_3$ does not pop one letter form the STACK, while it adds two letters to the STACK. However Row_{11} can be concatenated with some other Net style sentences *e.g.* $Row_{11}Net(READ_3, READ_7, a)Net(READ_7, READ_1, b)Net(READ_1, READ_8, b)$
Which gives the nonterminal
$Net(READ_9, READ_8, b)$, now the whole process can be written as
$Net(READ_9, READ_8, b) \rightarrow Row_{11}Net(READ_3, READ_7,a)\ Net(READ_7, READ_1, b)Net(READ_1, READ_8, b)$
Which will be a production in the CFG of the corresponding **row language**

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Question No : 47 of 52 **Marks: 3 (Budgeted Time 6 Min)**

Write down Context Free Grammar (CFG) for the language of strings expressed by the following regular expression:

$(a + b)^*(a + b)^+$

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Answer (Please click here to Add Answer)

Normal | Arial | 12 | B I U | 100%

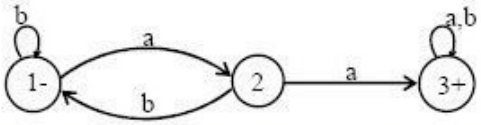
S->a|b|Xa|Xb, X->aX|bX|^

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Question No : 48 of 52 **Marks: 3 (Budgeted Time 6 Min)**

Let us consider the following Finite Automaton (FA):



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Answer (Please click here to Add Answer)

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Question No : 49 of 52 Marks: 5 (Budgeted Time 10 Min)

Write the CFG for EVEN-EVEN language?

Answer (Please click here to Add Answ

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Example

$\Sigma = \{a,b\}$

productions:

$S \rightarrow SS$

$S \rightarrow XS$

$S \rightarrow \Lambda$

$S \rightarrow YSY$

$X \rightarrow aa$

$X \rightarrow bb$

$Y \rightarrow ab$

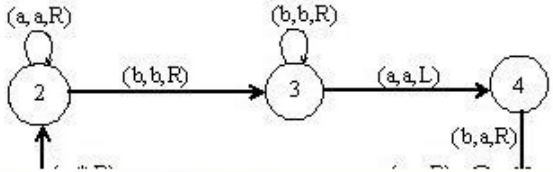
$Y \rightarrow ba$

This grammar generates EVEN-EVEN language.

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Question No : 50 of 52 Marks: 5 (Budgeted Time 10 Min)

Consider the following TM



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Answer (Please click here to Add Answer)

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Question No : 51 of 52 Marks: 5 (Budgeted Time 10 Min)

Using suitable examples, differentiate between Kleene star closure and plus operation?

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Answer (Pleas

Normal

Kleene Star Closure

Given Σ, then the Kleene Star Closure of the alphabet Σ, denoted by Σ^*, is the collection of all strings defined over Σ, including Λ.

It is to be noted that Kleene Star Closure can be defined over any set of strings.

Examples

If Σ = {x}
Then Σ^* = {Λ, x, xx, xxx, xxxx, ….}
If Σ = {0,1}
Then Σ^* = {Λ, 0, 1, 00, 01, 10, 11, ….}
If Σ = {aaB, c}
Then Σ^* = {Λ, aaB, c, aaBaaB, aaBc, caaB, cc, ….}

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Note

Languages generated by Kleene Star Closure of set of strings, are infinite languages. (By infinite language, it is supposed that the language contains infinite many words, each of finite length).

PLUS Operation ($^+$)

Plus Operation is same as Kleene Star Closure except that it does not generate Λ (null string), automatically.

Example

If Σ = {0,1}
Then Σ^+ = {0, 1, 00, 01, 10, 11, ….}
If Σ = {aab, c}
Then Σ^+ = {aab, c, aabaab, aabc, caab, cc, ….}

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Question No : 52 of 52 **Marks: 5 (Budgeted Time 10 Min)**

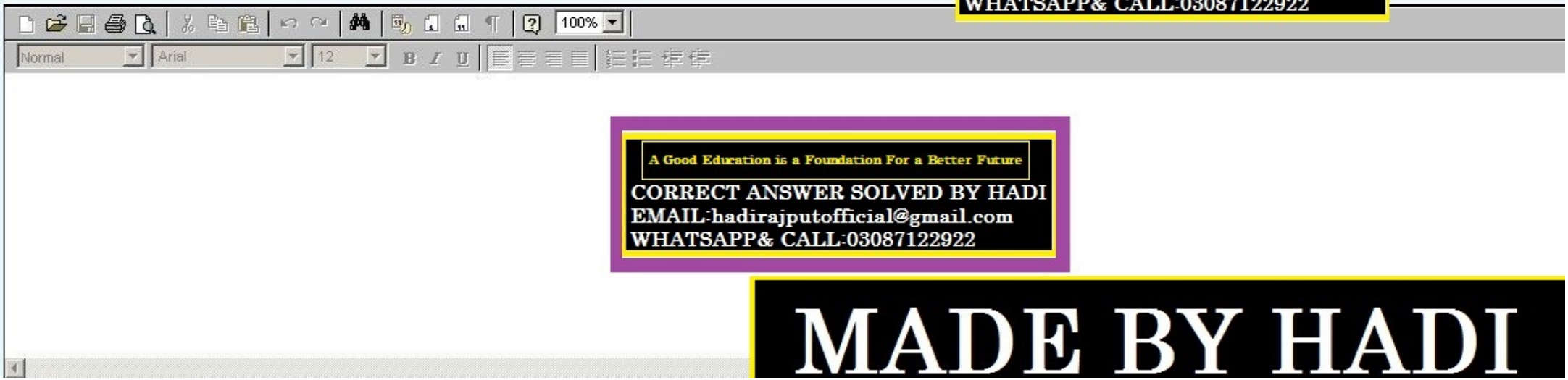
a. Construct Context Free Grammar (CFG) for the language defined by the regular expression:

(ab + ba)*(a + b)*

b. Remove null productions from the CFG constructed in part i.

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Answer (Please click here to Add Answer)



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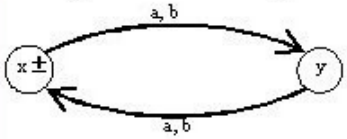
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Question No : 2 of 52 Marks: 1 (Budgeted Time 1 Min)

Below given FA can be represented by



Answer (Please select your correct option)

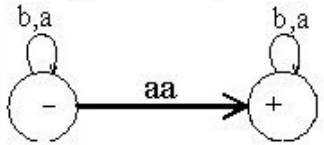
- ((a+ b) (a + b))*
- (a + b)(a + b)*
- (a + b)(a + b)
- (a + b)*(a + b)*

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Question No : 3 of 52 Marks: 1 (Budgeted Time 1 Min)

Below given TG has _____ RE.



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Answer (Please select your correct option)

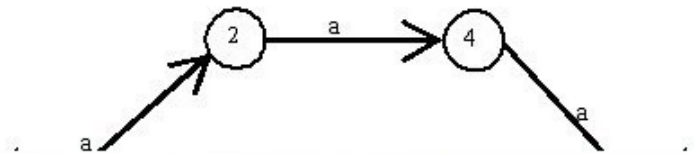
- (b+a) (aa) (b+a)*
- (a+b) (aa) (a+b)*
- (a+b)* (aa) (a+b)*
- (a+b)* (aa) (a+b)

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Question No : 4 of 52 Marks: 1 (Budgeted Time 1 Min)

Below given TG's are _____.



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Answer (Please select your correct option)

- non-symmetric
- Equivalent
- Non-equivalent
- TG's are not valid

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Question No : 5 of 52 Marks: 1 (Budgeted Time 1 Min)

"One GTG can generate _____ language".

Answer (Please select your correct option)

- more than one
- only one
- only two
- only three

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Question No : 6 of 52 Marks: 1 (Budgeted Time 1 Min)

Even-palindrome is a _____ language

Answer (Please select your correct option)

- non-regular
- regular
- regular but infinite
- regular but finite

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Question No : 7 of 52 Marks: 1 (Budgeted Time 1 Min)

If L1 and L2 are two regular languages, then _____ is/are also regular.

Answer (Please select your correct option)

- Both $L1 \cup L2$, $L1 \cap L2$
- $L1^c \cap L2$
- $L1 \cup L2$
- $L1 \cap L2$

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Question No : 8 of 52 Marks: 1 (Budgeted Time 1 Min)

If the FA has N states, then test the words of length less than N. If any one word is accepted by this FA, then it will accept ____ word.

Answer (Please select your correct option)

- All
- No
- One
- Two

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Question No : 9 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following pairs of regular expressions are equivalent?

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Answer (Please select your correct option)

- 1(001)* and (10)*10
- x(xx)* and (x)*x
- x^+ and x*
- x^+ and x*x^+





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Question No : 10 of 52 Marks: 1 (Budgeted Time 1 Min)

An alphabet of Σ is valid if

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Answer (Please select your correct option)

- No letter of Σ appears in middle of any other letter
- No letter of Σ appears at end of any other letter
- No letter of Σ appears at start of any other letter
- No letter of Σ appears at end or middle of any other letter



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Question No : 11 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following pairs of regular expressions are not equivalent?

Answer (Please select your correct option)

- (ab)* and a*b*
- x(xx)* and (xx)*x
- x^+ and x^*x^+
- x(x)* and (x)*x

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Question No : 12 of 52 Marks: 1 (Budgeted Time 1 Min)

There exist _____ derivations of a certain word in ambiguous grammar.

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Answer (Please select your correct option)

- more than one
- Exactly one
- exactly two
- no

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Question No : 13 of 52 Marks: 1 (Budgeted Time 1 Min)

Regular languages are closed under _____

Answer (Please select your correct option)

- Union and Concatenation
- Union and Division
- Union and Exponent
- Union and Factorial

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Question No : 14 of 52 Marks: 1 (Budgeted Time 1 Min)

Which one of the following statements is INCORRECT:

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Answer (Please select your correct option)

- A language consisting of all strings over ∑={a,b} having equal number of a's and b's is a regular language
- Every language that can be expressed by FA can also be expressed by RE
- None of these
- (a+b)*aa(a+b)* generates Regular language.

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Question No : 15 of 52 Marks: 1 (Budgeted Time 1 Min)

TM is more powerful than FSM because

not sure

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Answer (Please select your correct option)

- The tape movement is confined to one direction
- It has no finite state control
- It has the capability to remember arbitrary long sequences of input symbols
- The tape movement is confined to more than one directions



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Question No : 16 of 52 Marks: 1 (Budgeted Time 1 Min)

CYK algorithm was invented by John Cocke and later was published by ____

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Answer (Please select your correct option)

- Talik Khon and Daniel H
- Tandao Kasami and Daniel H
- Tandao Dagger and Daniel H
- Talik Khon

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Question No : 17 of 52 Marks: 1 (Budgeted Time 1 Min)

The process of finding the derivation of word generated by particular grammar is called_____

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Answer (Please select your correct option)

- Processing
- Parsing
- Programming
- Planing

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Question No : 18 of 52 Marks: 1 (Budgeted Time 1 Min)

There are different parsing techniques, including _____

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Answer (Please select your correct option)

- Top down parsing
- Bottom up parsing
- Parsing technique for particular grammar of arithmetic expression
- All of these

I THINK

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Question No : 19 of 52 **Marks: 1 (Budgeted Time 1 Min)**

Σ={a,Aa,Abb}, then string aAaAbbAa has length equal to_____.

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Answer (Please select your correct option)

- Three
- Four
- One
- Two



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Question No : 20 of 52 Marks: 1 (Budgeted Time 1 Min)

The language generated by CFG is called _____.

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Answer (Please select your correct option)

- Infinite
- Context Free Language (CFL)
- Regular
- Finite

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Question No : 21 of 52 Marks: 1 (Budgeted Time 1 Min)

In _____ there must be transition for all letters.

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Answer (Please select your correct option)

- NFA
- FA
- TG
- GTG

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Question No : 22 of 52 Marks: 1 (Budgeted Time 1 Min)



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Answer (Please select your correct option)

- r1* r2 r3*
- (r1r2r3)*
- r1*r2*r3*
- None of the given

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(Final Term Past Paper)

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Best of luck!

PAST PAPER

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Question No : 1 of 52 Marks: 1 (Budgeted Time 1 Min)

Which statement is true?

Answer (Please select your correct option)

- ● All words are strings 
- ○ All strings are words
- ○ Both are always same
- ○ All letter are string

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Question No : 2 of 52 Marks: 1 (Budgeted Time 1 Min)

If L1 and L2 are expressed by r1 and r2, respectively then the language expressed by (r1)(r2) will be _____

Answer (Please select your correct option)

- (●) Regular
- ( ) Ir-regular
- ( ) Undermined
- ( ) Such language does not exist

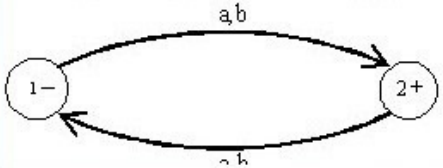
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Question No : 3 of 52 Marks: 1 (Budgeted Time 1 Min)

Below given FA generates the language having strings of _____



Answer (Please select your correct option)

- ● ODD length conceptual RE=(a+b)((a+b)(a+b))*
- ○ EVEN length
- ○ Equal number of a's and b's
- ○ Odd number of a's and b's

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Question No : 4 of 52 Marks: 1 (Budgeted Time 1 Min)

If an FA accepts no string, then language is denoted by _____

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Answer (Please select your correct option)

- {}
- Ø
- Both { } and Ø
- Null

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Question No : 5 of 52 Marks: 1 (Budgeted Time 1 Min)

Using tree structure, initial state can be represented by____

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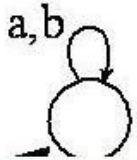
Answer (Please select your correct option)

- An arrow — for J.C.Martin tree structure lec:7,page:18
- +
- - — for simple tree structure lec:7,page:17
- *

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Question No : 6 of 52 Marks: 1 (Budgeted Time 1 Min)

Below given FA accepts _____ language.



Answer (Please select your correct option)

page 17

- Finite
- Infinite
- No
- All

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Question No : 7 of 52 Marks: 1 (Budgeted Time 1 Min)

Even-palindrome is a _____ language

Answer (Please select your correct option)

- non-regular conceptual page 70
- regular
- regular but infinite
- regular but finite

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Question No : 8 of 52 Marks: 1 (Budgeted Time 1 Min)

If L1 and L2 are two regular languages, then _____ is/are also regular.

Answer (Please select your correct option)

- ● Both $L1 \cup L2$, $L1 \cap L2$ concept
- ○ $L1^c \cap L2$
- ○ $L1 \cup L2$
- ○ $L1 \cap L2$

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Question No : 9 of 52 Marks: 1 (Budgeted Time 1 Min)

Consider the language L of strings, defined over Σ = {a,b}, ending in a

Answer (Please select your correct option)

- ● There are finite many classes generated by L, so L is regular
- ○ There are infinite many classes generated by L, so L is regular
- ○ There are finite many classes generated by L, so L is non-regular
- ○ There are infinite many classes generated by L, so L is non-regular



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Question No : 10 of 52 Marks: 1 (Budgeted Time 1 Min)

Pumping lemma is generally used to prove that:

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Answer (Please select your correct option)

- A given language is infinite
- A given language is not regular
- Whether two given regular expressions of a regular language are equivalent or not
- A given language is finite

Conceptual

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Question No : 11 of 52 Marks: 1 (Budgeted Time 1 Min)

If the FA has N states, then test the words of length less than N. If any one word is accepted by this FA, then it will accept ____ word.

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Answer (Please select your correct option)

- ● All — Lecture:30,page:85 concept
- ○ No
- ○ One
- ○ Two

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Question No : 12 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following pairs of regular expressions are equivalent?

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Answer (Please select your correct option)

- 1(001)* and (10)*10
- x(xx)* and (x)*x

concept

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- x^+ and x^*
- x^+ and x^*x^+

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Question No : 13 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following pairs of regular expressions are not equivalent?

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Answer (Please select your correct option)

- (ab)* and a*b*
- x(xx)* and (xx)*x
- x^+ and x*x^+ concept
- x(x)* and (x)*x

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Question No : 14 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following statement is correct?

Answer (Please select your correct option)

- ● The length of output string is greater than length of input string in moore machine.
- ○ The length of output string is greater than length of input string in mealy machine.
- ○ The length of output string is equal to length of input string in moore machine.
- ○ The length of output string is less than length of input string in mealy machine.

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Question No : 15 of 52 Marks: 1 (Budgeted Time 1 Min)

There exist _____ derivations of a certain word in ambiguous grammar.

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Answer (Please select your correct option)

- ● more than one
- ○ Exactly one
- ○ exactly two
- ○ no

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Question No : 16 of 52 Marks: 1 (Budgeted Time 1 Min)

Which one of the following statements is INCORRECT:

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Answer (Please select your correct option)

- (a+b)*aa(a+b)* generates Regular language.
- A language consisting of all strings over ∑={a,b} having equal number of a's and b's is a regular language
- Every language that can be expressed by FA can also be expressed by RE
- None of these

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Question No : 17 of 52 Marks: 1 (Budgeted Time 1 Min)

We can also represent an FA using different states e.g. Accept state, Reject state, Read State etc.
The _____ state behaves as final state of an FA.

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Answer (Please select your correct option)

- ● Accept — Lec:37,page:105
- ○ Pop
- ○ Push
- ○ Reject

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Question No : 18 of 52 Marks: 1 (Budgeted Time 1 Min)

CYK algorithm was invented by John Cocke and later was published by ____

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Answer (Please select your correct option)

- Talik Khon and Daniel H
- Tandao Kasami and Daniel H
- Tandao Dagger and Daniel H
- Talik Khon

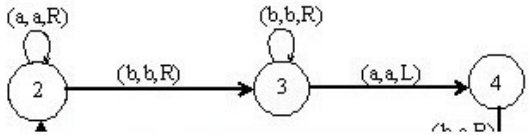
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Question No : 19 of 52 Marks: 1 (Budgeted Time 1 Min)

Consider the following TM



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Answer (Please select your correct option)

- Above TM accepts the non-CFL { a b c }.
- Above TM accepts the non-CFL $\{a^n b^n a^n\}$. ⇦
- Above TM accepts the non-CFL $\{a^n b^{n+2} a^n\}$.
- Above TM accepts the non-CFL $\{a^{n+2} b^n a^n\}$.

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Question No : 20 of 52 Marks: 1 (Budgeted Time 1 Min)

Σ= {a,b} then string abbabb has length equal to _____.

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Answer (Please select your correct option)

- Three
- Four
- Five
- Six

No.of letters in string= length

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Question No : 21 of 52 Marks: 1 (Budgeted Time 1 Min)

The language generated by CFG is called _____.

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Answer (Please select your correct option)

- Infinite
- Context Free Language (CFL) ⇦
- Regular
- Finite

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Question No : 22 of 52 Marks: 1 (Budgeted Time 1 Min)

If r1 and r2 are regular expressions then (r1) (r2) is a _____ .

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Answer (Please select your correct option)

- RE
- TG
- FA
- GTG

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Question No : 23 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following is RE for a language defined over Σ={a,b} having words starting with a:

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Answer (Please select your correct option)

- (a + b)*
- aa(a + b)+
- a(a + b)* ⇦
- a*(a + b)

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Question No : 24 of 52 Marks: 1 (Budgeted Time 1 Min)

The _____ machine helps in building a machine that can perform the addition of binary numbers.

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Answer (Please select your correct option)

- ● Incrementing lec:22,page:60
- ○ Complementing
- ○ Decrementing
- ○ Multiplication

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Question No : 25 of 52 Marks: 1 (Budgeted Time 1 Min)

Left hand side of a production in Conext free grammer (CFG) consists of _____.

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Answer (Please select your correct option)

- One terminal
- More than one terminal
- One non-terminal ⇦
- Terminals and non-terminals

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Question No : 26 of 52 Marks: 1 (Budgeted Time 1 Min)

A regular language _____ .

Answer (Please select your correct option)

- Must be finite
- Must be infinite
- Can be finite or infinite
- Complex Language

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Question No : 27 of 52 Marks: 1 (Budgeted Time 1 Min)

If a language can be expressed by a regular expression, then its complement is _____ .

Answer (Please select your correct option)

- ● Regular
- ○ Non Regular
- ○ Finite
- ○ Infinite

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Question No : 28 of 52 Marks: 1 (Budgeted Time 1 Min)

If a given Context Free grammar (CFG) contains a production of the form S→Λ, then _____

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Answer (Please select your correct option)

- ● The corresponding CFL is not empty.
- ○ The corresponding CFL is empty.
- ○ The corresponding CFL is not empty if the language is regular
- ○ The corresponding CFL is empty and non regular.

concept

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Question No : 29 of 52 Marks: 1 (Budgeted Time 1 Min)

Can a turing machine's head ever be in the same location in two successive steps?

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Answer (Please select your correct option)

- Yes
- Yes but only in finite languages
- No
- Yes but only in infinite langauges

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Question No : 30 of 52 Marks: 1 (Budgeted Time 1 Min)

In _____ there are Finite set of states containing exactly one START state and some (may be none) HALT states that cause execution to terminate, when the HALT states are entered.

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Answer (Please select your correct option)

- TG
- Turing Machine 
- GTG
- Finite Automata

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Question No : 31 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following statement(s) is/are true or false?

1) The turing machine is similar to a finite automaton but with an unlimited and unrestricted memory.
2) A Turing machine is a much more accurate model of a general purpose computer.

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Answer (Please select your correct option)

- ● Statement 1 is true
- ○ Statement 2 is true
- ○ Both statements (1 & 2) are false
- ○ Statement 2 is false

Both statements true

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Question No : 32 of 52 Marks: 1 (Budgeted Time 1 Min)

We can have more than one parse trees for a given string in case of _____ Context Free Grammar (CFG).

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Answer (Please select your correct option)

- vague
- ambiguous
- hazy
- simple

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Question No : 33 of 52 Marks: 1 (Budgeted Time 1 Min)

The language of $a^n b^n$ can be expressed by:

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Answer (Please select your correct option)

- FA
- TG
- GTG
- PDA

concept (non regular language)

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Question No : 34 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following theorem partitions Σ^* into distinct classes?

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Answer (Please select your correct option)

- Decidability theorem
- Myhill Nerode theorem
- Kleen's theorem
- Emptiness theorem

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Question No : 35 of 52 Marks: 1 (Budgeted Time 1 Min)

The languages are supposed to be _____ in case of testing pumping lemma.

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Answer (Please select your correct option)

- context free
- irregular
- both regular and irregular
- regular

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Question No : 36 of 52 Marks: 1 (Budgeted Time 1 Min)

Consider the following Context Free Grammar (CFG):

S → SX|XY
X → ZZ
Y → 1
Z → 0

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Answer (Please select your correct option)

- 00100
- 0010000
- 001
- 00010

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Question No : 37 of 52 Marks: 1 (Budgeted Time 1 Min)

A read state can have _____ outgoing edge/ edges.

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Answer (Please select your correct option)

- 1
- 2
- 3
- Any number of

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Question No : 38 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following states do not have outgoing edges:

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Answer (Please select your correct option)

- Start
- Read
- Pop
- Accept

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Question No : 39 of 52 Marks: 1 (Budgeted Time 1 Min)

Consider the following Context Free Grammar (CFG):

S---->01A

A---->10B

B---->0A|11

Answer (Please select your correct option)

- ● 011011
- ○ 011011011
- ○ 011001011
- ○ 011001001011

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Question No : 40 of 52 Marks: 1 (Budgeted Time 1 Min)

Let us consider the following Turing machine (™):

(y, Y, R)
(f, f, R)
(f, f, L)
(v, v, L)

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Answer (Please select your correct option)

- fffgggg
- fffggggf
- fffggg
- ffffggg

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Question No : 41 of 52 Marks: 2 (Budgeted Time 4 Min)

What is meant by "Left most Derivation" in context of CFG?

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Answer (Please click here to Add Answer)

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Question No : 42 of 52 Marks: 2 (Budgeted Time 4 Min)

Explain the language L of string, defined over ∑= {0,1}, having double 0's or double 1's?

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Answer (Please click here to Add Answer)

(0+1)*(00+11)(0+1)*

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Question No : 43 of 52 Marks: 2 (Budgeted Time 4 Min)

Consider the language defined by the following regular expression:

b(a + b)*a

What will be the corresponding Context Free Grammar (CFG)?

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Answer (Please click here to Add Answer)

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Question No : 44 of 52 Marks: 2 (Budgeted Time 4 Min)

Consider live productions to be applied during derivation of a word. In your point of view what will be the ultimate result?

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Answer (Please click here to Add Answer)

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Question No : 45 of 52 Marks: 3 (Budgeted Time 6 Min)

What is meant by the following statement ?

"LANGUAGE IS CLOSED"

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Answer (Please click here to Add Answer)



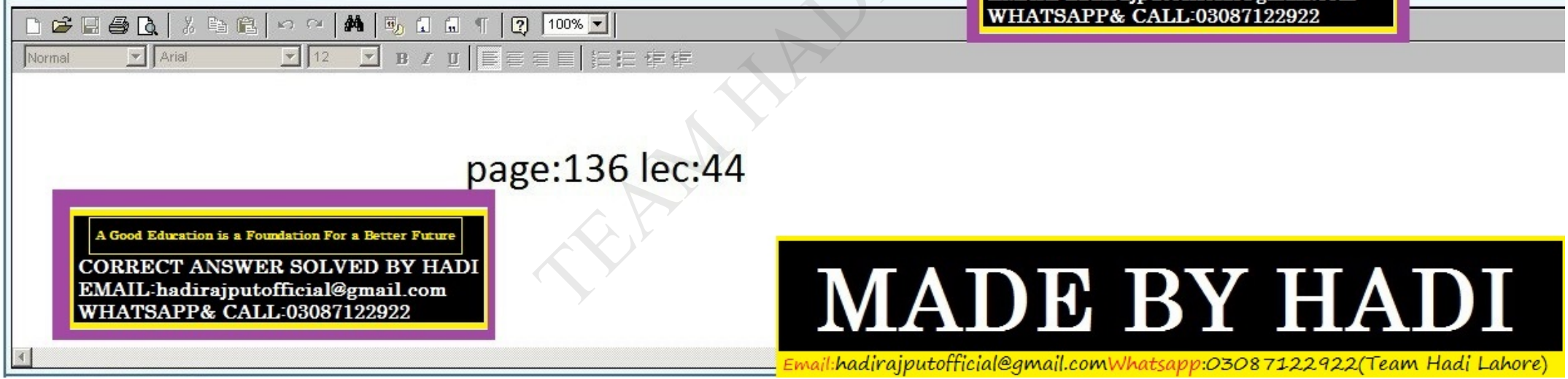
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Question No : 46 of 52 Marks: 3 (Budgeted Time 6 Min)

Write three different parsing techniques.

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Answer (Please click here to Add Answer)



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Question No : 47 of 52 Marks: 3 (Budgeted Time 6 Min)

Illustrate Decidable Problem with the help of an example.

Marks [1+2]

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Answer (Please click here to Add Answer)

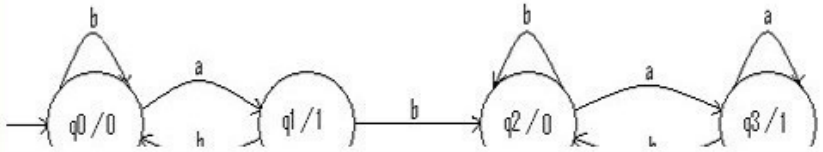
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Question No : 48 of 52 Marks: 3 (Budgeted Time 6 Min)

Consider the following Moore machine:



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Answer (Please click here to Add Answer)

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Marks: 5 (Budgeted Time 10 Min)

EN, defined over Σ = {a,b}. In how many classes does L may partition Σ*. Explain briefly.

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Answer (Please click here to Add Answer)

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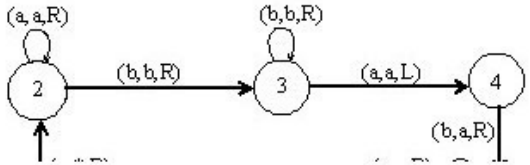
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Question No : 50 of 52 Marks: 5 (Budgeted Time 10 Min)

Consider the following TM



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Answer (Please click here to Add Answer)

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Question No : 51 of 52 Marks: 5 (Budgeted Time 10 Min)

Derive Chomsky Normal Form (CNF) corresponding to the Context Free Grammar (CFG) given below:

$A \rightarrow BAB \mid B \mid \Lambda$

$B \rightarrow 00 \mid \Lambda$

Answer (Please click here to Add Answer)

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Question No : 52 of 52 Marks: 5 (Budgeted Time 10 Min)

Suppose a Maze of 20 boxes; 1 box for initial and 1 for final state. 6 boxes are for non-moveable states while the rest can be used for transitions. Draw a Nondeterministic Finite Automaton (NFA) for the given Maze.

Marks [2.5+2.5]

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Answer (Please click here to Add Answer)



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Best of luck!

PAST PAPER

Question No : 1 of 52 Marks: 1 (Budgeted Time 1 Min)

Which statement is true?

pg 4

Answer (Please select your correct option)

- All words are strings



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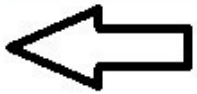
- All strings are words
- Both are always same
- All letter are string

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Question No : 2 of 52 **Marks: 1 (Budgeted Time 1 Min)**

If L1 and L2 are expressed by r1 and r2, respectively then the language expressed by (r1)(r2) will be _____

Answer (Please select your correct option)

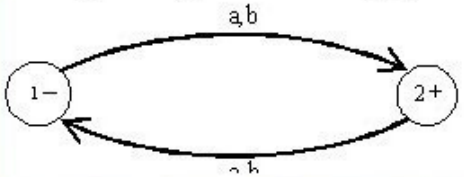
- Regular 
- Ir-regular
- Undermined
- Such language does not exist

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Question No : 3 of 52 **Marks: 1 (Budgeted Time 1 Min)**

Below given FA generates the language having strings of _____



Answer (Please select your correct option)

- ODD length
- EVEN length
- Equal number of a's and b's
- Odd number of a's and b's

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Question No : 4 of 52 Marks: 1 (Budgeted Time 1 Min)

If an FA accepts no string, then language is denoted by _____

Answer (Please select your correct option)

- {}
- Ø
- Both { } and Ø
- Null

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Question No : 5 of 52 Marks: 1 (Budgeted Time 1 Min)

Using tree structure, initial state can be represented by____

Answer (Please select your correct option)

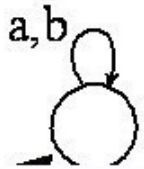
- An arrow
- +
- -
- *

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Question No : 6 of 52 Marks: 1 (Budgeted Time 1 Min)

Below given FA accepts _____ language.



Answer (Please select your correct option)

- Finite
- Infinite
- No
- All

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Question No : 7 of 52 Marks: 1 (Budgeted Time 1 Min)

Even-palindrome is a _____ language

Answer (Please select your correct option)

- non-regular
- regular
- regular but infinite
- regular but finite

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Question No : 8 of 52 **Marks: 1 (Budgeted Time 1 Min)**

If L1 and L2 are two regular languages, then _____ is/are also regular.

Answer (Please select your correct option)

- Both $L1 \cup L2$, $L1 \cap L2$
- $L1^c \cap L2$
- $L1 \cup L2$
- $L1 \cap L2$



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Question No : 9 of 52 Marks: 1 (Budgeted Time 1 Min)

Consider the language L of strings, defined over Σ = {a,b}, ending in a

Answer (Please select your correct option)

- There are finite many classes generated by L, so L is regular
- There are infinite many classes generated by L, so L is regular
- There are finite many classes generated by L, so L is non-regular
- There are infinite many classes generated by L, so L is non-regular

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Question No : 10 of 52 Marks: 1 (Budgeted Time 1 Min)

Pumping lemma is generally used to prove that:

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Answer (Please select your correct option)

- A given language is infinite
- A given language is not regular
- Whether two given regular expressions of a regular language are equivalent or not
- A given language is finite

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Question No : 11 of 52 Marks: 1 (Budgeted Time 1 Min)

If the FA has N states, then test the words of length less than N. If any one word is accepted by this FA, then it will accept ____ word.

. .

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Answer (Please select your correct option)

- All  not sure
- No
- One
- Two

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Question No : 12 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following pairs of regular expressions are equivalent?

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Answer (Please select your correct option)

- 1(001)* and (10)*10
- x(xx)* and (x)*x
- x^+ and x*
- x^+ and x*x^+

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Question No : 13 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following pairs of regular expressions are not equivalent?

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Answer (Please select your correct option)

- (ab)* and a*b*
- x(xx)* and (xx)*x
- x^+ and x*x^+
- x(x)* and (x)*x



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Question No : 14 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following statement is correct?

pg 54

Answer (Please select your correct option)

- The length of output string is greater than length of input string in moore machine. ⇦
- The length of output string is greater than length of input string in mealy machine.
- The length of output string is equal to length of input string in moore machine.
- The length of output string is less than length of input string in mealy machine.

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Question No : 15 of 52 Marks: 1 (Budgeted Time 1 Min)

There exist _____ derivations of a certain word in ambiguous grammar.

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Answer (Please select your correct option)

- more than one
- Exactly one
- exactly two
- no

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Question No : 16 of 52 Marks: 1 (Budgeted Time 1 Min)

Which one of the following statements is INCORRECT:

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Answer (Please select your correct option)

- (a+b)*aa(a+b)* generates Regular language.
- A language consisting of all strings over ∑={a,b} having equal number of a's and b's is a regular language
- Every language that can be expressed by FA can also be expressed by RE
- None of these

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Question No : 17 of 52 Marks: 1 (Budgeted Time 1 Min)

We can also represent an FA using different states e.g. Accept state, Reject state, Read State etc.
The _____ state behaves as final state of an FA.

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Answer (Please select your correct option)

- Accept
- Pop
- Push
- Reject

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Question No : 18 of 52 Marks: 1 (Budgeted Time 1 Min)

CYK algorithm was invented by John Cocke and later was published by ____

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Answer (Please select your correct option)

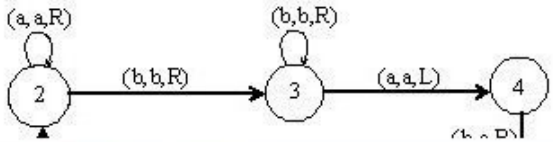
- Talik Khon and Daniel H
- Tandao Kasami and Daniel H
- Tandao Dagger and Daniel H
- Talik Khon

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Question No : 19 of 52 **Marks: 1 (Budgeted Time 1 Min)**

Consider the following TM



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Answer (Please select your correct option)

- Above TM accepts the non-CFL {a b c}.
- Above TM accepts the non-CFL $\{a^n b^n a^n\}$.
- Above TM accepts the non-CFL $\{a^n b^{n+2} a^n\}$.
- Above TM accepts the non-CFL $\{a^{n+2} b^n a^n\}$.

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Question No : 20 of 52 Marks: 1 (Budgeted Time 1 Min)

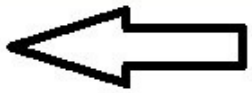
Σ= {a,b} then string abbabb has length equal to _____.

pg 4

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Answer (Please select your correct option)

- Three
- Four
- Five
- Six



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Question No : 21 of 52 Marks: 1 (Budgeted Time 1 Min)

The language generated by CFG is called _____.

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Answer (Please select your correct option)

- Infinite
- Context Free Language (CFL) ⇦
- Regular
- Finite

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Question No : 22 of 52 Marks: 1 (Budgeted Time 1 Min)

If r1 and r2 are regular expressions then (r1) (r2) is a _____ .

Answer (Please select your correct option)

- RE
- TG
- FA
- GTG

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Question No : 23 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following is RE for a language defined over Σ={a,b} having words starting with a:

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Answer (Please select your correct option)

- (a + b)*
- aa(a + b)+
- a(a + b)* ⇦
- a*(a + b)

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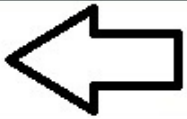
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Question No : 24 of 52 Marks: 1 (Budgeted Time 1 Min)

The _____ machine helps in building a machine that can perform the addition of binary numbers.

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Answer (Please select your correct option)

- Incrementing 
- Complementing
- Decrementing
- Multiplication

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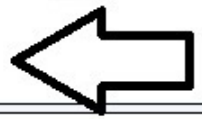
Question No : 25 of 52 Marks: 1 (Budgeted Time 1 Min)

Left hand side of a production in Conext free grammer (CFG) consists of _____.

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Answer (Please select your correct option)

- One terminal
- More than one terminal
- One non-terminal
- Terminals and non-terminals



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Question No : 26 of 52 Marks: 1 (Budgeted Time 1 Min)

A regular language _____ .

Answer (Please select your correct option)

- Must be finite
- Must be infinite
- Can be finite or infinite
- Complex Language

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Question No : 27 of 52 Marks: 1 (Budgeted Time 1 Min)

If a language can be expressed by a regular expression, then its complement is _____ .

pg 66

Answer (Please select your correct option)

- Regular
- Non Regular
- Finite
- Infinite

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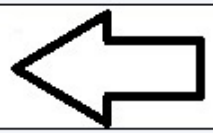
Question No : 28 of 52 Marks: 1 (Budgeted Time 1 Min)

If a given Context Free grammar (CFG) contains a production of the form S→Λ, then _____

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Answer (Please select your correct option)

- The corresponding CFL is not empty.
- The corresponding CFL is empty.
- The corresponding CFL is not empty if the language is regular
- The corresponding CFL is empty and non regular.



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Question No : 29 of 52 Marks: 1 (Budgeted Time 1 Min)

Can a turing machine's head ever be in the same location in two successive steps?

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Answer (Please select your correct option)

- Yes
- Yes but only in finite languages
- No
- Yes but only in infinite langauges

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Question No : 30 of 52 Marks: 1 (Budgeted Time 1 Min)

In _____ there are Finite set of states containing exactly one START state and some (may be none) HALT states that cause execution to terminate, when the HALT states are entered.

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Answer (Please select your correct option)

- TG
- Turing Machine
- GTG
- Finite Automata



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Question No : 31 of 52 **Marks: 1 (Budgeted Time 1 Min)**

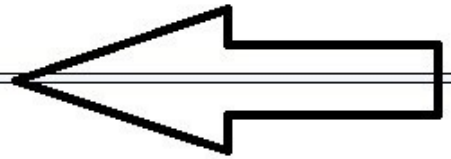
Which of the following statement(s) is/are true or false?

1) The turing machine is similar to a finite automaton but with an unlimited and unrestricted memory.
2) A Turing machine is a much more accurate model of a general purpose computer.

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Answer (Please select your correct option)

- Statement 1 is true
- Statement 2 is true
- Both statements (1 & 2) are false
- Statement 2 is false



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Question No : 32 of 52 Marks: 1 (Budgeted Time 1 Min)

We can have more than one parse trees for a given string in case of _____ Context Free Grammar (CFG).

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Answer (Please select your correct option)

- vague
- ambiguous
- hazy
- simple

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Question No : 33 of 52 Marks: 1 (Budgeted Time 1 Min)

The language of $a^n b^n$ can be expressed by:

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Answer (Please select your correct option)

- FA
- TG
- GTG
- PDA

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Question No : 34 of 52 Marks: 1 (Budgeted Time 1 Min)

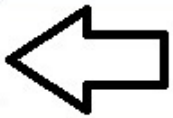
Which of the following theorem partitions Σ^* into distinct classes?

pg 73 bk

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Answer (Please select your correct option)

- Decidability theorem
- Myhill Nerode theorem
- Kleen's theorem
- Emptiness theorem



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Question No : 35 of 52 Marks: 1 (Budgeted Time 1 Min)

The languages are supposed to be _____ in case of testing pumping lemma.

to prove puming lemma theorem language
is suposed to be regular at first and thn
proof it non regular by pumping lemma

also told in th e

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Answer (Please select your correct option)

- context free
- irregular
- both regular and irregular
- regular



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Question No : 36 of 52 **Marks: 1 (Budgeted Time 1 Min)**

Consider the following Context Free Grammar (CFG):

S → SX|XY
X → ZZ
Y → 1
Z → 0

Answer (Please select your correct option)

- 00100
- 0010000
- 001
- 00010

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Question No : 37 of 52 Marks: 1 (Budgeted Time 1 Min)

A read state can have _____ outgoing edge/ edges.

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Answer (Please select your correct option)

- 1
- 2
- 3
- Any number of

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Question No : 38 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following states do not have outgoing edges:

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Answer (Please select your correct option)

- Start
- Read
- Pop
- Accept

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Question No : 39 of 52 **Marks: 1 (Budgeted Time 1 Min)**

Consider the following Context Free Grammar (CFG):

S---->01A

A---->10B

B---->0A|11

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Answer (Please select your correct option)

- 011011
- 011011011
- 011001011
- 011001001011

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Question No : 40 of 52 Marks: 1 (Budgeted Time 1 Min)

Let us consider the following Turing machine (TM):

(y, Y, R)
(f, f, R)
(f, f, L)
(y, y, L)

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Answer (Please select your correct option)

- fffgggg
- fffggggf
- fffggg
- ffffggg

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Question No : 41 of 52 Marks: 2 (Budgeted Time 4 Min)

What is meant by "Left most Derivation" in context of CFG?

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Answer (Please click here to Add Answer)



Left most derivation

Definition

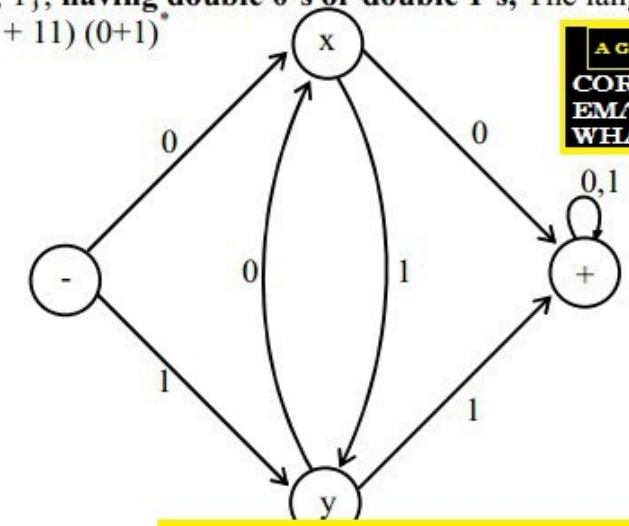
The derivation of a word w, generated by a CFG, such that at each step, a production is applied to the left most nonterminal in the working string, is said to be ***left most derivation***.

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Question No : 42 of 52 Marks: 2 (Budgeted Time 4 Min)

Explain the language L of string, defined over ∑= {0,1}, having double 0's or double 1's?

Consider the language L of strings, defined over Σ={0, 1}, **having double 0's or double 1's,** The language L may be expressed by the regular expression $(0+1)^*(00+11)(0+1)^*$
This language may be accepted by the following FA



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Question No : 43 of 52 **Marks: 2 (Budgeted Time 4 Min)**

Consider the language defined by the following regular expression:

$b(a + b)^+a$

What will be the corresponding Context Free Grammar (CFG)?

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Answer (Please click here to Add Answer)

Consider the following CFG

$S \rightarrow aXb|bXa$

$X \rightarrow aX|bX|\Lambda$

The above CFG generates the language of strings, defined over $\sum=\{a,b\}$, **beginning and ending in different letters**.

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Question No : 44 of 52 Marks: 2 (Budgeted Time 4 Min)

Consider live productions to be applied during derivation of a word. In your point of view what will be the ultimate result?

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Answer (Please click here to Add Answer)



It may be noted that every time a live production is applied during the derivation of a word it increases the number of nonterminals by one.

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Question No : 45 of 52 Marks: 3 (Budgeted Time 6 Min)

What is meant by the following statement ?

"LANGUAGE IS CLOSED"

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Answer (Please click here to Add Answer)

Normal Arial 12 B I U 100%

$\Sigma = \{a,b\}$
productions:

$S \rightarrow SS$
$S \rightarrow XS$
$S \rightarrow \Lambda$

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Question No : 46 of 52 Marks: 3 (Budgeted Time 6 Min)

Write three different parsing techniques.

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Answer (Please click here to Add Answer)



Parsing of word

Definition

The process of finding the derivation of word generated by particular grammar is called **parsing**.

There are different parsing techniques, containing the following three

Top down parsing.

Bottom up parsing.

Parsing technique for particular grammar of arithmetic expression.

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Question No : 47 of 52 **Marks: 3 (Budgeted Time 6 Min)**

Illustrate Decidable Problem with the help of an example.

Marks [1+2]

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Answer (Please click here to Add Answer)

Decidable problem

A problem that has decision procedure is called decidable problem *e.g.* the following problems

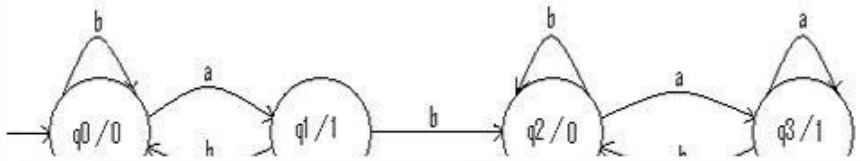
The two regular expressions define the same language.

The two FAs are equivalent.

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Question No : 48 of 52 Marks: 3 (Budgeted Time 6 Min)

Consider the following Moore machine:



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Answer (Please click here to Add Answer)

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Question No : 49 of 52 Marks: 5 (Budgeted Time 10 Min)

Consider the language L which is EVEN-EVEN, defined over Σ = {a,b}. In how many classes does L may partition Σ*. Explain briefly.

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Answer (Please click here to Add Answer)

100%

Example

Consider the language L which is EVEN-EVEN, defined over Σ = {a,b}. It can be observed that L partitions Σ* into the following four classes

C_1 = set of all strings with even number of a's and odd number of b's.

C_2 = set of all strings with odd number of a's and odd number of b's.

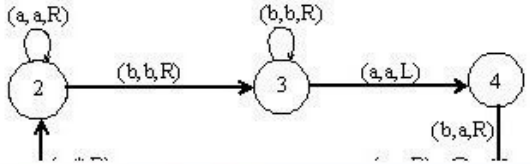
C_3 = set of all strings with odd number of a's and even number of b's.

C_4 = set of all strings with even number of a's and even number of b's

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Question No : 50 of 52 **Marks: 5 (Budgeted Time 10 Min)**

Consider the following TM

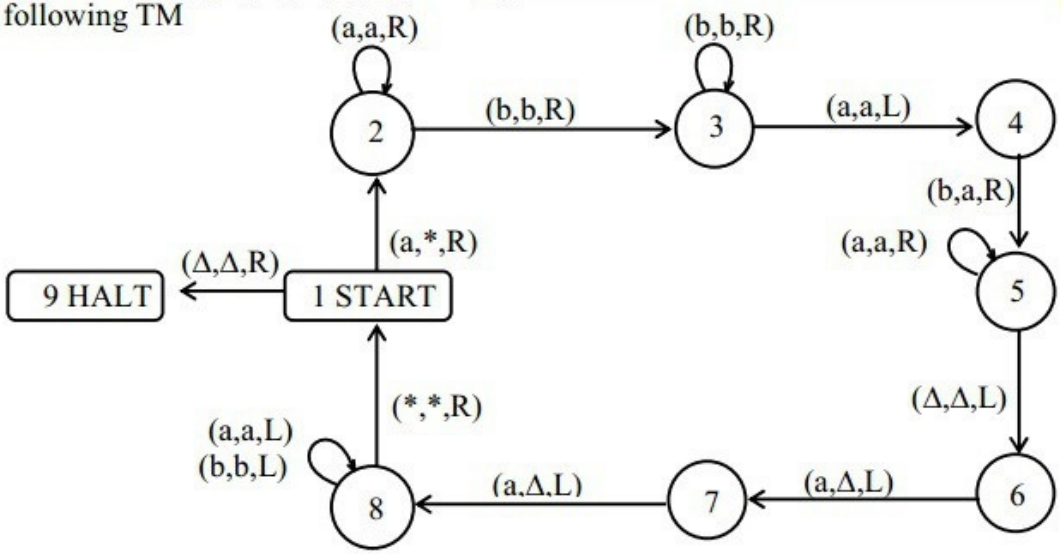


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Answer (Please click here to Add Answer)

Normal 100%

Consider the following TM



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The string aaabbbaaa can be observed to be accepted by the above TM. It can also be observed that the above TM accepts the non-CFL $\{a^n b^n a^n\}$.

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Question No : 51 of 52 **Marks: 5 (Budgeted Time 10 Min)**

Derive Chomsky Normal Form (CNF) corresponding to the Context Free Grammar (CFG) given below:

$A \rightarrow BAB \mid B \mid \Lambda$

$B \rightarrow 00 \mid \Lambda$

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Answer (Please click here to Add Answer)



Question No : 52 of 52 **Marks: 5 (Budgeted Time 10 Min)**

Suppose a Maze of 20 boxes; 1 box for initial and 1 for final state. 6 boxes are for non-moveable states while the rest can be used for transitions. Draw a Nondeterministic Finite Automaton (NFA) fo the given Maze.

Marks [2.5+2.5]

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Answer (Please click here to Add Answer)



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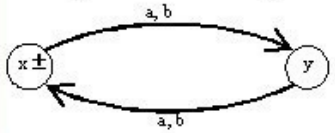
Best of luck!

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Question No : 2 of 52 Marks: 1 (Budgeted Time 1 Min)

Below given FA can be represented by



Answer (Please select your correct option)

- ((a+ b) (a + b))*
- (a + b)(a + b)*
- (a + b)(a + b)
- (a + b)*(a + b)*

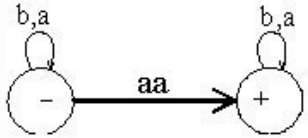
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Question No : 3 of 52 Marks: 1 (Budgeted Time 1 Min)

Below given TG has _____ RE.



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Answer (Please select your correct option)

- (b+a) (aa) (b+a)*
- (a+b) (aa) (a+b)*
- (a+b)* (aa) (a+b)*
- (a+b)* (aa) (a+b)

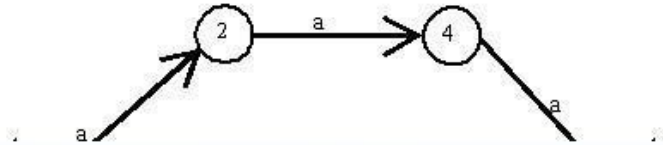
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Question No : 4 of 52 Marks: 1 (Budgeted Time 1 Min)

Below given TG's are _____.



Answer (Please select your correct option)

- non-symmetric
- Equivalent
- Non-equivalent
- TG's are not valid

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Question No : 5 of 52 Marks: 1 (Budgeted Time 1 Min)

"One GTG can generate _____ language".

Answer (Please select your correct option)

- more than one
- only one
- only two
- only three

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Question No : 6 of 52 Marks: 1 (Budgeted Time 1 Min)

Even-palindrome is a _____ language

Answer (Please select your correct option)

- ● non-regular Lec:25,page:71
- ○ regular
- ○ regular but infinite
- ○ regular but finite

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Question No : 7 of 52 Marks: 1 (Budgeted Time 1 Min)

If L1 and L2 are two regular languages, then _____ is/are also regular.

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Answer (Please select your correct option)

- ● Both $L1 \cup L2$, $L1 \cap L2$ lec 24,page 65 L1+L2= L1UL2 and on page 67
- ○ $L1^c \cap L2$
- ○ $L1 \cup L2$
- ○ $L1 \cap L2$

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Question No : 8 of 52 Marks: 1 (Budgeted Time 1 Min)

If the FA has N states, then test the words of length less than N. If any one word is accepted by this FA, then it will accept ____ word.

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Answer (Please select your correct option)

- ● All Lec:30,page:85 concept
- ○ No
- ○ One
- ○ Two

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Question No : 9 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following pairs of regular expressions are equivalent?

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Answer (Please select your correct option)

- 1(001)* and (10)*10
- x(xx)* and (x)*x
- x^+ and x^*
- x^+ and x^*x^+

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Question No : 10 of 52 Marks: 1 (Budgeted Time 1 Min)

An alphabet of Σ is valid if

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Answer (Please select your correct option)

- No letter of Σ appears in middle of any other letter
- No letter of Σ appears at end of any other letter
- ● No letter of Σ appears at start of any other letter
- No letter of Σ appears at end or middle of any other letter

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Question No : 11 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following pairs of regular expressions are not equivalent?

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Answer (Please select your correct option)

- (ab)* and a*b*
- x(xx)* and (xx)*x
- x^+ and x*x^+
- x(x)* and (x)*x

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Question No : 12 of 52 Marks: 1 (Budgeted Time 1 Min)

There exist _____ derivations of a certain word in ambiguous grammar.

Answer (Please select your correct option)

- ● more than one
- ○ Exactly one
- ○ exactly two
- ○ no

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Question No : 13 of 52 Marks: 1 (Budgeted Time 1 Min)

Regular languages are closed under _____

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Answer (Please select your correct option)

- ● Union and Concatenation
- ○ Union and Division
- ○ Union and Exponent
- ○ Union and Factorial

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Question No : 14 of 52 Marks: 1 (Budgeted Time 1 Min)

Which one of the following statements is INCORRECT:

Lec:26,page:73

Answer (Please select your correct option)

- A language consisting of all strings over ∑={a,b} having equal number of a's and b's is a regular language
- Every language that can be expressed by FA can also be expressed by RE
- None of these
- (a+b)*aa(a+b)* generates Regular language.

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Question No : 15 of 52 Marks: 1 (Budgeted Time 1 Min)

TM is more powerful than FSM because

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Answer (Please select your correct option)

- The tape movement is confined to one direction
- It has no finite state control
- It has the capability to remember arbitrary long sequences of input symbols
- ● The tape movement is confined to more than one directions

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Question No : 16 of 52 Marks: 1 (Budgeted Time 1 Min)

CYK algorithm was invented by John Cocke and later was published by ____

lec:44,page:135

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Answer (Please select your correct option)

- Talik Khon and Daniel H
- Tandao Kasami and Daniel H 
- Tandao Dagger and Daniel H
- Talik Khon

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Question No : 17 of 52 Marks: 1 (Budgeted Time 1 Min)

The process of finding the derivation of word generated by particular grammar is called_____

Lec:11,page:136

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Answer (Please select your correct option)

- Processing
- Parsing
- Programming
- Planing

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Question No : 18 of 52 Marks: 1 (Budgeted Time 1 Min)

There are different parsing techniques, including _____

Answer (Please select your correct option)

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- Top down parsing
- Bottom up parsing
- Parsing technique for particular grammar of arithmetic expression
- ● All of these

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Question No : 19 of 52 Marks: 1 (Budgeted Time 1 Min)

Σ={a,Aa,Abb}, then string aAaAbbAa has length equal to_____.

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Answer (Please select your correct option)

- Three
- Four
- One
- Two

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Question No : 20 of 52 Marks: 1 (Budgeted Time 1 Min)

The language generated by CFG is called _____.

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Answer (Please select your correct option)

- Infinite
- Context Free Language (CFL) 
- Regular
- Finite

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Question No : 21 of 52 Marks: 1 (Budgeted Time 1 Min)

In _____ there must be transition for all letters.

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Answer (Please select your correct option)

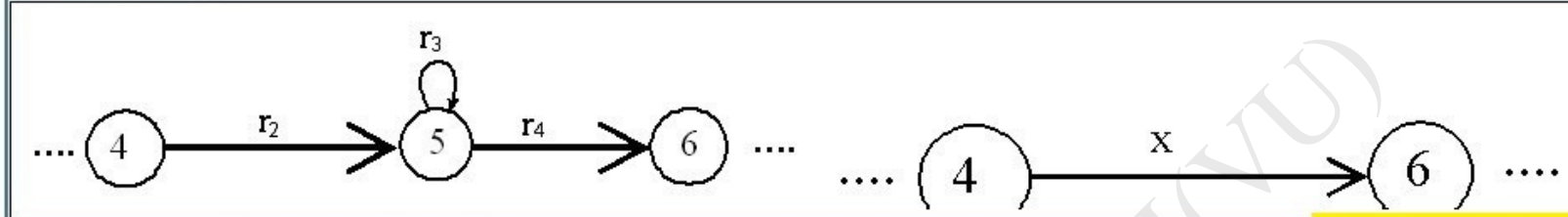
- NFA
- FA
- TG
- GTG

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Question No : 22 of 52 Marks: 1 (Budgeted Time 1 Min)



Answer (Please select your correct option)

- r1* r2 r3*
- (r1r2r3)*
- r1*r2*r3*
- None of the given

incomplete Q..RE of ist is r2r3*r4

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Question No : 23 of 52 Marks: 1 (Budgeted Time 1 Min)

A regular language _____ .

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Answer (Please select your correct option)

- Must be finite
- Must be infinite
- Can be finite or infinite
- Complex Language

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Question No : 24 of 52 Marks: 1 (Budgeted Time 1 Min)

If a language can be expressed by a regular expression, then its complement is _____ .

Lec:24,page:66

Answer (Please select your correct option)

- ● Regular ⇦
- ○ Non Regular
- ○ Finite
- ○ Infinite

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Question No : 25 of 52 Marks: 1 (Budgeted Time 1 Min)

For every Context Free Grammar (CFG), we can make the corresponding _____.

Lec:39,page:111

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Answer (Please select your correct option)

- FA
- TG
- PDA
- Regular Grammar

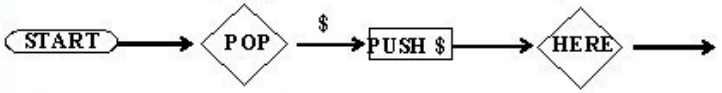
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Question No : 26 of 52 Marks: 1 (Budgeted Time 1 Min)

Look at the following diagram and select the correct option:



Lec:40,page:119

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Answer (Please select your correct option)

- The PDA must not begin with the sequence
- The PDA may begin with the sequence
- The PDA must begin with the sequence
- The PDA may not begin with the sequence

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Question No : 27 of 52 Marks: 1 (Budgeted Time 1 Min)

Consider the following Context Free Grammar (CFG) and select the correct choice
S→AB
A →BSB | a | b
B→CC
C→SS | b | bb

Answer (Please select your correct option)

- (●) abb is a word in the corresponding CFL.
- ( ) abb is not the word of corresponding CFL.
- ( ) Any word can be accepted from the corresponding CFL.
- ( ) b is a word in the corresponding CFL.

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Question No : 28 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following statement(s) is/are true or false?

1) The turing machine is similar to a finite automaton but with an unlimited and unrestricted memory.
2) A Turing machine is a much more accurate model of a general purpose computer.

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Answer (Please select your correct option)

- (●) Statement 1 is true
- ( ) Statement 2 is true
- ( ) Both statements (1 & 2) are false
- ( ) Statement 2 is false

Mentioned in lec 45

Both are true..check link in moazz file

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Question No : 29 of 52 Marks: 1 (Budgeted Time 1 Min)

Language of strings having even number of a's is considered to be:

Lec:3,page:9

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Answer (Please select your correct option)

- (●) Regular
- ( ) Irrelgular
- ( ) Irregular and infinite
- ( ) Irregular and finite

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Question No : 30 of 52 Marks: 1 (Budgeted Time 1 Min)

If we have two transiton graphs then their union will be expressed by:

Lec:24,page:65

Answer (Please select your correct option)

- ● taking a common start state and joining them by two null transitions
- ○ just connecting both start states by null transitions
- ○ connecting final state of first TG to the initial state of second TG
- ○ connecting the final state of first TG to the final state of second TG

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Question No : 31 of 52 Marks: 1 (Budgeted Time 1 Min)

A language of strings of prime length is considered to be:

Lec:27,page:75

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Answer (Please select your correct option)

- regular but infinite
- regular
- irregular ⇦
- regular but finite

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Question No : 32 of 52 Marks: 1 (Budgeted Time 1 Min)

_____ and _____ are removed in order to make a CFG in Chomsky Normal Form (CNF).

Lec:36,page:102

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Answer (Please select your correct option)

- Null, nullable productions
- Nullable, unit productions
- Null, unit productions
- Strings of length 0, null

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Question No : 33 of 52 Marks: 1 (Budgeted Time 1 Min)

The languages are supposed to be _____ in case of testing pumping lemma.

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Answer (Please select your correct option)

- context free
- irregular
- both regular and irregular
- regular

mentioned in video lec:27:P can check exm

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Question No : 34 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following refers to an effectively solvable problem having answer in "Yes" or "No"?

Lec:29,page:80

Answer (Please select your correct option)

- ● Decision procedure
- ○ Logical problem
- ○ Analytical problem
- ○ Binary procedure

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Question No : 35 of 52 Marks: 1 (Budgeted Time 1 Min)

Consider the following Context Free Grammar (CFG):

S ---> SX|XY
X ---> ZZ
Y ---> 0
Z ---> 1

Answer (Please select your correct option)

- 110
- 11011
- 1101111
- 11101

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Question No : 36 of 52 Marks: 1 (Budgeted Time 1 Min)

Consider the following Context Free Grammar (CFG):

S → SX|XY
X → ZZ
Y → 1
Z → 0

Answer (Please select your correct option)

- 001
- 00010
- 0010000
- 00100

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Question No : 37 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following is a regular Context Free Grammar:

Answer (Please select your correct option)

- S→abS | baS | ^
- S→aSb | baS |^
- S→abS | bSa | ^
- S→aSb | Sa | ^

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Question No : 38 of 52 Marks: 1 (Budgeted Time 1 Min)

Concatenation of r1 and r2 will be shown as:

Lec:13,page:35

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Answer (Please select your correct option)

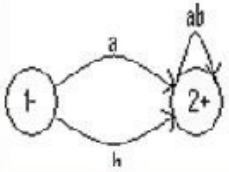
- r1+r2
- r2+r1
- r2r1
- r1r2

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Question No : 19 of 26 Marks: 1 (Budgeted Time 1 Min)

How many steps are required to convert the given transition graph into a regular expression?



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Answer (Please select your correct option)

- 1 step
- 2 steps firstly a & b combine to form a+b and in 2nd step loop of ab combine =(a+b)ab*
- 3 steps
- 4 steps

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Question No : 39 of 52 Marks: 1 (Budgeted Time 1 Min)

A nonterminal is said to be self-embedded, if in a given derivation of a word, it ever occurs as a tree _____ of itself.

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Answer (Please select your correct option)

- ascendant
- descendant
- top
- bottom

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Question No : 40 of 52 Marks: 1 (Budgeted Time 1 Min)

_____ is always Deterministic.

Answer (Please select your correct option)

- ● Finite Automaton
- ○ Transition Graph
- ○ Generalize Transition Graph
- ○ Non-deterministic finite automaton



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Question No : 41 of 52 Marks: 2 (Budgeted Time 4 Min)

Write alternative form of this production.
$S \rightarrow aS,\ S \rightarrow bS,\ S \rightarrow \Lambda$

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Answer (Please click here to Add Answer)

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$S \longrightarrow aS|bS|\Lambda$

e:90

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Question No : 42 of 52 Marks: 2 (Budgeted Time 4 Min)

What are the uses of Push Down Automata (PDA) in computing?

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Answer (Please click here to Add Answer)

PUSHDOWN STACK is a place where the input letters can be placed until these letters are referred again.
Itcan store as many letters as one can in a long column

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Question No : 43 of 52 Marks: 2 (Budgeted Time 4 Min)

What is meant by Row language?

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Answer (Please click here to Add Answer)

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Lec:41,page:123

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Question No : 44 of 52 Marks: 2 (Budgeted Time 4 Min)

Write down regular expression for a language L of strings defined over Σ = {a, b} that neither ends in "a" nor with "b".

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Answer (Please click here to Add Answer)

RE=^ (null)

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Question No : 45 of 52 Marks: 3 (Budgeted Time 6 Min)

What are the steps of Recursive Definition of Languages?

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Answer (Please click here to Add Answer)

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Lec:3,page:9

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Question No : 46 of 52 Marks: 3 (Budgeted Time 6 Min)

What does the following arbitrary summary table show?

FROM Where	TO Where	READ What	POP What	PUSH What	ROW Number
$READ_0$	$READ_2$	b	b	abb	11

Answer (Please click here to Add Answer)

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Lec:42,page:124

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Question No : 47 of 52 Marks: 3 (Budgeted Time 6 Min)

Write down Context Free Grammar (CFG) for the language of strings expressed by the following regular expression:

$(a + b)^*(a + b)^+$

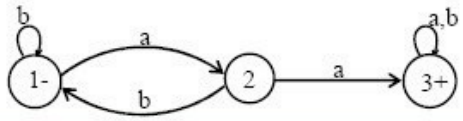
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Answer (Please click here to Add Answer)

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Question No : 48 of 52 Marks: 3 (Budgeted Time 6 Min)

Let us consider the following Finite Automaton (FA):



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Answer (Please click here to Add Answer)

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Lec:6,page:16

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Question No : 49 of 52 Marks: 5 (Budgeted Time 10 Min)

Write the CFG for EVEN-EVEN language?

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Answer (Please click here to Add Answer)

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Lec:32,page:90

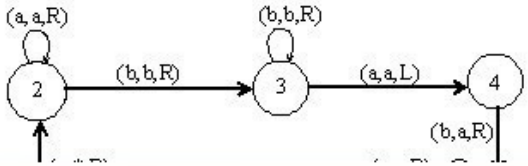
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Question No : 50 of 52 Marks: 5 (Budgeted Time 10 Min)

Consider the following TM



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Answer (Please click here to Add Answer)

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Question No : 51 of 52 Marks: 5 (Budgeted Time 10 Min)

Using suitable examples, differentiate between Kleene star closure and plus operation?

Answer (Please click here to Add Answer)

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Lec:2,page:7

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Question No : 52 of 52 Marks: 5 (Budgeted Time 10 Min)

a. Construct Context Free Grammar (CFG) for the language defined by the regular expression:

(ab + ba)*(a + b)*

b. Remove null productions from the CFG constructed in part i.

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Answer (Please click here to Add Answer)



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FINAL TERM PAST PAPER SOLVED BY TEAM HADI VU

CODE:CS402

Question 1: In Row Language, CFG is introduced in the form Net (A, B, C), where A and B are and C is____

- stack characters, joint.
- pop characters, joint.
- **joints, stack character.**
- joints, push character

Question 2: We can also represent an FA using Accept, Reject and Read states etc. The_____state behaves as final state of an FA.

- **Accept.**
- Pop.
- Push.
- Reject

Question 3: _____is not a word of language EQUAL

- aaabbb.
- abbbabaa.
- **abababa**.
- bbbaaa

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Question 4: In Row Language, CFG is introduced in the form Net (A, B, C), where A and B are and C is____

- stack characters, joint,
- pop characters, joint,
- **joints, stack character,**
- joints, push character

Question 5: The correct word produced by the regular expression aa(a + b)*b is,____

- ab.
- bb.
- aaab. ⇦
- aaa

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Question 6: Pumping lemma divides a string into____parts.

- one.
- two.
- **three.**
- four

Question: The first rule of converting the given "CFG in CNF", is____

- CNK algorithm.
- **CYK algorithm.**
- CKY algorithm.
- KYC algorithm

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Question 7: The symbols that cannot be replaced by anything are called_____

- **Terminals**.
- Non terminals.
- Terminators.
- Productions

Question 8: _____box of a sequential circuit is also called a Flip Flop Box.

- NAND.
- AND.
- OR.
- **Delay**

Question 9: The language of Palindromes defined over an alphabet set (a,b) can be recognized by?

- FA
- NFA
- TG
- **PDA**

Question 10: Which of the following regular expressions does not correspond to the language having all words (made up of a's and b's) with at least two a's?

- (a+b)* a (a+b)* a (a+b)* .
- (a+b)* ab* a(a+b)* .
- b*ab* (a+b)* . ⇦
- b*ab* a(a+b)*

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Question 11: Using Myhill Nerode theorem, we partition sigma star into distinct_____

- Objects.
- **Classes.**
- Instances.
- Templates

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Question 12: Regular language can be expressed by?

- **Regular expression only.**
- Finite automata only.
- Regular expression & Finite automata.
- Regular Language can not be expressed by FA or RE.

Question 13: How many rules are there to define all possible productions of Context Free Grammar (CFG) of "Row language"?

- **Three (3)**
- Five (5)
- Two (2)
- Four (4)

Question 14: The expression * +3 4 5 represents_____

- **Prefix notation.**
- Postfix notation.
- Infox notation.
- Free fix

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Question 15: If R is regular language and Q is any language (regular/ nonregular), then Pref (Q in R) is,_____

- Finite non-Regular.
- Infinite non-Regular.
- **Regular.**
- Non-Regular

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Question 16: Which one of the following is correct option with respect to the Unit Production?

- One nonterminal- one terminal.
- **Nonterminal- Nonterminal.**
- One terminal-one terminal.
- Terminal-nonterminal

Question 17: All NONNULL words of the CFL can be generated by the corresponding CFG which is in.

- TG.
- **CNF.**
- NFA.
- ODFA

Question 18: The languages PALINDROME and PRIME are the examples of_____languages

- **Non regular.**
- Regular.
- TG.
- GTG

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Question 19: A new state ____is introduced before a PDA is converted to the Conversion Form

- END.
- **HERE**.
- START.
- REJECT

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Question 20: FA accepts nothing if it has_____ final state(s).

- One
- Two
- Three
- Zero ⇦

Question 21: The choice of path taken at POP state to accommodate the word belonging to CFL can be determined by_____ derivation of the word.

- Right most.
- **Left most.**
- Middle.
- Random

Question 22: Pumping lemma for regular languages acts on_____while for CFLs it acts on____

- machines, states.
- grammar, states.
- machines, grammar.
- grammar, machines

Question 23: The STACK is never popped beneath_____symbol. Answer

- $
- *
- +
- -

Question 24: If a CFG in CNF has p live and a dead productions then all words generated without repeating any live production have at most_____letters.

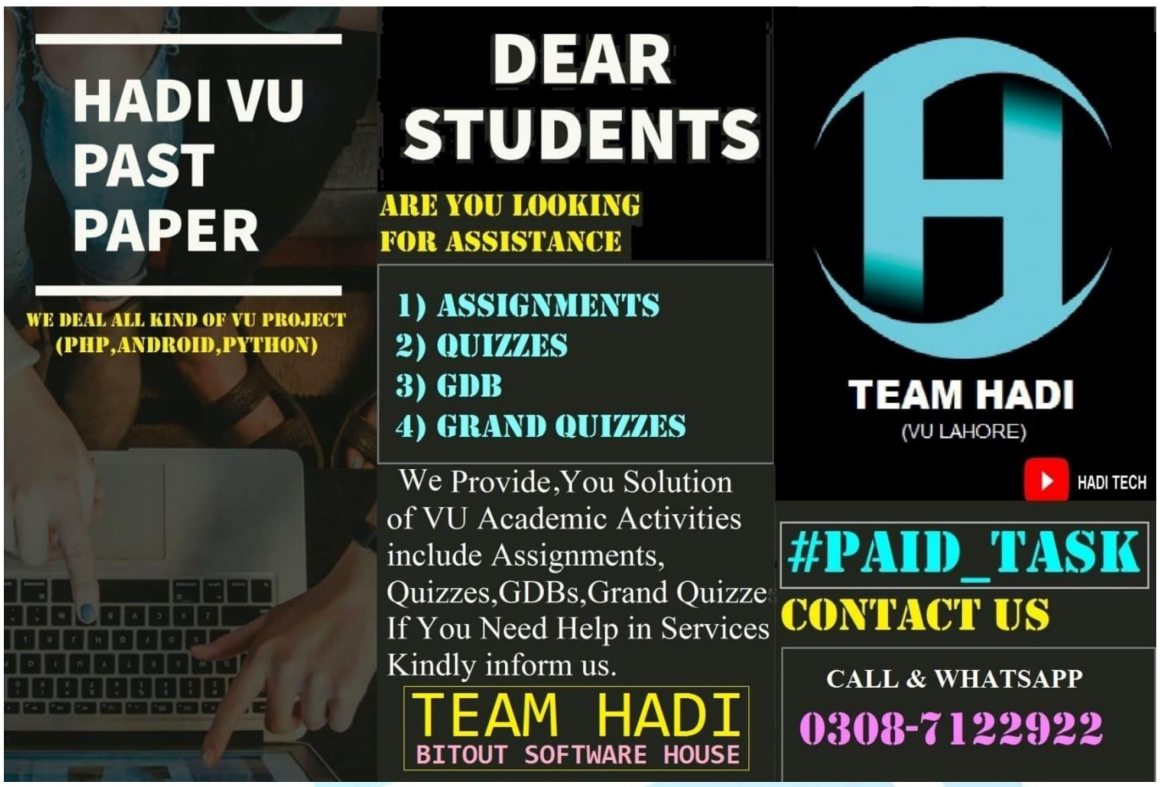
- P.
- **p+1**
- p+q+2
- q

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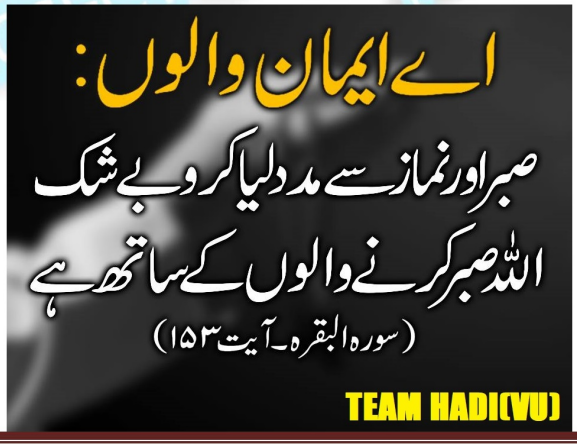
Question 25: In conversion form of PDA, there must be_____accept state(s) and_____reject state(s).

- zero, zero
- **one, zero**
- two, one
- three, two

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CS402 - Theory of Automata (Quiz# 03) Quiz Start Time: 11:33 AM, 04 July 2023

Question # 2 of 10 (Start time: 11:33:30 AM, 04 July 2023) **Total Marks:** 1

Subtraction of binary numbers is possible through:

Select the correct option

- ○ Complementing machine
- ○ Converting machine
- ◉ Both complementing and incrementing machine
- ○ Incrementing machine

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CS402 - Theory of Automata (Quiz# 03) **Quiz Start Time: 11:33 AM, 04 July 2023**

Question # 4 of 10 (Start time: 11:34:55 AM, 04 July 2023) **Total Marks:** 1

Which one of the following machine is represented as a pictorial representation with states and directed edges labeled by an input letter along with an output character?

Select the correct option

- ○ Finite state machine
- ◉ Mealy machine
- ○ Deterministic finite state machine
- ○ Moore machine

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CS402 - Theory of Automata (Quiz# 04) **Quiz Start Time: 09:39 AM, 21 July 2023**

Question # 6 of 10 (Start time: 09:43:38 AM, 21 July 2023) **Total Marks:** 1

To examine whether a certain FA accepts any words, it is required to seek the paths _____ state.

Select the correct option

- ○ from final to initial
- ○ from initial to initial back
- ○ from final to back final
- ◉ from initial to final

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CS402 - Theory of Automata (Quiz# 03) **Quiz Start Time: 11:24 AM, 04 July 2023**

Question # 2 of 10 (Start time: 11:24:58 AM, 04 July 2023) **Total Marks:** 1

Strings x,y,z belongs to Σ^* such that both xz or yz $\in$ L where L $\subseteq \Sigma^*$ are:

Select the correct option

- ○ Indistinguishable
- ○ Undetermined
- ◉ Distinguishable
- ○ Both distinguishable and indistinguishable

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CS402 - Theory of Automata (Quiz# 03) **Quiz Start Time: 11:33 AM, 04 July 2023**

Question # 1 of 10 (Start time: 11:33:03 AM, 04 July 2023) **Total Marks:** 1

In which of the following machine, the length of output string is 1 more than that of input string?

Select the correct option

- ○ Finite automaton with output
- ○ Non-deterministic finite automaton
- ○ Mealy machine
- ◉ Moore machine

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CS402 - Theory of Automata (Quiz# 04) **Quiz Start Time: 09:39 AM, 21 July 2023**

Question # 3 of 10 (Start time: 09:41:12 AM, 21 July 2023) **Total Marks:** 1

The CFG that generates the regular language is called _____.

Select the correct option

- finite automata
- regular grammar
- regular expression
- non-regular grammar

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CS402 - Theory of Automata (Quiz# 03) Quiz Start Time: 11:24 AM, 04 July 2023

Question # 7 of 10 (Start time: 11:28:12 AM, 04 July 2023) **Total Marks:** 1

Melay machine to increase the output string in magnitude by 1 is called:

Select the correct option

- ○ Converting machine
- ○ Decrementing machine
- ○ Complementing machine
- ◉ Incrementing machine

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CS402 - Theory of Automata (Quiz# 03) **Quiz Start Time: 11:24 AM, 04 July 2023**

Question # 9 of 10 (Start time: 11:29:42 AM, 04 July 2023) **Total Marks:** 1

If two finite state machines are equivalent, they should have the same number of _____

Select the correct option

- states and edges
- edges
- none of these
- states

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CS402 - Theory of Automata (Quiz# 04) **Quiz Start Time: 09:39 AM, 21 July 2023**

Question # 1 of 10 (Start time: 09:39:03 AM, 21 July 2023) **Total Marks:** 1

If a CFG has a null production, then it is _____.

Select the correct option

- ○ Called NULL CFG
- ○ Called Chmosky Normal Form (CNF)
- ◉ Possible to construct another CFG without null production accepting the same language with the exception of the word ^
- ○ Not possible to construct another CFG without null production accepting the same language with the exception of the word ^

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CS402 - Theory of Automata (Quiz# 04) **Quiz Start Time: 09:39 AM, 21 July 2023**

Question # 5 of 10 (Start time: 09:43:02 AM, 21 July 2023) **Total Marks:** 1

The basic approach of Myhill Nerode theorem is similar to the concept of:

Select the correct option

- ○ closure of FAs
- ○ distinguishable and indistinguishable strings
- ◉ concatenation of FAs
- ○ union of FAs

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CS402 - Theory of Automata (Quiz# 03) **Quiz Start Time: 11:33 AM, 04 July 2023**

Question # 7 of 10 (Start time: 11:36:21 AM, 04 July 2023) **Total Marks:** 1

Which of the following is used to delay the transmission of signal along the wire by one step (clock pulse)?

Select the correct option

- ○ Slow box
- ◉ Delay box
- ○ Holdup box
- ○ Reduce box

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CS402 - Theory of Automata (Quiz# 03) **Quiz Start Time: 11:24 AM, 04 July 2023**

Question # 8 of 10 (Start time: 11:28:47 AM, 04 July 2023) **Total Marks:** 1

Let L be the language of all strings, defined over $\Sigma = \{0,1\}$, ending in 111. Which of the following strings are distinguishable with respect to L with z being 11?

Select the correct option

- 111, 111
- 111, 101
- 001, 101
- 010, 101

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CS402 - Theory of Automata (Quiz# 03) **Quiz Start Time: 11:33 AM, 04 July 2023**

Question # 8 of 10 (Start time: 11:37:06 AM, 04 July 2023) **Total Marks:** 1

For a non-regular language, there exists _____ FA.

Select the correct option

- ○ one
- ○ at most one
- ◉ no
- ○ at least one

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CS402 - Theory of Automata (Quiz# 03) **Quiz Start Time: 11:24 AM, 04 July 2023**

Question # 6 of 10 (Start time: 11:27:28 AM, 04 July 2023) **Total Marks:** 1

Two machines are said to be equivalent if they print the _____ output string when the _____input string is run on them.

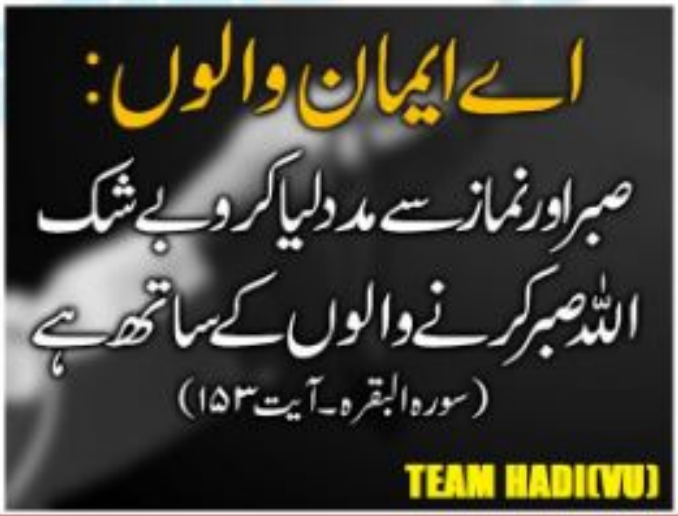
Select the correct option

- same, same
- unique, different
- same, different
- different, same

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Cs402

Theory of Automata

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❖ Final Term Short Notes	❖ Repeated Question	❖ Quiz File
❖ Mid Term Past Paper	❖ Solved Past Paper	❖ Accurate GDB
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- ***Moore and Melay machine***
- ***Complement of a language***
- ***Intersection of two regular languages***
- ***Regular and non-regular languages***
- ***Pumping Lemma Definition Equivalent languages***
- ***FA to CFG conversion***
- ***TG's corresponding to the Regular Grammar***
- ***Turing machine***

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Question No : 1 of 52 Marks: 1 (Budgeted Time 1 Min)

Which statement is true?

Answer (Please select your correct option)

VuAnswers.com

- ● All words are strings

Lec 1,page:4

- ○ All strings are words
- ○ Both are always same
- ○ All letter are string

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Question No : 2 of 52 Marks: 1 (Budgeted Time 1 Min)

If L1 and L2 are expressed by r1 and r2, respectively then the language expressed by (r1)(r2) will be _____

Answer (Please select your correct option)

VuAnswers.com

- ● Regular

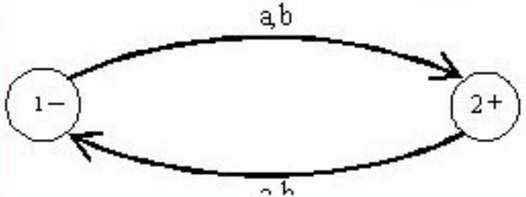
Lec:4,page:10

- ○ Ir-regular
- ○ Undermined
- ○ Such language does not exist

Made by: Waqar Siddhu

Question No : 3 of 52 Marks: 1 (Budgeted Time 1 Min)

Below given FA generates the language having strings of _____



Answer (Please select your correct option)

VuAnswers.com

- ● ODD length conceptual RE=(a+b)((a+b)(a+b))*
- ○ EVEN length
- ○ Equal number of a's and b's
- ○ Odd number of a's and b's

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Question No : 4 of 52 Marks: 1 (Budgeted Time 1 Min)

If an FA accepts no string, then language is denoted by _____

Answer (Please select your correct option)

VuAnswers.com

- {}
- Ø
- Both { } and Ø

Lec:6,page:16

- Null

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Question No : 5 of 52 Marks: 1 (Budgeted Time 1 Min)

Using tree structure, initial state can be represented by____

Answer (Please select your correct option)

VuAnswers.com

- An arrow

for J.C.Martin tree structure lec:7,page:18

- +
- -

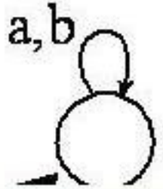
for simple tree structure lec:7,page:17

- *

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Question No : 6 of 52 Marks: 1 (Budgeted Time 1 Min)

Below given FA accepts _____ language.



Answer (Please select your correct option)

VuAnswers.com

page 17

- Finite
- Infinite
- No
- All

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Question No : 7 of 52 Marks: 1 (Budgeted Time 1 Min)

Even-palindrome is a _____ language

Answer (Please select your correct option)

VuAnswers.com

- non-regular

conceptual page 70

- regular
- regular but infinite
- regular but finite

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Question No : 8 of 52 Marks: 1 (Budgeted Time 1 Min)

If L1 and L2 are two regular languages, then _____ is/are also regular.

Answer (Please select your correct option)

VuAnswers.com

- ● Both $L1 \cup L2$, $L1 \cap L2$ concept
- ○ $L1^c \cap L2$
- ○ $L1 \cup L2$
- ○ $L1 \cap L2$

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Question No : 9 of 52 Marks: 1 (Budgeted Time 1 Min)

Consider the language L of strings, defined over Σ = {a,b}, ending in a

Answer (Please select your correct option)

VuAnswers.com

- (●) There are finite many classes generated by L, so L is regular

Lec:27,page:76

- ( ) There are infinite many classes generated by L, so L is regular
- ( ) There are finite many classes generated by L, so L is non-regular
- ( ) There are infinite many classes generated by L, so L is non-regular

Made by: Waqar Siddhu

Question No : 10 of 52 Marks: 1 (Budgeted Time 1 Min)

Pumping lemma is generally used to prove that:

Answer (Please select your correct option)

VuAnswers.com

- A given language is infinite
- A given language is not regular
- Whether two given regular expressions of a regular language are equivalent or not
- A given language is finite

Conceptual

Made by: Waqar Siddhu

Question No : 11 of 52 Marks: 1 (Budgeted Time 1 Min)

If the FA has N states, then test the words of length less than N. If any one word is accepted by this FA, then it will accept ____ word.

Answer (Please select your correct option)

VuAnswers.com

- (●) All
- ( ) No
- ( ) One
- ( ) Two

Lecture:30,page:85 concept

Made by: Waqar Siddhu

Question No : 12 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following pairs of regular expressions are equivalent?

Answer (Please select your correct option)

VuAnswers.com

- 1(001)* and (10)*10
- x(xx)* and (x)*x
- x^+ and x^*
- x^+ and x^*x^+

concept

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Question No : 13 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following pairs of regular expressions are not equivalent?

Answer (Please select your correct option)

VuAnswers.com

- (ab)* and a*b*
- x(xx)* and (xx)*x
- x^+ and x*x^+
- x(x)* and (x)*x

concept

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Question No : 14 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following statement is correct?

Answer (Please select your correct option)

VuAnswers.com

- (●) The length of output string is greater than length of input string in moore machine.
- ( ) The length of output string is greater than length of input string in mealy machine.
- ( ) The length of output string is equal to length of input string in moore machine.
- ( ) The length of output string is less than length of input string in mealy machine.

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Question No : 15 of 52 Marks: 1 (Budgeted Time 1 Min)

There exist _____ derivations of a certain word in ambiguous grammar.

Answer (Please select your correct option)

VuAnswers.com

- (●) more than one
- ( ) Exactly one
- ( ) exactly two
- ( ) no

Made by: Waqar Siddhu

Question No : 16 of 52 Marks: 1 (Budgeted Time 1 Min)

Which one of the following statements is INCORRECT:

Answer (Please select your correct option)

VuAnswers.com

- (a+b)*aa(a+b)* generates Regular language.
- A language consisting of all strings over ∑={a,b} having equal number of a's and b's is a regular language
- Every language that can be expressed by FA can also be expressed by RE
- None of these

Lec:26,page:73

Made by: Waqar Siddhu

Question No : 17 of 52 Marks: 1 (Budgeted Time 1 Min)

We can also represent an FA using different states e.g. Accept state, Reject state, Read State etc.
The _____ state behaves as final state of an FA.

Answer (Please select your correct option)

VuAnswers.com

- Accept

Lec:37,page:105

- Pop
- Push
- Reject

Made by: Waqar Siddhu

Question No : 18 of 52 Marks: 1 (Budgeted Time 1 Min)

CYK algorithm was invented by John Cocke and later was published by ____

Answer (Please select your correct option)

VuAnswers.com

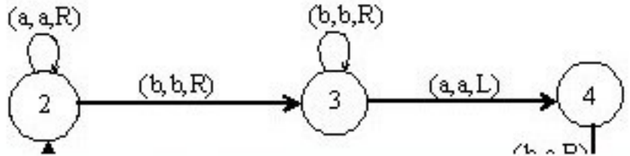
- Talik Khon and Daniel H
- Tandao Kasami and Daniel H
- Tandao Dagger and Daniel H
- Talik Khon

Lec:44,page:135

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Question No : 19 of 52 Marks: 1 (Budgeted Time 1 Min)

Consider the following TM



Answer (Please select your correct option)

VuAnswers.com

- Above TM accepts the non-CFL {a b c}.
- Above TM accepts the non-CFL $\{a^n b^n a^n\}$.
- Above TM accepts the non-CFL $\{a^n b^{n+2} a^n\}$.
- Above TM accepts the non-CFL $\{a^{n+2} b^n a^n\}$.

Lec:45,page:142

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Question No : 20 of 52 Marks: 1 (Budgeted Time 1 Min)

Σ= {a,b} then string abbabb has length equal to _____.

Answer (Please select your correct option)

VuAnswers.com

- Three
- Four
- Five
- Six

No.of letters in string=length

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Question No : 21 of 52 Marks: 1 (Budgeted Time 1 Min)

The language generated by CFG is called _____.

Answer (Please select your correct option)

VuAnswers.com

- Infinite
- Context Free Language (CFL) Lec:31,page:83
- Regular
- Finite

Made by: Waqar Siddhu

Question No : 22 of 52 Marks: 1 (Budgeted Time 1 Min)

If r1 and r2 are regular expressions then (r1) (r2) is a _____ .

Answer (Please select your correct option)

VuAnswers.com

- RE

Lec:3,page:9

- TG
- FA
- GTG

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Question No : 23 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following is RE for a language defined over Σ={a,b} having words starting with a:

Answer (Please select your correct option)

VuAnswers.com

- (a + b)*
- aa(a + b)+
- a(a + b)* lec:4,page:12
- a*(a + b)

Made by: Waqar Siddhu

Question No : 24 of 52 Marks: 1 (Budgeted Time 1 Min)

The _____ machine helps in building a machine that can perform the addition of binary numbers.

Answer (Please select your correct option)

VuAnswers.com

- ● Incrementing

lec:22,page:60

- ○ Complementing
- ○ Decrementing
- ○ Multiplication

Made by: Waqar Siddhu

Question No : 25 of 52 Marks: 1 (Budgeted Time 1 Min)

Left hand side of a production in Conext free grammer (CFG) consists of _____.

Answer (Please select your correct option)

VuAnswers.com

- One terminal
- More than one terminal
- One non-terminal

Lec:31,page:87

- Terminals and non-terminals

Made by: Waqar Siddhu

Question No : 26 of 52 Marks: 1 (Budgeted Time 1 Min)

A regular language _____ .

Answer (Please select your correct option)

VuAnswers.com

- Must be finite
- Must be infinite
- Can be finite or infinite

concept

- Complex Language

Made by: Waqar Siddhu

Question No : 27 of 52 Marks: 1 (Budgeted Time 1 Min)

If a language can be expressed by a regular expression, then its complement is _____ .

Answer (Please select your correct option)

VuAnswers.com

- (●) Regular lec:23,page:66
- ( ) Non Regular
- ( ) Finite
- ( ) Infinite

Made by: Waqar Siddhu

Question No : 28 of 52 Marks: 1 (Budgeted Time 1 Min)

If a given Context Free grammar (CFG) contains a production of the form S→Λ, then _____

Answer (Please select your correct option)

VuAnswers.com

- ● The corresponding CFL is not empty.
- ○ The corresponding CFL is empty.
- ○ The corresponding CFL is not empty if the language is regular
- ○ The corresponding CFL is empty and non regular.

concept

Made by: Waqar Siddhu

Question No : 29 of 52 Marks: 1 (Budgeted Time 1 Min)

Can a turing machine's head ever be in the same location in two successive steps?

Answer (Please select your correct option)

VuAnswers.com

- Yes
- Yes but only in finite languages
- No
- Yes but only in infinite langauges

Made by: Waqar Siddhu

Question No : 30 of 52 Marks: 1 (Budgeted Time 1 Min)

In _____ there are Finite set of states containing exactly one START state and some (may be none) HALT states that cause execution to terminate, when the HALT states are entered.

Answer (Please select your correct option)

VuAnswers.com

- TG
- Turing Machine
- GTG
- Finite Automata

Lec 45

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Question No : 31 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following statement(s) is/are true or false?

1) The turing machine is similar to a finite automaton but with an unlimited and unrestricted memory.
2) A Turing machine is a much more accurate model of a general purpose computer.

Answer (Please select your correct option)

VuAnswers.com

- (●) Statement 1 is true
- ( ) Statement 2 is true
- ( ) Both statements (1 & 2) are false
- ( ) Statement 2 is false

Both statements true

Made by: Waqar Siddhu

Question No : 32 of 52 Marks: 1 (Budgeted Time 1 Min)

We can have more than one parse trees for a given string in case of _____ Context Free Grammar (CFG).

Answer (Please select your correct option)

VuAnswers.com

- vague
- ambiguous Lec:33,page:95
- hazy
- simple

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Question No : 33 of 52 Marks: 1 (Budgeted Time 1 Min)

The language of $a^n b^n$ can be expressed by:

Answer (Please select your correct option)

VuAnswers.com

- FA
- TG
- GTG
- PDA

concept (non regular language)

Made by: Waqar Siddhu

Question No : 34 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following theorem partitions Σ^* into distinct classes?

Answer (Please select your correct option)

VuAnswers.com

- Decidability theorem
- Myhill Nerode theorem
- Kleen's theorem
- Emptiness theorem

Lec:27,page:75

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Question No : 35 of 52 Marks: 1 (Budgeted Time 1 Min)

The languages are supposed to be _____ in case of testing pumping lemma.

Answer (Please select your correct option)

VuAnswers.com

- context free
- irregular
- both regular and irregular
- regular

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Question No : 36 of 52 Marks: 1 (Budgeted Time 1 Min)

Consider the following Context Free Grammar (CFG):

S → SX|XY
X → ZZ
Y → 1
Z → 0

Answer (Please select your correct option)

VuAnswers.com

- 00100
- 0010000
- 001
- 00010

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Question No : 37 of 52 Marks: 1 (Budgeted Time 1 Min)

A read state can have _____ outgoing edge/ edges.

Answer (Please select your correct option)

VuAnswers.com

- 1
- 2
- 3
- Any number of

Lec:38,page:112

Made by: Waqar Siddhu

Question No : 38 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following states do not have outgoing edges:

Answer (Please select your correct option)

VuAnswers.com

- Start
- Read
- Pop
- Accept

Lecture 37

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Question No : 39 of 52 Marks: 1 (Budgeted Time 1 Min)

Consider the following Context Free Grammar (CFG):

S---->01A

A---->10B

B---->0A|11

Answer (Please select your correct option)

VuAnswers.com

- ● 011011
- ○ 011011011
- ○ 011001011
- ○ 011001001011

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Let us consider the following Turing machine (™):

(y, Y, R)

(f, f, R)

(f, f, L)

(y, y, L)

Answer (Please select your correct option)

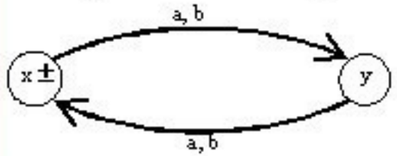
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- fffgggg
- fffggggf
- fffggg
- ffffggg

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Question No : 2 of 52 Marks: 1 (Budgeted Time 1 Min)

Below given FA can be represented by



Answer (Please select your correct option)

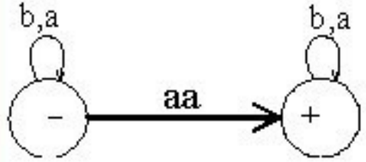
VuAnswers.com

- ((a+ b) (a + b))* lec:5 ,page:13
- (a + b)(a + b)*
- (a + b)(a + b)
- (a + b)*(a + b)*

Made by: Waqar Siddhu

Question No : 3 of 52 Marks: 1 (Budgeted Time 1 Min)

Below given TG has _____ RE.



Answer (Please select your correct option)

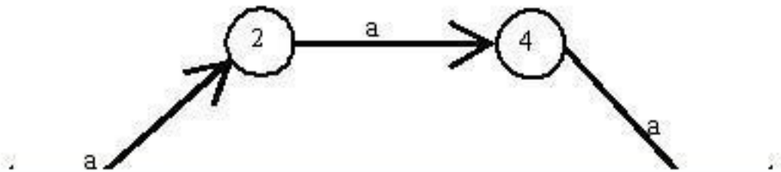
VuAnswers.com

- (b+a) (aa) (b+a)*
- (a+b) (aa) (a+b)*
- (a+b)* (aa) (a+b)* lec:8,page:20
- (a+b)* (aa) (a+b)

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Question No : 4 of 52 Marks: 1 (Budgeted Time 1 Min)

Below given TG's are _____.



Answer (Please select your correct option)

VuAnswers.com

- non-symmetric
- Equivalent page 21
- Non-equivalent
- TG's are not valid

Made by: Waqar Siddhu

Question No : 5 of 52 Marks: 1 (Budgeted Time 1 Min)

"One GTG can generate _____ language".

Answer (Please select your correct option)

VuAnswers.com

- more than one
- only one
- only two
- only three

Concept

Made by: Waqar Siddhu

Question No : 6 of 52 Marks: 1 (Budgeted Time 1 Min)

Even-palindrome is a _____ language

Answer (Please select your correct option)

VuAnswers.com

- ● non-regular

Lec:25,page:71

- ○ regular
- ○ regular but infinite
- ○ regular but finite

Made by: Waqar Siddhu

Question No : 7 of 52 Marks: 1 (Budgeted Time 1 Min)

If L1 and L2 are two regular languages, then _____ is/are also regular.

Answer (Please select your correct option)

VuAnswers.com

- ● Both $L1 \cup L2$, $L1 \cap L2$ lec 24,page 65 L1+L2= L1UL2 and on page 67
- ○ $L1^c \cap L2$
- ○ $L1 \cup L2$
- ○ $L1 \cap L2$

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Question No : 8 of 52 Marks: 1 (Budgeted Time 1 Min)

If the FA has N states, then test the words of length less than N. If any one word is accepted by this FA, then it will accept ____ word.

Answer (Please select your correct option)

VuAnswers.com

- ● All
- ○ No
- ○ One
- ○ Two

Lec:30,page:85 concept

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Question No : 9 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following pairs of regular expressions are equivalent?

Answer (Please select your correct option)

VuAnswers.com

- 1(001)* and (10)*10
- x(xx)* and (x)*x
- x^+ and x*
- x^+ and x^*x^+

concept

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Question No : 10 of 52 Marks: 1 (Budgeted Time 1 Min)

An alphabet of Σ is valid if

Answer (Please select your correct option)

VuAnswers.com

- No letter of Σ appears in middle of any other letter
- No letter of Σ appears at end of any other letter
- ● No letter of Σ appears at start of any other letter

Lec:1,page:4

- No letter of Σ appears at end or middle of any other letter

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Question No : 11 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following pairs of regular expressions are not equivalent?

Answer (Please select your correct option)

VuAnswers.com

- (ab)* and a*b*
- x(xx)* and (xx)*x
- x^+ and x*x^+
- x(x)* and (x)*x

Concept

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Question No : 12 of 52 Marks: 1 (Budgeted Time 1 Min)

There exist _____ derivations of a certain word in ambiguous grammar.

Answer (Please select your correct option)

VuAnswers.com

- ● more than one
- ○ Exactly one
- ○ exactly two
- ○ no

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Question No : 13 of 52 Marks: 1 (Budgeted Time 1 Min)

Regular languages are closed under _____

Answer (Please select your correct option)

VuAnswers.com

- ● Union and Concatenation

Concept

- ○ Union and Division
- ○ Union and Exponent
- ○ Union and Factorial

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Question No : 14 of 52 Marks: 1 (Budgeted Time 1 Min)

Which one of the following statements is INCORRECT:

Answer (Please select your correct option)

VuAnswers.com

- (●) A language consisting of all strings over ∑={a,b} having equal number of a's and b's is a regular language

Lec:26,page:73

- ( ) Every language that can be expressed by FA can also be expressed by RE
- ( ) None of these
- ( ) (a+b)*aa(a+b)* generates Regular language.

Made by: Waqar Siddhu

Question No : 15 of 52 Marks: 1 (Budgeted Time 1 Min)

TM is more powerful than FSM because

Answer (Please select your correct option)

VuAnswers.com

- The tape movement is confined to one direction
- It has no finite state control
- It has the capability to remember arbitrary long sequences of input symbols
- The tape movement is confined to more than one directions

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Question No : 16 of 52 Marks: 1 (Budgeted Time 1 Min)

CYK algorithm was invented by John Cocke and later was published by ____

Answer (Please select your correct option)

VuAnswers.com

- Talik Khon and Daniel H
- Tandao Kasami and Daniel H
- Tandao Dagger and Daniel H
- Talik Khon

lec:44,page:135

Made by: Waqar Siddhu

Question No : 17 of 52 Marks: 1 (Budgeted Time 1 Min)

The process of finding the derivation of word generated by particular grammar is called_____

Answer (Please select your correct option)

VuAnswers.com

- Processing
- Parsing
- Programming
- Planing

Lec:44,page:136

Made by: Waqar Siddhu

Question No : 18 of 52 Marks: 1 (Budgeted Time 1 Min)

There are different parsing techniques, including _____

Answer (Please select your correct option)

VuAnswers.com

- Top down parsing
- Bottom up parsing
- Parsing technique for particular grammar of arithmetic expression
- All of these

Lec:44,page:136

Made by: Waqar Siddhu

Question No : 19 of 52 Marks: 1 (Budgeted Time 1 Min)

Σ={a,Aa,Abb}, then string aAaAbbAa has length equal to_____.

Answer (Please select your correct option)

VuAnswers.com

- Three
- Four
- One
- Two

concept

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Question No : 20 of 52 Marks: 1 (Budgeted Time 1 Min)

The language generated by CFG is called _____.

Answer (Please select your correct option)

VuAnswers.com

- Infinite
- Context Free Language (CFL) Lec:31,page:88
- Regular
- Finite

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Question No : 21 of 52 Marks: 1 (Budgeted Time 1 Min)

In _____ there must be transition for all letters.

Answer (Please select your correct option)

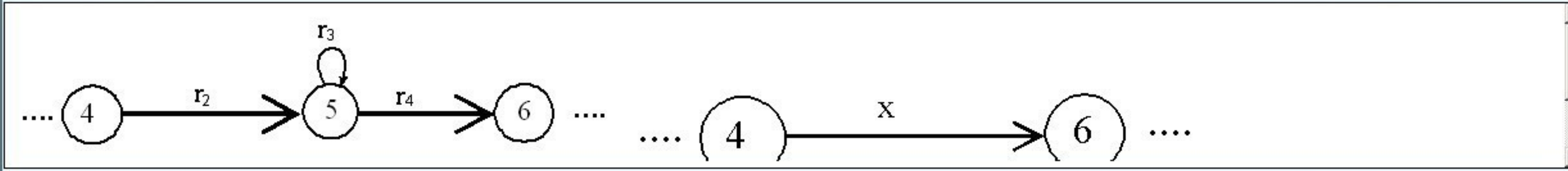
VuAnswers.com

- NFA
- FA
- TG
- GTG

Lec:4,page:11

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Question No : 22 of 52 Marks: 1 (Budgeted Time 1 Min)



Answer (Please select your correct option)

VuAnswers.com

- r1* r2 r3*
- (r1r2r3)*
- r1*r2*r3*
- None of the given

incomplete Q..RE of ist is r2r3*r4

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Question No : 23 of 52 Marks: 1 (Budgeted Time 1 Min)

A regular language _____ .

Answer (Please select your correct option)

VuAnswers.com

- Must be finite
- Must be infinite
- Can be finite or infinite

concept

- Complex Language

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Question No : 24 of 52 Marks: 1 (Budgeted Time 1 Min)

If a language can be expressed by a regular expression, then its complement is _____ .

Answer (Please select your correct option)

VuAnswers.com

- ● Regular Lec:24,page:66
- ○ Non Regular
- ○ Finite
- ○ Infinite

Made by: Waqar Siddhu

Question No : 25 of 52 Marks: 1 (Budgeted Time 1 Min)

For every Context Free Grammar (CFG), we can make the corresponding _____.

Answer (Please select your correct option)

VuAnswers.com

- FA
- TG
- PDA

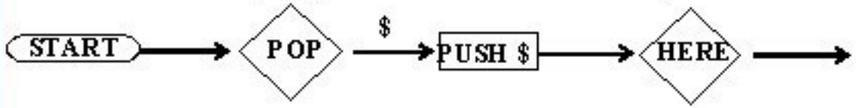
Lec:39,page:111

- Regular Grammar

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Question No : 26 of 52 Marks: 1 (Budgeted Time 1 Min)

Look at the following diagram and select the correct option:



Answer (Please select your correct option)

VuAnswers.com

- The PDA must not begin with the sequence
- The PDA may begin with the sequence
- The PDA must begin with the sequence

Lec:40,page:119

- The PDA may not begin with the sequence

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Question No : 27 of 52 Marks: 1 (Budgeted Time 1 Min)

Consider the following Context Free Grammar (CFG) and select the correct choice
S→AB
A →BSB | a | b
B→CC
C→SS | b | bb

Answer (Please select your correct option)

VuAnswers.com

- (●) abb is a word in the corresponding CFL.
- ( ) abb is not the word of corresponding CFL.
- ( ) Any word can be accepted from the corresponding CFL.
- ( ) b is a word in the corresponding CFL.

concept

Made by: Waqar Siddhu

Question No : 28 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following statement(s) is/are true or false?

1) The turing machine is similar to a finite automaton but with an unlimited and unrestricted memory.
2) A Turing machine is a much more accurate model of a general purpose computer.

Answer (Please select your correct option)

VuAnswers.com

- Statement 1 is true
- Statement 2 is true
- Both statements (1 & 2) are false
- Statement 2 is false

Mentioned in lec 45

Both are true..check link in moazz file

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Question No : 29 of 52 Marks: 1 (Budgeted Time 1 Min)

Language of strings having even number of a's is considered to be:

Answer (Please select your correct option)

VuAnswers.com

- (●) Regular

Lec:3,page:9

- ( ) Irrelgular
- ( ) Irregular and infinite
- ( ) Irregular and finite

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Question No : 30 of 52 Marks: 1 (Budgeted Time 1 Min)

If we have two transiton graphs then their union will be expressed by:

Answer (Please select your correct option)

VuAnswers.com

- [x] taking a common start state and joining them by two null transitions

Lec:24,page:65

- [ ] just connecting both start states by null transitions
- [ ] connecting final state of first TG to the initial state of second TG
- [ ] connecting the final state of first TG to the final state of second TG

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Question No : 31 of 52 Marks: 1 (Budgeted Time 1 Min)

A language of strings of prime length is considered to be:

Answer (Please select your correct option)

VuAnswers.com

- regular but infinite
- regular
- irregular Lec:27,page:75
- regular but finite

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Question No : 32 of 52 Marks: 1 (Budgeted Time 1 Min)

_____ and _____ are removed in order to make a CFG in Chomsky Normal Form (CNF).

Answer (Please select your correct option)

VuAnswers.com

- Null, nullable productions
- Nullable, unit productions
- Null, unit productions

Lec:36,page:102

- Strings of length 0, null

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Question No : 33 of 52 Marks: 1 (Budgeted Time 1 Min)

The languages are supposed to be _____ in case of testing pumping lemma.

Answer (Please select your correct option)

VuAnswers.com

- context free
- irregular
- both regular and irregular
- regular

mentioned in video lec:27 :P can check exm

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Question No : 34 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following refers to an effectively solvable problem having answer in "Yes" or "No"?

Answer (Please select your correct option)

VuAnswers.com

- ● Decision procedure

Lec:29,page:80

- ○ Logical problem
- ○ Analytical problem
- ○ Binary procedure

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Question No : 35 of 52 Marks: 1 (Budgeted Time 1 Min)

Consider the following Context Free Grammar (CFG):

S ---> SX|XY
X ---> ZZ
Y ---> 0
Z ---> 1

Answer (Please select your correct option)

VuAnswers.com

- [x] 110
- [ ] 11011
- [ ] 1101111
- [ ] 11101

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Question No : 36 of 52 Marks: 1 (Budgeted Time 1 Min)

Consider the following Context Free Grammar (CFG):

S → SX|XY
X → ZZ
Y → 1
Z → 0

Answer (Please select your correct option)

VuAnswers.com

- (●) 001
- ( ) 00010
- ( ) 0010000
- ( ) 00100

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Question No : 37 of 52 Marks: 1 (Budgeted Time 1 Min)

Which of the following is a regular Context Free Grammar:

Answer (Please select your correct option)

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- S→abS | baS | ^
- S→aSb | baS |^
- S→abS | bSa | ^
- S→aSb | Sa | ^

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Question No : 38 of 52 Marks: 1 (Budgeted Time 1 Min)

Concatenation of r1 and r2 will be shown as:

Answer (Please select your correct option)

VuAnswers.com

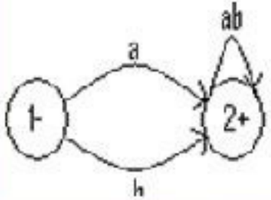
- r1+r2
- r2+r1
- r2r1
- r1r2

Lec:13,page:35

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Question No : 19 of 26 Marks: 1 (Budgeted Time 1 Min)

How many steps are required to convert the given transition graph into a regular expression?



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Answer (Please select your correct option)

- 1 step
- 2 steps firstly a & b combine to form a+b and in 2nd step loop of ab combine =(a+b)ab*
- 3 steps
- 4 steps

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Question No : 39 of 52 Marks: 1 (Budgeted Time 1 Min)

A nonterminal is said to be self-embedded, if in a given derivation of a word, it ever occurs as a tree _____ of itself.

Answer (Please select your correct option)

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- ascendant
- descendant

Lec:43,page:127

- top
- bottom

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Question No : 40 of 52 Marks: 1 (Budgeted Time 1 Min)

_____ is always Deterministic.

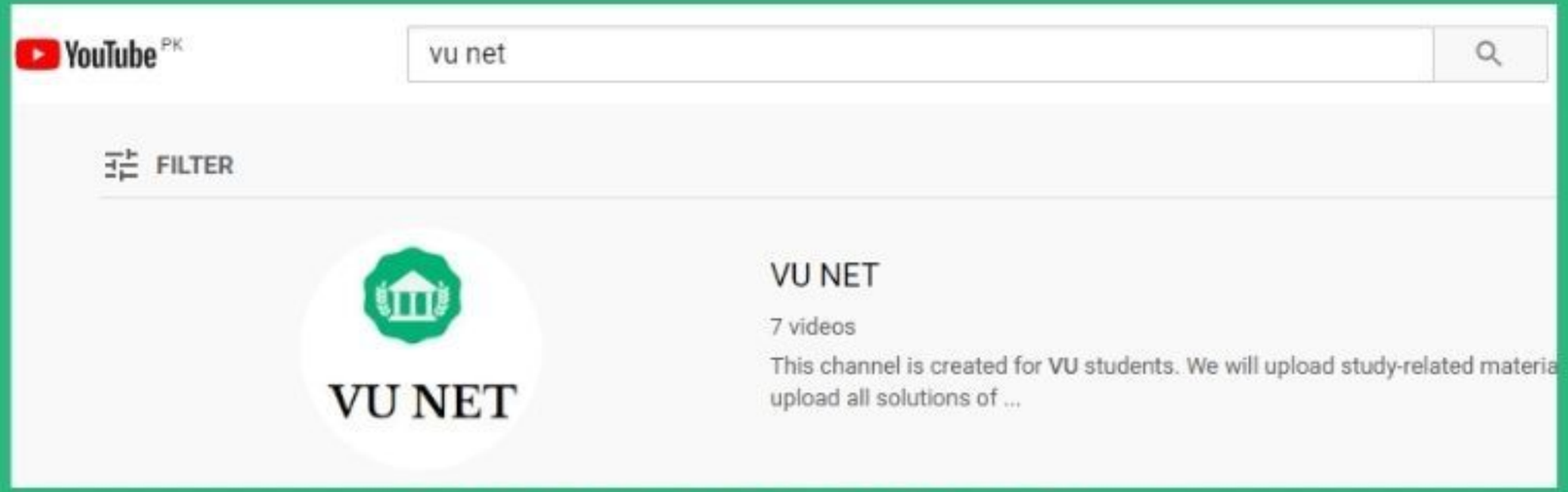
Answer (Please select your correct option)

VuAnswers.com

- Finite Automaton lec:10,page:25
- Transition Graph
- Generalize Transition Graph
- Non-deterministic finite automaton

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ALL answers are verified if found any mistake then Correct ACCORDINGLY

1. If Σ = {aa, bb} , then Σ* will not contain
- **aaabbb**
- aabbbb
- aabbaa
- bbaabbbb
2. "One language can have _____ TG"s".
- Only one
- Only two
- **More than one**
- Only three
3. According to 1st part of the Kleene"s theorem, If a language can be accepted by an FA then it can be accepted by a _____ as well.
- FA
- CFG
- GTG
- **TG**
4. Even-palindrome is a _____ language.
- **Non-regular**
- Regular
- Regular but infinite
- Regular but finite
5. If L is a regular language then, Lc is also a _____ language.
- **Regular (Page 66)**
- Non-regular
- Regular but finite

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- None of the given

6. Pumping lemma is generally used to prove that:

- A given language is infinite
- **A given language is not regular**
- Whether two given regular expressions of a regular language are equivalent or not
- None of these

7. the FA has N states, then test the words of length less than N. If no word is accepted by this FA, then it will _____ word/words.

- accept all
- **accept no (Page 85)**
- accept some
- reject no

8. In CFG, the symbols that can't be replaced by anything are called_____.

- **Terminal (Page 87)**
- Non-Terminal
- Production
- All of given

9. Which of the following is a regular language?

- **String of odd number of zeroes**
- Set of all palindromes made up of 0"s and 1"s
- String of 0"s whose length is a prime number
- All of these

10. Which of the following pairs of regular expressions are equivalent?

- 1(001)* and (10)*10
- **x(xx)* and (x)*x**
- X + and X*
- X + and X* X +

11. An alphabet of Σ is valid if

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- No letter of Σ appears in middle of any other letter
- No letter of Σ appears at end of any other letter
- **No letter of Σ appears at start of any other letter**
- No letter of Σ appears at end or middle of any other letter

12. Which of the following statement is true

- **The length of the output string is greater than length of input string in moore machine.**
- The length of the output string is greater than length of input string in mealy machine.
- The length of the output string is equal to length of input string in moore machine.
- The length of the output string is less than length of input string in mealy machine.

13. If a CFG has only productions of the form nonterminal → string of two nonterminals or nonterminal → one terminal then the CFG is said to be in _____

- **Chomsky Normal Form**
- Ambiguous Form
- Left Aligned Form
- Right Aligned Form

14. We can also represent an FA using different states e.g Accept state; Reject state, Read state etc. The _____ state behaves as final state of an FA

- **Accept (Page 105)**
- Pop
- Push
- Reject

15. where the input string is placed before it is run, is called _____

- Date tape
- **Input Tape (Page 105)**
- Output Tape

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- Magnetic tape

16. An FSM can be considered as TM

- Of finite tape length, rewinding capability and unidirectional tape movement
- Of finite tape length, without rewinding capability and bidirectional tape movement
- Of finite tape length, rewinding capability and bidirectional tape movement
- **Of finite tape length, without rewinding capability and unidirectional tape movement**

17. The process of finding the derivation of the word generated by particular grammar is called _____

- Processing
- **Parsing (Page 136)**
- Programming
- Planning

18. The first rule of converting the given "CFG in CNF", is _____

- CNK algorithm
- **CYK algorithm (Page 135) Algorithm 4 (The CYK algorithm)**
- CKY algorithm
- KYC algorithm

19. Alphabet Σ = {a, bc, cc} has number of letters

- One
- Two
- **Three**
- Four

20. We cannot write regular expressions for all _____.

- FA"s
- TG"s
- NFA"s
- **CFG's (Page 97)**

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21. For every Context Free Grammar (CFG), we can make the corresponding _____.

- FA
- TG
- **PDA**
- Regular Grammar

22. Pumping Lemma II says that length(x) + length(y) should be _____.

- **Less than number of states (Page 75)**
- Equal to number of states
- Greater than number of states
- Greater than or equal to number of states

23. Chomsky normal form (CYK) algorithm was proposed by _____.

- **John cock (Page 135)**
- James Cock
- Daniel I.A.
- John Weiss

24. The language of Palindromes defined over an alphabet set {a, b} can be recognized by _____.

- FA
- NFA
- TG
- **PDA**

25. Which of the following is the first phase of compiler on the basis of functionality?

- Parser
- Lexical analyzer
- **Scanner**
- Interpreter

26. (Σ* - L) represent the _____ of a language L.

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- **Complement (Page 66)**
- Kleene‟s closure
- Union
- intersection

27. If we have two transition graphs then their union will be expressed by

- **taking a common start state and joining them by two null transitions (Page 65)**
- just connecting both start states by null transitions
- connecting final state of first TG to the initial state of second TG
- connecting the final state of first TG to the final state of second TG

28. _____ and _____ are removed in order to make a CFG in Chomsky Normal Form(CNF).

- Null, nullable productions
- Nullable , unit productions
- **Null, unit productions (Page 102)**
- String of length 0, null

29. If L1 and L2 are expressed by regular languages then L1 + L2 is also a_____ Language.

- **Regular (Page 10)**
- Ir-regular
- PDA
- Hybrid

30. Which of the following is a regular Context Free Grammar:

- **S → abS| baS | ^ ab(ab+ba)*ba + ba(ab+ba)*ab**
- S → aSb| baS | ^
- S → abS| bSa | ^
- S → aSb| Sa | ^

31. A read state can have _____ outgoing edge/ edges.

- 1
- 2

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- 3
- **Any number of (Page 111)**

32. Who did not invent the Turing machine?

- Alan Turing
- **A. M. Turing (Page 140)**
- Turing
- None of these

33. Which statement is true?

- **The tape of turing machine is infinite. (Page 140)**
- The tape of turing machine is finite.
- The tape of turing machine is infinite when the language is regular
- The tape of turing machine is finite when the language is nonregular.

34. Every regular expression can be expressed as CFG but every CFG cannot be expressed as a regular expression. This statement is:

- Depends on the language
- None of the given options
- **True (Page 97)**
- False

35. Consider the language L of strings, defined over Σ = {a,b}, ending in a

- **There are finite many classes generated by L, so L is regular (Page 76)**
- There are infinite many classes generated by L, so L is regular
- There are finite many classes generated by L, so L is non-regular
- There are infinite many classes generated by L, so L is non-regular

36. The word „formal" in formal languages means

► The symbols used have well defined meaning

► They are unnecessary, in reality

► **Only the form of the string of symbols is significant**

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► None of these

37. Let A = {0, 1}. The number of possible strings of length „n“ that can be formed by the elements of the set A is

► n!

► n2

► nm

► 2n

38. Choose the correct statement.

► A Mealy machine generates no language as such

► A Moore machine generates no language as such

► A Mealy machine has no terminal state

► All of these

39. TM is more powerful than FSM because

► The tape movement is confined to one direction

► It has no finite state control

► It has the capability to remember arbitrary long sequences of input symbols

► None of these

40. Like TG, a PDA can also be non-deterministic

- **True (Page 111)**
- False

41. The language of all words (made up of a“s and b“s) with at least two a“s can not be described by the regular expression.

- a(a+b)*a(a+b)*(a+b)*ab*

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- (a+b)* ab* a(a+b)*
- b*ab* a(a+b)*
- **none of these**

42. If L is a regular language then, Lc is also a _____ language.

- **Regular (Page 66) rep**
- Non-regular
- Regular but finite
- None of the given

43. In CFG, the symbols that can‟t be replaced by anything are called___

- **Terminal (Page 87) rep**
- Non-Terminal
- Production
- All of given

44. Which of the following is NOT a regular language?

- String of 0‟s whose length is a perfect squere
- Set of all palindromes made up of 0‟s and 1‟s
- String of 0‟s whose length is a prime number
- **All of the given options**

45. Choose the incorrect (FALSE) statement.

- A Mealy machine generates no language as such
- A Mealy machine has no terminal state
- **For a given input string, length of the output string generated by a Moore machine is not more than the length of the output string generated by that of a Mealy machine**
- All of these

46. Choose the incorrect statement:

- (a+b)*aa(a+b)* generates Regular language.
- **A language consisting of all strings over ∑={a,b} having equal number of a's and b's is a regular language**

- Every language that can be expressed by FA can also be expressed by RE
- None of these

47. Left hand side of a production in CFG consists of:

- One terminal
- More than one terminal
- **One non-terminal (Page 87)**
- Terminals and non-terminals

48. PDA is only used to represent a regular language.

- True
- **False**

49. A production of the form non-terminal ∅ string of two non-terminal is called a live Production.

- **True (Page 127)**
- False

50. We can find a CFG corresponding to a DFA.

- **True (Page 97)**
- False

51. START, READ, HERE and ACCEPTS are conversions of the machine

- **True (Page 122)**
- False

52. A CFG is said to be ambiguous if there exists at least one word of its language that can be generated by different production trees

- **True (Page 95)**
- False

53. Syntax tree or Generation tree or Derivation tree are same tree

- **True (Page 92)**
- False

54. The symbols that cannot be replaced by anything are called terminals

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- **True (Page 87) repeat**
- False

55. The production of the form non-terminal ∅ one non-terminal is called unit production

- **True (Page 100)**
- False

56. DFA and PDA are equal in power.

- True
- **False (Page 105)**

57. A production of the form non-terminal ∅ non-terminal is called a dead Production.

- True
- **False (Page 127)**

58. Semi-word is a string having some terminals and one non-terminal at the right of string.

- **True (Page 97)**
- False

59. Two FAs are equivalent if they have same no. of states.

- **True (Page 15)**
- False

60. There exist exactly two different derivations in an ambiguous CFG for a word.

- **True (Page 93)**
- False

61. Regular languages are closed under Union, Concatenation and Kleene star.

- **True (Page 10)**
- False

62. CFG may also represent a regular language.

- **True (Page 97)**

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- False

63. PDA is stronger than FA.

- **True (Page 105)**
- False

64. A Total Language Tree has

- All languages over Σ
- **All strings over Σ (Page 96)**
- All words of all languages over Σ
- All words of one language over Σ

65. What Turing Machine does not have?

- Stack
- Tape
- Head
- **Word**

66. CFG given S ∅ bS|Sb|aa represents language b*aa

- aab*
- b*aab*
- **b*(aa)*b***

67. The values of input (say a & b) does not remain same in one cycle due to

- NAND gate
- Click plus
- OR gate
- **NOT gate**

68. Set of all palindromes over {a,b}is regular

- True
- **False (Page 74)**

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69. In CFG, the symbols that cannot be replaced by anything are called

- **Terminals (Page 87) rep**
- Non terminals
- Productions
- None of the given options

70. a^n b^n generates the …… language

- regular
- non regular
- **EQUAL and non regular (Page 71)**
- EQUAL and regular

71. The grammatical rules which involves meaning of words are called:

- **Semantic (Page 87)**
- Sytactics
- Alphabets
- None of the given options

72. If an FA has N state then it must accept the word of length

- **N-1**
- N+1
- N+2N

73. Two languages are said to belong to same class if they end in the same state when they run over an FA, that state

- Must be final state
- **May be final state or not (Page 75)**
- May be start or not
- None of the given options

74. In pref(Q in R) Q is …… to (than) R

- Equal
- **Not Equal (Page 79)**
- Greater

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- Smaller

75. According to Myhill Nerode theorem, if L generates finite no. of classes then L is.....

- Finite
- Infinite
- **Regular (Page 76)**
- Non Regular

76. If the intersection of two regular languages is regular then the complement of the intersection of these two languages is also regular

- **True (Page 68)**
- False

77. In pumping lemma theorem (x y^n z) the range of n is

- **n=1,2,3,4..... (Page 74)**
- n=0,1,2,3,4....
- n=-3,-2,-1,0,1,2,3,4.....
- n=-3,-2,-1,1,2,3,4.....

78. The complement of a regular language is also a regular

- **True repeat**
- False

79. For a non regular language there exist …… FA

- One
- At least one
- At most one
- **No (Page 71)**

80. The strings or words which do not belong to a language is called……. of that language

- Intersection
- Union
- **Complement (Page 66)**
- Quotient

81. A non regular language can be represented by

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- RE
- FA
- TG
- **None of the given options (Page 71)**

82. For language L defined over {a, b},then L partitions {a, b}* into …… classes

- Infinite
- Finite
- **Distinct (Page 75)**
- Non distinct

83. If an FA accept a word then there must exist a path from

- **Initial to final state (Page 81)**
- Initial to each state
- Initial to each state but not to final state
- Initial to final state by traversing each state

84. Which of the following statement is true about NFA with Null String?

- Infinite states
- Infinite set of letters
- Infinite set of transitions
- **Transition of null string is allowed at any stage (Page 71)**

85. FA corresponding to an NFA can be built by introducing an empty state for a letter having

- **no transition at certain state (Page 43)**
- one transition at certain state
- two transition at certain state
- more than two transitions at certain state

86. Let FA3 be an FA corresponding to FA1FA2, then the initial state of FA3 must correspond to the initial state of

- **FA1 only (Page 35)**
- FA2 only

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- FA1 or FA2
- FA1 and FA2

87. (a* + b*)* = (a + b)* this expression is _____

- True
- **False**

88. If S = {ab, bb}, then S* will not contain

- Abbbab
- **Bbba**
- ababbb
- bbbbab

89. What do automata mean?

- Something done manually
- **Something done automatically**
- What is false about the term alphabet?
- It is a finite set of symbols.

90. Consider the following production (of a CFG): S->XYZ Here _____ is left most nonterminal in working string. Note: S, X, Y and Z are all nonterminals

- S
- **X**
- Y
- Z

91. A PDA is called nondeterministic PDA if _____

- **There are more than one outgoing edges at READ or POP states with one label (Page 111)**
- There are more than one PUSH states
- There are mroe than one POP states
- All of the given options

92. A PDA consists of the following:

- An alphabet (Sigma) of input letters.
- An input TAPE with infinite many locations in one direction

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- One START state with only one out-edge and no in-edge
- **All of the given options (Page 105)**

93. The CFG S --> aSa | bSb | a | b | ^ represents the language

- EVEN-EVEN
- **PALINDROM (Page 91)**
- EQUAL
- ODD-ODD

94. Halt states are

- Start and Accept
- **Accept and Reject (Page 105)**
- Start and Reject
- Read and Reject

95. Choice of path can be determined by left most derivation of the string belonging to CFL at…… state

- **Accept (Page 104)**
- Reject
- Push
- POP

96. The unit and null productions can be deleted from a CFG

- **True (Page 99-100)**
- False

97. Identify the TRUE statement about following CFG: S -> SB|AB A -> CC B -> b C -> a

- The given CFG has 8 Nonterminals
- The given CFG has 8 Terminals
- **The given CFG is in CNF (Page 101)**
- The given CFG is not in CNF

98. The structure given below is called _____ S -> aA|bB A -> aS|a B -> bS|b

- RE
- TG

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- **CFG (Page 87)**
- PDA

99. Which of the following states is not part of PDA

- START
- ACCEPT
- **WRITE (Page 107)**
- REJECT

100. The production of the form: nonterminal --> one nonterminal is called the _____

- **Unit production (Page 100)**
- NULL production
- Terminal production
- Non Terminal production

101. A _____ is the one for which every input string has a unique path through the machine.

- **Deterministic PDA (Page 111)**
- nondeterministic PDA
- PUSHDOWN store
- Input Tape

102. In the null production N --> ^ , N is a

- Terminal
- **Non terminal (Page 99)**
- Word
- None of the given options

103. The major problem in the earliest computers was

- To store the contents in the registers
- **To display mathematical formulae (Page 87)**
- To load the contents from the registers
- To calculate the mathematical formula

104. In polish notation, (o-o-o) is the abbreviation of……?

- Operand - Operator – Operand

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- Operand - Operand- Operator
- **Operator -Operand – Operand (Page 94)**
- Operand -Operand – Operand

105. The CFG is said to be ambiguous if there exist at least one word of its language that can be generated by the …… production trees

- One
- Two
- **More than one (Page 95)**
- At most one

106. The input string is placed, before it runs, in

- Stack
- Memory
- **Tape (Page 105)**
- Ram

107. The production S --> SS | a | b | ^ can be expressed by RE

- (a+b)+
- (a+b)
- **(a+b)* (Page 88)**
- (ab)*

108. The locations into which we put the input letters on "Input Tap" are called _____

- Words
- alphabets
- **cells (Page 105)**
- elements

109. "CFG" stands for _____

- Context Free Graph
- **Context Free Grammer (Page 87)**
- Context Finite Graph
- Context Finite Grammer

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110. In a CFG the nonterminal that occurs first from the left in the working string, is said to be _____

- Least Significant nonterminal
- Most Significant nonterminal
- **Left most nonterminal (Page 103)**
- Left most derivate

111. The unit production is

- Terminal --> Terminal
- Terminal --> Non Terminal
- Non terminal --> Terminal
- **Non terminal --> Non Terminal (Page 100)**

112. A _____ operator adds a new letter at the top of STACK

- **PUSH (Page 107)**
- POP
- READ
- APPEND

113. PDA stands for _____

- Push and Drop Automaton
- Pop and Drop Automaton
- **Push Down Automaton (Page 112)**
- None of given options

114. The production of the form: Nonterminal-> ^ is said to be _____ production

- **NULL (Page 99)**
- UNIT
- Chomsky form production
- None of the given options

115. In a STACK:

- The element PUSHed first is POPed first
- **The element PUSHed first is POPed in the last (Page 107 concept)**
- The element PUSHed in last is POPed in last

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- None of given options

116. For a given input, it provides the compliment of Boolean AND output.

- **NAND box (NOT AND) (Page 63)**
- DELAY box
- OR box
- AND box

117. It delays the transmission of signal along the wire by one step (clock pulse).

- NAND box (NOT AND)
- **DELAY box (Page 63)**
- OR box
- AND box

118. Any language that can not be expressed by a RE is said to be regular language.

- True
- **False**

119. The current in the wire is indicated by 1 and 0 indicates the absence of the current.

- **True (Page 63)**
- False

120. For the given input, AND box provides the Boolean AND output.

- **True (Page 63)**
- False

121. Let L be a language defined over an alphabet Σ, then the language of strings, defined over Σ, not belonging to L, is called Complement of the language L, denoted by Lc or L‟.

- **True (Page 66)**
- False

122. To describe the complement of a language, it is very important to describe the ---------- of that language over which the language is defined.

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- **Alphabet (Page 66)**
- Regular Expression
- String
- Word

123. For a certain language L, the complement of Lc is the given language L i.e. (Lc)c = Lc

- True
- **False (Page 66)**

124. If L is a regular language then, --------- is also a regular language.

- Lm
- Ls
- Lx
- **Lc (Page 66)**

125. Converting each of the final states of F to non-final states and old non-final states of F to final states, FA thus obtained will reject every string belonging to L and will accept every string, defined over Σ, not belonging to L. is called

- Transition Graph of L
- Regular expression of L
- **Complement of L (Page 66)**
- Finite Automata of L

126. If L1 and L2 are two regular languages, then L1 U L2 is not a regular.

- True
- **False (Page 65)**

127. If L1 and L2 are regular languages, then these can be expressed by the corresponding FAs.

- **True (Page 68)**
- False

128. The language that can be expressed by any regular expression is called a Non regular language.

- True

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- **False (Page 71)**

129. The languages ---------- are the examples of non regular languages.

- **PALINDROME and PRIME (Page 71)**
- PALINDROME and EVEN-EVEN
- EVEN-EVEN and PRIME
- FACTORIAL and SQURE

130. Let L be any infinite regular language, defined over an alphabet Σ then there exist three strings x, y and z belonging to Σ* such that all the strings of the form xy z n for n=1,2,3, … are the words in L. called.

- Complement of L
- **Pumping Lemma (Page 72)**
- Kleene‟s theorem
- None in given

131. Languages are proved to be regular or non regular using pumping lemma.

- **True (Page 74)**
- False

132. ---------- is obviously infinite language.

- EQUAL-EQUAL
- EVEN-EVEN
- **PALINDROME (Page 75)**
- FACTORIAL

133. If, two strings x and y, defined over Σ, are run over an FA accepting the language L, then x and y are said to belong to the same class if they end in the same state, no matter that state is final or not.

- **True (Page 75)**
- False

134. Myhill Nerode theorem is consisting of the followings,

- L partitions Σ* into distinct classes.
- If L is regular then, L generates finite number of classes.
- If L generates finite number of classes then L is regular.

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- **All of above (Page 75)**

135. The language Q is said to be quotient of two regular languages P and R, denoted by--- if PQ=R.

- R=Q/P
- **Q=R/P (Page 78)**
- Q=P/R
- P=R/Q

136. If two languages R and Q are given, then the prefixes of Q in R denoted by Pref(Q in R).

- **True (Page 78)**
- False

137. Let Q = {aa, abaaabb, bbaaaaa, bbbbbbbbbb} and R = {b, bbbb, bbbaaa, bbbaaaaa} Pref (Q in R) is equal to,

- **{b,bbba,bbbaaa} (Page 78)**
- {b,bba,bbaaa}
- {ab,bba,bbbaa}
- {b,bba,bbba}

138. If R is regular language and Q is any language (regular/ non regular), then Pref (Q in R) is ---------.

- Non-regular
- Equal
- **Regular (Page 79)**
- Infinite

139. _____ states are called the halt states.

- **ACCEPT and REJECT (Page 105)**
- ACCEPT and READ
- ACCEPT AND START
- ACCEPT AND WRITE

140. The part of an FA, where the input string is placed before it is run, is called _____

- State
- Transition

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- **Input Tape (Page 105)**
- Output Tape

141. In new format of an FA (discussed in lecture 37), This state is like dead-end non final state

- ACCEPT
- **REJECT (Page 105)**
- STATR
- READ

142. Between the two consecutive joints on a path:

- One character can be pushed and one character can be popped
- **Any no. of characters can be pushed and one character can be popped (Page 122)**
- One character can be pushed and any no. of characters can be popped
- Any no. of characters can be pushed and any no. of characters can be popped

143. The PDA is called non-deterministic PDA when there are more than one out going edges from…… state

- START or READ
- POP or REJECT
- **READ or POP (Page 111)**
- PUSH or POP

144. Identify the TRUE statement:

- A PDA is non-deterministic, if there are more than one READ states in PDA
- A PDA is never non-deterministic
- **Like TG, A PDA can also be non-deterministic (Page 111)**
- A PDA is non-deterministic, if there are more than one REJECT states in PDA

145. There is a problem in deciding whether a state of FA should be marked or not when the language Q is infinite.

- **True (Page 79)**
- False

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146. If an effectively solvable problem has answered in yes or no, then this solution is called ---------

- **Decision procedure (Page 80)**
- Decision method
- Decision problem
- Decision making

147. The following problem(s) ---------- is/are called decidable problem(s).

- The two regular expressions define the same language
- The two FAs are equivalent
- **Both a and b (Page 80)**
- None of given

148. To examine whether a certain FA accepts any words, it is required to seek the paths from ------- state.

- Final to initial
- Final to final
- **Initial to final (Page 81)**
- Initial to initial

149. The high level language is converted into assembly language codes by a program called compiler.

- **TRUE (Page 87)**
- FALSE

150. Grammatical rules which involve the meaning of words are called ----------

- **Semantics (Page 87)**
- Syntactic
- Both a and b
- None of given

151. Grammatical rules which do not involve the meaning of words are called ----------

- Semantics
- **Syntactic (Page 87)**

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- Both a and b
- None of given

152. The symbols that must be replaced by other things are called _____

- Productions
- Terminals
- **Non-terminals (Page 87)**
- None of given

153. The grammatical rules are often called_____

- **Productions (Page 87)**
- Terminals
- Non-terminals
- None of given

154. The terminals are designated by _____ letters, while the non-terminals are designated by _____ letters.

- Capital, bold
- **Small, capital (Page 87)**
- Capital, small
- Small, bold

155. The language generated by _____ is called Context Free Language (CFL).

- FA
- TG
- **CFG (Page 87)**
- TGT

156. S → aXb|bXa X → aX|bX|Λ The given CFG generates the language in English _____

- **Beginning and ending in different letters (Page 91)**
- Beginning and ending in same letter
- Having even-even language
- None of given

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157. The CFG is not said to be ambiguous if there exists atleast one word of its language that can be generated by the different production trees,

- TRUE
- **FALSE (Page 95)**

158. The language generated by that CFG is regular if _____

- No terminal → semi
- word No terminal → word
- **Both a and b (Page 97)**
- None of given

159. The production of the form no terminal → Λ is said to be null production.

- **TRUE (Page 99)**
- FALSE

160. CNF is stands for

- Context Normal Form
- Complete Normal Form
- **Chomsky Normal Form (Page 102)**
- Compared Null Form

161. Kleene‟s theorem states

- All representations of a regular language are equivalent.
- All representations of a context free language are equivalent.
- All representations of a recursive language are equivalent
- **Finite Automata are less powerful than Pushdown Automata. (Page 105)**

162. Null production is a

- Word
- String
- Terminal
- **All of the given options**

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163. In nondeterministic PDA a string is supposed to be accepted, if there exists at least one path traced by the string, leading to _____ state.

- **ACCEPT (Page 111)**
- REJECT
- START
- READ

164. The CFG which generates the regular language is called:

- Regular expression
- Finite Automata
- **Regular grammar (Page 97)**
- None of the given options

165. If a CFG has a null production, then it is possible to construct another CFG accepting the same language without null production

- TRUE
- **FALSE (Page 99)**

166. In large FA with thousands of states and millions of directed edges, without an effective procedure it is _____ to find a path from initial to final state.

- Always easy
- **Impossible (Page 81)**
- may be good
- always impossible

167. If there is no final state of two FAs then their _____ also have no _____ state

- initial, union
- final, union
- **union,final (Page 83)**
- union, initial

168. Set of all palindromes over {a,b} is:

- Regular
- Regular and finite

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- Regular and infinite
- **Non-regular (Page 71)**

169. In the context of Myhill Nerode theorem, for even-even language sigma star can be partitioned into _____ number of classes.

- 3
- **4 (Page 77)**
- 5
- 6

170. The product of two regular languages is _____.

- **Regular (Page 78)**
- Infinite
- non-regular
- closure of a regular language

171. incase of Myhill Nerode theorem, if a language L partitions sigma star into distinct classes and L is also regular then L generates_____ number of classes.

- Infinite
- specified
- **finite (Page 75)**
- odd

172. While determining regular expression for a given FA, it is _____ to write its regular expression.

- Always possible easily
- **Sometime impossible (Page 80)**
- always impossible
- None of the given options

173. If (L1 ∩ L2c) ∪ (L1c ∩ L2) is regular language that accepts the words which are in L1 but not in L2 or else in L2 but not in L1 . The corresponding FA cannot accept any word which is in _____ L1 and L2.

- Not both
- **Both (Page 80)**

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- At least in one
- None of the given options

174. A problem that has decision procedure is called _____ problem.

- Regular language
- un-decidable
- Infinite
- **Decidable (Page 80)**

175. The product of two regular languages is _____.

- **Regular (Page 78)**
- Infinite
- non-regular
- closure of a regular language

176. In new format of an FA (discussed in lecture 37):……state is like a final state of an FA

- START
- ACCEPT (Handouts Page # 119)
- REJECT
- READ

177. In conversion form of PDA there is no……. state

- PUSH
- ACCEPT
- REJECT (Handouts Page # 119)
- READ

178. Given a PDA that accepts the language L

- There does not exist any CFG that generates exactly L
- that PDA will also accept Language L' (complement of L)
- There exists a CFG that generates exactly L (Handouts Page # 118)
- None of given options

179. In a CFG the non-terminal that occurs first from the left in the working string. is said to be

- Least Significant nonterminal

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- Left most nonterminal (Handouts Page # 103)
- Most Significant nonterminal
- Left most derivate

180. The structure given below is called

S -> aAlbB

A -> aSla

B -> bSIb

- RE
- PDA
- CFG (It is form of CFG)
- TG

181. An FA has N states then it must accept the word of length

- 2N
- N
- N-1
- N-1

182. To examine whether a certain FA accepts any words. it is required to seek the paths……..state.

- from initial to final (Handouts Page # 81)
- from initial-to-initial back
- from final to initial
- from final to back final

183. In nondeterministic PDA. a string is supposed to be accepted if there exists at least one path traced by the string. leading to……..state.

- START
- REJECT
- READ
- ACCEPT (Handouts Page # 111)

184. If a CFG has a null production, then it is

- Called Null CFG
- Not possible to construct another CFG without null production accepting the same language with the exception of the word
- Called Chmosky Normal Form (CNF)
- Possible to construct another CFG without null production accepting the same language with the exception of the word

185. **There is at least one production in CFG that has one…… on its left side.**

- Non terminal (Handouts Page # 87)
- Null production
- Terminal
- Unit production

186. In large FA with thousands of states and millions of directed edges, without an effective procedure it is……to find a path from initial to final state.

- Impossible (Handouts Page # 81)
- Always easy
- always impossible
- may be good

187. By removing null and unit productions_____.

- CNF can be converted into FA
- CNF can be converted into CFG
- CFG can be converted into CNF (Handouts Page # 102)
- CNF can be converted into Turing machine

188. A……is the one for which every input string has a unique path through the machine

- deterministic PDA
- Input Tape
- nondeterministic PDA
- PUSHDOWN store

189. PDA stands for

- Push Down Automaton (Handouts Page # 112)

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- Pop and Drop Automaton
- Push and Drop Automaton
- Push Deterministic Automaton

190. A PDA is called nondeterministic PDA if

- there are more than one POP states
- there are more than one PUSH states
- there are more than one outgoing edges at READ or POP states with one label
- every READ state is followed by a HERE state.

191. Which of the following cannot be represented by a regular expression?

- String of 0's with an odd length
- Language of even-even
- Language of odd-odd
- String of 0s with a prime length (Because Prime is not regular Langue)

192. In conversion form of PDA. there is……..accept state(s).

- At most one
- At least one
- More than One
- Exactly one (Handouts Page # 119)

193. If there is no final state of two FAs, then their…….also have no…….state

- union, initial
- union. Final (Handouts Page # 83)
- final, union
- initial, union

194. The tree which produces all the strings of a language is called

- Derivation tree
- Total language tree (Handouts Page # 96)
- Non ambiguous tree
- Ambiguous tree

195. In new format of an FA (discussed in lecture 37), ……state is like dead-end non final state.

- READ
- REJECT (Handouts Page # 105)
- START
- ACCEPT

196. To write the expression from the tree, it is required to traverse from

- Top to bottom of the tree
- Right side of the tree
- Left side of the tree (Handouts Page # 94)
- Bottom to top of the tree

197. A PDA consists of the following:

- An alphabet (Sigma) of input letters.
- An input TAPE with infinite many locations in one direction
- One START state with only one out-edge and no in-edge •
- All the given options (Handouts Page 105)

198. If R is regular language and Q is any language (regular/ non-regular), then Pref…….in ……. is regular.

- R R
- R.Q
- Q.R (Handouts Page # 79)
- Q.Q

199. ……is an operation that takes out a letter from the top of the STACK.

- WRITE
- APPEND
- PUSH
- POP (Handouts Page # 107)

200. Before the CFG corresponding to the given PDA is determined, the PDA is converted into the standard form which is called.

- Finite Automaton
- Conversion form (Handouts Page # 118)
- None of given options
- Chomsky Normal Form (CNF)

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201. The part of an FA, where the input string is placed before it is run, is called

- Transition
- Input Tape (Handouts Page # 105)
- Output Tape
- State

202. A problem is said to be ……if there exists an algorithm that provides the solution in…… number of steps.

- Effectively unsolvable, infinite
- Effectively solvable, infinite
- Effectively unsolvable, finite
- Effectively solvable, finite (Handouts Page # 80)

203. …… states are called the halt states.

- ACCEPT AND START
- ACCEPT and READ
- ACCEPT and REJECT (Handouts Page # 105)
- ACCEPT AND WRITE

204. The grammatical rules which involve meaning of words are called

- Semantics (Handouts Page # 87)
- Syntactics
- strings
- alphabets

205. The PDA is called non-deterministic PDA when there are more than one out going edges from state

- READ or POP (Handouts Page # 111)
- START or READ
- POP or
- PUSH or POP

206. Which of the following states is not part of PDA?

- REJECT
- ACCEPT
- START
- WRITE (All other are parts of PDA)

207. The major problem in the earliest computers was

- To calculate the mathematical formula
- To display mathematical formulas (Handouts Page # 87)
- To store the contents in the registers
- To load the contents from the registers

208. The operators like (` +) in the parse tree are considered as

- Terminals (Handouts Page # 93)
- productions
- non-terminals
- intermediates

209. If L1 and L2 are two regular languages, then they……expressed by FAs.

- cannot be
- May be
- may or may not be
- can be (Handouts Page # 68)

210. Before running the input string on PDA it is first placed on

- Stack
- Ram
- Memory
- Tape (Handouts Page # 107)

211. Which is the correct option

- The element PUSHED in last is POPED in last
- The element PUSHED first is POPED in the last (LIFO Method, from Book)
- The element PUSHED first is POPED first
- None of given options

212. Null production is a

- String
- Word (Handouts Page # 97)

- Terminal
- All the above

213. A/an……operator adds a new letter at the top of STACK

- Push (Handouts Page # 107)
- Append
- Read
- Pop

214. In conversion form of PDA, no two……states exist in a row without state

- POP. READ (Handouts Page # 119)
- POP. REJECT
- PUSH. START
- PUSH READ

215. Given a PDA that accepts the language L

- that PDA will also accept Language L' (complement of Ll
- There exists a CFG that generates exactly L (Handouts Page # 118)
- None of given options
- There does not exist any CFG that generates exactly

216. In large FA with thousands of states and millions of directed edges, without an effective procedure it is ……. to find a path from initial to final state.

- Always easy
- always impossible
- may be good
- Impossible (Handouts Page # 81)

217. The CFG there generates the regular language is called

- Regular expression
- finite automata
- regular grammars (Handouts Page # 97)
- now regular grammars

218. Consider the following CFG: (Note: ^ means NULL)

S-→Xa

X→aX|bX|^

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- Above give a CFG can be represented by RE
- a*b*
- a (a + b) *a
- (a + b) *a
- A*b*a

S production will give us Xa. As the X is nonterminal and we must only change X and the terminal a will be on the last of the R.E.

Now we will change X production.

X production will give us as many a as we want. or if we use the second production which will give us as many b as we want. And last production will give us ^ (lemda)

So the answer would be a*b*a

Last a is the terminal which we got from the very first production.

219. For a machine with N number of states, the total number of strings to be tested, defined over an alphabet of m letters is

- mN +mN+1 + mN+2 +… +m2N-1 (Handouts Page # 86)
- mN
- Nm
- Nm +mN+1 + mN+2 +… +

220. Consider the CFG given below.

A→B|b

B→a

Which of the following is a unit production?

- S→bb
- A→b
- A→B
- B→a

221. The CFG is said to be ambiguous if there exist at least one word of its language that can be generated by the …… production trees

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- One
- Two
- More than one (Handouts Page # 95)
- At most one

222. If Q = {xx, xyxxxy} and R = { xyxyxyxxyy, xyxyyyxx} then Pref {Q in R} = _____

- Xx
- Xyxyxy
- Xyxyyy (Solved by my self 100% sure)
- Xxy

223. The unit production is

- Terminal --> Terminal
- Terminal --> Non Terminal
- Non terminal --> Terminal
- Non terminal --> Non-Terminal (Hand out Page # 100)

224. Which of the following statement is FALSE?

- For every PDA, there always exists a regular expression (Not sure)
- Every CFG cannot be expressed as Regular Expression
- Every Regular Expression be expressed by a CFG.
- For a PDA, there exists a CFG that represent the same language

225. The CFG S → aSb|ab|^

- Palindrome
- Prime
- Equal
- Even

The production will give us ab and non-terminal S inside the a and b. If we change the S into next production of ab, we will get abab but instead of using 2nd production, if we use the last which will give us only ^ (Lemda), thus we will get ^ab.

So, we will get Equal language (same number of a and same number of b)

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226. Before the PDA is converted into conversion form, a new state ---------- is defined which is placed in the middle of any edge.

- HERE (Hand out Page # 118)
- STOP
- START
- REJECT

227. A PDA is in conversion form if it fulfills the following conditions:

- There is only one ACCEPT state. (Hand out Page # 119)
- There are one REJECT state.
- There are more than one ACCEPT states.
- There is only one Accept state.

228. Identify the false statement about the following CFG

S→SB|AB
A→CC
B→
C→a

- CFG has 8 Non terminals
- all the given option (All are false as There are 4 terminals , It is in CNF and it does not generate any null string)
- CFG is not in CNF
- CFG generate null string

229. This CFG there generates to the regular language is called

- Regular grammar (Hand out Page # 97)
- nonregular grammar
- finite automata
- regular expression

230. The derivation of the word W generated by CFG such that at each step a production is applied to the leftmost nonterminal in the working string is said to be

- Left most terminal

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- right most terminal
- left most derivation (Hand out Page # 103)
- right most derivation

231. If the FA has N states, then test these words of length less than N. If no word is accepted by this FA, then it will word/words

- Accept no (Hand out Page # 85)
- Accept some
- Reject No
- Accept All

232. In a CFG then non terminals are denoted by

- small letters
- numbers
- capital letters (Hand out Page # 87)
- small letters and numbers

233. "CFG"stands for_____

- Context finite graph
- contacts finite grammar
- contact free graph
- Context free grammar (Hand out Page # 87)

234. Consider the following production (of a CFG) S→XYZ
Here _____is left most non terminals in working string
note XY and Z are all known terminals

- X (X is on the most left side)
- S
- Z
- Y

235. Consider the following CFG
S→ a|Xb|aYa
X→ Y|^ (Note: ^ means NULL)
Y→ b|X
which nonterminal is/are not nullable

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- Y
- S, X and Y
- S
- X (X is Null Production and not a null able)

236. In new format of an FA (discussed in lecture 37):……state is like a final state of an FA

- START
- ACCEPT (Handouts Page # 119)
- REJECT
- READ

237. In conversion form of PDA there is no……. state

- PUSH
- ACCEPT
- REJECT (Handouts Page # 119)
- READ

238. Given a PDA that accepts the language L

- There does not exist any CFG that generates exactly L
- that PDA will also accept Language L' (complement of L)
- There exists a CFG that generates exactly L (Handouts Page # 118)
- None of given options

239. In a CFG the non-terminal that occurs first from the left in the working string. is said to be

- Least Significant nonterminal
- Left most nonterminal (Handouts Page # 103)
- Most Significant nonterminal
- Left most derivate

240. The structure given below is called

S -> aAlbB

A -> aSla

B -> bSIb

- RE
- PDA
- CFG (It is form of CFG)
- TG

241. An FA has N states then it must accept the word of length

- 2N
- N
- N-1
- N-1

242. To examine whether a certain FA accepts any words. it is required to seek the paths……..state.

- from initial to final (Handouts Page # 81)
- from initial-to-initial back
- from final to initial
- from final to back final

243. In nondeterministic PDA. a string is supposed to be accepted if there exists at least one path traced by the string. leading to……..state.

- START
- REJECT
- READ
- ACCEPT (Handouts Page # 111)

244. If a CFG has a null production, then it is

- Called Null CFG
- Not possible to construct another CFG without null production accepting the same language with the exception of the word
- Called Chmosky Normal Form (CNF)
- Possible to construct another CFG without null production accepting the same language with the exception of the word

245. **There is at least one production in CFG that has one…… on its left side.**

- Non terminal (Handouts Page # 87)
- Null production

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- Terminal
- Unit production

246. In large FA with thousands of states and millions of directed edges, without an effective procedure it is……to find a path from initial to final state.

- Impossible (Handouts Page # 81)
- Always easy
- always impossible
- may be good

247. By removing null and unit productions_____.

- CNF can be converted into FA
- CNF can be converted into CFG
- CFG can be converted into CNF (Handouts Page # 102)
- CNF can be converted into Turing machine

248. A……is the one for which every input string has a unique path through the machine

- deterministic PDA
- Input Tape
- nondeterministic PDA
- PUSHDOWN store

249. PDA stands for

- Push Down Automaton (Handouts Page # 112)
- Pop and Drop Automaton
- Push and Drop Automaton
- Push Deterministic Automaton

250. A PDA is called nondeterministic PDA if

- there are more than one POP states
- there are more than one PUSH states
- there are more than one outgoing edges at READ or POP states with one label
- every READ state is followed by a HERE state.

251. Which of the following cannot be represented by a regular expression?

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- String of 0's with an odd length
- Language of even-even
- Language of odd-odd
- String of 0s with a prime length (Because Prime is not regular Langue)

252. In conversion form of PDA. there is……..accept state(s).

- At most one
- At least one
- More than One
- Exactly one (Handouts Page # 119)

253. If there is no final state of two FAs, then their…….also have no…….state

- union, initial
- union. Final (Handouts Page # 83)
- final, union
- initial, union

254. The tree which produces all the strings of a language is called

- Derivation tree
- Total language tree (Handouts Page # 96)
- Non ambiguous tree
- Ambiguous tree

255. In new format of an FA (discussed in lecture 37), ……state is like dead-end non final state.

- READ
- REJECT (Handouts Page # 105)
- START
- ACCEPT

256. To write the expression from the tree, it is required to traverse from

- Top to bottom of the tree
- Right side of the tree
- Left side of the tree (Handouts Page # 94)
- Bottom to top of the tree

257. A PDA consists of the following:

- An alphabet (Sigma) of input letters.
- An input TAPE with infinite many locations in one direction
- One START state with only one out-edge and no in-edge •
- All the given options (Handouts Page 105)

258. If R is regular language and Q is any language (regular/ non-regular), then Pref…….in ……. is regular.

- R R
- R.Q
- Q.R (Handouts Page # 79)
- Q.Q

259. ……is an operation that takes out a letter from the top of the STACK.

- WRITE
- APPEND
- PUSH
- POP (Handouts Page # 107)

260. Before the CFG corresponding to the given PDA is determined, the PDA is converted into the standard form which is called.

- Finite Automaton
- Conversion form (Handouts Page # 118)
- None of given options
- Chomsky Normal Form (CNF)

261. The part of an FA, where the input string is placed before it is run, is called

- Transition
- Input Tape (Handouts Page # 105)
- Output Tape
- State

262. A problem is said to be ……if there exists an algorithm that provides the solution in……. number of steps.

- Effectively unsolvable, infinite
- Effectively solvable, infinite
- Effectively unsolvable, finite
- Effectively solvable, finite (Handouts Page # 80)

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263. …… states are called the halt states.

- ACCEPT AND START
- ACCEPT and READ
- ACCEPT and REJECT (Handouts Page # 105)
- ACCEPT AND WRITE

264. The grammatical rules which involve meaning of words are called

- Semantics (Handouts Page # 87)
- Syntactics
- strings
- alphabets

265. The PDA is called non-deterministic PDA when there are more than one out going edges from state

- READ or POP (Handouts Page # 111)
- START or READ
- POP or
- PUSH or POP

266. Which of the following states is not part of PDA?

- REJECT
- ACCEPT
- START
- WRITE (All other are parts of PDA)

267. The major problem in the earliest computers was

- To calculate the mathematical formula
- To display mathematical formulas (Handouts Page # 87)
- To store the contents in the registers
- To load the contents from the registers

268. The operators like (` +) in the parse tree are considered as

- Terminals (Handouts Page # 93)
- productions
- non-terminals

- intermediates

269. If L1 and L2 are two regular languages, then they……expressed by FAs.

- cannot be
- May be
- may or may not be
- can be (Handouts Page # 68)

270. Before running the input string on PDA it is first placed on

- Stack
- Ram
- Memory
- Tape (Handouts Page # 107)

271. Which is the correct option

- The element PUSHED in last is POPED in last
- The element PUSHED first is POPED in the last (LIFO Method, from Book)
- The element PUSHED first is POPED first
- None of given options

272. Null production is a

- String
- Word (Handouts Page # 97)
- Terminal
- All the above

273. A/an……operator adds a new letter at the top of STACK

- Push (Handouts Page # 107)
- Append
- Read
- Pop

274. In conversion form of PDA, no two……states exist in a row without state

- POP. READ (Handouts Page # 119)
- POP. REJECT
- PUSH. START
- PUSH READ

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275. Given a PDA that accepts the language L

- that PDA will also accept Language L' (complement of Ll
- There exists a CFG that generates exactly L (Handouts Page # 118)
- None of given options
- There does not exist any CFG that generates exactly

276. In large FA with thousands of states and millions of directed edges, without an effective procedure it is ……. to find a path from initial to final state.

- Always easy
- always impossible
- may be good
- Impossible (Handouts Page # 81)

277. The CFG there generates the regular language is called

- Regular expression
- finite automata
- regular grammars (Handouts Page # 97)
- now regular grammars

278. Consider the following CFG: (Note: ^ means NULL)

S-→Xa

X→aX|bX|^

- Above give a CFG can be represented by RE
- a*b*
- a (a + b) *a
- (a + b) *a
- A*b*a

279. For a machine with N number of states, the total number of strings to be tested, defined over an alphabet of m letters is

- mN +mN+1 + mN+2 +… +m2N-1 (Handouts Page # 86)
- mN
- Nm
- Nm +mN+1 + mN+2 +… +

280. Consider the CFG given below.

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A→B|b

B→a

Which of the following is a unit production?

- S→bb
- A→b
- A→B
- B→a

281. The CFG is said to be ambiguous if there exist at least one word of its language that can be generated by the ……. production trees

- One
- Two
- More than one (Handouts Page # 95)
- At most one

282. If Q = {xx, xyxxxy} and R = { xyxyxyxxyy, xyxyyyxx} then Pref {Q in R} = _____

- Xx
- Xyxyxy
- Xyxyyy (Solved by my self 100% sure)
- Xxy

283. The unit production is

- Terminal --> Terminal
- Terminal --> Non Terminal
- Non terminal --> Terminal
- Non terminal --> Non-Terminal (Hand out Page # 100)

284. Which of the following statement is FALSE?

- For every PDA, there always exists a regular expression (Not sure)
- Every CFG cannot be expressed as Regular Expression
- Every Regular Expression be expressed by a CFG.
- For a PDA, there exists a CFG that represent the same language

285. The CFG S → aSb|ab|^

- Palindrome

- Prime
- Equal
- Even

286. Before the PDA is converted into conversion form, a new state ---------- is defined which is placed in the middle of any edge.

- HERE (Hand out Page # 118)
- STOP
- START
- REJECT

287. A PDA is in conversion form if it fulfills the following conditions:

- There is only one ACCEPT state. (Hand out Page # 119)
- There are one REJECT state.
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A→CC

B→

C→a

- CFG has 8 Non terminals
- all the given option (All are false as There are 4 terminals , It is in CNF and it does not generate any null string)
- CFG is not in CNF
- CFG generate null string

289. This CFG there generates to the regular language is called

- Regular grammar (Hand out Page # 97)
- nonregular grammar
- finite automata
- regular expression

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290. The derivation of the word W generated by CFG such that at each step a production is applied to the leftmost nonterminal in the working string is said to be

- Left most terminal
- right most terminal
- left most derivation (Hand out Page # 103)
- right most derivation

291. If the FA has N states, then test these words of length less than N. If no word is accepted by this FA, then it will word/words

- Accept no (Hand out Page # 85)
- Accept some
- Reject No
- Accept All

292. In a CFG then non terminals are denoted by

- small letters
- numbers
- capital letters (Hand out Page # 87)
- small letters and numbers

293. "CFG"stands for_____

- Context finite graph
- contacts finite grammar
- contact free graph
- Context free grammar (Hand out Page # 87)

294. Consider the following production (of a CFG) S→XYZ Here _____is left most non terminals in working string note XY and Z are all known terminals

- X (X is on the most left side)
- S
- Z
- Y

295. Consider the following CFG

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S→ a|Xb|aYa

X→ Y|^ (Note: ^ means NULL)

Y→ b|X

which nonterminal is/are not nullable

- Y
- S, X and Y
- S
- X (X is Null Production and not a nullable

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Q No 1.How Moore and Mealy machine works in Computer Memory what is their importance in Computing ?

Mealy & Moore Machines work in computing as incrementing machine & 1's complement machine etc. These operations as basic computer operations so these machines are very important.

Q No 2.What is sequential circuit ?

Sequential Circuit:

A sequential circuit contains a memory component.

The memory component provides a state input. A flip-flop is often used as a memory component.

The state variable indicates the states of the sequential machine, i.e. the status or stage or progress of the whole event.

The state of a sequential circuit is indicated by the output of a flip-flop. A single flip-flop can be used to indicate two states (q=0 and q=1). When there are more than two states, additional flip-flops are used. Given n flip-flops, a total of 2^n states can be represented.

In other words, a sequential machine can be put into a number of different states depending on the particular inputs given.

The output is a function of both the Present Inputs and the Present States.

In addition to the outputs, the circuit must also generate an update to the memory components so that the state of the machine can also be changed with respect to the new inputs.

The update is called the Next State Function and is also a function of the Present Inputs and the Present States.

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Both the output functions and the Next State Functions are combinational circuits. $Z=f(X,S^t)$

$S=g(X,S^t)$ The superscript t indicates the present time period while the superscript (t+1) indicates the next time period.

The characteristic of a sequential circuit is completely defined by a state transition diagram that enumerates all possible transitions for every possible input combination.

Q No 1. What is the concept of Pumping Lemma I and II and what is the difference between pumping Lemma 1 and pumping Lemma 2 ?

In fact PLI & PLII are same (A way to recognize Non Regular language). The only difference is that the conditions in pumping lemma II are more stricter than Pumping Lemma I some language that are difficult to proof Non Regular by Pumping Lemma I are proved Non Regular by pumping Lemma II easily.

Further mare in pumping lemma I we have to generate all words to of a language but in Pumping Lemma II we have to generate a single word to prove a language non regular.

Explanation:

Some languages like PALINDROME that are proved to be regular by first version

due to some of their symmetrical words when we pump these words they remain to be the parts of the language like bbabb

By pumping

lemma 1 Let y

= a

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Now repeating y three
times results in bbaaabb
That is also a valid word of PALINDROME so by pumping lemma I PALINDROME can not be proved non regular, so there was the need of pumping lemma version version 2.
Now consider for
the word bbabb
if we take N=2
Then by pumping y (let we take it b)
two times results in bbbbabb
That word is not in
PALINDROME. But if
we take N=3 and y = a
Then by pumping y two
times results in bbaaabb
That word is in PALINDROME. So be careful in taking total no of states of the FA and also the repeating factor (y) to prove an infinite language non regular you need to prove only one word that is not part of the language.

Q No 2. What is the significance of Pumping Lemma II ?

The significance of 2nd version of 'pumping lemma' is that there are some infinite non regular languages like PALINDROME we can built FA that can accept there certain words but if we increase the length of their words that FA don't accept these words so by pumping lemma

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version I it is very difficult to prove them non regular but with the second version we can prove that a language is Non regular even it's some words may be accepted by some FA's. See page 195 of the book for further example.

Q No 3.Moore and Mealy machine?

1. In order to run a string on a Mealy or Moore machine, you can take directions from transition table. Running string on Mealy or Moore machine is similar to running string on a FA. For example, if want to run abba on the machine, take start from initial state. Check what is the transition for a, what state it goes. After that check what is the path of b from that state and so on. In this way you will be able to run whole of the string. Note that there is no final state in Mealy or Moore machine. So there is no case of acceptance or rejection of string. You just have to determine what the output is. I hope that will clear your mind for further clarification please listens to your lecture carefully.
2. The string is taken for the testing purposes. You can take any sort of string and determine its output using machine.

Q No 1.What is the difference between semiword and word please also give an example regarding this?

Word:

A word is complete combinations of terminals only
e.g. abba or ab or a or null string.

Semiword:

A semiword is a string of terminals (may be none)

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concatenated with exactly one nonterminal on the right i.e. a semi word, in general, is of the following form

(terminal)(terminal)--- (terminal)(nonterminal)

For example

aaaaaaB , aabbaaaA , A.

What is the difference between derivation tree and total tree?

A Derivation tree is the one that shows how to derive any specific word of the language described by CFG but Total Language Tree shows all words of the

Q No 2.What does mean the LANGUAGE IS CLOSED?

When we say that a Language is closed it is always with respect to certain operation.

A simple example may be that the set of integers is closed under addition. It means when we take two numbers from set of integers say 3, 7 the result of their addition would also be in the set of integers. Similarly if the result of an operation on the words of a language results in the word of the same language we say that the language is closed under that operation.

Q No 3.What are the Productions?

Productions are the grammatical rules and regulations. These rules express the behavior of CFG. Using production in CFG terminals are converted into non-terminals and when all the terminals are converted using productions, a word

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is acquired.

Q No 4.What is the difference between concatenation and intersection of two FA's also what is the difference among Union of two FA's and addition of them?

In intersection of two FA's only those strings are accepted which are independently accepted by both FA's, while in concatenation of two FA's only those strings will be accepted in which first part of string is accepted by first FA and remaining part of string is accepted by the second FA.

While taking union of two FA's one can represent it using + sign. So (FA1 U FA2) and (FA + FA2) both are same. There is no difference between them.

FAQ's about

Lectures 36 to 40

Automata Theory

FAQ's about Lectures 36 to 40

Q No 1.What is the Difference between Nullable and Null production? How to make eliminate Nullable and for Null Productions from the CFG ?

The production of

the form

nonterminal ® L

is said to be ***null production***.

Example:

Consider the following CFG

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S ® aA|bB|L, A ® aa|L, B ® aS

Here S ® L and A ® L are null productions.

A production is called ***nullable production*** there is a derivation that starts at Non Terminal and leads to L

i.e.

S ----> *aA* | *bB* | *aa*

A -----> *C* | *bb*

C -----> L

Here A nullable Non Terminal due to Nullable production A > C as C leads to null.

Example:

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Consider the following CFG S ® XY, X ® Zb, Y ® bW Z ® AB, W ® Z, A ® aA|bA|L B ®Ba|Bb|L.

Here A ® L and B ® L are null productions, while Z ® AB, W ® Z are nullable productions.

Method:

Delete all the Null productions and add new productions *e.g.* Consider the following productions of a certain CFG X ® aNbNa, N ® L, delete the production N ® L and using the production X ® aNbNa, add the following new productions X ® aNba, X ® abNa and X ® aba

Thus the new CFG will contain the following productions X ® Nba|abNa|aba|aNbNa

Note: It is to be noted that X ® aNbNa will still be included in the new CFG.

Method:

Consider the following CFG S ® XY, X ® Zb, Y ® bW Z ® AB, W ® Z, A ® aA|bA|L B ®Ba|Bb|L.

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Here A ® L and B ® L are null productions, while Z ® AB, W ® Z are nullable productions. The new CFG after, applying the method, will be

S ® XY
X ®
Zb|b Y
®
bW|b
Z ®
AB|A|B
W ® Z
A ®
aA|a|bA|b
B
®Ba|a|Bb
|b

Note: While adding new productions all Nullable productions should be handled with care. All Nullable productions will be used to add new productions, but only the Null production will be deleted

Q No 2. Is it possible to make CFG for infix and postfix expression's using derivation tree ?

Derivation tree is only used to derive words of language that is described by a CFG. Yes, we can create CFG for languages infix expressions, postfix expressions.

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Q No 3 what is the uses of push down automata in computing ?

PDA is just an enhancement in FAs. i.e Memory is attached with machine that recognizes some language. FA is basic structure for most advanced electronic machines such as computer etc.

Q No 4 What is difference between PUSH DOWN STACK and PUSH DOWN STORE ?

No difference at all. Both terms are used to describe memory structure attached with FAs to store some characters in it.

Q No 5 How we can distinguish between "CFG" and "CNF" in the questions ?

Chomsky Normal Form (CNF)

If a CFG has only productions of the form

string of two nonterminals□nonterminal ---------

or

one terminal□Nonterminal ----------

Then the CFG is said to be in Chomsky Normal Form (CNF).

Thus if the given CFG is in the form specified above it will be called in CNF.

Q No 6.What is meant by the terms stack consistence and input tape consistence ?

Term Stack consistent means we can pop any character from the top of the stack only. PDA should not be able to pop any character other than that is present on the top of the stack.

Term Tape consistent means we can read only the first letter on the tape not any other letter of the

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tape after the first one.

Q No 7 What is the concept of unit production ?

The productions of the form

one Nonterminal□one Nonterminal --------

Are called unit productions. For example

A (Unit Produciton)□S --------

a | b□A--------

A. we can directly write□Here there is no need of Unit Production S S □ a | b

Q No 8 Why Context Free Grammars are called "Context Free? Context Free Grammars are called context free because the words of the languages of Context Free Grammars have words like "aaabbb"(PALINDROME). In these words the value of letters (a, b) is the same on whatever position they appear. On the other hand in context sensitive grammars their value depend on the position they appear in the word a simple example may be as follows

Suppose we have a decimal number 141 in our language . When compiler reads it, it would be in the form of string. The compiler would calculate its decimal equivalent so that we can perform

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mathematical functions on it. In calculating its decimal value , weight of first "1" is different than the second "1" it means it is context sensitive (depends on in which position the "1" has appeared).

i.e.

$$1*10^2 + 4*10^1 + 1*10^0 = 14$$

(value of one is 100) (value of one is just one)

That is not the case with the words of Context Free Languages. (The value of "a" is always same in whatever position "a" appears).

Q No 9. What is Unit Production?

The production in which one non-terminal leads to only one non-terminal.

Q No 10.What is Left most Derivation in CFG?

It is a method of generation of strings from a CFG starting from left most letter of the string.

Q No 1.Give a example of converting a CFG to CNF?

Consider the CFG given below S}
ABC
A} aa
| bB}
c
C}d

Its CNF

will be

S} DC

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D } AB
A}
EE | b
E}a
B}c
C}d

Q No 2.In the lecture 41 's example, we have converted PDA to conversion form and a word 'aaaabb' is derived from this conversion form PDA. What are the derivation steps.

The PDA converted to conversion form has some specific features that are important to understand first. These features are

The states named START, READ, HERE and ACCEPT are called joints of the machine.

With the help of the conversion form we have been able to achieve that POP state has only one path out of it and the path taking (multiple paths) decisions take place only on the READ state.

The word 'aaaabb' is generated as follows from the PDA START-

POP4-PUSH $

This step pops $ and then pushes it to ensure that stack contains $ at the beginning.

READ1-POP6-PUSH $-PUSH a

As first time after reading "a" there is $ at the top

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of stack so we will follow path segment READ1-
POP6-PUSH $-PUSH a
READ1-POP5-PUSH a-PUSH a
Now a is on the top of the stack so we will follow
READ1-POP5-PUSH a-PUSH a
READ1-POP5-PUSH a-PUSH a
Again following same
segment for a READ1-
POP5-PUSH a-PUSH

a
Again following same segment for a
READ1-POP1- HERE-POP2
As we read b on
input tape.
READ2-POP1-
HERE-POP2
As we read b on
input tape.
READ2-POP3-
ACCEPT.
As we read Δ from the input tape

Q No 3.How to differentiate between "wanted" and "unwanted branch" ? When we derive a word in Top down parsing beginning with the starting Non Terminal the branches of the tree that do not lead to our required word are left aside these branches are called unwanted branches.

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For example

for CFG S

---->AA

A->a | b

If we want to generate the word "aa" we will leave the branch generated by the production A >b.

Q No 4.What is the difference between intersection and union of a language?

Intersection of two languages will consist of all those words which are in both languages while union of two languages will consist of all those words which are present in at least one language.

Symbol for intersection is 、and for union is U.

Q No 5.What is the difference between Context free languages and regular languages?

Regular languages can be represented by FA's because we do not need any memory to recognize (accept or reject them on FA) them but there is another class of languages that can not be represented by FA's because these languages require that we have some memory (with the help of memory we can store letters of the string we are checking so that we can compare them with next coming letters in the string).

For example language anbn requires that we must store a's and then compare their count with next coming b's so that we can check whether a's are equal to b's or not.

Due to this reason we use Context Free Grammars to

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represent them because we can5t write RE's for them. So Context Free Languages represent a broader category this category also include regular languages as subcategory. It means that context free languages include regular languages as well as some other languages.

Q No 6 What is the difference between Moore and Mealey machines?

In Mealy Machine we read input string letters and generate output while moving along the paths from one state to another while in Moore machine we generate output on reaching the state so the output pattern of Moore machine contains one extra letter because we generated output for state q0 where we read nothing.

Q No 7.What does the following terms mean

- STACK Consistent
- Y-able Paths
- Working string
- Semi Word means

Stack consistence means that in the PDA converted in the conversion form, when we follow a path segment (which is formed by combining start, read or here state with next read, here or accept state on the path) along the PDA its pop state should have the path for the same letter that is present on the top of the stack at that stage. If this doesn't happen our PDA will crash because in conversion form of

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the PDA the pop state has only one letter path, so if we could not be able to find that letter on the top of the stack our PDA will crash (if will not find path where to go from that state)

Working string means the string present on the input tape.

Y-able Paths means that when we follow a certain sequence of rows from the row table to generate a path for a word form start state to accept state. The path (sequence of rows) should be stack as well as joint consistent it means that rows should end at the same read or here state (join consistency) and the rows should be able to pop the letter from the top that is indicated in the pop state of the row.

Semi word is the string of terminals it may be null string ending with a Non terminals on the right.

For example some
semi words are aaS
aab
bA
B

Is Automata Theory is a Programming Subject or theoretical?

Automata theory is the study of *abstract* computing devices, or "machines". This topic goes back to the days before digital computers and describes *what is possible to compute using an abstract machine*.

These ideas directly apply to creating compilers, programming languages, and designing applications.

They also provide a formal framework to analyze new types of computing devices, e.g. biocomputers or quantum computers

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What are practical Examples of the implications of Automata Theory and the formal Languages?

Grammars and languages are closely related to automata theory and are the basis of many important software components like:

- Compilers and interpreters
- Text editors and processors
- Text searching
- System verification

What are the Types of Automata?

- The Types of Automata Theory are
- Finite Automata

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- Regular Languages
- Linear-bounded Automata
- Context Sensitive Languages
- Push-Down Automata
- Context Free Languages
- Turing Machines
- Recursively innumerable languages

There are others as well like,

- Random Access Machines
- Parallel Random Access Machines
- Arrays of Automata

Question: How types of Automata Differ?

Answer:

They differ in the following areas

Complexity (or Simplicity)

Power

In the function that can be computed. In the languages that can be accepted.

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Question: What is the difference between the alphabet and an element of a set?

Answer: Alphabets is a set of letters nothing else but a set of strings (elements) can have more than one letters in one string.

Question: Difference between Palindrome and Reverse function?

Answer: The language consisting of ⋯ and the strings s defined over ┆ such that Rev(s)=s.

It is to be denoted that the words of PALINDROME are called palindromes. Reverse (w) = w

Example: ┆={a,b},

PALINDROME={⋯, a, b, aa, bb, aaa, aba, bab, bbb, ...}

If a is a word in some language L, then reverse (a) is the same string of letters spelled backwards, called the reverse of a.

e.g

reverse (xxx)

= xxx reverse

(623) =

326

reverse (140) = 041

Question: Define Strings?

Answer: Concatenation of finite letters from the alphabet is called a string.

e.g If ┆={a,b} then a language L can be defined as

L = {a, abab, aaabb, abababababababababab,.}

it's mean all words with a's more or equal to b's

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Question: Define empty or null strings?

Answer: Concatenation of finite letters from the alphabet is called a string.

Sometimes a string with no symbol at all is used, denoted by (Small Greek letter Lambda) ⊢ or (Capital Greek letter Lambda) ¨, is called an empty string or null string.

Question: Difference between string and word?

Answer: Any combination of letters of alphabet that follows rules of language is called a word.
A string is a finite sequence of symbols from an alphabet.

Question: There are as many palindromes of length 2n as there are of length 2n-1, please explain?

Answer: If we try to create palindromes then middle elements (2 in even palindromes & 1 in odd palindrome) does not cause any change in no. of palindromes
Defining the language PALINDROME, of length 2n and 2n-1 defined over S = {a,b}
e.g if we take n= 2 for 2n
Length (2n) = 4 and string can be written as
{aaaa, abba, baab, bbbb} And if we take n = 2 for 2n-1
Length (2n-1) = 3 and string can be written as
{aaa, aba, bab, bbb}

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Question: Define Kleene Star?

Answer: Given ┆, then the Kleene Star Closure of the alphabet ┆, denoted by ┆*, is the collection of all strings defined over ┆, including ¨.

It is to be noted that Kleene Star Closure can be defined over any set of strings. Examples

If ┆ = {x}
Then ┆* = {¨, x, xx, xxx, xxxx, ….} If ┆ = {0,1}
Then ┆* = {¨, 0, 1, 00, 01, 10, 11, ….}
If ┆ = {aaB, c}
Then ┆* = {¨, aaB, c, aaBaaB, aaBc, caaB, cc, ….} Note:

Languages generated by Kleene Star Closure of set of strings, are infinite languages. (By infinite language, it is supposed that the language contains infinite many words, each of finite length).

Question: Why do not we can write" ba" in the set of PALINDROME while it is reverse of "ab".

Answer: The language consisting of ¨ and the strings s defined over ┆ such that

Rev(s)=s.

It is to be denoted that the words of PALINDROME are called palindromes.

Exampl e For ┆ ={a,b},
PALINDROME={¨, a, b, aa, bb, aaa, aba, bab, bbb, ...}
All two length string cannot satisfied the palindrome. aa and bb in palindrome but ba and ab are not in palindrome.

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Question: What are the steps of Recursive Definition of Languages?
Answer: A recursive definition is characteristically a three-step process. First, we specify some basic objects in the set.

Second, we give rules for constructing more objects in the set from ones we already know.

Third, we declare that no objects except those constructed in this way are allowed in the set.

Question: Strings that ending in "a " and strings containing exactly one "a".
Answer:

Its means all string ending in a

e.g ¦= {a, b}

{a, aa, ba, aba,

baa,…….} Exactly a,

defined over ¦= {a, b}

{ab, ba, abb, bba,…}

Question: What is Lexical Analyzer?
Answer:

The first phase of the compiler is the lexical analyzer, also known as the scanner, which recognizes the basic language units, called tokens.

The exact characters in a token is called its lexeme.□

Tokens are classified by token types, e.g. identifiers, constant literals, strings, operators, punctuation marks, and key words.□

Different types of tokens may have their own semantic attributes (or values) which must be extracted and stored in the symbol table.□

The lexical analyzer may perform semantic actions to extract such values and insert

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them in the symbol table.□

Question: What is accepting string language?

Answer: The strings which follow rules for the language are accepted in language.

Let u and v be strings. Then uv denotes the string obtained by concatenating u with v, that is, uv is the string obtained by appending the sequence of symbols of v to that of u. For example if u = aab and v = bbab,□ then uv = aabbbab. Note that vu = bbabaab uv. We are going to use first few symbols of English alphabet such as a and b to denote symbols of an alphabet and those toward the end such as u and v for strings.

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Question: What is transition table?

Answer: A complete transition table contains one column for each character. To save space, table compression may be used. Only non-error entries are explicitly represented in the table, using hashing, indirection or linked structures. Tabular representation of a function that takes two arguments and returns a value

q0◊	q2	q0
*q1	q1	q1
q2	q2	q1

Rows correspond to states Columns correspond to inputs Entries correspond to next states. The start state is marked with an arrow The accepting states are marked with a star

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Question: What does it means by the transition?

Answer: Transition means which letter, after being read, is transfer from which place to which place. It is necessary to show transition of every letter from each and every state.

Question: What is Null?

Answer: ⋯ is a string having no letter in it. e.g (A box having no object in it).
Let us observe that if the alphabet has no letters, then its closure is the language with the null string as its only word, because ⋯ is always a word in a Kleen closure. Symbolically,
we write
if ┆ = {the empty set} then ┆* = {⋯},
This is not the same as if S = {⋯}
then S* = {⋯}
which is also true but for a different reason, that is ⋯⋯ = ⋯.
Example
If L is any language, then
L⋯ = ⋯L = L
If ⋯ string concatenates with any string S, it does not cause any change in the string S, if we use ⋯ in any string then it generates some result that is below here
⋯ for both side then string is ⋯aa⋯ = aa
b for left and ⋯ for right then string is baa⋯ = baa

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‘‘ for left and b for right then string is ‘‘aab = abb

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Question: What is the difference between Regular Languages and Non Regular Languages?

Answer: The language determined by a regular expression is regular otherwise non regular.

Question: What is NFA?

Answer: Nondeterminism plays a key role in the theory of computing. A nondeterministic finite state automaton is one in which the current state of the machine and the current input do not uniquely determine the next state. This just means that a number of subsequent states (zero or more) are possible next states of the automaton at every step of a computation.

Of course, nondeterminism is not realistic, because in real life, computers must be deterministic. Still, we can simulate nondeterminism with deterministic programs. Furthermore, as a mathematical tool for understanding computability, nondeterminism is invaluable.

As with deterministic finite state automata, a nondeterministic finite state automaton has five components.

a set of *states*

a finite *input alphabet* from which input strings can be constructed

a *transition function* that describes how the automaton changes states as it processes an input string

a single designated *starting state*

a set of *accepting states*

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The only difference lies in the transition function, which can now target subsets of the states of the automaton rather than a single next state for each state, input pair.

Question: What is a main difference between NFA and FA?

Answer: Finite Automata (FA)

A finite automaton with unique transitions from each state. There are no choices

There is only 1 letter of the alphabet per transition (the label on the edges in the graph is limited to 1)

- transitions are not allowed.

No implied trap states. That is, if the letter of alphabet has n letters in it, every state will have n edges coming out of it. If the letters are not part of a valid word, then the edges will go into a special state, called the trap states. Trap states are the NO states.

Nondeterministic Finite Automaton (NFA)

Has the freedom to do various different moves when in a state and seeing some input

This is modeled mathematically as

The ability to be in various states at once

Accepting a string whenever at least one of those states is accepting.

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Question: How to obtain 9's complement?

Answer: The (r – 1)'s Complement

Given a positive number N is base r with an integer part of n digits and a fraction part of m digits, the (r-1)'s complements of N is defined as

$r^n - r^{-m} - N$. Some numerical examples follow:

The 9's complement of $(52520)_{10}$ is $(10^5 - 1 - 52520) = 99999 - 52520 = 47479$.

No fraction part, so $10^{-m} = 10^0 = 1$.

The 9's complement of $(0.3267)_{10}$ is $(1 - 10^{-4} - 0.3267) = 0.9999 - 0.3267 =$

0.6732

No integer part, so $10^n = 10^0 = 1$.

The 9's complement of $(25.639)_{10}$ is $(10^2 - 10^{-3} - 25.639) = 99.9999 - 25.63967$

$= 74.360$

Question: What is DELAY box?

Answer: It is a component which held input for some time and then forwards it just a holder.

Question: What is the difference between pumping Lemma 1 and pumping Lemma 2?

Answer: Infact PLI & PLII are same (A way to recognize Non Regular language). The only difference is in PLII we take care about the substring x & y that length (x) + length (y) less than or equal no. of state of machine. This is because through PLI palindrome (that is Non Regular) is proved to be regular and through PLII this problem is fixed.

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Question: What is pumping lemma? And what is history?

Answer: A theorem to check validity (Regularity) of an infinite language should not be used with finite languages. Whenever an infinite is regular then there must be a loop (circuit) because without a loop means infinite no. of states that is not possible practically. (Machine can have finite states only)

Question: What is the difference between semi word and word?

Answer: A word is complete combinations of terminals only e.g. abba or ab or a or null string.

Semiword: A semiword is a string of terminals (may be none) concatenated with exactly one nonterminal on the right i.e. a semiword, in general, is of the following form

(terminal)(terminal)… (terminal)(nonterminal)

Question: What is the difference between derivation tree and total tree?

Answer: A Derivation tree is the one that shows how to derive any specific word of the language described by CFG but Total Language Tree shows all words of the

Language described by CFG on it.

Question: How to identify a production by it, ambiguity will be removed?

Answer: It is a matter of practice that one can know how to

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remove ambiguity from it, only practice makes you efficient enough to do it in less time.

Question: Difference between Nullable and Null production? How to make CFG for Nullable and for Null?

Answer: The production of the form
nonterminal ® L
is said to be ***null production***.

Example:
Consider the following CFG
S ® aA|bB|L, A ® aa|L, B ® aS
Here S ® L and A ® L are null productions.
A production is called ***nullable production*** if it is of the form N ® L
or
there is a derivation that starts at N and leads to L *i.e.*
N1 ® N2, N2 ® N3, N3 ® N4, …, Nn ® L,
where N, N1, N2, …, Nn are non terminals.

Example:
Consider the following CFG S ® XY, X ® Zb, Y ® bW
Z ® AB, W ® Z,
A ® aA|bA|L B ®Ba|Bb|L.
Here A ® L and B ® L are null productions, while Z ® AB, W ® Z are nullable productions.

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Method:

Delete all the Null productions and add new productions *e.g.*

Consider the following productions of a certain CFG X ® aNbNa, N ® L, delete the production N ® L and using the production X ® aNbNa, add the following new productions X ® aNba, X ® abNa and X ® aba

Thus the new CFG will contain the following productions X ® Nba|abNa|aba|aNbNa

Note: It is to be noted that X ® aNbNa will still be included in the new CFG.

Method:

Consider the following CFG S ® XY, X ® Zb, Y ® bW Z ® AB, W ® Z, A ® aA|bA|L B ®Ba|Bb|L.

Here A ® L and B ® L are null productions, while Z ® AB, W ® Z are nullable productions. The new CFG after, applying the method, will be

S ® XY X ® Zb|b Y ® bW|b Z ® AB|A|B W ® Z

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A ®

aA|a|bA|b

B

®Ba|a|Bb|

b

Note: While adding new productions all Nullable productions should be handled with care. All Nullable productions will be used to add new productions, but only the Null production will be deleted.

Question: Is it possible to make CFG for infix and postfix expression's using derivation tree?

Answer: Derivation tree is only used to derive words of language that is described by a CFG. Yes, we can create CFG for languages infix expressions, postfix expressions.

Question: What are the uses of push down automata in computing?

Answer: PDA is just an enhancement in FAs. i.e Memory is attached with machine that recognizes some language. FA is basic structure for most advanced electronic machines such as computer etc.

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Question: What is difference between PUSH DOWN STACK and PUSH DOWN STORE?

Answer: No difference at all. Both terms are used to describe memory structure attached with FAs to store some characters in it.

Question: How to accommodate NULL string if it is part of language during converting from CFG to CNF and building FA's?

Answer: When we convert CFG to CNF and Null is a part of language then null string is not part of language in CNF. This is the only change a language gets in CNF. When we draw an FA for a CFG, there is no change in language and simply draws FA that accepts the language of CFG.

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Question: How to accommodate NULL string if it is part of language during converting from CFG to CNF and in building PDA?

Answer: When we convert CFG to CNF and Null is a part of language then null string is not part of language in CNF. This is the only change a language gets in CNF. When we draw an PDA for a CFG, there is no change in language and simply draws PDA that accepts the language of CFG.

Question: What is Push down Automata?

Answer: Pushdown Automaton (PDA), consists of the following

An alphabet S of input letters.
An input TAPE with infinite many locations in one direction. Initially the input string is placed in it starting from first cell; the remaining part of the TAPE is empty.
An alphabet G of STACK characters.
A pushdown STACK which is initially empty, with infinite many locations in one direction. Initially the STACK contains blanks.
One START state with only one out-edge and no in-edge.
Two halt states i.e. ACCEPT and REJECT states, with in-edges and no out- edges.
A PUSH state that introduces characters onto the top of the STACK.
A POP state that reads the top character of the STACK (may contain more than one out-edges with same label).

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A READ state that reads the next unused letter from the TAPE (may contain more than one out-edges with same label).

Question: Why we study Automata?

Answer: Automata theory is the study of abstract computing devices, or "machines". This topic goes back to the days before digital computers and describes what is possible to compute using an abstract machine. These ideas directly apply to creating compilers, programming languages, and designing applications. They also provide a formal framework to analyze new types of computing devices, e.g. biocomputers or quantum computers. Finally, the course should help to turn you into mathematically mature computer scientists capable of precise and formal reasoning. More precisely, we'll focus primarily on the following topics. Don't worry about what all the terms mean yet, we'll cover the definitions as we go:

1. Finite state automata: Deterministic and non-deterministic finite state machines; regular expressions and languages. Techniques for identifying and describing regular languages; techniques for showing that a language is not regular. Properties of such languages.

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2. Context-free languages: Context-free grammars, parse trees, derivations and ambiguity. Relation to pushdown automata. Properties of such languages and techniques for showing that a language is not context-free.
3. Turing Machines: Basic definitions and relation to the notion of an algorithm or program. Power of Turing Machines.
4. Undecidability: Recursive and recursively enumerable languages. Universal Turing Machines. Limitations on our ability to compute; undecidable problems.
5. Computational Complexity: Decidable problems for which no sufficient algorithms are known. Polynomial time computability. The notion of NP-completeness and problem reductions. Examples of hard problems.

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Question: What is valid and invalid alphabets explain with example?

Answer: Example 1

If s=abc is a string defined over ¦= {a,b,c} then Rev(s) or sr = cba

¦= {a,b}

s=abbaa

Rev(s)=a

abba

When more then letter in the alphabet you have to be quite careful that don't reverse the symbols however you write the letter from right to left.

Example 2

¦= {B, aB,

bab, d}

s=BaBbabB

d

Rev(s)=dBb

abaBB

Example 3

¦= {ab, b,

aa} s=abbaa

Rev(s)=aaba

b

¦1= {B, aB, bab, d} is valid alphabet as there is no letter in ¦1 that lies in start of any other letter means all the tokens of any word (string) will be unique.

Whereas in ¦2= {B, Ba, bab, d} letter B lies in start of letter Ba.

This makes it difficult to decide which token to select

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at some point if B occurs in any string.

Question: Why we use Capital Letters for Languages.
Is it possible to combine two languages together like EVEN-EVEN & EQUAL, and so on?

Answer: We use capital letter for our convenient and yes you can combine two languages.

Question: What are the rules to form WORDS in languages developed by Automata?
Are strings not following any rule?

Answer: Rules are different for different languages.
e.g ┆={a,b}
The language L of strings of even length, defined over ┆ = {a,b}, can be written as Valid for even length L= {aa, bb, aabb, bbaa, baab, abba …..}
Invalid for even length L= {a, b, aaa, bbb, aba, bab, …….}
The language L of strings of odd length, defined over ┆ = {a,b}, can be written as Valid for odd length L1= {a, b, aaa, bbb, aba, bab, …….}
Invalid for odd length L= {aa, bb, aabb, bbaa, baab, abba …..} Strings cannot follow any rule.

Question: What are graphs of palindromes of length 2n and length 2n-1?

Answer: Palindromes of even length are always symmetric about the middle line and

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palindromes of odd length are always symmetric about middle letter.

If we try to create palindromes then middle elements (2 in even palindromes & 1 in odd palindrome) does not cause any change in no. of palindromes

Defining the language PALINDROME, of length 2n and 2n-1 defined over S = {a,b}

e.g if we take n= 2 for 2n

Length (2n) = 4 and string can be written as {aaaa, abba, baab, bbbb} And if we take n = 2 for 2n-1

Length (2n-1) = 3 and string can be written as {aaa, aba, bab, bbb}

Question: How can we write a RE for a given number of words?

Answer: In example let us consider a finite language L that contains all the strings of a's and b's of length three exactly:

L = {aaa aab aba abb baa bab bba bbb}

The first letter of each word in L is either an a or a b. The second letter of each word in L is either an a or a b. The third letter of each word in L is either an a or a b. So, we may write

L = language ((a+b)(a+b)(a+b)) Or

L = language $((a+b)^3)$

If we want to define the set of all seven-letter strings of a's and b's, we could write $(a+b)^7$. In general, if we want to refer to the set of all possible strings of a's and b's of any length whatsoever, we could write $(a+b)^*$

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This is the set of all possible strings of letters from the alphabet $\sum = \{a, b\}$ including the null string. This is a very important expression and we shall use it often.

Again, this expression represents a language. If we choose that * stands for 5, then

(a+
b)*
give
s

$(a+b)^5 = (a+b)(a+b)(a+b)(a+b)(a+b)$

We now have to make five more choices: either a or b for the first letter, either a or b for second letter, and so on.

21. Please explain that in some expression having more then one plus sign the resulting string is only one from them or it can be more then one? For example if there is an expression: a +b + c, with out any small bracket between them the resultant string is "a or b or c" OR it cans both "a or b and c","a and b or c" The resulting string is only one from them. Whenever we put + signs between n words that means one option (only) out of all available.

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Question: One Language generates many REs?

Answer: Sometimes we generate many Regular Expressions (RE) for one language these REs are called Equal RE.

Example:

Consider the following regular expressions r1= (a + b)* (aa + bb)

r2= (a + b)*aa + (a + b)*bb then

both regular expressions define the language of strings ending in aa or bb. This RE (aa+bb) is separated by +. Whenever RE is separated by +, two possibilities occur

1. Before + part
2. After + part

(a+b)*aa comes before + part, means RE generate all strings that end with aa. (a+b)*bb comes after + part this means RE generate all strings that end with bb. In short we can say r2 generates the language of strings ending either aa or bb this is equal to r1.

Question: Rules for determining RE for a given language defined on a set?

Answer: The following rules define the language associated with any regular expression: Rule 1: The language associated with the regular expression that is just a single letter is that one-letter word alone and the language associated with null is just {null}, a one-word language.

Rule 2: If r1 is a regular expression associated with the language L1 and r2 is regular expression associated with the language L2, then:

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The regular expression (r□1)(r2) is associated with the product L1L2 that is the language L1 times L2

language (r1r2) = L1L2

The regular expression r□1 + r2 is associated with the language formed by the union of the sets L1 and L2:

language (r1 + r2) = L1 + L2

The language associated with the regular expression (r□1)* is L1*, the Kleene closure of the set L1 as a set of words:

language(r1*) = L1*

Once again, this collection of rules proves recursively that there is some language associated with every regular expression. As we build up a regular expression from the rules, we simultaneously are building up the corresponding language.

Question: What is EVEN - EVEN LANGUAGE?

Answer: Even-Even means count of a's is even and cout of b's is also even.

Even + Even = Even (Proved)

So we can divide any string excluding ¨ which is also in Even-Even in substrings of length 2 each. It gives us following combinations

aa, bb makes no change in string status ab, ba create disorder in string status

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so (aa+bb+(ab+ba)(aa+bb)*(ab+ba))*.

Question: What is tokenizing string?

Answer: Tokenize a string means make its valid units. Question: What is whole star?

Answer: Whole star of any RE means all possible combinations of that RE including ¨.

Question: How to use + operator in Automata?

Answer: Plus Operation is same as Kleene Star Closure except that it does not generate ¨ (null string), automatically.

Question: How to know what is RE?

Answer: It is a matter of practice that you come to know what does an RE represent. You may start with simpler REs and later you will be able to recognize different REs gradually.

Question: Why we use null string in FA?

Answer: If null string is part of our language then we have to handle it in FA, its not compulsion.

Question: What is tree structure?

Answer: A tree is a connected undirected graph with no simple circuits. Since a tree cannot have a simple circuit, a tree cannot contain multiple edges or loops. Therefore any tree must be a simple graph.

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Question: What is difference between (a, b) & (a + b)?

Answer: (a, b) & (a + b) are same and both represents either a or b.

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Question: Difference between FA & TG?

Answer: Finite Automata (FA)

- A finite automaton with unique transitions from each state.
- There are no choices
- There is only 1 letter of the alphabet per transition (the label on the edges in the graph is limited to 1)
- ... transitions are not allowed.
- No implied trap states. That is, if the letter of alphabet has n letters in it, every state will have n edges

coming out of it. If the letters are not part of a valid word, then the edges will go into a special state, called the trap states. Trap states are the NO states. Transition Graphs (TG)

- TG are generalizations of FA.
- Can change state without an input.
- Can read more than one letter at a time.
- Can have a regular expression as a edge label.
- Can have more then one start state.

We are not bound in TG. We are only given a freedom or relation which we are not forced to use. We may or may not use it on will.

In fact we enjoy freedom of staying at multiple places at one time in TGs while reading any letter strings which provides us a facility that any one available path it leads us to final state, word is accepted.

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Question: Difference between $(a+b)^+$ and $(a+b)^*$?

Answer: $(a + b)^+$ means, we repeat RE a + b infinite (any) no. of times but minimum once, whereas $(a + b)^*$ means we may repeat a + b any no. of times even zero times. () are only used to clear (distinguish) the one RE from some other RE.

Question: What is length of string?

Answer: The length of a string indicates how many symbols are in that string.

For example, the string 0101 using the binary alphabet has a length of 4. The standard notation for a string w is to use |w|.
For example:
Length of string: |0101| is 4.
Length of string: |0010| = 4, |aa| = 2, | |= 0

Question: After looking the on diagram how can we say it is TG or is FA?

Answer: Every FA is also a TG but not every TG is FA.
In every FA, every state shows transition of all letters of given alphabet but in any TG it is not must. In TG, we may or may not show all letters transition according to requirement. We can also show transitions on reading any strings in TGs but it is not possible in FAs.

Question: Differentiate between FA, TG and GTG?

Answer: Every FA is also a TG but not every TG is FA.
In every FA, every state shows transition of all letters of given alphabet but in any TG it is not

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must. In TG, we may or may not show all letters transition according to requirement.

We can also show transitions on reading any strings in TGs but it is not possible in FAs. In GTG Directed edges connecting some pair of states labeled with regular expression. It may be noted that in GTG, the labels of transition edges are corresponding regular expressions. In TG we write strings and in GTG we are bound to write RE.

Question: Difference between even clumps and odd clumps?

Answer: Letters may be a's (for example) in even count at one place.

e.g.
aab =
valid baa
= valid
aba =
invalid
abab =
invalid

Question: Difference between containing and consisting?

Answer: Containing something (e.g. R1) means R1 is there (must), whatever other things are, we don't care. Consisting something (e.g. R1) means only R1 is there all other things should be rejected.

Question: Define the main formula of Regular expressions? Define the back ground of regular

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expression?

Answer: Regular expressions are a notation that you can think of similar to a programming language. In fact, regular expressions are quite fundamental in some programming languages like perl and applications like grep or lex.

Regular expressions are similar to NFA and end up describing the same things we can express with a finite automaton. However, regular expressions are declarative in what strings are accepted, while automata are machines that accept strings. We use Regular expressions for defining the languages.

Say that R is a regular expression if R is:

1. a for some a in the alphabet ¦, standing for the language {a}
2. ¨ , standing for the language {¨}
3. R1+R2 where R1 and R2 are regular expressions, and + signifies union
4. R1R2 where R1 and R2 are regular expressions and this signifies concatenation
5. R* where R is a regular expression and signifies closure
6. (R) where R is a regular expression, then a parenthesized R is also a regular expression

A set of strings from an alphabet. The set may be empty, finite or infinite.

The building blocks of regular languages are symbols, concatenation of symbols to make strings (words), set union of strings and Kleene closure (denoted as *, also called the Kleene star, it should be typed as a superscript but this is plain text.)

Informally, we use a syntax for regular expressions.

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Using sigma as the set {0, 1} (an alphabet of two symbols)

01110 is a string starting with the symbol 0 and then concatenating 1, then 1, then 1, and finally concatenating 0. No punctuation is used between symbols or strings that are concatenated.

(01+10) is a union of the two strings 01 and 10. The set {01, 10}

(00+11)* is the Kleene closure of the union of 0 concatenated with 0 and 1 concatenated with 1.

The Kleene closure (star) is defined as the concatenation of none, one, two, or any countable number strings it applies to.

Examples of Kleene star:

1* is the set of strings {¨, 1, 11, 111, 1111, 11111, etc. } This set is infinite.

(1100)* is the set of strings {¨, 1100, 11001100, 110011001100, etc. } (00+11)* is the set of strings {¨, 00, 11, 0000, 0011, 1100, 1111, 000000, 000011, 001100, etc. }

Note how the union (+ symbol) allows all possible choices of ordering when used with the Kleene star.

(0+1)* is all possible strings of zeros and ones, often written as ¦* where ¦ = {0, 1}(0+1)*

(00+11) is all strings of zeros and ones that end with either 00 or 11. Note that concatenation does not have an operator symbol.

(w)+ is a shorthand for (w)(w)* w is any string or expression and the superscript plus, + , means one or more copies of w are in the set defined by this expression.

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Question: Are S* and S^+ same?

Answer: No because S+ means same as Kleene Star Closure except that it does not generate ¨ (null string), automatically. So in the above example, there is no null string.

Concatenation of finite letters from the alphabet is called a string.

If we have S={a, bb, bab, abaab}, first we factorize the string like (a) (bb) (bab) (abaab) then concatenate to each other and make more string to its concatenation but the string abbabaabab is not in S* because the last member (ab) of the group does not belong to S, so abbabaabab is not in S.

Question: What is set?

Answer: Set is a collection of distinct objects.

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Question: How many Methods of defining the languages?

Answer: 1. You can describe a language in English like statement
2. You can define a language by putting all its words in a set
3. You can define a language in a mathematical way
4. You can define a language by Recursive Definition
5. You can define a language by Regular Expression
6. You can define a language by Finite Automata
7. You can define a language by Transition Graph
8. You can define a language by Context Free Grammar

Question: What is difference between Palindrome, Kleene star closure and plus operation?

Answer: The language consisting of ⋯ and the strings s defined over ┊ such that Rev(s)=s.

or

A string x is a palindrome if $x^R=x$.
It is to be denoted that the words of PALINDROME are called palindromes. Reverse (w) = w
Example: ┊={a,b},
PALINDROME={⋯, a, b, aa, bb, aaa, aba, bab, bbb, ...}
If a is a word in some language L, then reverse (a) is the same string of letters spelled backwards, called the reverse of a.
e.g
reverse (xxx)
= xxx reverse
(623) = 326

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reverse (140) = 041

Given ¦, then the Kleene Star Closure of the alphabet ¦, denoted by ¦*, is the collection of all strings defined over ¦, including ¨.

Plus Operation is same as Kleene Star Closure except that it does not generate ¨ (null string), automatically.

Question: What is inside language?

Answer: Any language contains words in it and certain rules to validate strings for that language.

Question: What is Equal RE?

Answer: Sometimes we generate many REs for one language these are called Equal RE.

Question: How can we make Finite Automaton from a language and a language from FA?

Answer: There is not any formal procedure to design FA for a language. This ability just improves with time and practice.

Question: Could we just use +, - symbols with x not with y in FA?

Answer: Yes, you can use only + or – for the place of x and y, but remember when you don't write + or –, So you should write start and final at the beginning or ending state Or you should indicated by an arrow and a final state by drawing box or another circle around its circle because if you don't write how can we indicate the start and final state.

Question: Explain the language L of string, defined over ∑= {0,1}, having double 0's and double 1's?

Answer: Language of strings with 00 or 11 means string that have substrings 00 or 11 in them at least.

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Minimum words which are included in this language are 00 and 11. This language does not accept null and it also does not accept 0 or 1.

Question: What are the difference between single 1 and 0 and double 1's and 0's?

Answer: 1. Consider the language L of strings, defined over

If ¦={0, 1}, having words with either 0's or 1's without null. The language L may be expressed by RE

$(0 + 1)^+$

When you make string by above RE you have all possible combination of 0's and 1's except null i.e {0, 1, 00, 01, 10, 11,… }. Minimum words which are included in this language are 0 and 1.

2. Consider the language L of strings, defined over

If ¦={0, 1}, having double 0's or double 1's, The language L may be expressed by the RE (0+1)* (00 + 11)

(0+1)*

Double 1's and 0's means clumps of letter which will always come together.

Minimum words which are included in this language are 00 and 11.

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Question: On what basis we select initial and final states?

Answer: It depends on the expression given to us.

Question: How we know that the given expression has how many states?

Answer: There is not any formal procedure to know the number of states. This ability just improves with time and practice.

Question: How will we develop the rules of transition?

Answer: Transition means which letter, after being read, is transfer from which place to which place. It is necessary to show transition of every letter from each and every state.

Question: Can we accept the strings going from final to initial?

Answer: It is to be noted that if any state start from the final state it does not accept any string. Even it does not accept the null string, because there is no path starting from initial state and ending in final state.

Question: What are the basic rules to build FA?

Answer: One and only rule is to build a Finite Automata (FA) should accept all words of the language and reject all the words which are not part of the language. Any FA that ensures these above things is the right FA for the language.
Note: One language can have many FA.

Question: What is Dead state?

Answer: The DEAD STATE is introduced to be able to

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make an automaton complete without altering its behavior.

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Question No : 41 of 52 Marks: 2 (Budgeted Time 4 Min)

What is meant by "Left most Derivation" in context of CFG?

Answer (Please click here to Add Answer)

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Lec:36,page:103

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Question No : 42 of 52 Marks: 2 (Budgeted Time 4 Min)

Explain the language L of string, defined over ∑= {0,1}, having double 0's or double 1's?

Answer (Please click here to Add Answer)

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(0+1)*(00+11)(0+1)*

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Question No : 43 of 52 Marks: 2 (Budgeted Time 4 Min)

Consider the language defined by the following regular expression:

$b(a + b)^*a$

What will be the corresponding Context Free Grammar (CFG)?

Answer (Please click here to Add Answer)

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Lec:32,Page:91

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Question No : 44 of 52 Marks: 2 (Budgeted Time 4 Min)

Consider live productions to be applied during derivation of a word. In your point of view what will be the ultimate result?

Answer (Please click here to Add Answer)

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Lec:43

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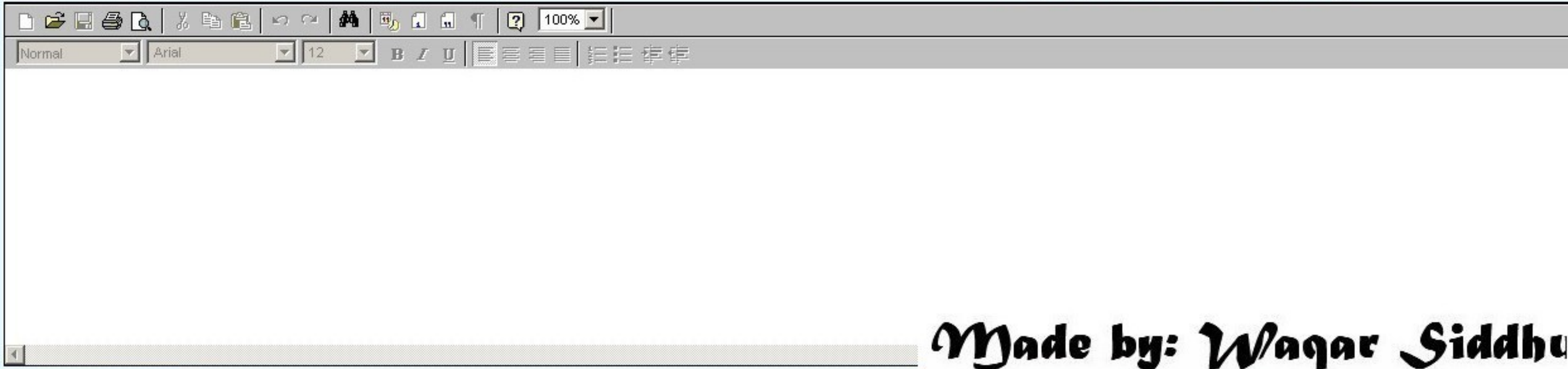
Question No : 45 of 52 Marks: 3 (Budgeted Time 6 Min)

What is meant by the following statement ?

"LANGUAGE IS CLOSED"

Answer (Please click here to Add Answer)

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Question No : 46 of 52 Marks: 3 (Budgeted Time 6 Min)

Write three different parsing techniques.

Answer (Please click here to Add Answer)

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page:136 lec:44

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Question No : 47 of 52 Marks: 3 (Budgeted Time 6 Min)

Illustrate Decidable Problem with the help of an example.

Marks [1+2]

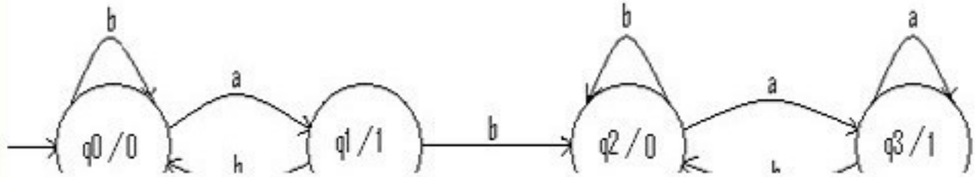
Answer (Please click here to Add Answer)

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Lec:29,page80

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Consider the following Moore machine:



Answer (Please click here to Add Answer)

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Question No : 49 of 52 Marks: 5 (Budgeted Time 10 Min)

Consider the language L which is EVEN-EVEN, defined over $\Sigma = \{a,b\}$. In how many classes does L may partition Σ^*. Explain briefly.

Answer (Please click here to Add Answer)

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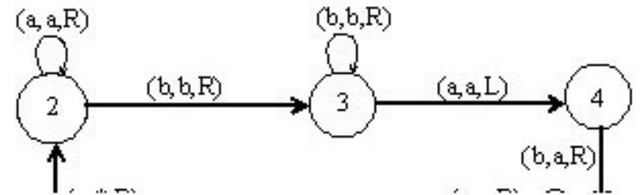
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Lec:28,Page:77

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Question No : 50 of 52 Marks: 5 (Budgeted Time 10 Min)

Consider the following TM



Answer (Please click here to Add Answer)

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Derive Chomsky Normal Form (CNF) corresponding to the Context Free Grammar (CFG) given below:

$A \rightarrow BAB \mid B \mid \Lambda$

$B \rightarrow 00 \mid \Lambda$

Answer (Please click here to Add Answer)

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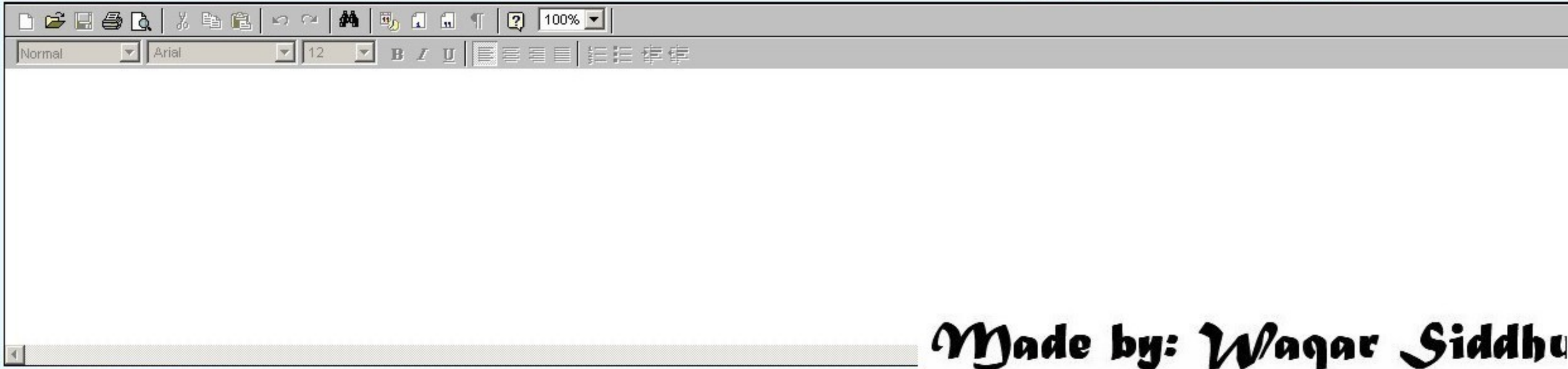
Question No : 52 of 52 Marks: 5 (Budgeted Time 10 Min)

Suppose a Maze of 20 boxes; 1 box for initial and 1 for final state. 6 boxes are for non-moveable states while the rest can be used for transitions. Draw a Nondeterministic Finite Automaton (NFA) for the given Maze.

Marks [2.5+2.5]

Answer (Please click here to Add Answer)

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Question No : 41 of 52 Marks: 2 (Budgeted Time 4 Min)

Write alternative form of this production.
$S \rightarrow aS, S \rightarrow bS, S \rightarrow \Lambda$

Answer (Please click here to Add Answer)

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$S \longrightarrow aS|bS|\Lambda$

e:90

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Question No : 42 of 52 Marks: 2 (Budgeted Time 4 Min)

What are the uses of Push Down Automata (PDA) in computing?

Answer (Please click here to Add Answer)

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PUSHDOWN STACK is a place where the input letters can be placed until these letters are referred again.

Itcan store as many letters as one can in a long column

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Question No : 43 of 52 Marks: 2 (Budgeted Time 4 Min)

What is meant by Row language?

Answer (Please click here to Add Answer)

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Lec:41,page:123

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Question No : 44 of 52 Marks: 2 (Budgeted Time 4 Min)

Write down regular expression for a language L of strings defined over $\Sigma = \{a, b\}$ that neither ends in "a" nor with "b".

Answer (Please click here to Add Answer)

VuAnswers.com

RE=^ (null)

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Question No : 45 of 52 Marks: 3 (Budgeted Time 6 Min)

What are the steps of Recursive Definition of Languages?

Answer (Please click here to Add Answer)

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Lec:3,page:9

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Question No : 46 of 52 Marks: 3 (Budgeted Time 6 Min)

What does the following arbitrary summary table show?

FROM Where	TO Where	READ What	POP What	PUSH What	ROW Number
$READ_0$	$READ_3$	b	b	abb	11

Answer (Please click here to Add Answer)

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Lec:42,page:124

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Question No : 47 of 52 Marks: 3 (Budgeted Time 6 Min)

Write down Context Free Grammar (CFG) for the language of strings expressed by the following regular expression:

$(a + b)^*(a + b)^+$

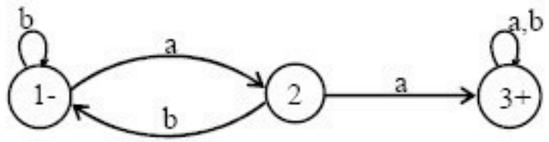
Answer (Please click here to Add Answer)

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Question No : 48 of 52 Marks: 3 (Budgeted Time 6 Min)

Let us consider the following Finite Automaton (FA):



Answer (Please click here to Add Answer)

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Lec:6,page:16

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Question No : 49 of 52 Marks: 5 (Budgeted Time 10 Min)

Write the CFG for EVEN-EVEN language?

Answer (Please click here to Add Answer)

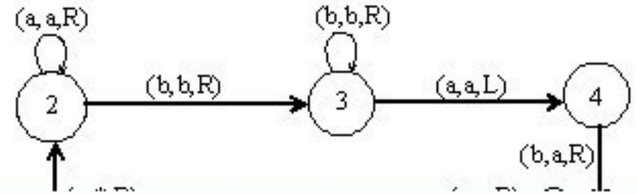
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Lec:32,page:90

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Question No : 50 of 52 Marks: 5 (Budgeted Time 10 Min)

Consider the following TM



Answer (Please click here to Add Answer)

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page 142

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Question No : 51 of 52 Marks: 5 (Budgeted Time 10 Min)

Using suitable examples, differentiate between Kleene star closure and plus operation?

Answer (Please click here to Add Answer)

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Lec:2,page:7

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Question No : 52 of 52 Marks: 5 (Budgeted Time 10 Min)

a. Construct Context Free Grammar (CFG) for the language defined by the regular expression:

(ab + ba)*(a + b)*

b. Remove null productions from the CFG constructed in part i.

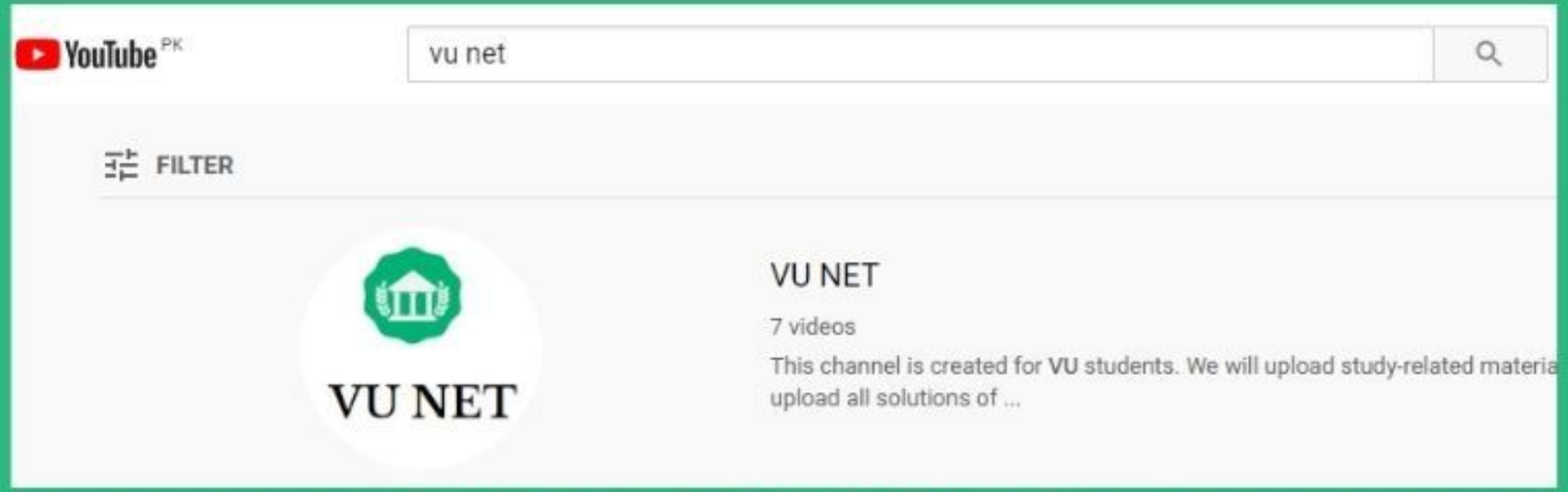
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CS402 GRAND QUIZ

Sr.No	MCQS	ANSWER
1.	Which of the following steps replaces multiple incoming transition edges with a single one proving Kleene's theorem part II?	Step 3
2.	Let FA1 accepts many strings and FA2 accepts no strings, then FA1+FA2 will be equal to:	FA1
3.	Let L be the language of all strings, defined over ∑ =(0,1), ending in 10. Which of the following strings are indistinguishable w.r.t L with z being 0?	(010,101)
4.	If r1=(aa+bb)and r2=(a+b) then the language (aa+bb)(a+b) will bhe generated by_____	(r)(r2)
5.	Introducing a new start state in the case of multiple states is step no._____of proving Kleen's theorem part II.	1
6.	The language having even numbers of a's and even number of b's defined over S={a,b} is called _____	EVEN-EVEN
7.	In NFA having no transition at a certain state, FA can be built by introducing :	Empty state
8.	For every three regular expression R, S, and T. the language denoted by R(S U T) and (RS)U(RT) are the _____	Same
9.	Which of the following string belongs to the language of the regular expression (aa*b)?	aabaab
10.	If L1' and L2' are regular languages, then L1, L2 will be	Regular
11.	Suppose the language L1 has 2 L2 has 2 states. If we have a machine M that accepts L1∩L2. Then the total number of states in M is equal to_____	4

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12.	If L is a regular language, then (L')' U L will be:	L
13.	In Mealy machine, the output depends on_____	Present state and Present output
14.	Strings x,y,z belongs to $\sum^*$ such that $xz \in L$ but $yz \notin L$ where $L \subseteq \sum^*$ are:	Distinguishable
15.	Melay machine to increase the output string in magnitude by 1 is called:	Incrementing machine
16.	Suppose we have FA3 (which is to FA1+FA2) then the final state of FA3 will be declared final if:	It corresponds to any of the final states of FA1 or FA2
17.	If we have the finite language and the number of states in the FA is n then the maximum number of letter in each word of the language that will be accepted by the given FA will be :	n+1
18.	Which of the following state is introduced while developing NFA for the closure of FA?	An initial state which should be final as well
19.	Length of EVEN-EVEN language is_____	Even
20.	If FA1 corresponds to (a+b)* then FA1 must accept_____ strings/strings.	Every
21.	In FA, initial stage is represented by :	Drawing an arrowhead before the state
22.	Which one of the following machine is represented as a pictorial representation with states and directed edges labeled by an input letter along with an output character?	Mealy machine
23.	Length of machine "AbBAbcd" defined over $\sum$=(Ab,B,c,d) is_____.	Five
24.	An FA is a collection of:	Finite states , finite transition and finite input

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		letter
25.	Given the language L={ab, aa, baa}, which of the following strings are in L*? i) abaabaaabaa ii) aaaabaaaa iii)baaaaabaaaab iv)baaaaabaa	1,2 & 4
26.	In the context to make NFA for the concentration of FA1 and FA2 (FA1 accepting null string) which of the following option is correct?	Final states in both FAs
27.	Every ___ is a ___ as well, but the converse may not be true.	FA, TG
28.	NFA with null string has ____ initial state(s).	One
29.	While finding RE corresponding to a TG, we connect the new start state with the old start state by____ transition.	Null
30.	If S=(x). then S* will be_____.	{^,x,xx,xxx,xxxx….}
31.	The minimum length of string (except null string) of a language that starts and ends in the same letter will be:	2
32.	If S={ab, bb} , then S* will not contain_____.	bbba
33.	Which of the following machine has only one initial state?	Moore machine
34.	Which of the following diagram is very rigid in order to express any language?	FA
35.	Let L be the language of all strings, defined over ∑ =(0,1), ending in 111. Which of the following strings are indistinguishable w.r.t L with z being 11?	111,101
36.	Mealy machine can have _____ final states.	Zero
37.	In Moore machine , output is produced over the change of:	States
38.	Lets we have two regular expressions R1 ={xx+yy}and R2={x+y} . Which one of the following is the correct regular expression for the union of R1 and R2?	(xx+yy)+ (x+y)

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39.	FA corresponding to an NFA can be built by introducing a state corresponding to the combination of states, for a letter having	No transition at certain state
40.	The situation there is no way to leave after entry is called	Davey john locker
41.	Which one of the following word is not accepted by the given regular expression?	Abbaab
42.	According to the theory of automata, there are _____ types of languages.	Two
43.	Which of the following word is not accepted by the given regular expression?	Baabaabba
44.	Regular languages are closed under the following operations.	Union, Concentration , Closure
45.	There can be more than ____ FA for a certain language but for ____FA there is only one language associated with it.	One, one
46.	There is no compulsion that each state must have an on outdoing edge for every input variable in:	Transition graph
47.	FA is also called_____.	DFA
48.	If r1 and r2 are regular expressions then (r1*r2) is_____	RE (Regular expression)
49.	Which of the following is the minimal number of states for a finite automaton accepting the language of all strings defined over any alphabet set?	1
50.	Keeping view language of all strings ending with 'a' for which symbol we will take a loop on the final state of its transition diagram?	A
51.	Which of the following statements is true about NFA with Null String?	Transition of null string is allowed in any stage
52.	Which one of the following diagrams expresses languages more simply?	GTG
53.	The language of all strings defined over alphabet	a and ^

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	set={a,b} that does not end with 'a' actually end with:	
54.	Let S={aa,bb}, then S* will have the _____ string.	^
55.	Formal is also known as_____.	Syntactic language
56.	There may be more than one transition for a certain letter on a state in:	Non-Deterministic finite automata
57.	A loop at a state is supposed to be_____transition while converting Moore machine into an equivalent Maley machine.	Incoming
58.	FA of EVEN language shows null string when_____.	initial state is final as well
59.	Which of the following statement is true about GTG?	Transitions are based on regular expressions
60.	Which of the following machine has only one initial state and no final state?	Moore machine
61.	In GTG, there can be more than one :	Start state and final state
62.	GTG for the expression (aa+aba)* may have minimum number of states.	1
63.	In regular expression, the operator '*' stands for.	Iteration
64.	If we have only one state having no transition for input letters, then it is an example of:	NFA
65.	If A and B are regular languages, !(A'U B') is:	Regular
66.	A _____ with "n" states must accept least one string of length greater than "n".	DFA
67.	If r1 is a regular expression then (r1)* is _____.	Also a regular expression
68.	Which of the following is the bypass and state elimination step in the context of Kleene's theorem part II proof?	4
69.	Which of the following is free of non-	FA

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	determinism?	
70.	There is no question of accepting any language in:	Moore machine
71.	A string will be accepted by an NFA if there exist_____one successful path.	atleast
72.	Kleene's theorem part I expresses the relationship between_____	FA and TG
73.	Keeping in view the discussion by Martin, how any states are required to recognize the language of all strings of length 2 or more defined over ∑={a,b} with 'b' being the second letter from right?	7
74.	FA and _____ are same excepts that _____has unique symbol for each transition.	NFA,FA
75.	Subtraction of binary number is possible through.	Both complementing and incrementing machine
76.	Null strings can be specified on edges in:	Transition graph
77.	What is false about the PLAINDROME LANGUAGE?	FA can be build for it
78.	While finding RE corresponding to a TG, if TG has more than one start state then.	Introduce the new start state
79.	All possible combination of string of a language including null string is referred as.	Kleene star closure of a language
80.	N! will be equal to:	n*(n-1)!
81.	Every NFA can be considered to be a____ as well, but the converse may not be true.	TG
82.	In proving Kleene theorem II , if three statuses are connected then middle state is removed bt connecting first and third and writing corresponding RE in:	Concentration
83.	In _____ there must be transition for all the letters of the string.	FA

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84.	For a given Moore Machine , the input string is '101010' , thus the output string would be of length:	Length of input string+1
85.	The FA can be drawn for the regular expression (a+b)* with minimum_____ state(s).	1
86.	Which of the following does not contribute while finding out the length of strings?	^
87.	The language of all strings defined over alphabet set ={x,y} that ends with same letters will have the maximum length of:	Infinite
88.	Considering FA1 and FA2 having 2 states each. Now FA1+FA2 can have maximum_____ number of states.	More than 3
89.	Which one of the following is RE for the language defined over ∑={a,b} having all the words starting with a?	a(a+b)*
90.	An _____ can be considered to be an intermediate structure between finite automaton and transition graph.	NFA
91.	In order to make NFA for the union of FA1 and FA2, the new initial state should be liked to:	Initial states of both FAs
92.	We cannot construct an NFA for the language of _____ defined over alphabet set{a,b}.	Palindromes
93.	The CFG is said to be ambiguous if there exist at least one word of its language that can be generated by the …… production trees	More then one / Different
94.	What do automata mean?	something that works automatically / "something are done automatically
95.	According to theory of automata there	2
96.	The Minimum length of the string (except bull string) of a language that starts and ends in the same letters will be:	1

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97.	If S= {ab,bb} then S* will not contain_____	Bbba
98.	Which of the following machines has only one initial state and no final state?	More machine
99.	Which of the following diagram is very rigid in order to express any language ?	FA
100.	If S={a},then S+will be_____	{a,aa ,aaa , aaaa…}
101.	Let L be the language of the all string defined over over∑ ¿{0,1} ending in10. Which of the following string are indistinguishable with respect to L with z being 11?	010,101
102.	Melay machine can have _____final state	Zero
103.	Given the Language L = {ab, aa,baa},which of the following string are in L*? 1) Abaabaaaabaa 2) Aaaabaaaa 3) Baaaaabaaaaab 4) baaaaabaa	1, 2 and 4
104.	If L1 and L2 are regular Language $L1 \cap (L2 \cup L1)$ will be	Regular
105.	In Mealy Machine the out put depends on_____	Present State and present output
106.	There is no question of accepting any language in.	Moore Machine
107.	The state where there is no way to leave after entry is called___	Davey john Locker
108.	FA corresponding to an NFA can be built by introducing an empty state for a letter having	No transaction at certain state
109.	Which of the following diagram express language more simply?	GTG
110.	Automata is the plural of_____	Automation
111.	If A and B are regular Language !(A∪B) is	Regular
112.	In NFA having no transition at certain state FA can be built by introducing.	Empty state

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113.	Consuming FA1 and FA2 having 2 STATES each. Now FA1+FA2 can have maximum_____number of state	2 3 More then 3 None of the given
114.	In an FA when there is no path starting from initial state and ending state in final state then that FA_____	Accept all string
115.	According to theory of automation there are_____type if language	Two
116.	In Moore machine if the length of input string is 9 then the length of output string will be.	10
117.	When ODD language is expressed by an FA,then it will have minimum ____ state	One
118.	[(a+b)(a+b)]*.given RE contact generate the string_____	Bbbbbb
119.	Which of the following state is true about GTG?	Transection are based on regular expression
120.	Every_____is a _____ as will, but the converts may not be true.	FA,TG
121.	Which of the following machine is represented as a pictorial representation with states and directed edges labeled by an input letter along with an output character?	Mealy Machine
122.	The recursive method for defining a language has ____ steps	Three
123.	Consider the following RE. A(a+b)b* All of the following word are accepted except_____	Aa
124.	Which of the following regular expression represented same language? 1. (a+ab)* 2. 2(ba+a)* 3. A*(aa*b)*	1 and 2

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	4. (a*b)*	
125.	For every there regular expression R,S and T the Language denoted by R(S∪T) and (RS)∪(RT) are the	Same
126.	Alphabet S={a,bc,cc} has____number of letters.	Three
127.	An____can be considered to be an intermediate structure between Finite automation and Transition Graph.	NFA
128.	Two FAs are said to be equivalent if they_____	Accept same language
129.	There may be more then one transition for a certain letter on a state in	Finite Automata
130.	_____can also help in proving Kleene Theorem III.	NFA
131.	Kleene Theorem Part II expression the relationship between____	TG and RE
132.	FA corresponding to an NFA can be built by introducing an empty state for a letter having.	No transition at certain state
133.	FA is also called	DFA
134.	If two Res generated same language then these Res are called ___	Equivalent RE
135.	We cannot an NFA for the language of ____ defend over alphabet set{a,b}	Palindromes
136.	Kleene Theorem Part II expression the relationship between____	RE and FA
137.	Let FA3 an FA corresponding to FA1 FA2 then the initial state of FA3 must correspond to the initial state of	FA1 only
138.	Every FA should be___	Deterministic
139.	The minimum length of string (except null string) of a language that starts and ends in the different letter will be:	1
140.	Which of the following will be the final state of FA3 obtained from the union of FA1 and FA2?	Final states of FA1 or FA2
141.	In concatenation we accept the initial state of FA2 automatically after the final state of FA1	We need just one initial

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	because of:	state
142.	Let FA1 accepts many strings and FA2 accepts none then FA1+FA2 will be equal to:	FA2-FA1
143.	The language {a ab aba bab} is _____ .	Regular
144.	Decomposing a string into its valid units is referred as:	Tokenizing
145.	Let FA3 be an FA corresponding to FA1+FA2, then the initial state of FA3 Must corresponds to the initial state of	FA1 or FA2
146.	If FA1 corresponds to (a+b)* then FA1 must accept _____ string/strings. Select correct option: No Odd length	EVERY
147.	A regular language can be:	irregular infinite non-deterministic **None of the given options**
148.	N into its valid units is referred as:	Tokenizing
149.	The strings of FA2 are accepted first before the strings of FA1	Palindromes
150.	There _____ a language for which only FA can be built but not the RE.	Be may
151.	Kleene's Theorem part I expresses the relationship between ___	FA and TG

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CS402 Theroy Of Automata

Update MCQS For Final Term

Solve By Vu Topper RM

85% To 100% Marks



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Question No:1 **(Marks:1)** **Vu-Topper RM**

Consider the following CFG:

S->a|Xb|aYa

X->Y|^ (NOTE: ^ means NULL)

Y->b|X

Which Non-terminals are nullable?

A. X

B. Y

C. Z

D. S,X and Y

Question No:2 **(Marks:1)** **Vu-Topper RM**

The CFG S--> aSa | bSb | a | b | ^ represents _____ language.

A. EQUAL

B. ODD-ODD

C. EVEN-EVEN

D. PALINDROME

Question No:3 **(Marks:1)** **Vu-Topper RM**

The structure given below is called _____

S -> aaBm

A -> Asia

B -> sub

A. RE

B. TG

C. CFG

D. PDA

Question No:4 **(Marks:1)** **Vu-Topper RM**

One language can have _____ CFG(s).

A. Only one

B. At most one

C. At least one

D. More than one

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Question No:5 **(Marks:1)** **Vu-Topper RM**

Consider the Following CFG: (NOTE: ^ means NULL)

S-◊Xa

X◊aX|bX|^

Above give a CFG can be represented by RE

A. a*b*a

B. a*b*

C. (a+b)*a

D. a(a+b)*a

Question No:6 **(Marks:1)** **Vu-Topper RM**

The tree which produces all the strings of a language is called _____.

A. Derivation tree

B. Ambiguous tree

C. Total language tree **Page 96**

D. Non ambiguous tree

Question No:7 **(Marks:1)** **Vu-Topper RM**

The language of all strings partition ∑* into _____ class(es).

A. Two

B. Five

C. Four

D. Three

Question No:8 **(Marks:1)** **Vu-Topper RM**

There is at least one production in CFG that has one _____ on its left side.

A. Terminal

B. Non terminal **Page 87**

C. Unit production

D. Null production

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Question No:9 **(Marks:1)** **Vu-Topper RM**

The CFG that generates the regular language is called _____.

A. finite automata
B. regular expression
C. regular grammar **Google**
D. non-regular grammar

Question No:10 **(Marks:1)** **Vu-Topper RM**

Prime is a _____ language.

A. Finite
B. Regular **Page 75**
C. Non-regular
D. Both context free and regular

Question No:11 **(Marks:1)** **Vu-Topper RM**

Which of the following cannot be represented by a regular expression?

A. Language of odd-odd
B. Language of even-even
C. String of 0's with an odd length
D. String of 0's with a prime length

Question No:12 **(Marks:1)** **Vu-Topper RM**

"CFG" stands for _____.

A. Context Free Graph
B. Context Finite Graph
C. Context Free Grammar **Page 87**
D. Context Finite Grammar

Question No:13 **(Marks:1)** **Vu-Topper RM**

In pref(Q in R), Q is _____ to/than R.

A. Equal
B. Smaller
C. Greater
D. Not equal **Page 79**

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Question No:14 **(Marks:1)** **Vu-Topper RM**

The operators like (* , +) in the parse tree are considered as _____.

A. Terminals **Page 93**

B. Productions

C. Intermediates

D. non-terminals

Question No:15 **(Marks:1)** **Vu-Topper RM**

A problem is said to be _____ if there exists an algorithm that provides the solution in _____ number of steps.

A. effectively solvable, finite **Page 80**

B. effectively solvable, infinite

C. effectively unsolvable, finite

D. effectively unsolvable, infinite

Question No:16 **(Marks:1)** **Vu-Topper RM**

Which of the following refers to the set of strings of letters that when concatenated to the front of some word in Q produces some word in R?

A. Pref(Q in R) **Page 78**

B. Postf(R in Q)

C. Postf(Q in R)

D. Pref(R in Q)

Question No:17 **(Marks:1)** **Vu-Topper RM**

If a CFG has a null production, then it is _____.

A. Called NULL CFG

B. Called Chmosky Normal Form (CNF)

C. Possible to construct another CFG without null production accepting the same language with the exception of the word ^

D. Not possible to construct another CFG without null production accepting the same language with the exception of the word ^

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Question No:18 **(Marks:1)** **Vu-Topper RM**

For a machine with N number of states, the total number of strings to be tested, defined over an alphabet of m letters, is _____.

A. Nm
B. Mn
C. Nm +Nm+1+ N m+2 +… + N2m-1
D. mN +mN+1+ mN+2 +… +m2N-1

Question No:19 **(Marks:1)** **Vu-Topper RM**

In large FA with thousands of states and millions of directed edges, without an effective procedure it is _____ to find a path from initial to final state.

A. Impossible **Page 81**
B. Always easy
C. Always impossible
D. May be good

Question No:20 **(Marks:1)** **Vu-Topper RM**

The basic approach of Myhill Nerode theorem is similar to the concept of:

A. Union of FAs
B. Closure of FAs
C. Concatenation of FAs
D. Distinguishable and indistinguishable strings

Question No:21 **(Marks:1)** **Vu-Topper RM**

The product of two regular languages is _____.

A. Infinite
B. Regular **Page 78**
C. non-regular
D. closure of a regular language

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Question No:22 **(Marks:1)** **Vu-Topper RM**

If there is no final state of two FAs then their _____ also have no _____ state

A. union,final **Page 83**

B. final, union

C. initial, union

D. union, initial

Question No:23 **(Marks:1)** **Vu-Topper RM**

The production of the form: nonterminal --> one nonterminal is called the _____

A. Unit production **Page 100**

B. NULL production

C. Terminal production

D. Non-Terminal production

Question No:24 **(Marks:1)** **Vu-Topper RM**

To examine whether a certain FA accepts any words, it is required to seek the paths _____ state.

A. FromFinal to initial

B. From Initial to final **Page 81**

C. From Final to final back

D. From Initial to initial back

Question No:25 **(Marks:1)** **Vu-Topper RM**

The production S --> SS | a | b | ^ can be expressed by Regular expression _____.

A. (ab)*

B. (a+b)

C. (a+b)* **Page 88**

D. (a+b)+

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Question No:26 **(Marks:1)** **Vu-Topper RM**

If Q = {xx, xyxxxy }, and R = {xyxyxyxxyy, xyxyyyxx} then Pref(Q in R) = _____

A. Xx
B. Yy
C. Xyxyyy
D. Xyxyxy

Question No:27 **(Marks:1)** **Vu-Topper RM**

In polish notation, (o-o-o) is the abbreviation of _____.

A. Operand -Operand – Operand
B. Operand - Operand- Operator
C. Operand - Operator – Operand
D. Operator -Operand – Operand **Page 94**

Question No:28 **(Marks:1)** **Vu-Topper RM**

In a CFG, the non-terminals are denoted by _____.

A. Numbers
B. Small letters
C. Capital letters
D. Small letters and numbers

Question No:29 **(Marks:1)** **Vu-Topper RM**

Even-Even language partitions ∑* into _____ distinct classes.

A. Two
B. Five
C. Four
D. Three

Question No:30 **(Marks:1)** **Vu-Topper RM**

The CFG S → aSb|ab|Λ is used to express the language _____.

A. Even
B. Equal
C. Prime

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D. Palindrome

Question No:31 **(Marks:1)** **Vu-Topper RM**

In the null production N --> ^, N is a _____.

A. word
B. terminal
C. Semi word
D. Non terminal **Page 99**

Question No:32 **(Marks:1)** **Vu-Topper RM**

In CFG, symbols that cannot be replaced by anything are called _____.

A. Terminals **Google**
B. Productions
C. non-terminals
D. null productions

Question No:33 **(Marks:1)** **Vu-Topper RM**

The production of the form: Non-terminal-> ^ is said to be _____ production.

A. CNF
B. UNIT
C. NULL **Page 99**
D. Chomsky form production

Question No:34 **(Marks:1)** **Vu-Topper RM**

The production of the form: non-terminal ----> one non-terminal is called the _____.

A. NULL production
B. Unit production
C. Terminal production
D. Non Terminal production

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Question No:35 **(Marks:1)** **Vu-Topper RM**

If R is regular language and Q is any language (regular/ non-regular), then Pref(_____in _____) is regular.

A. Q,Q
B. R,R
C. R,Q
D. Q,R

Question No:36 **(Marks:1)** **Vu-Topper RM**

If an FA accepts a word then there must exist a path from _____.

A. Initial to each state
B. Initial to final state
C. Initial to each state but not to final state
D. Initial to final state by traversing each state

Question No:37 **(Marks:1)** **Vu-Topper RM**

Consider the CFG given below:
S->A|bbA->
B|bB->
S|a
Which of the following is a unit production

A. A->B
B. A->b
C. S->bb
D. B->a

Question No:38 **(Marks:1)** **Vu-Topper RM**

By removing null and unit productions, _____.

A. CNF can be converted into FA
B. CNF can be converted into CFG
C. CFG can be converted into CNF **Page 102**
D. CNF can be converted into Turing machine

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Question No:39 **(Marks:1)** **Vu-Topper RM**

Which of the following is not a true theorem?

A. Pseudo theorem
B. Decidability theorem
C. Equivalency theorem
D. Myhill Nerode theorem

Question No:40 **(Marks:1)** **Vu-Topper RM**

In a CFG the non-terminal that occurs first from the left in the working string, is said to be _____.

A. Left most derivate
B. Left most nonterminal **Page 103**
C. Most Significant nonterminal
D. Least Significant nonterminal

Question No:41 **(Marks:1)** **Vu-Topper RM**

The CFG is said to be ambiguous if there exist at least one word of its language that can be generated by _____ production tree(s).

A. Zero
B. One
C. At most one
D. More than one

Question No:42 **(Marks:1)** **Vu-Topper RM**

Using Myhill Nerode theorem we partition sigma star into distinct _____.

A. Objects
B. Classes
C. Instances
D. Templates

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Question No:43 **(Marks:1)** **Vu-Topper RM**

Incase of Myhill Nerode theorem, if a language L partitions sigma star into distinct classes and L is also regular then L generates _____ number of classes.

A. Add
B. Finite **Page 75**
C. Infinite
D. Specified

Question No:44 **(Marks:1)** **Vu-Topper RM**

To write the expression from the tree, it is required to traverse from _____.

A. Left side of the tree
B. Right side of the tree
C. Top to bottom of the tree
D. Bottom to top of the tree

Question No:45 **(Marks:1)** **Vu-Topper RM**

If L1 and L2 are two regular languages, then they _____ expressed by FAs.

A. Can be **Page 68**
B. May be
C. Cannot be
D. may or may not be

Question No:46 **(Marks:1)** **Vu-Topper RM**

Null production is a _____.

A. Word
B. String
C. Terminal
D. All of the given

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Question No:47 **(Marks:1)** **Vu-Topper RM**

Which of the following is a non-regular language?

A. Prime

B. Odd-Odd

C. Even-Even

D. Language of strings ending in abba

Question No:48 **(Marks:1)** **Vu-Topper RM**

Set of all palindromes over {a,b} is:

A. Regular

B. Regular and finite

C. Regular and infinite

D. Non-regular **Page 71**

Question No:1 **(Marks:1)** **Vu-Topper RM**

In which of the following machine, the length of output string is the same to that of input string?

A. Mealy machine

B. Moore machine

C. Finite automaton with output

D. Non-deterministic finite automaton

Question No:49 **(Marks:1)** **Vu-Topper RM**

Which of the following machine has only one initial state and no final state?

A. Moore machine

B. Finite state machine **Google**

C. Deterministic finite state machine

D. Non deterministic finite state machine

Question No:50 **(Marks:1)** **Vu-Topper RM**

Which one of the following machine is represented as a pictorial representation with states and directed edges labeled by an input letter along with an output character?

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A. Moore machine
B. Mealy machine Google
C. Finite state machine
D. Deterministic finite state machine

Question No:51 (Marks:1) Vu-Topper RM
In Moore machine, output is produced over the change of:
A. States
B. Transitions Google
C. Transitions and states
D. None of the mentioned

Question No:52 (Marks:1) Vu-Topper RM
Moore Machine is an application of:
A. None of the mentioned
B. Finite automata with output
C. Finite automata without input Google
D. Non- Finite automata with output

Question No:53 (Marks:1) Vu-Topper RM
For a given Moore Machine, the input string is '101010', thus the output string would be of length:
A. Length of input string – 1
B. Length of input string – 2
C. Length of input string + 2
D. Length of input string + 1 Google

Question No:54 (Marks:1) Vu-Topper RM
Which of the following should not be NULL in the context of Pumping Lemma?
A. N
B. X
C. Y
D. Z

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Question No:55 **(Marks:1)** **Vu-Topper RM**

In Moore machine, if the length of input string is 9, then the length of output string will be:

A. 7
B. 8
C. 9
D. 10

Question No:56 **(Marks:1)** **Vu-Topper RM**

Let L be the language of all strings, defined over Σ = {0,1}, ending in 10. Which of the following strings are indistinguishable with respect to L with z being 0?

A. 010,101
B. 110,101
C. 100,101
D. 111,101

Question No:57 **(Marks:1)** **Vu-Topper RM**

Keeping in view the discussion by Martin, how many states are required to recognize the language of all strings of length 2 or more defined over ∑= {a,b}, with 'b' being the second letter from right?

A. 6
B. 7
C. 8
D. 9

Question No:58 **(Marks:1)** **Vu-Topper RM**

Melay machine can have -------- final states.

A. One
B. Zero
C. More than one but infinite
D. More than one but finite

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Question No:59 **(Marks:1)** **Vu-Topper RM**

Subtraction of binary numbers is possible through:

A. Both complementing and incrementing machine
B. Complementing machine
C. Incrementing machine
D. Converting machine

Question No:60 **(Marks:1)** **Vu-Topper RM**

In Moore machine the output depends on

A. Nothing
B. Type of input
C. Only present state
D. Present state and present input

Question No:61 **(Marks:1)** **Vu-Topper RM**

1's complement for 01101 will be:

A. 10111
B. 10010 **Google**
C. 00100
D. 00000

Question No:62 **(Marks:1)** **Vu-Topper RM**

Let L be the language of all strings, defined over Σ = {0,1}, ending in 111. Which of the following strings are indistinguishable with respect to L with z being 11?

A. 110,101
B. 111,101
C. 010,101
D. 100.101

Question No:63 **(Marks:1)** **Vu-Topper RM**

---------- state is not important in Melay machine.

A. Initial
B. Final

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C. Empty
D. Combination of

Question No:64 **(Marks:1)** **Vu-Topper RM**

Keeping in view the discussion by Martin, how many states are required to recognize the language of all strings of length 3 or more defined over ∑= {a,b}, with 'a' being the third letter from right?

A. 10
B. 12
C. 14
D. 16

Question No:65 **(Marks:1)** **Vu-Topper RM**

Strings x,y,z belongs to Σ * such that both xz or yz ∈ L where L ⊆ Σ* are:

A. Undetermined
B. Distinguishable
C. Indistinguishable
D. Both distinguishable and indistinguishable

Question No:66 **(Marks:1)** **Vu-Topper RM**

If we subtract a binary number 1010 from the binary number 1101(ignore the overflow), then the result will be:

A. 1100
B. 0011
C. 1010
D. 0010

Question No:67 **(Marks:1)** **Vu-Topper RM**

A loop at a state is supposed to be ---------- transition while converting Moore machine into an equivalent Melay machine.

A. Complex
B. Incoming
C. Outgoing

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D. Both incoming and outgoing

Question No:68 **(Marks:1)** **Vu-Topper RM**

Two machines are said to be equivalent if they print the _____ output string when the _____input string is run on them.

A. Same, Same
B. Same, different
C. Different, same
D. Unique, different

Question No:69 **(Marks:1)** **Vu-Topper RM**

In which of the following machine, the length of output string is 1 more than that of input string?

A. Mealy machine
B. Moore machine
C. Finite automaton with output
D. Non-deterministic finite automaton

Question No:70 **(Marks:1)** **Vu-Topper RM**

Which of the following is used to delay the transmission of signal along the wire by one step (clock pulse)?

A. Slow box
B. Delay box
C. Holdup box
D. Reduce box

Question No:71 **(Marks:1)** **Vu-Topper RM**

Which of the following is pumped to generate further strings in the definition of Pumping Lemma?

A. X
B. Y
C. N
D. Z

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Question No:72 **(Marks:1)** **Vu-Topper RM**

The strings or words which do not belong to a language are called _____ of that language.

A. Union
B. Quotient
C. Intersection
D. Complement **Page 66**

Question No:73 **(Marks:1)** **Vu-Topper RM**

If L1 and L2 are regular languages then which statement is NOT true?

A. L1* is always regular
B. L1 L2 is always regular
C. L1/L2 is always regular
D. L1 + L2 is always regular

Question No:74 **(Marks:1)** **Vu-Topper RM**

For a non-regular language, there exists _____ FA.

A. No
B. One
C. At least one
D. At most one

Question No:75 **(Marks:1)** **Vu-Topper RM**

Melay machine to increase the output string in magnitude by 1 is called:

A. Complementing machine
B. Incrementing machine
C. Decrementing machine
D. Converting machine

Question No:76 **(Marks:1)** **Vu-Topper RM**

If the intersection of two regular languages is regular then the complement of the intersection of these two languages is _____.

A. Irregular but finite
B. Regular

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C. Irregular
D. Irregular but infinite

Question No:77 **(Marks:1)** **Vu-Topper RM**
The language "PRIME" is an example of _____ language.
A. Regular but infinite
B. Non regular but infinite
C. Regular
D. Non regular **Page 75**

Question No:78 **(Marks:1)** **Vu-Topper RM**
In pumping lemma theorem (x y^n z) the range of n is
A. n=1, 2, 3, 4…….
B. n=0, 1, 2, 3, 4…….
C. n=…….-3,-2,-1, 1, 2, 3, 4……
D. n=…….-3,-2,-1, 0, 1, 2, 3, 4……

Question No:79 **(Marks:1)** **Vu-Topper RM**
Which of the following represent the absence and presence of current in sequential circuit respectively??
A. 0,1
B. 0,0
C. 1,0
D. 1,1

Question No:80 **(Marks:1)** **Vu-Topper RM**
The values of input (say a & b) do not remain same in one cycle due to
A. Clock plus
B. OR gate
C. NAND gate
D. NOT gate

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Question No:81 **(Marks:1)** **Vu-Topper RM**

If new A =1 NAND (1 AND 1), then what will be the value of new A?

A. 0
B. 10
C. 1
D. 01

Question No:82 **(Marks:1)** **Vu-Topper RM**

If L1 and L2 are two regular languages, then L1 Intersection L2 is:

A. Finite
B. Infinite
C. Iregular
D. Regular **Page 67**

Question No:83 **(Marks:1)** **Vu-Topper RM**

If an effectively solvable problem has answer in YES or NO, then the solution is called _____.

A. Infinite problem
B. Decision procedure **Page 80**
C. Finite solution
D. Optimal procedure

Question No:84 **(Marks:1)** **Vu-Topper RM**

What will be the 9's complement of the number 872?

A. 127
B. 170
C. 172
D. 271

Question No:85 **(Marks:1)** **Vu-Topper RM**

A non regular language can be represented by

A. TG
B. RA
C. FA

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D. None of the given options **Page 71**

Question No:86 **(Marks:1)** **Vu-Topper RM**

If a language is regular it must generate _____ number of distinct classes.

A. Two
B. Finite
C. Three
D. Infinite

Question No:87 **(Marks:1)** **Vu-Topper RM**

The language of all strings not beginning with 'b' partitions ∑* into _____distinct classes.

A. Two
B. Five
C. Four
D. Three

Question No:88 **(Marks:1)** **Vu-Topper RM**

Which one of the following languages is a non regular language?

A. Even-even
B. Palindrome
C. Containing double a
D. Start and end with same letter

Question No:89 **(Marks:1)** **Vu-Topper RM**

The language of all string not beginning with 'b'partition ∑* into _____distinct classes.

A. Five
B. Four
C. Two
D. three

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Question No:90 **(Marks:1)** **Vu-Topper RM**

The language L defined over ∑,not belonging to l, is called ____of the language L.

A. closure
B. complement
C. intersection
D. union

Question No:91 **(Marks:1)** **Vu-Topper RM**

A problem that has decision procedure is called _____ problem.

A. Decidable
B. Regular language
C. Un-decidable
D. Infinite

Question No:92 **(Marks:1)** **Vu-Topper RM**

A language that can be expressed by RE, is said to be a _____ language.

A. Finite
B. Infinite
C. Irregular
D. Regular

Question No:93 **(Marks:1)** **Vu-Topper RM**

A non- regular language can be represented by

A. TG
B. RE
C. FA
D. None of the given option

Question No:94 **(Marks:1)** **Vu-Topper RM**

If Q={xx,xyxxxy},and R={xyxyxyxxyy,xyxyyyxx}then pref(Q in R)=----------

A. Xyxyxy

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B. Xxy
C. Xx
D. Xyxyyy

Question No:95 **(Marks:1)** **Vu-Topper RM**
a^b^n generates the_____ language
A. non regular
B. EQUAL and non regular
C. Regular
D. EQUAL and regular

Question No:96 **(Marks:1)** **Vu-Topper RM**
Set of all palindromes over {a,b}is :
A. Regular and infinite
B. Regular and infinite
C. Non-regular
D. Regular

Question No:97 **(Marks:1)** **Vu-Topper RM**
The language of all string partition∑*into _____class(es).
A. Two
B. Four
C. One
D. three

Question No:98 **(Marks:1)** **Vu-Topper RM**
If the FA has N states, then test the words of length less than N. If no word is accepted by this FA, then it will _____ word/words.
A. reject no
B. accept all
C. accept no
D. accept some

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Question No:99 **(Marks:1)** **Vu-Topper RM**

The complement of a regular language is also _____.

A. Regular
B. Irregular
C. irregular but finite
D. irregular but infinite

Question No:100 **(Marks:1)** **Vu-Topper RM**

A language ending with 'b' partitions ∑* into _____ distinct classes.

A. Two
B. Four
C. One
D. Three

Question No:101 **(Marks:1)** **Vu-Topper RM**

The language L defined over Σ, not belonging to L, is called _____ of the language L.

A. Union
B. Quotient
C. Intersection
D. Complement **Page 66**

Question No:102 **(Marks:1)** **Vu-Topper RM**

The reverse of the string sbfsbb over { sb, f, b }

A. Bsfbsb
B. Sbbfsb
C. Bbsfbs
D. Bsbfsb

Question No:103 **(Marks:1)** **Vu-Topper RM**

If an FA has N states then it must accept the word of length

A. N
B. n

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C. n-1
D. n+1

Question No:104 (Marks:1) Vu-Topper RM

a^n b^n generates the …… language

A. regular
B. non regular
C. EQUAL and regular
D. EQUAL and non regular Page 71

Question No:105 (Marks:1) Vu-Topper RM

Finite Automaton (FA) must have _____ number of states while a language has _____ words.

A. finite, finite
B. infinite, finite
C. finite, infinite
D. infinite, infinite

Question No:106 (Marks:1) Vu-Topper RM

To describe the complement of a language, it is very important to describe the ---------- of that language over which the language is defined.

A. Word
B. String
C. Alphabet
D. Regular Expression

Question No:107 (Marks:1) Vu-Topper RM

---------- is obviously infinite language.

A. EVEN-EVEN
B. FACTORIAL
C. PALINDROME
D. EQUAL-EQUAL

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Question No:108 **(Marks:1)** **Vu-Topper RM**

The language Q is said to be quotient of two regular languages P and R, denoted by--- if PQ=R.

A. R=Q/P
B. Q=R/P
C. Q=P/R
D. P=R/Q

Question No:109 **(Marks:1)** **Vu-Topper RM**

If R is regular language and Q is any language (regular/ non regular), then Pref (Q in R) is ---------.

A. Equal
B. Infinite
C. Regular
D. Non-regular

Question No:110 **(Marks:1)** **Vu-Topper RM**

The part of an FA, where the input string is placed before it is run, is called _____

A. State
B. Transition
C. Input Tape
D. Output Tape

Question No:111 **(Marks:1)** **Vu-Topper RM**

In new format of an FA (discussed in lecture 37), This state is like dead-end non final state

A. Read
B. Start
C. Reject
D. Accept

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Question No:112 **(Marks:1)** **Vu-Topper RM**

For language L defined over {a, b}, then L partitions {a, b}into …… classes

A. Finite
B. Infinite
C. Distinct
D. Non- Distinct

Question No:113 **(Marks:1)** **Vu-Topper RM**

The major problem in the earliest computers was

A. To display mathematical formula
B. To store the contents in the registers
C. To calculate the mathematical formula
D. To load the contents from the registers

Question No:114 **(Marks:1)** **Vu-Topper RM**

Grammatical rules which do not involve the meaning of words are called ----------

A. Syntactic
B. Semantics
C. Both a and b
D. None of given

Question No:115 **(Marks:1)** **Vu-Topper RM**

The symbols that can't be replaced by anything are called --- ----------

A. Terminals
B. Productions
C. Non-terminals
D. All of the above

Question No:116 **(Marks:1)** **Vu-Topper RM**

The symbols that must be replaced by other things are called _____

A. Terminals

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B. Productions
C. Non-terminals
D. None of the given

Question No:117 **(Marks:1)** **Vu-Topper RM**
The grammatical rules are often called_____
A. Terminals
B. Productions
C. Non-terminals
D. None of the given

Question No:118 **(Marks:1)** **Vu-Topper RM**
The language generated by _____ is called Context Free Language (CFL).
A. FA
B. TG
C. CFG
D. NFA

Question No:119 **(Marks:1)** **Vu-Topper RM**
If a CFG has only productions of the form nonterminal -> string of two nonterminal or nonterminal -> one terminal then the CFG is said to be in PDA form
A. NULL able form
B. None of the these
C. Unit production form
D. Chomsky Normal Form (CNF)

Question No:120 **(Marks:1)** **Vu-Topper RM**
Which of the following states is not part of PDA?
A. Start
B. Write
C. Reject
D. Accept

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Question No:121 **(Marks:1)** **Vu-Topper RM**

The PDA is called non-deterministic PDA when there are more than one out going edges from…… state

A. PUSH or POP
B. READ or POP
C. POP or REJECT
D. START or READ

Question No:122 **(Marks:1)** **Vu-Topper RM**

In nondeterministic PDA a string is supposed to be accepted, if there exists at least one path traced by the string, leading to state.

A. Start
B. Write
C. Reject
D. Accept

Question No:123 **(Marks:1)** **Vu-Topper RM**

The CFG which generates the regular language is called

A. Finite Automata
B. Regular grammar
C. Regular expression
D. None of the given options

Question No:124 **(Marks:1)** **Vu-Topper RM**

PDA stands for _____

A. None of given options
B. Push Down Automaton
C. Pop and Drop Automaton
D. Push and Drop Automaton

Question No:125 **(Marks:1)** **Vu-Topper RM**

Halt states are

A. Start and accept
B. Read and Reject

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C. Start and Reject
D. Accept and Reject

Question No:126 (Marks:1) Vu-Topper RM
In an FA, when there is no path starting from initial state and ending in final state then that FA
A. Accept null string
B. Accept all strings
C. Does not accept any string
D. Accept all non-empty strings

Question No:127 (Marks:1) Vu-Topper RM
While finding RE corresponding to TG, we connect the new start state to the old start state by the transition labelled by
A. A
B. B
C. Null string
D. None of the given options

Question No:128 (Marks:1) Vu-Topper RM
According to theory of automata there are _____ types of languages
A. One
B. Two
C. Four
D. Three

Question No:129 (Marks:1) Vu-Topper RM
While finding RE corresponding to TG, If TG has more than one final state then
A. Eliminate the old final state
B. Introduce the new final state
C. Replace the old final state with start state
D. Replace the old final state with new start state

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Question No:130 **(Marks:1)** **Vu-Topper RM**

The states in which there is no way to leave after entry are called

A. Dead States
B. Waste Baskets
C. Davey John Lockers
D. All of the given options

Question No:131 **(Marks:1)** **Vu-Topper RM**

What is false about the term alphabet?

A. It can be an empty set
B. It is a finite set of symbols
C. Strings are made up of its element
D. It is usually denoted by Greek letter sigma

Question No:132 **(Marks:1)** **Vu-Topper RM**

A PDA consists of the following:

A. All of the given options
B. An input TAPE with infinite
C. Many locations in one direction
D. An alphabet (Sigma) of input letters.

Question No:133 **(Marks:1)** **Vu-Topper RM**

A _____ is the one for which every input string has a unique path through the machine

A. Input Tape
B. Push Down store
C. Deterministic PDA
D. Non deterministic PDA

Question No:134 **(Marks:1)** **Vu-Topper RM**

The input string is placed, before it runs, in

A. Ram
B. Tape
C. Stack

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Vu Topper RM

D. Memory

Question No:135 **(Marks:1)** **Vu-Topper RM**
In a CFG the nonterminal that occurs first from the left in the working string, is said to be _____
A. Left most derivate
B. Left most nonterminal
C. Least Significant nonterminal
D. Most Significant nonterminal

Question No:136 **(Marks:1)** **Vu-Topper RM**
The unit production is
A. Terminal --> Terminal
B. Non terminal --> Terminal
C. Terminal --> non-Terminal
D. Non terminal --> non-Terminal

Question No:137 **(Marks:1)** **Vu-Topper RM**
A _____ operator adds a new letter at the top of STACK
Push

Question No:138 **(Marks:1)** **Vu-Topper RM**
The locations into which we put the input letters on "Input Tap" are called _____
Cells

Question No:139 **(Marks:1)** **Vu-Topper RM**
We cannot write regular expressions for all _____.
CFG's

Question No:140 **(Marks:1)** **Vu-Topper RM**
The grammatical rules which involve meaning of words are called
Semantics

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Question No:141 **(Marks:1)** **Vu-Topper RM**
Which of the following is a non-regular language?
Language of strings ending in abba

Question No:142 **(Marks:1)** **Vu-Topper RM**
Tape and Stack alphabets
Must be different

Question No:143 **(Marks:1)** **Vu-Topper RM**
Choice of path can be determined by left most derivation of the string belonging to CFL at…… state
Accept

Question No:144 **(Marks:1)** **Vu-Topper RM**
Identify the TRUE statement about following CFG: S -> SB|AB A -> CC B -> b C -> a
The given CFG is in CNF
The given CFG has 8 Terminals

Question No:145 **(Marks:1)** **Vu-Topper RM**
For the given input, AND box provides the Boolean AND output.
True
False

Question No:146 **(Marks:1)** **Vu-Topper RM**
The current in the wire is indicated by 1 and 0 indicates the absence of the current.
True
False

Question No:147 **(Marks:1)** **Vu-Topper RM**
Any language that cannot be expressed by a RE is said to be regular language.
True

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False

Question No:148 **(Marks:1)** **Vu-Topper RM**
For a certain language L, the complement of Lc is the given language L i.e. (Lc)c = Lc
True
False

Question No:149 **(Marks:1)** **Vu-Topper RM**
The high-level language is converted into assembly language codes by a program called compiler.
True
False

Question No:150 **(Marks:1)** **Vu-Topper RM**
If a CFG has a null production, then it is possible to construct another CFG accepting the same language without null production
True
False

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CS402

Quiz-1

BY Attiq Kundi

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In GTG, there can be more than one.

Start states

There can be more than ____ FA for a certain language but for ____FA there is only one language associated with it.

one, one

The complement of a regular language is also ____.

regular

Which of the following represent the absence and presence of current in sequential circuit respectively?

0, 1

The strings or words which do not belong to a language are lulled ___ of that language.

Complement

If the intersection of two regular language is regular then the complement of the intersection of these two languages is ____.

regular

In pref (Q in R), Q is ___ to/then R.

Not equal

Which of the following state is introduced while developing NFA for the closure of FA?

An initial state which should be final as well

The reverse of the string sbfsbb over {sb, f, b }

bsbfsb

A problem that his decision procedure is called ___ problem .

decidable

A language ending with 'b' partition ∑* into ___ distinct classes.

two

____State is not important in Moore Machine?

Initial

A non regular language an be repewsented by

None of the given options

TG
FA
RE

Let L be the language of all strings, defined over ∑ ={0,1}, ending in 111. Which of the following strings are indistinguishable with respect to L with Z being 11?

111, 101

Let L be the language of all strings, defined over SUM ={0,1}, ending in 10. Which of the following strings are indistinguishable with respect to L with Z being 11?

111.101

The CFG S → aSb↑ab↑∧ is used to express the language ___.

Equal

If there is no final state of two FAs then their ___ also have no ___ state.

union, final

Formal is also known as_____.

Syntactic language

Which of the following refers to the set of strings of letters that when concatenated to the front of some word in Q produces some word in R?

Pref (Q in R)

13. The grammatical rules which involve the meaning of words are called ___.

semantics

Which of the following is a non-regular language?
Prime

A problem is said to be ___ if there exists an algorithm that provides the solution in ___ number of steps.

effectively solvable, finite

In programmable interpreter controller which of the following ports is referred as interrupt mask register?

21

Which of the following string belongs to the language of the regular expression (aa*b) ?

aabaab

___ is the highest priority interrupt in interrupt controller

IRQ 0

If r1 and r2 are regular expressions then (r1*r2) is_____

RE (Regular expression)

IRET returns on the basis of and

CS, IP

If r1 is regular expression the (r1)* is _____.

Also regular expression

If is set, the after every instruction a type 1 interrupt will be automatically generated.

Trap flag

Melay machine to increase the output string in magnitude by 1 is called _____.

Incrementing machine

The interrupt handler uses instruction to return back to the caller.
IRET

Which of the following interrupt is used for Arithmetic overflow?
INT 4

During the execution of INT instruction, some contents are pushed on to the stack, the order of pushing then is
FLAGS register, CS and then IP

Each of the bits at Port _____ corresponding to one of the IRQ lines.
21

Which of the following pins of the parallel port connector are grounded? a.

18-25

Which of the following interrupts plays the most significant part during step debugging of a program?

INT 1

Which of the following IRQs is connected to serial port COM 2?

IRQ 3

Which of the following IRQs is connected to serial port COM 1?

IRQ 4

Which of the following IRQs is used by the parallel port?

IRQ 7

In programmable interpreter controller which of the following ports is referred as interrupt mask register?

21

In programmable interpreter controller which of the following ports is used to selectively enabling or disabling interrupts?

21

The space where all the registers of task are stored is called

Process control box

Which of the following is the destination register in IN instruction?

AL or AX

In multitasking environment, which of the following structure is used to maintain the ordering of active PCBs?

Linked List

In multitasking which of the following interrupts is used as scheduler during context switching?

INT 8

Which of the following are required for thread entry?

CS and IP

The time interval between two timer tick is?

55 MS

Which of the following flag can be used for mathematical operations ?

Carry Flag

In multitasking, the process of saving and restoring to values of registers from a process control block (PCB) is called

context switching

When two devices in a system want to use the same IRQ line, is referred as:

IRQ Conflit

AN End of Interrupt (EOI) signal is sent by

Hardler

Threads can have function calls, parameters and _ variables.

Local

Which of the following arranges jobs in a sequence in order to be executed?

Process control box

Which of the following flags cannot be cleared using an assembly instruction?

Carry flag

Which of the following is the highest priority interrupt?

INT0

At the end of servicing an interrupt, which of the following is used to inform the PIC that it is completed?

EOI

Which of the following interrupts is used for maintaining the system time?

INT 8

Which of the following is used for exporting parallel port services?

INT 17

[(a+b)(a+)] , given RE cannot generate the string _____.

bbbbbb

Which of the following is free of non-determinism?

FA

In programmable interpret control which of the following ports is referred as a control port?

20

_____is/are the port number(s) for parallel port.

378

The number of pins in a parallel port connector are?

25

In proving Keene theorem II , if three statuses are connected then middle state is removed by connecting first and third and writing corresponding RE in:

Concentration

The offset address of an interrupt n will be at

nx4

Non-Deterministic is present in :

Both TG and GTG

programmable interpret control has two ports (20 and 21). Port 20 is the control port while port21 is .

The interrupt mask register

Which of the following instruction selects memory address space?

MOV

The thread registration code initializes the PCB and adds it to the linked list so that the will give it a turn.

Scheduler

Which of the following instruction is used for disabling all the interrupts during a program execution?

Cli

programmable interpret control (PIC) has

Eight input signals and one output signals

In 8088 processor, there can be total possible entries in an interrupt vector table.

256

each thread can have their own

Execution area

The parallel port controller is called?

DB-25

In 8088, the physically memory address for Interrupt Vector Table is fixed and the table occupies exactly of memory.

1 KB

Which of the following interrupts is non maskable interrupt?

INT 2

Using OUT instruction on parallel data port results into a signal of for every 1 bit.

5 V

PCB stands for?

Process control block

Which of the following port number is used to send an end of interrupt (EOI) signal to the PIC after an interrupt is ended?

0x20

Which of the following instruction is used for reading a char from keyboard?

in al , 0x60

In PIC, which of the following port is used for selectively enabling or disabling interrupts?

21

DOS has single entry points to access all its services through interrupt

a) INT 21

Which of the following pins of parallel port are used to carry the data from processor to the device connected through parallel port?

Pin 2 to Pin 9

56. The input frequency of the prigramable interval timer (PIT) is

Fixed

All registers of task are stored in space called

Process control block

Which of the following IRQ`s is derived by a key board

IRQ 1

changing and restoring the state of control process unit (CPU) is referred as

Multitasking

For the external hardware to generate an interrupt there are how many

pins outside the processor?

1

Which of the following instruction selects peripherl address space?

IN

Which of the following is the most commonly used port with printer?

Parallel Port

DVI Port

INT 1

Which of the following is used for exporting keyboard services?

INT 16

TSR stands for

Terminate and Stay resident

Which of the following is the ACK pin in DB-25 connector

a) 10

Which of the following IRQs is a cascading interrupt?

IRQ 2

In interrupt masking, we use to get control from the program without letting the program know about it.

IRQ 0

The output of programmable timer interval is connected to which line of the PIC?

IRQ 0

Which of the following IRQs is used for FLoppy disk drive?

IRQ 6

In multitasking, each PCB requires bytes to store the values of registers.

28

The CFG is said to be ambiguous if there exist at least one word of its language that can be generated by the _____ production trees.

More than one / Different

The language of the all string beginning with ‘b; partitions ∑ “ into _____ distinct classes.

Two

Every_____is a _____ as will, but the converts may not be true.

FA , TG

Which of the following should not be NULL in the context of pumping Lemma?

N

Regular languages are closed under the following operations.

Union, Concatenation and closure

Reverse of string “YxwzYz” defined over ∑= (w,x,Yxz) is _____

zYzwxY

If two Res generated same language then these Res are called:

Equivalent RE

In FA initial state can be represented by:

Drawing ‘ + ‘ sign in that state

Which of the following is used to delay the transmission of signal along the wire by one step (clock pulse)?

Delay box

What is false about the PALINDROME LANGUAGE?

None of the given option

FA can be build for it
Every word is reverse of itself
It is an infinite language

Which of the following string is a part of equal language defined over ∑={a,b}?

ababab

The strings of FA2 are accepted first before the strings of FA1

Palindromes

The reverse of the string sbfsbb over[sb, f, b}

bbsfbs

Which of the following IRQs is used for sound card or network card?

IRQ 5

An FA is a collection of:

Finite states , finite transition and finite input letters

One language can have ____ CGFs.

More than one

Programmable interrupt controller has ports.

2

Which of the following bits of parallel control port enables the IRQ 7 triggering by the ACK pin?

Bit 4

Which one of the following machine is represented as a pictorial representation with states and directed edges labeled by an input letter along with an output character?

Mealy machine

Which of the following IRQs is derived by a timer device?

IRQ 0

Suppose we have FA3 (which is equal to FA1+FA2), then the final state of FA3 will be declared final if:

It corresponds to any of the final states of FA1 or FA2

If "r1" and "r2" are regular languages, then which of the following is not a regular expression.

r1 – r2

_____ is a special type of interrupt that returns to the same instruction instead f the next instruction

Divide overflow

If L1' and L2' are regular languages, then L1, L2 will be

Regular

All the registers & stack are saved in

Multitasking

Every NFA can be considered to be a _____ as well, but the converse may not be true.

TG

Which of the following is the source register in OUT instruction?

AL or AX

Melay machine can have _____final state

Zero

Which of the following is the destination register in IN instruction?

AL or AX

CS402

Quiz-1

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Finite Automaton (FA) has:

A. Zero or more final states
B. Exactly one final state
C. Not more than two final states
D. Exactly two final states

The formal language is also known as _____.

A. Semantic language
B. Informal language
C. Syntactic language
D. Normal language

The language of all strings defined over alphabet set = {x, y} having triple x's or triple y's will have the minimum strings with length of:

A. 1
B. 3
C. 4
D. 2

If an alphabet has "2" number of letters, then total number of strings of length "3" will be _____.

A. 5
B. 9
C. 8
D. 6

GTG for the expression (a+b)*bb may have minimum number of states:

A. 3
B. 4
C. 2
D. 1

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Consider the Regular Expression (RE) a (a + b)b*. Which one of the following is NOT accepted by the provided RE?

A. aa
B. aab
C. aba
D. abb

Which of the following is NOT true about the term alphabet?

A. It is usually denoted by Greek letter sigma
B. It can be an empty set
C. Strings are generated by concatenating its elements
D. It is a finite set of symbols

Which of the following is free of non-determinism?

A. FA
B. TG
C. NFA
D. NFA-^

The language of all strings defined over alphabet set = {a, b} containing 'bbb' will have the minimum string with length of:

A. 1
B. 2
C. 3
D. 4

The aa(a+b)*bb is the RE of the language defined over Σ={a,b}.The language must _____.

A. have at least two ab
B. have at least one aa and one bb
C. have at least one abbb
D. have at least one ba

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Reverse of string "YxwzYz" defined over Σ ={w,x,Y,z} is _____.

A. zYzwxY
B. zYzxwY
C. zYwzxY
D. zYzwYx

If "r1" and "r2" are regular expressions, then which of the following is not a regular expression?

A. r1 + r2
B. r1*
C. r1 r2
D. r1 – r2

Which of the following string belongs to the language of the regular expression (aa*b)*?

A. baabab
B. aabaab
C. aaaaaa
D. abbbaa

FA of EVEN-EVEN language shows that it accepts the null string by declaring the _____ as a _____as well.

A. Initial state, final state
B. Initial sate, null state
C. Final state, initial state
D. Final state, null state

Let S = {a, bb, bab, baabb} be a set of strings, which one of the following will not be included in S*?

A. baba
B. bbbaabaabb
C. baabbabb
D. bbaaabb

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The language of all strings defined over alphabet set = {x, y} that ends with different letters will have the maximum length of:

A. 1
B. 2
C. infinite
D. 3

In an FA, when there is no path from the initial state to final state, then that FA_____.

A. accept all non empty strings
B. does not accept any string
C. accept all strings
D. accept null strings

If Σ= {a, b, c, d}. How many transitions will be there on each state of a finite automaton for any language defined over Σ?

A. 2
B. 4
C. 1
D. 3

Which of the following is the minimal number of states for a finite automaton accepting the language of all strings defined over any alphabet set?

A. 3
B. 4
C. 2
D. 1

How many states of a finite automaton will be final for accepting L = {^, b, bb, bbb}?

A. 3
B. 1

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C. 4
D. 2

There is no compulsion that each state must have an on outgoing edge for every input variable in:
A. Transition Graph
B. Transition Table
C. Both Finite Automata and Transition Graph
D. Finite Automata

In TG, there can be more than one _____.
A. start state only
B. null state only
C. start state and final state
D. final state only

Substrings as input letters can be specified on edges in:
A. NFA
B. PDA
C. FA
D. TG

If we have the regular expression (a + b)*, then we can draw FA for the provided RE with minimum _____ number of state(s).
A. 2
B. 0
C. 1
D. 3

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Question No:1 **(Marks:1)** **Vu-Topper RM**

Σ={a,Aa,Abb}, then string aAaAbbAa has__length.

A. One
B. Two
C. Three
D. Four **Page 4**

Question No:2 **(Marks:1)** **Vu-Topper RM**

Languages generated by kleene star are always___.

A. Finite
B. Infinite **Page 7**
C. Sometimes finite & sometimes infinite
D. None of the these

Question No:3 **(Marks:1)** **Vu-Topper RM**

Let S = {aa, bb}, then S* will have the _____ string.

A. Λ **Page 7**
B. abba
C. aabbbaa
D. bbaab

Question No:4 **(Marks:1)** **Vu-Topper RM**

If r1 = (aa + bb) and r2 = (a + b) then the language (aa + bb)* will be generated by

A. (r1)(r2)
B. (r1 + r2)
C. (r2)*
D. (r1)* **Page 10**

Question No:5 **(Marks:1)** **Vu-Topper RM**

If a language can be expressed through FA, then it can also be expressed through TG.

A. True **Page 25**

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B. False

Question No:6 **(Marks:1)** **Vu-Topper RM**

If an alphabet has n number of letter, then number of strings of length m will be

A. n+m
B. (n)(m)
C. m^n
D. n^m Page 6

Question No:7 **(Marks:1)** **Vu-Topper RM**

In GTG, if a state has more than one incoming transitions from a state. Then all those incoming transitions can be reduced to one transition using sign

A. -
B. + Page 27
C. *
D. ( )

Question No:8 **(Marks:1)** **Vu-Topper RM**

Above given FA accepts___strings defined over Σ={a , b}

A. All Page 15
B. Some
C. All but not null
D. None of these

Question No:9 **(Marks:1)** **Vu-Topper RM**

One FA has 3 states and 2 letters in the alphabet. Then FA will have _____number of transitions in the diagram

A. 4
B. 5
C. 7
D. 6 Page 14

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Question No:10 **(Marks:1)** **Vu-Topper RM**

Every FA should be_____.

A. Deterministic **Page 25**

B. Non- Deterministic

C. Deterministic & Non- Deterministic

D. None of these

Question No:11 **(Marks:1)** **Vu-Topper RM**

Auto Meta mean

A. Manual work

B. Automatic work **Page 3**

C. Both

D. None of these

Question No:12 **(Marks:1)** **Vu-Topper RM**

NFA to FA will

A. Equal **Page 43**

B. Not equal

C. Not valid

D. None of given

Question No:13 **(Marks:1)** **Vu-Topper RM**

The length of output string in case of__is one more than the length of corresponding input string.

A. Finite Automaton **Page 55**

B. TG

C. GTG

D. NFA

Question No:14 **(Marks:1)** **Vu-Topper RM**

The_machine helps in building a machine that can perform the addition of binary numbers.

A. Incrementing **Page 60**

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B. Complementing
C. Decrementing
D. None of the given

Question No:15 **(Marks:1)** **Vu-Topper RM**

In proving Kleene Theorem II, if a state has two incoming transition edges labelled by RE from the same state, then replace all the edges with a single transition edge labelled by ------- of corresponding RE.

A. Sum **Page 27**
B. Edge
C. FA
D. RE

Question No:16 **(Marks:1)** **Vu-Topper RM**

Kleene Theorem III states that if the language can be expressed by RE then there exist -------- accepting the language.

A. FA **Page 32**
B. DFA
C. NFA
D. None

Question No:17 **(Marks:1)** **Vu-Topper RM**

If L1 and L2′ are regular languages, L1 ∩ (L2′ U L1′)’ will be

A. Regular **Page 10**
B. Ir-regular
C. Can’t be decided
D. Another Language which is not listed here

Question No:18 **(Marks:1)** **Vu-Topper RM**

A regular language can be:

A. irregular
B. infinite
C. non-deterministic

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D. **None of the given options**

Question No:19 **(Marks:1)** **Vu-Topper RM**

There _____ a language for which only FA can be built but not the RE.

A. is cannot be
B. is
C. may be
D. may not be

Question No:20 **(Marks:1)** **Vu-Topper RM**

For every three regular expressions R, S, and T, the languages denoted by R(S U T) and (RS) U (RT) are the _____ .

A. **Same**
B. Different
C. R(S U T) is Greater
D. None of the given options

Question No:21 **(Marks:1)** **Vu-Topper RM**

In _____ there must be transition for all the lettersof a string.

A. NFA
B. GTG
C. TG
D. FA

Question No:22 **(Marks:1)** **Vu-Topper RM**

We cannot construct an NFA for the language of _____ defined over alphabet set {a,b}.

A. Even
B. odd
C. Palindromes
D. Integers

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Question No:23 **(Marks:1)** **Vu-Topper RM**

Decomposing a string into its valid units is referred as:

A. Decomposing
B. Splitting
C. Tokenizing
D. Dividing

Question No:24 **(Marks:1)** **Vu-Topper RM**

Choose the correct word produced by RE (a + b)* (aa+bb).

A. Abab
B. Babab
C. aaaa
D. Ab

Question No:25 **(Marks:1)** **Vu-Topper RM**

Considering FA1 and FA2 having 2 states each. Now FA1+FA2 can have maximum _____ number of states.

A. 2
B. 3
C. more than 3
D. None of these

Question No:26 **(Marks:1)** **Vu-Topper RM**

If R is a regular language and L is some language, and L U R is a _____, then L must be a _____.

A. Regular language
B. Finite Auto

Question No:27 **(Marks:1)** **Vu-Topper RM**

The minimum length of the strings(except null string) of a language that starts and ends in different letters will be:

A. 1
B. 2

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C. 3
D. 4

Question No:28 **(Marks:1)** **Vu-Topper RM**

Consider we have languages L7 and L6. Which of the following represents their concatenation?

A. L7+L6
B. L7/L6
C. L6L7
D. L7L6

Question No:29 **(Marks:1)** **Vu-Topper RM**

Let FA1 has x number of states and FA2 has y number of states. Now FA1+FA2 can have maximum _____ **number of states.**

A. x+y
B. x-y
C. x/y
D. None

Question No:30 **(Marks:1)** **Vu-Topper RM**

The language {a ab aba bab} is _____ .

A. Irregular
B. Regular
C. Recursive
D. None of the given options

Question No:31 **(Marks:1)** **Vu-Topper RM**

If we have a finite language and the number of states in the FA is n then the maximum number of letters in the each word of the language that will be accepted by the given FA will be:

A. N
B. n-1
C. n+1

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D. 1

Question No:32 **(Marks:1)** **Vu-Topper RM**

Moore machine can have -------- final states.

A. 2
B. 4
C. 6
D. 8

Question No:33 **(Marks:1)** **Vu-Topper RM**

There _____ be dead states in NFA.

A. may not
B. must
C. should not
D. will

Question No:34 **(Marks:1)** **Vu-Topper RM**

Let L be the language of all strings, defined over ∑ = {0,1}, ending in 10. Which of the following strings are distinguishable with respect to L with z being 0?

A. 010, 101
B. 111, 101
C. 001, 101
D. 111, 111

Question No:35 **(Marks:1)** **Vu-Topper RM**

There _____ be a unique path for each valid string (called a word) in NFA.

A. May not
B. Must
C. Should not
D. Will

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Question No:36 **(Marks:1)** **Vu-Topper RM**

If we have only one state, having no transition for input letters, then it is an example of:

A. RE
B. FA
C. TG
D. NFA

Question No:37 **(Marks:1)** **Vu-Topper RM**

Strings x,y,z belongs to Σ^* such that $xz \in L$ but $yz \notin L$ where $L \subseteq \Sigma^*$ are:

A. Undetermined
B. Distinguishable
C. Indistinguishable
D. Both distinguishable and indistinguishable

Question No:38 **(Marks:1)** **Vu-Topper RM**

A _____ with "n" states must accept at least one string of length greater than "n".

A. DFA
B. RE
C. Irregular language
D. Irrelevant language

Question No:39 **(Marks:1)** **Vu-Topper RM**

In Moore machine, output is produced over the change of:

A. Transitions
B. Transitions and states
C. None of the mentioned
D. States

Question No:40 **(Marks:1)** **Vu-Topper RM**

Keeping in view the discussion by Martin, how many states are required

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to recognize the language of all strings of length 3 or more defined over ∑= {a,b}, with 'a' being the third letter from right?

A. 10
B. 12
C. 14
D. 16

Question No:41 (Marks:1) Vu-Topper RM

Every _____ can be considered to be _____ as well, but the converse may not be true.

A. TG, FA
B. GTG
C. PDA
D. FA, TG Page 19

Question No:42 (Marks:1) Vu-Topper RM

In the context of make NFA for the concatenation of FA1 and FA2 (FA1 accepting null string), which of the following option is correct?

A. Final states in both FAs
B. Initial states in both FAs
C. FA2 having initial state only
D. FA2 having final state only

Question No:43 (Marks:1) Vu-Topper RM

In order to make NFA for the union of FA1 and FA2, the new initial state should be linked to:

A. Initial states of both FAs
B. Initial and final states of FA1 and FA2 respectively
C. Initial state of FA1 only
D. Final and initial states of FA1 and FA2 respectively

Question No:44 (Marks:1) Vu-Topper RM

Keeping in view the discussion by Martin, how many states are required

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Vu Topper RM

to recognize the language of all strings of length 2 or more defined over ∑= {a,b}, with 'b' being the second letter from right?

A. 9
B. 6
C. 7
D. 8

Question No:45 (Marks:1) Vu-Topper RM

If we have an NFA having 3 states, and we convert that NFA to an FA. The resultant FA will contains _____ states.

A. 1
B. 2
C. 3
D. 4

Question No:46 (Marks:1) Vu-Topper RM

Let FA3 be an FA corresponding to FA1FA2, then initial state of FA3 must correspond to the initial state of

A. FA1 only
B. FA2 only
C. FA1 and FA2
D. FA1 or FA2

Question No:47 (Marks:1) Vu-Topper RM

In which of the following machine, the length of output string is the same to that of input string?

A. Mealy machine
B. Moore machine
C. Finite automaton with output
D. Non-deterministic finite automaton

Question No:48 (Marks:1) Vu-Topper RM

Moore Machine is an application of:

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A. None of the mentioned
B. Finite automata with output
C. Finite automata without input **Google**
D. Non- Finite automata with output

Question No:49 **(Marks:1)** **Vu-Topper RM**
In NFA having multiple transitions at certain state, FA can be built by introducing:
A. Empty state
B. Combination of states
C. Initial state
D. Final state

Question No:50 **(Marks:1)** **Vu-Topper RM**
In Mealy machine the output depends on _____
A. Present state and Present input
B. Only present state
C. Nothing
D. Type of input

Question No:51 **(Marks:1)** **Vu-Topper RM**
If L is a regular language, then (L')' U L will be:
A. L
B. C
C. P
D. F

Question No:52 **(Marks:1)** **Vu-Topper RM**
A string will be accepted by an NFA if there exists _____ one successful path.
A. Atleast
B. Atmost
C. Maximum

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D. None of the given options

Question No:53 **(Marks:1)** **Vu-Topper RM**

If A and B are regular languages, !(A' U B') is:

A. Non regular
B. May be regular
C. None of the mentioned
D. Regular

Question No:54 **(Marks:1)** **Vu-Topper RM**

There is no question of accepting any language in:

A. Moore machine
B. FA
C. TG
D. GTG

Question No:55 **(Marks:1)** **Vu-Topper RM**

In _____ there must be transitions for all the alphabets over which a language is defined.

A. FA
B. TG
C. NFA
D. GTG

Question No:56 **(Marks:1)** **Vu-Topper RM**

Let FA3 be an FA corresponding to FA1FA2, then final state of FA3 must correspond to the final state of

A. FA2 only
B. FA1 only
C. FA1 or FA2
D. FA1 and FA2

Question No:57 **(Marks:1)** **Vu-Topper RM**

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How many new states are introduced while developing NFA for the closure of an FA?

A. 2
B. 4
C. 6
D. 8

Question No:58 **(Marks:1)** **Vu-Topper RM**

Subtraction of binary numbers is possible through:

A. Both complementing and incrementing machine
B. Complementing machine
C. Incrementing machine
D. Converting machine

Question No:59 **(Marks:1)** **Vu-Topper RM**

For a given Moore Machine, the input string is '101010', thus the output string would be of length:

A. Length of input string + 1
B. Length of input string – 1
C. Length of input string + 2
D. Length of input string -2

Question No:60 **(Marks:1)** **Vu-Topper RM**

Which one of the following machine is represented as a pictorial representation with states and directed edges labeled by an input letter along with an output character?

A. Mealy machine
B. Moore machine
C. Finite state machine
D. Deterministic finite state machine

Question No:61 **(Marks:1)** **Vu-Topper RM**

If FA1 corresponds to (a+b)* then FA1 must accept _____

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string/strings.

A. No
B. Odd length
C. Even length
D. Every

Question No:62 **(Marks:1)** **Vu-Topper RM**

Closure of an FA is the same as _____ of an FA with itself except that the initial state of the required FA is a final state as well.

A. Sum
B. Union
C. Intersection
D. Concatenation

Question No:63 **(Marks:1)** **Vu-Topper RM**

Given the language L = {ab, aa, baa}, which of the following strings are inL*?

abaabaaabaa
aaaabaaaa
baaaaabaaaab
baaaaabaa

A. 1, 2 and 3
B. 2, 3 and 4
C. 1, 2 and 4
D. 1, 3 and 4

Question No:64 **(Marks:1)** **Vu-Topper RM**

FA and _____ are same except that _____ has unique symbol for each transition.

A. FA,TG
B. NFA,TG
C. NFA,FA
D. GTG,NFA

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Question No:65 **(Marks:1)** **Vu-Topper RM**

How many states of a finite automaton will be final for accepting the only string 'abb', if Σ= {a, b}?

A. 1
B. 2
C. 3
D. 4

Question No:66 **(Marks:1)** **Vu-Topper RM**

Two machines are said to be equivalent if they print the_output string when the__input string is run on them.

A. Same, Same
B. Same, different
C. Different, same
D. Unique, different

Question No:67 **(Marks:1)** **Vu-Topper RM**

Every NFA can be considered to be a -------- as well, but the converse may not be true.

A. TG
B. FA
C. GTG
D. PDA

Question No:68 **(Marks:1)** **Vu-Topper RM**

In which of the following machine, the length of output string is 1 more than that of input string?

A. Mealy machine
B. Non-deterministic finite automaton
C. Finite automaton with output
D. Moore machine

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Question No:69 **(Marks:1)** **Vu-Topper RM**

If S = {aa, bb} then S* will not contain _____.

A. abbbab

B. bbba

C. bbbbab

D. ababbb

Question No:70 **(Marks:1)** **Vu-Topper RM**

Which of the following machine has only one initial state and no final state?

A. Moore machine

B. Finite state machine

C. Deterministic finite state machine

Question No:71 **(Marks:1)** **Vu-Topper RM**

Which of the following diagram is very rigid in order to express any language?

A. TG

B. NFA

C. GTG

D. FA

Question No:72 **(Marks:1)** **Vu-Topper RM**

If S = {a}, then S+ will be _____.

A. {a, aaa, aaaa, aaaaa,…}

B. {a, aa, aaa, aaaa,…}

C. {a, aaa, aaaaa, aaaaaaa,…}

D. {aa, aaaa, aaaaaa, aaaaaaaa,…}

Question No:73 **(Marks:1)** **Vu-Topper RM**

Let L be the language of all strings. defined over ∑ = {0,1}. ending in 111.

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Melay machine can have final states.

A. Zero
B. One
C. More than one but finite
D. More than one but infinite

Question No:74 (Marks:1) Vu-Topper RM

Let's we have two regular expressions R1=(xx+yy) and R2=(x+ y). Which one of the following is the correct regular expression for the Union of R1 and R2?

A. (xx+yy)(x+y)
B. (xx+yy)+(x+y)*
C. (xx+yy)+(x+y)
D. ((xx+yy)+(x+y))*

Question No:75 (Marks:1) Vu-Topper RM

The state where there is no way to leave after entry, is called _____.

A. Davey John locker
B. initial state
C. final state
D. non-final state

Question No:76 (Marks:1) Vu-Topper RM

Which one of the following word is not accepted by the given regular expression?

A. aaabab
B. aaaababb
C. abbaab
D. aabbabb

Question No:77 (Marks:1) Vu-Topper RM

According to theory of automata there are _____ types of languages.

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A. One
B. Two
C. Three
D. Four

Question No:78 **(Marks:1)** **Vu-Topper RM**
Regular languages are closed under the following operations.
A. Union only
B. Concatenation, Closure only
C. Union, Concatenation and Closure

Question No:79 **(Marks:1)** **Vu-Topper RM**
Regular languages are closed under the following operations.
A. Union only
B. Concatenation, Closure only
C. Union, Concatenation and Closure
D. Regular languages are not closed under any operation

Question No:80 **(Marks:1)** **Vu-Topper RM**
There can be more than _____ FA for a certain language but for _____ FA there is only one language associated with it.
A. one, one
B. one, two
C. two, three
D. two, one

Question No:81 **(Marks:1)** **Vu-Topper RM**
There is one compulsion that each state must have an on outgoing edge forevery input variable in:
A. Finite Automata
B. Transition Graph
C. Both Finite Automata and Transition Graph
D. Transition Table

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Question No:82 **(Marks:1)** **Vu-Topper RM**

FA is also called

A. TG
B. GTG
C. NFA
D. DFA

Question No:83 **(Marks:1)** **Vu-Topper RM**

If r1 and r2 are regular expressions then (r1 * r2) is _____ .

A. FA
B. TG
C. GTG
D. RE

Question No:84 **(Marks:1)** **Vu-Topper RM**

Keep in view the language of all strings ending with 'a' defined over Σ = {a, b, c, d}. For which input letter, we will take a loop on the final state of its transition diagram?

A. a
B. b
C. c
D. d

Question No:85 **(Marks:1)** **Vu-Topper RM**

Which of the following statements is true about NFA with Null String?

A. Infinite states
B. Infinite set of letters
C. Infinite set of transitions
D. Transition of null string is allowed at any stage

Question No:86 **(Marks:1)** **Vu-Topper RM**

Introducing new start state in case of multiple start states is the step no.

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of proving Kleene's theorem part ||.

A. 1
B. 2
C. 3
D. 4

Question No:87 **(Marks:1)** **Vu-Topper RM**

Which of the following diagrams expresses languages more simply?

A. FA
B. NFA
C. TG
D. GTG

Question No:88 **(Marks:1)** **Vu-Topper RM**

The language of all strings defined over alphabet set = {a, b} that does not end with 'a' actually ends with:

A. b
B. b and ^
C. ^
D. ^ and a

Question No:89 **(Marks:1)** **Vu-Topper RM**

In NFA having no transition at certain state, FA can be built by introducing:

A. Empty state
B. Combination of states
C. Initial state
D. Final state

Question No:90 **(Marks:1)** **Vu-Topper RM**

Formal is also known as

A. Syntactic language
B. Semantic language

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C. Informal language
D. None of these

Question No:91 **(Marks:1)** **Vu-Topper RM**
There may be more than one transition for a certain letter on a state in:
A. Finite automata
B. Non-Deterministic Finite Automata
C. Transition Table
D. Moore Machine

Question No:92 **(Marks:1)** **Vu-Topper RM**
FA of EVEN language shows null string when
A. Initial state is final as well
B. EVEN does not accept null
C. One state is declared null
D. None of the these

Question No:93 **(Marks:1)** **Vu-Topper RM**
Which of the following statement is true about GTG?
A. Transitions are based on input letters
B. Transitions are based on specified substrings
C. Transitions are based on regular expressions
D. Transitions are based on alphabet set

Question No:94 **(Marks:1)** **Vu-Topper RM**
In GTG, there can be more than one:
A. Start state
B. Final state
C. Start state and final state
D. Null state

Question No:95 **(Marks:1)** **Vu-Topper RM**
GTG for the expression (aa+aba)* may have minimum number of states:

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A. 1
B. 2
C. 3
D. 4

Question No:96 **(Marks:1)** **Vu-Topper RM**
In regular expressions, the operator '*' stands for
A. Concatenation
B. Iteration
C. Selection
D. Add

Question No:97 **(Marks:1)** **Vu-Topper RM**
If r1 is a regular expression then (r1)* is____.
A. A generalized transition graph
B. A non-deterministic finite automaton
C. A finite automaton
D. Also, a regular expression

Question No:98 **(Marks:1)** **Vu-Topper RM**
Which of the following is the bypass and state elimination step in the context of Kleene's theorem part || proof?
A. 1
B. 2
C. 3
D. 4

Question No:99 **(Marks:1)** **Vu-Topper RM**

Question No:100 **(Marks:1)** **Vu-Topper RM**
Melay machine to increase the output string in magnitude by 1 is called:
A. Complementing machine

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B. Incrementing machine
C. Decrementing machine
D. Converting machine

Question No:101 **(Marks:1)** **Vu-Topper RM**
Kleene's Theorem Part I expresses the relationship between_____.
A. FA and TG
B. TG and RE
C. RE and FA
D. FA and RE

Question No:102 **(Marks:1)** **Vu-Topper RM**
Suppose we have FA3 (which is equal to FA1 + FA2), then the final state of FA3 will be declared final if:
A. It corresponds to final states of both FA1 and FA2
B. It corresponds to final states of FA1 only
C. It corresponds to final states of FA2 only
D. It corresponds to any of the final states in FA1 or FA2

Question No:103 **(Marks:1)** **Vu-Topper RM**
Null strings can be specified on edges in:
A. Finite Automata
B. Non-Deterministic Finite Automata
C. Transition Graph
D. Melay Machine

Question No:104 **(Marks:1)** **Vu-Topper RM**
What is false about the PALINDROME LANGUAGE?
A. Every word is reverse of itself.
B. It is an infinite language.
C. FA can be build for it.
D. None of the given option

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Question No:105 **(Marks:1)** **Vu-Topper RM**

While finding RE corresponding to TG, If TG has more than one startstate then

A. Introduce the new start state
B. Eliminate the old start state
C. Replace the old start stat with final state
D. Replace the old final state with new start state

Question No:106 **(Marks:1)** **Vu-Topper RM**

All possible combinations of strings of a language including null string is referred as:

A. Concatenation of a language with itself
B. Kleene star closure of a language
C. Multiplication of language with itself
D. Addition of a language with itself

Question No:107 **(Marks:1)** **Vu-Topper RM**

n! will be equal to:

A. n*n
B. n*(-n)!
C. n*(n-1)
D. n*(n-1)!

Question No:108 **(Marks:1)** **Vu-Topper RM**

While finding RE corresponding to a TG, we connect the new start state with the old start state by__transition.

A. a
B. b
C. Null
D. RE

Question No:109 **(Marks:1)** **Vu-Topper RM**

In proving Kleene Theorem II, if three states are connected then middle state is removed by connecting first and third state and writing

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corresponding RE in:

A. Sum
B. Concatenation
C. Difference
D. Asterisk

Question No:110 (Marks:1) Vu-Topper RM

In___there must be transition for all the letters of a string.

A. NFA
B. GTG
C. TG
D. FA

Question No:111 (Marks:1) Vu-Topper RM

There is no question accepting any language in:

A. FA
B. TG
C. GTG
D. Moore machine

Question No:112 (Marks:1) Vu-Topper RM

The FA can be drawn for the regular expression (a+b)* with minimum state(s).

A. 1
B. 2
C. 3
D. 4

Question No:113 (Marks:1) Vu-Topper RM

Which of the following does not contribute while finding out the length of strings?

A. ^
B. a

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C. b
D. a+b

Question No:114 **(Marks:1)** **Vu-Topper RM**
The language of all strings defined over alphabet set = {x, y} that ends with same letters will have the maximum length of:
A. 1
B. 2
C. 3
D. Infinite

Question No:115 **(Marks:1)** **Vu-Topper RM**
Considering FA1 and FA2 states each. Now FA1+FA2 can have maximum_number of states.
A. 2
B. 3
C. More than 3
D. None of the given option

Question No:116 **(Marks:1)** **Vu-Topper RM**
Which one of the following is the RE for the language defined over Σ= {a, b} having all the words starting with a?
A. (a + b)*
B. aa(a + b)+
C. a(a + b)*
D. a*(a + b)

Question No:117 **(Marks:1)** **Vu-Topper RM**
An _____ can be considered to be an intermediate structure between Finite automaton and Transition Graph.
A. RE
B. GTG
C. NFA

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D. None of the given options

Question No:118 (Marks:1) Vu-Topper RM

Suppose a language L1 has 2 states and L2 has 2 states. If we have a machine M that accepts L1 ∩ L2. Then, the total number of states in M is equal to _____.

A. 2
B. 4
C. 6
D. 8

Question No:119 (Marks:1) Vu-Topper RM

FA corresponding to an NFA can be built by introducing a state corresponding to the combination of states, for a letter having

A. No transition at certain state
B. One transition at certain state
C. Two transitions at certain state
D. More than two transitions at certain state

Question No:120 (Marks:1) Vu-Topper RM

Automata is the plural of _____.

A. Automate
B. Automaton
C. Automation
D. Automatic

Question No:121 (Marks:1) Vu-Topper RM

In NFA having no transition at certain. FA can be built by introducing:

A. Empty state
B. Combination of states
C. Initial state
D. Final state

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Question No:122 **(Marks:1)** **Vu-Topper RM**

If S = { x }, then S* will be _____.

A. {^,x,xxx,xxxx,xxxxx,…}

B. {^,x,xx,xxx,xxxx,…}

C. {^,x,xxx,xxxxx,xxxxxxx,…}

D. {^,xx,xxxx,xxxxxx,xxxxxxxx,…}

Question No:123 **(Marks:1)** **Vu-Topper RM**

In TG, the string is supposed to be _____ if there is no path for a string from initial to final state.

A. Accept null string

B. Accept all strings

C. Accept all non-empty strings

D. Does not accept any string

Question No:124 **(Marks:1)** **Vu-Topper RM**

In Moore machine, if the length of input string is 9, then the length of output string will be:

A. 7

B. 8

C. 9

D. 10

Question No:125 **(Marks:1)** **Vu-Topper RM**

When ODD language is expressed by an FA, then it will have minimum _____ states.

A. One

B. Two

C. Three

D. Four

Question No:126 **(Marks:1)** **Vu-Topper RM**

[(a + b)(a + b)]*, given RE cannot generate the string _____.

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A. abbaabab
B. abbbaa
C. bbbbbb
D. abbbaaaaa

Question No:127 **(Marks:1)** **Vu-Topper RM**
The recursive method for defining a language has _____ steps.
A. One
B. Two
C. Three
D. Four

Question No:128 **(Marks:1)** **Vu-Topper RM**
Consider the following RE:
a(a + b)b*
All of the following words are accepted except___.
A. aab
B. abb
C. aa
D. aba

Question No:129 **(Marks:1)** **Vu-Topper RM**
For every three regular expressions R, S, T, the languages denoted by R(S U T) and (RS) U (RT) are the____.
A. Same
B. Different
C. R(S U T) is greater
D. None of the given options

Question No:130 **(Marks:1)** **Vu-Topper RM**
Alphabet S = {a, bc, cc} has_____number of letters.
A. One
B. Two

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C. Three
D. Four

Question No:131 **(Marks:1)** **Vu-Topper RM**
Two FAs are said to be equivalent, if they _____.
A. Accept null string
B. Accept same language
C. Accept different language
D. None of the given options

Question No:132 **(Marks:1)** **Vu-Topper RM**
---------- can also help in proving Kleene Theorem III.
A. NFA
B. PDA
C. Moore machine
D. Melay machine

Question No:133 **(Marks:1)** **Vu-Topper RM**
Kleene's Theorem Part II expresses the relationship between _____.
A. FA and TG
B. TG and RE
C. RE and FA
D. FA and RE

Question No:134 **(Marks:1)** **Vu-Topper RM**
If two RE's generate same language then these RE's are called _____.
A. Same RE
B. Equal RE
C. Similar RE
D. Equivalent RE

Question No:135 **(Marks:1)** **Vu-Topper RM**

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Every FA should be__.

A. Deterministic

B. Non-deterministic

C. Deterministic and non-deterministic

D. Not depends on language

Question No:136 **(Marks:1)** **Vu-Topper RM**

What statement is true?

A. A letter is always a combination of symbols

B. A letter may consist of one symbol

C. There is no difference between symbol and letter

D. Letters and symbols are the same thing

Question No:137 **(Marks:1)** **Vu-Topper RM**

If ∑= {ab, bb}, then ∑* will not contain

A. abbbab

B. bbba

C. bbbbab

D. ababbb

Question No:138 **(Marks:1)** **Vu-Topper RM**

Choose the correct word produced by RE (a + b)*ab.

A. abb

B. abab

C. bbbb

D. aaaa

Question No:139 **(Marks:1)** **Vu-Topper RM**

According to 1st part of the Kleene's theorem, If a language can be accepted by an FA then it can be accepted by a___as well

A. FA

B. CFG

C. GTG

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D. TG

Question No:140 (Marks:1) Vu-Topper RM

"One language can be expressed by___GTG".

A. Only one
B. Only two
C. **More than one**

Question No:141 (Marks:1) Vu-Topper RM

If a TG has more than one start states, then we can make a single startstate by introducing a new state and connecting it with all the previously existing start states by using.

A. Any infinite string
B. Single letter string
C. **Null string**
D. Any finite string

Question No:142 (Marks:1) Vu-Topper RM

If in a NFA, ^ is allowed to be a label of an edge then that NFA iscalled _____.

A. TG
B. RE
C. **NFA with null string**
D. RE

Question No:143 (Marks:1) Vu-Topper RM

If we want to make a Moore machine equivalent to mealy machinethen

A. **We should ignore the extra character printed by the Moore machine.**
B. We should ignore the extra character printed by the Mealy machine.
C. We will make the initial state as a no carry state.
D. We should not ignore the extra character printed by the Moore machine.

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Question No:144 **(Marks:1)** **Vu-Topper RM**

Two machines are said to be equivalent if they print the_output string when same input string is run no them.

A. Same
B. Different
C. Inverse
D. Null

Question No:145 **(Marks:1)** **Vu-Topper RM**

The length of output in case of___is one more than the length of corresponding input string

A. Moore machine
B. Mealy machine
C. Incremental machine
D. Adding machine

Question No:146 **(Marks:1)** **Vu-Topper RM**

A is not a valid transition in

A. TG
B. GTG
C. NFA
D. RE

Question No:147 **(Marks:1)** **Vu-Topper RM**

Dead states are also called

A. John Davey Lockers
B. Davey John Lockers
C. Mutex Lockers
D. Semaphores

Question No:148 **(Marks:1)** **Vu-Topper RM**

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Language of all strings whose length is odd and number of y's even defined over alphabet set ∑ = {x, y} .__will be accepted by the given language.

A. xxyxyxyyyx
B. xxyxyxyyyxy
C. xxyxyxyyyxx
D. xxyxyxyyy

Question No:149 (Marks:1) Vu-Topper RM

If an effectively solvable problem has answer in Yes or NO. then the solution is called

A. Infinite problem
B. Decision procedure
C. Finite solution
D. Optimal procedure

Question No:150 (Marks:1) Vu-Topper RM

If the intersection of two regular languages is regular then thecomplement of the intersection of these two languages is

A. Regular
B. Irregular
C. Irregular but finite
D. Irregular but infinite

Question No:151 (Marks:1) Vu-Topper RM

If R is regular language and Q is any language (regular/non-regular). Then Pref(_in___) is regular.

A. Q, Q
B. Q, R
C. R, Q
D. R, R

Question No:152 (Marks:1) Vu-Topper RM

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The strings or words which do not belong to a language are called of that language

A. Intersection
B. Union
C. Complement
D. Quotient

Question No:153 **(Marks:1)** **Vu-Topper RM**

Prime is a_language.

A. Finite
B. Both context free and regular
C. Regular
D. Non-regular

Question No:154 **(Marks:1)** **Vu-Topper RM**

Finite Automaton (FA) must have____number of states while alanguage has__words.

A. Infinite, finite
B. Finite, finite
C. Finite, infinite
D. Infinite, infinite

Question No:155 **(Marks:1)** **Vu-Topper RM**

The language "PRIME" is an example of___language.

A. Regular but finite
B. Regular
C. Non regular but finite
D. Non regular **Page 75**

Question No:156 **(Marks:1)** **Vu-Topper RM**

If L1 and L2 are regular languages then which statement is NOT true?

A. L1 + L2 is always regular
B. L1 L2 is always regular

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C. L1/L2 is always regular
D. L1* is always regular

Question No:157 **(Marks:1)** **Vu-Topper RM**
If a language is regular it must generate_____number of distinctclasses.
A. Finite
B. Infinite
C. Two
D. three

Question No:158 **(Marks:1)** **Vu-Topper RM**
The operators like (* . +) in the parse tree are considered as
A. Terminals
B. Non-terminals
C. Productions
D. Intermediates

Question No:159 **(Marks:1)** **Vu-Topper RM**
Set of all palindromes over {a,b} is:
A. Regular
B. Regular and finite
C. Regular and infinite
D. Non-regular

Question No:160 **(Marks:1)** **Vu-Topper RM**
Which one of the following languages is a non-regular language?
A. Even-even
B. Containing double a
C. Start and end with same letter
D. Palindrome

Question No:161 **(Marks:1)** **Vu-Topper RM**

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The language of all strings partition ∑* into_class(es).

A. One
B. Two
C. Three
D. Four

Question No:162 **(Marks:1)** **Vu-Topper RM**

The language of all strings not beginning with 'b' partitions ∑* into distinct classes.

A. Two
B. Three
C. Four
D. Five

Question No:163 **(Marks:1)** **Vu-Topper RM**

The values of input (say a & b) do not remain same in one cycle dueto

A. NAND gate
B. Clock pulse
C. OR gate
D. NOT gate

Question No:164 **(Marks:1)** **Vu-Topper RM**

In a CFG, the non-terminals are denoted by

A. Small letters
B. Numbers
C. Capital letters
D. Small letters and numbers

Question No:165 **(Marks:1)** **Vu-Topper RM**

a* + b* = (a + b)* this expression is

A. True
B. False

Question No:166 **(Marks:1)** **Vu-Topper RM**

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Length of EVEN-EVEN language is always_____.

A. Even

B. Odd

C. Sometimes even & sometimes odd

D. Such language doesn't exist

Question No:167 (Marks:1) Vu-Topper RM

While finding RE corresponding to TG, we connect the new start stateto the old start state by the transition labeled by

A. a

B. b

C. null

D. none of the given options

Question No:168 (Marks:1) Vu-Topper RM

Given S, Kleene star closure is denoted by

A. S*

B. S+

C. S-

D. None of these

Question No:169 (Marks:1) Vu-Topper RM

Which of the following steps replaces multiple incoming transitionedges with a single one in proving Kleene's theorem part ||?

A. 1

B. 2

C. 3

D. 4

Question No:170 (Marks:1) Vu-Topper RM

If r1 = (aa + bb) and r2 = (a + b) then the language (aa + bb)(a + b) will be generated by _____.

A. (r1)(r2)

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B. (r1 + r2)
C. (r2)(r1)
D. (r1)*

Question No:171 **(Marks:1)** **Vu-Topper RM**

The language having even number of a's and even number of b's defined over S = {a, b} is called _____.

A. EVEN-EVEN
B. ODD-ODD
C. PALINDROME
D. FACTORIAL

Question No:172 **(Marks:1)** **Vu-Topper RM**

If L1' and L2' are regular languages. Then L1,L2 will be

A. Regular
B. Non regular
C. May be regular
D. None of the mentioned

Question No:173 **(Marks:1)** **Vu-Topper RM**

f FA1 corresponding to (a+b)* then FA1 must accept string/strings

A. No
B. Odd length
C. Even length
D. Every

Question No:174 **(Marks:1)** **Vu-Topper RM**

In FA, initial state can be represented by:

A. Drawing an arrow head before that state
B. Drawing a circle in that state
C. leave the state empty
D. Drawing '+' sign in that state

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Question No:175 **(Marks:1)** **Vu-Topper RM**

An FA is a collection of:

A. Finite states, finite transition and finite input letters

B. Infinite states, infinite transition and infinite input letters

C. Only finite states and finite transitions

D. Only infinite states and infinite transitions

Question No:176 **(Marks:1)** **Vu-Topper RM**

NFA with null string has ---------- initial state(s).

A. One

B. Two

C. Four

D. Three

Question No:177 **(Marks:1)** **Vu-Topper RM**

The difference between number of states with regular expression (a +b) and (a + b)* is:

A. 0

B. 1

C. 2

D. 3

Question No:178 **(Marks:1)** **Vu-Topper RM**

A transition graph is converted into a(n)____in order to obtain regular expression.

A. FA

B. GTG

C. NFA

D. NFA

Question No:179 **(Marks:1)** **Vu-Topper RM**

Consider the languages L1 = and L2 = {a}. Which one of thefollowing

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represents L1 L2* ∪ L1*

A. ^

B. a*

C. All of the mentioned

D. None of the mentioned

Question No:180 (Marks:1) Vu-Topper RM

If S = {a, b} then which of the following RE will generate all possible strings?

A. a* + b*

B. (ab)*

C. (a + b)*

D. (ab + ba)*

Question No:181 (Marks:1) Vu-Topper RM

In drawing FA3 (which is equal to FA1 + FA2), a state will bedeclared final if

A. It corresponds to final states of both FA1 and FA2

B. It corresponds to final states of FA1

C. It corresponds to final states of FA2

D. It corresponds to any of the final states in FA1 or FA2

Question No:182 (Marks:1) Vu-Topper RM

Let S = {a, bb, bab, baabb} be a set of strings, which one of the following will not be included in S*?

A. baba

B. baabbabb

C. bbaaabb

D. bbbaabaabb

Question No:183 (Marks:1) Vu-Topper RM

The length of string “AbBAbcd” defined over Σ ={Ab,B,c,d} is _____.

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A. One
B. Two
C. Five
D. Four

Question No:184 **(Marks:1)** **Vu-Topper RM**
In case of finite automaton there _____ be a transition on each _____ for every letter of the alphabet set.
A. Must, state
B. May be, state
C. Often, edge
D. Must, edge

Question No:185 **(Marks:1)** **Vu-Topper RM**
Which one of the following word is not accepted by the given regular expression? (a+b)*(aaa+bbb)(a+b)*
A. Ababaaaab
B. Bababbbba
C. Baabaabba
D. Abbaaabba

Question No:186 **(Marks:1)** **Vu-Topper RM**
1 Let FA1 accepts many strings and FA2 accepts none then FA1+FA2 will be equal to:
A. FA1
B. FA2
C. FA2-FA1
D. (FA2)

Question No:187 **(Marks:1)** **Vu-Topper RM**
Edges are expressed with a regular expression in:
A. GTG **Page 23**
B. FA

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C. NFA
D. TG

Question No:188 (Marks:1) Vu-Topper RM

NFA corresponding to union of FAs is built by introducing a new start state and connect it to the states originally connected to the old start state with the --------- transitions as the old start state:

A. Same
B. Union of
C. Different
D. Concatenated

Question No:189 (Marks:1) Vu-Topper RM

---------- state is not important in Moore machine.

Final
Start

Question No:190 (Marks:1) Vu-Topper RM

If we subtract a binary number 1010 from the binary number 1101(ignore the overflow), then the result will be:

1100
0011

Question No:191 (Marks:1) Vu-Topper RM

In concatenation, we include the initial state of FA2 automatically after the final state of FA1 because of:

A. We need just two initial states
B. We need just one initial state
C. Some part of the string may be accepted by FA2
D. The strings of FA2 are accepted first before the strings of FA1

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Question No:192 **(Marks:1)** **Vu-Topper RM**

a(a+b)*b + b(a+b)*a is the regular expression of language defined over Σ={a,b} that is _____.

starting with a and ending in a

Question No:193 **(Marks:1)** **Vu-Topper RM**

GTG for the expression (a+b)*bb may have minimum number of states:

Aaabcbbcbacc

Question No:194 **(Marks:1)** **Vu-Topper RM**

Which of the following state is introduced while developing NFA for the closure of an FA?

A. Final state
B. Simply an initial state
C. An initial state with loop for all letters
D. An initial state which should be final as well

Question No:195 **(Marks:1)** **Vu-Topper RM**

In NFA,if null word (lambda) is allowed to be a label of an edge, then that NFA is called _____.

A. NFA with one string
B. NFA with two strings
C. NFA with null string
D.NFA without null string

Question No:196 **(Marks:1)** **Vu-Topper RM**

Which one of the following is a correct word produced by the RE (a*b*)ab?

abab

Question No:197 **(Marks:1)** **Vu-Topper RM**

While developing NFA for the union of FA1 and FA2, if there is a loop

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of ‘a’ at the initial state of FA1 then the new initial state will have a transition for ‘a’ that goes straight to:

A. the final state of FA1
B. The initial state of FA1
C. the initial state of FA2
D. the initial state of FA1*FA1

Question No:198 (Marks:1) Vu-Topper RM
Let L be the language of all strings, defined over Σ = {0,1}, ending in 111. Which of the following strings are distinguishable with respect to L with z being 11?
111, 101

Question No:199 (Marks:1) Vu-Topper RM
Which one of the following word is not accepted by the given regular expression?
abbbbaa

Question No:200 (Marks:1) Vu-Topper RM
Which of the following is not a step-in elimination of states procedure?
Unify single transitions to multi transitions that contains union of input

Question No:201 (Marks:1) Vu-Topper RM
In Moore machine the output depends on
The state

Question No:202 (Marks:1) Vu-Topper RM
While developing NFA for the union of FA1 and FA2, there will be
The initial state of FA1

Question No:203 (Marks:1) Vu-Topper RM
Let FA3 be an FA corresponding to FA1FA2, then the final state of FA3

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must correspond to the final state of

A. FA2 only

B. FA1 only

C. FA1 or FA2

D. FA1 and FA2

Question No:204 (Marks:1) Vu-Topper RM

Let FA3 be an FA corresponding to FA1FA2, then the initial state of FA3 must correspond to the initial state of

A. FA1 only

B. FA2 only

C. FA1 or FA2

D. FA1 and FA2

Question No:205 (Marks:1) Vu-Topper RM

Mealy machine is equivalent to Moore machine, if we:

Applications of complementing and incrementing machines

Question No:206 (Marks:1) Vu-Topper RM

In the context of make NFA for the concatenation of FA1 and FA2 (FA2 accepting null string), which of the following option is correct?

A. Final states in both FAs

B. Initial states in both FAs

C. FA2 having final state only

D. FA2 having initial state only

Question No:207 (Marks:1) Vu-Topper RM

In the context of make NFA for the concatenation of FA1 and FA2 (none accepting null string), which of the following option is correct?

A. No final state in FA2 only

B. No initial state in FA1 only

C. No final and initial states in FA1 and FA2 respectively

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D. No initial and final states in FA1 and FA2 respectively

Question No:208 (Marks:1) Vu-Topper RM

Let FA1 accepts many strings and FA2 accepts no string, then FA1+FA2 will be equal to:

A. FA1
B. FA2
C. (FA2)*
D. FA2-FA1

Question No:209 (Marks:1) Vu-Topper RM

The minimum length of the strings(except null string) of a language that starts and ends in the same letters will be:

A. 1
B. 2
C. 3
D. 4

Question No:210 (Marks:1) Vu-Topper RM

While developing NFA for the union of FA1 and FA2, there will be _____ transition/transitions for both ‘a’ and ‘b’ on the new initial state.

A. Single
B. Multiple
C. Only one
D. Only three

Question No:211 (Marks:1) Vu-Topper RM

Which of the following form correctly expressed the regular expression RR*?

A. R+
B. R-
C. R*
D. R+R-

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Question No:212 **(Marks:1)** **Vu-Topper RM**

Which of the following is not a step in elimination of states procedure?

A. Unifying all the final states into one using e-transitions
B. Get the resulting regular expression by direct calculation
C. Remove states until there is only starting and accepting states
D. Unify single transitions to multi transitions that contains union of input

Question No:213 **(Marks:1)** **Vu-Topper RM**

In the context of make NFA for the concatenation of FA1 and FA2 (Both FAs accepting null string), which of the following option is correct?

A. Initial states in both FAs
B. Final states in both FAs
C. FA2 having initial state only
D. FA2 having final state only

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CS-402 Important Mcq's For Mid Term !! Solve By Vu-Topper RM!!



Question No:1 **(Marks:1)** **Vu-Topper RM**

Σ={a,Aa,Abb}, then string aAaAbbAa has__length.

A. One
B. Two
C. Three
D. Four **Page 4**

Question No:2 **(Marks:1)** **Vu-Topper RM**

Languages generated by kleene star are always___.

A. Finite
B. Infinite **Page 7**
C. Sometimes finite & sometimes infinite
D. None of the these

Question No:3 **(Marks:1)** **Vu-Topper RM**

Let S = {aa, bb}, then S* will have the _____ string.

A. Λ **Page 7**
B. abba
C. aabbbaa
D. bbaab

Question No:4 **(Marks:1)** **Vu-Topper RM**

If r1 = (aa + bb) and r2 = (a + b) then the language (aa + bb)* will be generated by

A. (r1)(r2)
B. (r1 + r2)
C. (r2)*
D. (r1)* **Page 10**

Question No:5 **(Marks:1)** **Vu-Topper RM**

If a language can be expressed through FA, then it can also be expressed through TG.

A. True **Page 25**
B. False

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Question No:6 **(Marks:1)** **Vu-Topper RM**

If an alphabet has n number of letter, then number of strings of length m will be

A. n+m
B. (n)(m)
C. m^n
D. n^m Page 6

Question No:7 **(Marks:1)** **Vu-Topper RM**

In GTG, if a state has more than one incoming transitions from a state. Then all those incoming transitions can be reduced to one transition using sign

A. -
B. + Page 27
C. *
D. ( )

Question No:8 **(Marks:1)** **Vu-Topper RM**

Above given FA accepts___strings defined over Σ={a , b}

A. All Page 15
B. Some
C. All but not null
D. None of these

Question No:9 **(Marks:1)** **Vu-Topper RM**

One FA has 3 states and 2 letters in the alphabet. Then FA will have _____number of transitions in the diagram

A. 4
B. 5
C. 7
D. 6 Page 14

Question No:10 **(Marks:1)** **Vu-Topper RM**

Every FA should be

A. Deterministic Page 25
B. Non- Deterministic
C. Deterministic & Non- Deterministic
D. None of these

Question No:11 **(Marks:1)** **Vu-Topper RM**

Auto Meta mean

A. Manual work

B. Automatic work **Page 3**

Question No:12 **(Marks:1)** **Vu-Topper RM**

NFA to FA will

A. Equal **Page 43**

B. Not equal

C. Not valid

D. None of given

Question No:13 **(Marks:1)** **Vu-Topper RM**

The length of output string in case of__is one more than the length of corresponding input string.

A. Finite Automaton **Page 55**

B. TG

C. GTG

Question No:14 **(Marks:1)** **Vu-Topper RM**

The_machine helps in building a machine that can perform the addition of binary numbers.

A. Incrementing **Page 60**

B. Complementing

C. Decrementing

D. None of the given

Question No:15 **(Marks:1)** **Vu-Topper RM**

There _____ be dead states in NFA.

A. may not

B. must

C. should not

D. **will**

Question No:16 **(Marks:1)** **Vu-Topper RM**

1 Let FA1 accepts many strings and FA2 accepts none then FA1+FA2 will be equal to:

A. FA1

B. FA2
C. FA2-FA1
D. (FA2)

Question No:17 **(Marks:1)** **Vu-Topper RM**
If FA1 corresponds to (a+b)* then FA1 must accept _____ string/strings.
A. No
B. Odd length
C. Even length
D. **Every**

Question No:18 **(Marks:1)** **Vu-Topper RM**
A regular language can be:
A. irregular
B. infinite
C. non-deterministic
D. **None of the given options**

Question No:19 **(Marks:1)** **Vu-Topper RM**
There _____ a language for which only FA can be built but not the RE.
A. is cannot be
B. may be
C. may not be

Question No:20 **(Marks:1)** **Vu-Topper RM**
For every three regular expressions R, S, and T, the languages denoted by R(S U T) and (RS) U (RT) are the _____ .
A. **Same**
B. Different

Question No:21 **(Marks:1)** **Vu-Topper RM**
In _____ there must be transition for all the lettersof a string.
A. NFA
B. GTG
C. TG
D. **FA**

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Question No:22 **(Marks:1)** **Vu-Topper RM**

We cannot construct an NFA for the language of _____ defined over alphabet set {a,b}.

A. Even
B. odd
C. **Palindromes**
D. Integers

Question No:23 **(Marks:1)** **Vu-Topper RM**

Decomposing a string into its valid units is referred as:

A. Decomposing
B. Splitting
C. **Tokenizing**
D. Dividing

Question No:24 **(Marks:1)** **Vu-Topper RM**

In concatenation, we include the initial state of FA2 automatically after the final state of FA1 because of:

We need just one initial state

Question No:25 **(Marks:1)** **Vu-Topper RM**

Considering FA1 and FA2 having 2 states each. Now FA1+FA2 can have maximum _____ number of states.

A. 2
B. 3
C. **more than 3**
D. None of these

Question No:26 **(Marks:1)** **Vu-Topper RM**

If R is a regular language and L is some language, and L U R is a _____, then L must be a _____.

A. **Regular language**
B. Finite Auto

Question No:27 **(Marks:1)** **Vu-Topper RM**

The minimum length of the strings(except null string) of a language that starts and ends in different letters will be:

A. **1**

B. 2
C. 3
D. 4

Question No:28 **(Marks:1)** **Vu-Topper RM**

Consider we have languages L7 and L6. Which of the following represents their concatenation?

A. **L7+L6**
B. L7/L6
C. L6L7
D. L7L6

Question No:29 **(Marks:1)** **Vu-Topper RM**

Let FA1 has x number of states and FA2 has y number of states. Now FA1+FA2 can have maximum _____ **number of states.**

A. x+y
B. x-y
C. x/y
D. **none**

Question No:30 **(Marks:1)** **Vu-Topper RM**

The language {a ab aba bab} is _____ .

A. Irregular
B. **Regular**
C. Recursive
D. None of the given options

Question No:31 **(Marks:1)** **Vu-Topper RM**

If we have a finite language and the number of states in the FA is n then the maximum number of letters in the each word of the language that will be accepted by the given FA will be:

A. N
B. n-1
C. n+1
D. 1

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Question No:32 **(Marks:1)** **Vu-Topper RM**

Moore machine can have -------- final states.

A. 2
B. 4
C. 6
D. 8

Question No:33 **(Marks:1)** **Vu-Topper RM**

Let L be the language of all strings, defined over Σ = {0,1}, ending in 111. Which of the following strings are distinguishable with respect to L with z being 11?

111, 101

Question No:34 **(Marks:1)** **Vu-Topper RM**

Let L be the language of all strings, defined over ∑ = {0,1}, ending in 10. Which of the following strings are distinguishable with respect to L with z being 0?

A. 010, 101
B. 111, 101
C. 001, 101
D. 111, 111

Question No:35 **(Marks:1)** **Vu-Topper RM**

There _____ be a unique path for each valid string (called a word) in NFA.

A. May not
B. Must
C. Should not
D. Will

Question No:36 **(Marks:1)** **Vu-Topper RM**

If we have only one state, having no transition for input letters, then it is an example of:

A. RE
B. FA
C. TG
D. NFA

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Question No:37 **(Marks:1)** **Vu-Topper RM**

Which of the following state is introduced while developing NFA for the closure of an FA?

An initial state which should be final as well

Question No:38 **(Marks:1)** **Vu-Topper RM**

A _____ with "n" states must accept at least one string of length greater than "n".

A. DFA
B. RE
C. Irregular language
D. Irrelevant language

Question No:39 **(Marks:1)** **Vu-Topper RM**

In Moore machine, output is produced over the change of:

A. Transitions
B. Transitions and states
C. None of the mentioned
D. States

Question No:40 **(Marks:1)** **Vu-Topper RM**

In NFA,if null word (lambda) is allowed to be a label of an edge, then that NFA is called _____.

NFA with null string

Question No:41 **(Marks:1)** **Vu-Topper RM**

Every _____ can be considered to be _____ as well, but the converse may not be true.

A. TG, FA Page 19
B. GTG
C. PDA
D. FA, TG

Question No:42 **(Marks:1)** **Vu-Topper RM**

In the context of make NFA for the concatenation of FA1 and FA2 (Both FAs accepting null string), which of the following option is correct?

A. Final states in both FAs
B. Initial states in both FAs

C.
D. FA2 having initial state only
E. FA2 having final state only

Question No:43 **(Marks:1)** **Vu-Topper RM**

In order to make NFA for the union of FA1 and FA2, the new initial state should be linked to:

A. Initial states of both FAs
B. Initial and final states of FA1 and FA2 respectively
C. Initial state of FA1 only
D. Final and initial states of FA1 and FA2 respectively

Question No:44 **(Marks:1)** **Vu-Topper RM**

Keeping in view the discussion by Martin, how many states are required to recognize the language of all strings of length 2 or more defined over ∑= {a,b}, with 'b' being the second letter from right?

A. 9
B. 6
C. 7
D. 8

Question No:45 **(Marks:1)** **Vu-Topper RM**

Let FA3 be an FA corresponding to FA1FA2, then the final state of FA3 must correspond to the final state of

FA2 only

Question No:46 **(Marks:1)** **Vu-Topper RM**

Let FA3 be an FA corresponding to FA1FA2, then initial state of FA3 must correspond to the initial state of

A. FA1 only
B. FA2 only
C. FA1 and FA2
D. FA1 or FA2

Question No:47 **(Marks:1)** **Vu-Topper RM**

In which of the following machine, the length of output string is the same to that of input string?

A. Mealy machine

B. Moore machine
C. Finite automaton with output
D. Non-deterministic finite automaton

Question No:48 **(Marks:1)** **Vu-Topper RM**
Moore Machine is an application of:
A. Finite automata with output
B. Finite automata with input
C. None

Question No:49 **(Marks:1)** **Vu-Topper RM**
---------- state is not important in Moore machine.
Final

Question No:50 **(Marks:1)** **Vu-Topper RM**
In Mealy machine the output depends on _____
A. Present state and Present input
B. Only present state
C. Nothing
D. Type of input

Question No:51 **(Marks:1)** **Vu-Topper RM**
If L is a regular language, then (L')' U L will be:
A. L
B. C
C. P
D. F

Question No:52 **(Marks:1)** **Vu-Topper RM**
A string will be accepted by an NFA if there exists _____ one successful path.
A. Atleast
B. Atmost
C. Maximum
D. None of the given options

Question No:53 **(Marks:1)** **Vu-Topper RM**
If A and B are regular languages, !(A' U B') is:

A. Non regular
B. May be regular
C. None of the mentioned
D. Regular

Question No:54 **(Marks:1)** **Vu-Topper RM**

There is no question of accepting any language in:

A. Moore machine
B. FA
C. TG
D. GTG

Question No:55 **(Marks:1)** **Vu-Topper RM**

Let FA3 be an FA corresponding to FA1FA2, then the initial state of FA3 must correspond to the initial state of

FA1 or FA2

Question No:56 **(Marks:1)** **Vu-Topper RM**

Let FA3 be an FA corresponding to FA1FA2, then final state of FA3 must correspond to the final state of

A. FA2 only
B. FA1 only
C. FA1 or FA2
D. FA1 and FA2

Question No:57 **(Marks:1)** **Vu-Topper RM**

If we subtract a binary number 1010 from the binary number 1101(ignore the overflow), then the result will be:

1100

Question No:58 **(Marks:1)** **Vu-Topper RM**

Subtraction of binary numbers is possible through:

A. Both complementing and incrementing machine
B. Complementing machine
C. Incrementing machine
D. Converting machine

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Question No:59 **(Marks:1)** **Vu-Topper RM**

For a given Moore Machine, the input string is '101010', thus the output string would be of length:

A. Length of input string + 1
B. Length of input string – 1
C. Length of input string + 2
D. Length of input string -2

Question No:60 **(Marks:1)** **Vu-Topper RM**

Which one of the following machine is represented as a pictorial representation with states and directed edges labeled by an input letter along with an output character?

A. Mealy machine
B. Moore machine
C. Finite state machine
D. Deterministic finite state machine

Question No:61 **(Marks:1)** **Vu-Topper RM**

If L1 and L2′ are regular languages, L1 ∩ (L2′ U L1′)’ will be

A. Regular **Page 10**
B. Ir-regular
C. Can’t be decided
D. Another Language which is not listed here

Question No:62 **(Marks:1)** **Vu-Topper RM**

Mealy machine is equivalent to Moore machine, if we:

Applications of complementing and incrementing machines

Question No:63 **(Marks:1)** **Vu-Topper RM**

Given the language L = {ab, aa, baa}, which of the following strings are inL*?
abaabaaabaa
aaaabaaaa
baaaaabaaaab
baaaaabaa

A. 1, 2 and 3
B. 2, 3 and 4
C. 1, 2 and 4

D. 1, 3 and 4

Question No:64 **(Marks:1)** **Vu-Topper RM**

In the context of make NFA for the concatenation of FA1 and FA2 (FA2 accepting null string), which of the following option is correct?

Final states in both FAs

Question No:65 **(Marks:1)** **Vu-Topper RM**

In the context of make NFA for the concatenation of FA1 and FA2 (none accepting null string), which of the following option is correct?

No initial state in FA1 only

Question No:66 **(Marks:1)** **Vu-Topper RM**

Two machines are said to be equivalent if they print the_outputstring when the _____input string is run on them.

A. Same, Same
B. Same, different
C. Different, same
D. Unique, different

Question No:67 **(Marks:1)** **Vu-Topper RM**

Every NFA can be considered to be a - as well, but the converse may not be true.

A. TG
B. FA
C. GTG
D. PDA

Question No:68 **(Marks:1)** **Vu-Topper RM**

In which of the following machine, the length of output string is 1 more than that of input string?

A. Mealy machine
B. Non-deterministic finite automaton
C. Finite automaton with output
D. Moore machine

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Question No:69 **(Marks:1)** **Vu-Topper RM**

If S = {aa, bb} then S* will not contain _____.

A. abbbab

B. bbba

C. bbbbab

D. ababbb

Question No:70 **(Marks:1)** **Vu-Topper RM**

Which of the following machine has only one initial state and no finalstate?

A. Moore machine

B. Finite state machine

C. Deterministic finite state machine

Question No:71 **(Marks:1)** **Vu-Topper RM**

Which of the following diagram is very rigid in order to express any language?

A. TG

B. NFA

C. GTG

D. FA

Question No:72 **(Marks:1)** **Vu-Topper RM**

If S = {a}, then S+ will be

A. {a, aaa, aaaa, aaaaa,…}

B. {a, aa, aaa, aaaa,…}

C. {a, aaa, aaaaa, aaaaaaa,…}

D. {aa, aaaa, aaaaaa, aaaaaaaa,…}

Question No:73 **(Marks:1)** **Vu-Topper RM**

Let L be the language of all strings. defined over ∑ = {0,1}. ending in 111. Melay machine can have final states.

A. Zero

B. One

C. More than one but finite

D. More than one but infinite

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Question No:74 **(Marks:1)** **Vu-Topper RM**

Let's we have two regular expressions R1=(xx+yy) and R2=(x+ y). Whichone of the following is the correct regular expression for the Union of R1 and R2?

A. (xx+yy)(x+y)
B. (xx+yy)+(x+y)*
C. (xx+yy)+(x+y)
D. ((xx+yy)+(x+y))*

Question No:75 **(Marks:1)** **Vu-Topper RM**

The state where there is no way to leave after entry, is called _____.

A. Davey John locker
B. initial state
C. final state
D. non-final state

Question No:76 **(Marks:1)** **Vu-Topper RM**

Which one of the following word is not accepted by the given regular expression?

A. aaabab
B. aaaababb
C. abbaab
D. aabbabb

Question No:77 **(Marks:1)** **Vu-Topper RM**

According to theory of automata there are___types of languages

A. One
B. Two
C. Three
D. Four

Question No:78 **(Marks:1)** **Vu-Topper RM**

Regular languages are closed under the following operations.

A. Union only
B. Concatenation, Closure only
C. Union, Concatenation and Closure

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Question No:79 **(Marks:1)** **Vu-Topper RM**

Regular languages are closed under the following operations.

A. Union only
B. Concatenation, Closure only
C. Union, Concatenation and Closure
D. Regular languages are not closed under any operation

Question No:80 **(Marks:1)** **Vu-Topper RM**

There can be more than____FA for a certain language but for_FAthere is only one language associated with it:

A. one, one
B. one, two
C. two, three
D. two, one

Question No:81 **(Marks:1)** **Vu-Topper RM**

There is one compulsion that each state must have an on outgoing edge for every input variable in:

A. Finite Automata
B. Transition Graph
C. Both Finite Automata and Transition Graph
D. Transition Table

Question No:82 **(Marks:1)** **Vu-Topper RM**

FA is also called

A. TG
B. GTG
C. NFA
D. DFA

Question No:83 **(Marks:1)** **Vu-Topper RM**

If r1 and r2 are regular expressions then (r1 * r2) is _____ .

A. FA
B. TG
C. GTG
D. RE

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Question No:84 **(Marks:1)** **Vu-Topper RM**

Keep in view the language of all strings ending with 'a' defined over Σ = {a, b, c, d}. For which input letter, we will take a loop on the final state of its transition diagram?

A. a
B. b
C. c
D. d

Question No:85 **(Marks:1)** **Vu-Topper RM**

Which of the following statements is true about NFA with Null String?

A. Infinite states
B. Infinite set of letters
C. Infinite set of transitions
D. Transition of null string is allowed at any stage

Question No:86 **(Marks:1)** **Vu-Topper RM**

Introducing new start state in case of multiple start states is the step no. of proving Kleene's theorem part ||.

A. 1
B. 2
C. 3
D. 4

Question No:87 **(Marks:1)** **Vu-Topper RM**

Which of the following diagrams expresses languages more simply?

A. FA
B. NFA
C. TG
D. GTG

Question No:88 **(Marks:1)** **Vu-Topper RM**

The language of all strings defined over alphabet set = {a, b} that does notend with 'a' actually ends with:

A. b
B. b and ^
C. ^

D. ^ and a

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Question No:89 **(Marks:1)** **Vu-Topper RM**

In NFA having no transition at certain state, FA can be built byintroducing:

A. Empty state
B. Combination of states
C. Initial state
D. Final state

Question No:90 **(Marks:1)** **Vu-Topper RM**

Formal is also known as

A. Syntactic language
B. Semantic language
C. Informal language
D. None of these

Question No:91 **(Marks:1)** **Vu-Topper RM**

There may be more than one transition for a certain letter on a state in:

A. Finite automata
B. Non-Deterministic Finite Automata
C. Transition Table
D. Moore Machine

Question No:92 **(Marks:1)** **Vu-Topper RM**

FA of EVEN language shows null string when

A. Initial state is final as well
B. EVEN does not accept null
C. One state is declared null
D. None of the these

Question No:93 **(Marks:1)** **Vu-Topper RM**

Which of the following statement is true about GTG?

A. Transitions are based on input letters
B. Transitions are based on specified substrings
C. Transitions are based on regular expressions
D. Transitions are based on alphabet set

Question No:94 **(Marks:1)** **Vu-Topper RM**

In GTG, there can be more than one:

A. Start state
B. Final state
C. Start state and final state
D. Null state

Question No:95 **(Marks:1)** **Vu-Topper RM**

GTG for the expression (aa+aba)* may have minimum number of states:

A. 1
B. 2
C. 3
D. 4

Question No:96 **(Marks:1)** **Vu-Topper RM**

In regular expressions, the operator '*' stands for

A. Concatenation
B. Iteration
C. Selection
D. Add

Question No:97 **(Marks:1)** **Vu-Topper RM**

If r1 is a regular expression then (r1)* is____.

A. A generalized transition graph
B. A non-deterministic finite automaton
C. A finite automaton
D. Also, a regular expression

Question No:98 **(Marks:1)** **Vu-Topper RM**

Which of the following is the bypass and state elimination step in thecontext of Kleene's theorem part || proof?

A. 1
B. 2
C. 3
D. 4

Question No:99 **(Marks:1)** **Vu-Topper RM**

Which of the following is free of non-determinism?

A. TG

B. FA
C. NFA
D. NFA-^

Question No:100 **(Marks:1)** **Vu-Topper RM**
Melay machine to increase the output string in magnitude by 1 is called:
A. Complementing machine
B. Incrementing machine
C. Decrementing machine
D. Converting machine

Question No:101 **(Marks:1)** **Vu-Topper RM**
A. Kleene's Theorem Part I expresses the relationship between_____.
B. FA and TG
C. TG and RE
D. RE and FA
E. FA and RE

Question No:102 **(Marks:1)** **Vu-Topper RM**
Suppose we have FA3 (which is equal to FA1 + FA2), then the final stateof FA3 will be declared final if:
A. It corresponds to final states of both FA1 and FA2
B. It corresponds to final states of FA1 only
C. It corresponds to final states of FA2 only
D. It corresponds to any of the final states in FA1 or FA2

Question No:103 **(Marks:1)** **Vu-Topper RM**
Null strings can be specified on edges in:
A. Finite Automata
B. Non-Deterministic Finite Automata
C. Transition Graph
D. Melay Machine

Question No:104 **(Marks:1)** **Vu-Topper RM**
What is false about the PALINDROME LANGUAGE?
A. Every word is reverse of itself.
B. It is an infinite language.
C. FA can be build for it.

D. None of the given option

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Question No:105 (Marks:1) Vu-Topper RM

While finding RE corresponding to TG, If TG has more than one startstate then

A. Introduce the new start state
B. Eliminate the old start state
C. Replace the old start stat with final state
D. Replace the old final state with new start state

Question No:106 (Marks:1) Vu-Topper RM

All possible combinations of strings of a language including null string is referred as:

A. Concatenation of a language with itself
B. Kleene star closure of a language
C. Multiplication of language with itself
D. Addition of a language with itself

Question No:107 (Marks:1) Vu-Topper RM

n! will be equal to:

A. n*n
B. n*(-n)!
C. n*(n-1)
D. n*(n-1)!

Question No:108 (Marks:1) Vu-Topper RM

While finding RE corresponding to a TG, we connect the new start statewith the old start state by__transition.

A. a
B. b
C. Null
D. RE

Question No:109 (Marks:1) Vu-Topper RM

In proving Kleene Theorem II, if three states are connected then middle state is removed by connecting first and third state and writing corresponding RE in:

A. Sum
B. Concatenation

C. Difference
D. Asterisk

Question No:110 **(Marks:1)** **Vu-Topper RM**
In___there must be transition for all the letters of a string.
A. NFA
B. GTG
C. TG
D. FA

Question No:111 **(Marks:1)** **Vu-Topper RM**
There is no question accepting any language in:
A. FA
B. TG
C. GTG
D. Moore machine

Question No:112 **(Marks:1)** **Vu-Topper RM**
The FA can be drawn for the regular expression (a+b)* with minimum state(s).
A. 1
B. 2
C. 3
D. 4

Question No:113 **(Marks:1)** **Vu-Topper RM**
Which of the following does not contribute while finding out the length of strings?
A. ^
B. a
C. b
D. a+b

Question No:114 **(Marks:1)** **Vu-Topper RM**
The language of all strings defined over alphabet set = {x, y} that endswith same letters will have the maximum length of:
A. 1
B. 2

C. 3

D. Infinite

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Question No:115 **(Marks:1)** **Vu-Topper RM**

Considering FA1 and FA2 states each. Now FA1+FA2 can have maximum _____number of states.

A. 2

B. 3

C. More than 3

D. None of the given option

Question No:116 **(Marks:1)** **Vu-Topper RM**

Which one of the following is the RE for the language defined over ∑= {a,b} having all the words starting with a?

A. (a + b)*

B. aa(a + b)+

C. a(a + b)*

D. a*(a + b)

Question No:117 **(Marks:1)** **Vu-Topper RM**

An__can be considered to be an intermediate structure between Finite automaton and Transition Graph.

A. RE

B. GTG

C. NFA

D. None of the given options

Question No:118 **(Marks:1)** **Vu-Topper RM**

Suppose a language L1 has 2 states and L2 has2 states. If we have a machine M that accepts L1 ∩ L2. Then, the total number of states in M isequal to

A. 2

B. 4

C. 6

D. 8

Question No:119 **(Marks:1)** **Vu-Topper RM**

FA corresponding to an NFA can be built by introducing an empty state fora letter having

A. No transition at certain state
B. One transition at certain state
C. Two transitions at certain state
D. More than two transitions at certain state

Question No:120 **(Marks:1)** **Vu-Topper RM**
Automata is the plural of___.
A. Automate
B. Automaton
C. Automation
D. Automatic

Question No:121 **(Marks:1)** **Vu-Topper RM**
In NFA having no transition at certain. FA can be built by introducing:
A. Empty state
B. Combination of states
C. Initial state
D. Final state

Question No:122 **(Marks:1)** **Vu-Topper RM**
If S = { x }, then S* will be _____.
A. {^,x,xxx,xxxx,xxxxx,…}
B. {^,x,xx,xxx,xxxx,…}
C. {^,x,xxx,xxxxx,xxxxxxx,…}
D. {^,xx,xxxx,xxxxxx,xxxxxxxx,…}

Question No:123 **(Marks:1)** **Vu-Topper RM**
In TG, the string is supposed to be _____ if there is no path for a string from initial to final state.
A. Accept null string
B. Accept all strings
C. Accept all non-empty strings
D. Does not accept any string

Question No:124 **(Marks:1)** **Vu-Topper RM**
In Moore machine, if the length of input string is 9, then the length of output string will be:
A. 7

B. 8
C. 9
D. 10

Question No:125 **(Marks:1)** **Vu-Topper RM**

When ODD language is expressed by an FA, then it will have minimum states.

A. One
B. Two
C. Three
D. Four

Question No:126 **(Marks:1)** **Vu-Topper RM**

[(a + b)(a + b)]*, given RE cannot generate the string __.

A. abbaabab
B. abbbaa
C. bbbbbb
D. abbbaaaaa

Question No:127 **(Marks:1)** **Vu-Topper RM**

The recursive method for defining a language has_steps.

A. One
B. Two
C. Three
D. Four

Question No:128 **(Marks:1)** **Vu-Topper RM**

Consider the following RE:
a(a + b)b*
All of the following words are accepted except___.

A. aab
B. abb
C. aa
D. aba

Question No:129 **(Marks:1)** **Vu-Topper RM**

For every three regular expressions R, S, T, the languages denoted byR(S ∪ T) and (RS) ∪ (RT) are the___.

A. Same

B. Different
C. R(S ∪ T) is greater
D. None of the given options

Question No: 130 (Marks:1) Vu-Topper RM

Alphabet S = {a, bc, cc} has_____number of letters.

One
Two
Three
Four

Question No:131 (Marks:1) Vu-Topper RM

Two FAs are said to be equivalent, if they

A. Accept null string
B. Accept same language
C. Accept different language
D. None of the given options

Question No:132 (Marks:1) Vu-Topper RM

_____can also help in proving Kleene Theorem III.

A. NFA
B. PDA
C. Moore machine
D. Melay machine

Question No:133 (Marks:1) Vu-Topper RM

Kleene's Theorem Part II expresses the relationship between _____.

A. FA and TG
B. TG and RE
C. RE and FA
D. FA and RE

Question No:134 (Marks:1) Vu-Topper RM

If two RE's generate same language then these RE's are called____.

A. Same RE
B. Equal RE
C. Similar RE
D. Equivalent RE

Question No:135 **(Marks:1)** **Vu-Topper RM**

Every FA should be__.

A. Deterministic

B. Non-deterministic

C. Deterministic and non-deterministic

D. Not depends on language

Question No:136 **(Marks:1)** **Vu-Topper RM**

What statement is true?

A. A letter is always a combination of symbols

B. A letter may consist of one symbol

C. There is no difference between symbol and letter

D. Letters and symbols are the same thing

Question No:137 **(Marks:1)** **Vu-Topper RM**

If ∑= {ab, bb}, then ∑* will not contain

A. abbbab

B. bbba

C. bbbbab

D. ababbb

Question No:138 **(Marks:1)** **Vu-Topper RM**

Choose the correct word produced by RE (a + b)* ab

A. abb

B. abab

C. bbbb

D. aaaa

Question No:139 **(Marks:1)** **Vu-Topper RM**

According to 1st part of the Kleene's theorem, If a language can beaccepted by an FA then it can be accepted by a_as well

A. FA

B. CFG

C. GTG

D. TG

Question No:140 **(Marks:1)** **Vu-Topper RM**

"One language can be expressed by___GTG".

A. Only one
B. Only two
C. More than one

Question No:141 **(Marks:1)** **Vu-Topper RM**

If a TG has more than one start states, then we can make a single startstate by introducing a new state and connecting it with all the previously existing start states by using.

A. Any infinite string
B. Single letter string
C. Null string
D. Any finite string

Question No:142 **(Marks:1)** **Vu-Topper RM**

If in a NFA, ^ is allowed to be a label of an edge then that NFA iscalled _____.

A. TG
B. RE
C. NFA with null string
D. RE

Question No:143 **(Marks:1)** **Vu-Topper RM**

If we want to make a Moore machine equivalent to mealy machinethen

A. We should ignore the extra character printed by the Moore machine.
B. We should ignore the extra character printed by the Mealy machine.
C. We will make the initial state as a no carry state.
D. We should not ignore the extra character printed by the Moore machine.

Question No:144 **(Marks:1)** **Vu-Topper RM**

Two machines are said to be equivalent if they print the output string when same input string is run no them.

A. Same
B. Different
C. Inverse
D. Null

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Question No:145 **(Marks:1)** **Vu-Topper RM**

The length of output in case of___is one more than the length of corresponding input string

A. Moore machine
B. Mealy machine
C. Incremental machine
D. Adding machine

Question No:146 **(Marks:1)** **Vu-Topper RM**

A is not a valid transition in

A. TG
B. GTG
C. NFA
D. RE

Question No:147 **(Marks:1)** **Vu-Topper RM**

Dead states are also called

A. John Davey Lockers
B. Davey John Lockers
C. Mutex Lockers
D. Semaphores

Question No:148 **(Marks:1)** **Vu-Topper RM**

Language of all strings whose length is odd and number of y's even defined over alphabet set ∑ = {x, y} .__will be accepted by the given language.

A. xxyxyxyyyx
B. xxyxyxyyyxy
C. xxyxyxyyyxx
D. xxyxyxyyy

Question No:149 **(Marks:1)** **Vu-Topper RM**

If an effectively solvable problem has answer in Yes or NO. then the solution is called

A. Infinite problem

B. Decision procedure
C. Finite solution
D. Optimal procedure

Question No:150 **(Marks:1)** **Vu-Topper RM**
If the intersection of two regular languages is regular then thecomplement of the intersection of these two languages is
A. Regular
B. Irregular
C. Irregular but finite
D. Irregular but infinite

Question No:151 **(Marks:1)** **Vu-Topper RM**
If R is regular language and Q is any language (regular/non-regular). Then Pref(_in___) is regular.
A. Q, Q
B. Q, R
C. R, Q
D. R, R

Question No:152 **(Marks:1)** **Vu-Topper RM**
The strings or words which do not belong to a language are called of that language
A. Intersection
B. Union
C. Complement
D. Quotient

Question No:153 **(Marks:1)** **Vu-Topper RM**
Prime is a_language.
A. Finite
B. Both context free and regular
C. Regular
D. Non-regular

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Question No:154 **(Marks:1)** **Vu-Topper RM**

Finite Automaton (FA) must have____number of states while alanguage has__words.

A. Infinite, finite
B. Finite, finite
C. Finite, infinite
D. Infinite, infinite

Question No:155 **(Marks:1)** **Vu-Topper RM**

The language "PRIME" is an example of___language.

A. Regular but finite
B. Regular
C. Non regular but finite
D. Non regular

Question No:156 **(Marks:1)** **Vu-Topper RM**

If L1 and L2 are regular languages then which statement is NOT true?

A. L1 + L2 is always regular
B. L1 L2 is always regular
C. L1/L2 is always regular
D. L1* is always regular

Question No:157 **(Marks:1)** **Vu-Topper RM**

If a language is regular it must generate____number of distinctclasses.

A. Finite
B. Infinite
C. Two
D. three

Question No:158 **(Marks:1)** **Vu-Topper RM**

The operators like (* . +) in the parse tree are considered as

A. Terminals
B. Non-terminals
C. Productions
D. Intermediates

Question No:159 **(Marks:1)** **Vu-Topper RM**

Set of all palindromes over {a,b} is:

A. Regular
B. Regular and finite
C. Regular and infinite
D. Non-regular

Question No:160 **(Marks:1)** **Vu-Topper RM**

Which one of the following languages is a non-regular language?

A. Even-even
B. Containing double a
C. Start and end with same letter
D. Palindrome

Question No:161 **(Marks:1)** **Vu-Topper RM**

The language of all strings partition ∑* into_class(es).

A. One
B. Two
C. Three
D. Four

Question No:162 **(Marks:1)** **Vu-Topper RM**

The language of all strings not beginning with 'b' partitions ∑* into distinct classes.

A. Two
B. Three
C. Four
D. Five

Question No:163 **(Marks:1)** **Vu-Topper RM**

The values of input (say a & b) do not remain same in one cycle dueto

A. NAND gate
B. Clock pulse
C. OR gate
D. NOT gate

Question No:164 **(Marks:1)** **Vu-Topper RM**

In a CFG, the non-terminals are denoted by

A. Small letters
B. Numbers
C. Capital letters
D. Small letters and numbers

Question No:165 **(Marks:1)** **Vu-Topper RM**

a* + b* = (a + b)* this expression is

A. True
B. False

Question No:166 **(Marks:1)** **Vu-Topper RM**

Length of EVEN-EVEN language is

A. Even
B. Odd
C. Sometimes even & sometimes odd
D. Such language doesn't exist

Question No:167 **(Marks:1)** **Vu-Topper RM**

While finding RE corresponding to TG, we connect the new start stateto the old start state by the transition labeled by

A. a
B. b
C. null
D. none of the given options

Question No:168 **(Marks:1)** **Vu-Topper RM**

Given S, Kleene star closure is denoted by

A. S*
B. S+
C. S-
D. None of these

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Question No:169 **(Marks:1)** **Vu-Topper RM**

Which of the following steps replaces multiple incoming transitionedges with a single one in proving Kleene's theorem part ||?

A. 1
B. 2
C. 3
D. 4

Question No:170 **(Marks:1)** **Vu-Topper RM**

If r1 = (aa + bb) and r2 = (a + b) then the language (aa + bb)(a + b)will be generated by

A. (r1)(r2)
B. (r1 + r2)
C. (r2)(r1)
D. (r1)*

Question No:171 **(Marks:1)** **Vu-Topper RM**

The language having even number of a's and even number of b's defined over S = {a, b} is called _____.

A. EVEN-EVEN
B. ODD-ODD
C. PALINDROME
D. FACTORIAL

Question No:172 **(Marks:1)** **Vu-Topper RM**

If L1' and L2' are regular languages. Then L1,L2 will be

A. Regular
B. Non regular
C. May be regular
D. None of the mentioned

Question No:173 **(Marks:1)** **Vu-Topper RM**

f FA1 corresponding to (a+b)* then FA1 must accept string/strings

A. No
B. Odd length
C. Even length
D. Every

Question No:174 (Marks:1) Vu-Topper RM

In FA, initial state can be represented by:

A. Drawing an arrow head before that state
B. Drawing a circle in that state
C. Drawing '+' sign in that state

Question No:175 (Marks:1) Vu-Topper RM

An FA is a collection of:

A. Finite states, finite transition and finite input letters
B. Infinite states, infinite transition and infinite input letters
C. Only finite states and finite transitions
D. Only infinite states and infinite transitions

Question No:176 (Marks:1) Vu-Topper RM

NFA with null string has initial state(s)

A. One
B. Two
C. Three

Question No:177 (Marks:1) Vu-Topper RM

The difference between number of states with regular expression (a +b) and (a + b)* is:

A. 0
B. 1
C. 2
D. 3

Question No:178 (Marks:1) Vu-Topper RM

A transition graph is converted into a(n)____in order to obtain regular expression.

A. FA
B. GTG
C. NFA
D. NFA

Question No:179 (Marks:1) Vu-Topper RM

Consider the languages L1 = and L2 = {a}. Which one of thefollowing represents L1 L2* ∪ L1*

A. ^
B. a*
C. All of the mentioned
D. None of the mentioned

Question No:180 (Marks:1) Vu-Topper RM

If S = {a, b} then which of the following RE will generate all possible strings?

A. a* + b*
B. (ab)*
C. (a + b)*
D. (ab + ba)*

Question No:181 (Marks:1) Vu-Topper RM

In drawing FA3 (which is equal to FA1 + FA2), a state will bedeclared final if

A. It corresponds to final states of both FA1 and FA2
B. It corresponds to final states of FA1
C. It corresponds to final states of FA2
D. It corresponds to any of the final states in FA1 or FA2

Let S = {a, bb, bab, baabb} be a set of strings, which one of the following will not be included in S*?

A. baba
B. baabbabb
C. bbaaabb
D. bbbaabaabb

Edges are expressed with a regular expression in:
GTG Page 23

Which one of the following word is not accepted by the given regular expression?
abbbbaa

The length of string "AbBAbcd" defined over Σ ={Ab,B,c,d} is _____.

A. One
B. Two
C. Five
D. Four

a(a+b)*b + b(a+b)*a is the regular expression of language defined over Σ={a,b} that is _____.
starting with a and ending in a

In case of finite automaton there _____ be a transition on each _____ for every letter of the alphabet set.

A. Must, state
B. May be, state
C. Often, edge
D. Must, edge

Which one of the following word is not accepted by the given regular expression?
(a+b)*(aaa+bbb)(a+b)*

A. Ababaaaab
B. Bababbbba
C. Baabaabba
D. Abbaaabba

Kleene Theorem III states that if the language can be expressed by RE then there exist -------- accepting the language.

A. FA **Page 32**
B. DFA
C. NFA
D. None

In proving Kleene Theorem II, if a state has two incoming transition edges labelled by RE from the same state, then replace all the edges with a single transition edge labelled by ------- of corresponding RE.

A. Sum **Page 27**
B. Edge
C. FA
D. RE

GTG for the expression (a+b)*bb may have minimum number of states:
Aaabcbbcbacc

Choose the correct word produced by RE (a + b)* (aa+bb).

A. Abab
B. Babab
C. aaaa
D. Ab

How many states of a finite automaton will be final for accepting the only string ‘abb’, if Σ= {a, b}?

A. 1
B. 2
C. 3
D. 4

Which one of the following is a correct word produced by the RE (a*b*)ab?
abab

FA and _____ are same except that _____ has unique symbol for each transition.

A. FA,TG

B. NFA,TG
C. NFA,FA
D. GTG,NFA

While developing NFA for the union of FA1 and FA2, if there is a loop of ‘a’ at the initial state of FA1 then the new initial state will have a transition for ‘a’ that goes straight to:
The initial state of FA1

Closure of an FA is the same as _____ of an FA with itself except that the initial state of the required FA is a final state as well.
A. Sum
B. Union
C. Intersection
D. Concatenation

How many new states are introduced while developing NFA for the closure of an FA?
A. 2
B. 4
C. 6
D. 8

In _____ there must be transitions for all the alphabets over which a language is defined.
A. FA
B. TG
C. NFA
D. GTG

Which of the following is not a step-in elimination of states procedure?
Unify single transitions to multi transitions that contains union of input

In Moore machine the output depends on
The state

Keeping in view the discussion by Martin, how many states are required to recognize the language of all strings of length 3 or more defined over ∑= {a,b}, with 'a' being the third letter from right?

A. 10
B. 12
C. 14
D. 16

Strings x,y,z belongs to Σ * such that xz ∈ L but yz ∉ L where L ⊆ Σ* are:

A. Undetermined
B. Distinguishable
C. Indistinguishable
D. Both distinguishable and indistinguishable

While developing NFA for the union of FA1 and FA2, there will be
The initial state of FA1

NFA corresponding to union of FAs is built by introducing a new start state and connect it to the states originally connected to the old start state with the --------- transitions as the old start state:
Same

If we have an NFA having 3 states, and we convert that NFA to an FA. The resultant FA will contains _____ states.

A. 1
B. 2
C. 3
D. 4

In NFA having multiple transitions at certain state, FA can be built by introducing:

A. Empty state
B. Combination of states
C. Initial state
D. Final state

CS-402 Theroy Of Automata Update MCQS For Quiz-2 File Solve By Vu Topper RM

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FA corresponding to an NFA can be built by introducing an empty state for a letter having

A. no transition at certain state
B. one transition at certain state
C. two transitions at certain state
D. more than two transitions at certain state

In order to make NFA for the union of FA1 and FA2, the final state/ states of:

A. both FAs should be linked
B. both FAs should be left intact
C. FA1 have a transition to the final state of FA2
D. FA2 have a transition to the final state of FA1

Suppose we have FA3 which is equal to the union of FA1 and FA2. Now the initial state of the FA3 will be equal to:

A. Only initial state of FA1
B. Final state of FA2
C. Only initial state of FA2
D. Initial state of FA1 or FA2 ok

Introducing new final state in case of multiple final states is the step no. _____ of proving Kleene's theorem part II.

A. 4
B. 1
C. 2
D. 3

In proving Kleene Theorem II, circuits are reduced into:

A. asterisk
B. difference
C. both difference and asterisk
D. sum

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Finite Automaton (FA) has:

A. Zero or more final states
B. Exactly one final state
C. Not more than two final states
D. Exactly two final states

The formal language is also known as _____.

A. Semantic language
B. Informal language
C. Syntactic language
D. Normal language

The language of all strings defined over alphabet set = {x, y} having triple x's or triple y's will have the minimum strings with length of:

A. 1
B. 3
C. 4
D. 2

If an alphabet has "2" number of letters, then total number of strings of length "3" will be _____.

A. 5
B. 9
C. 8
D. 6

GTG for the expression (a+b)*bb may have minimum number of states:

A. 3
B. 4
C. 2
D. 1

Vu Topper RM

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Consider the Regular Expression (RE) a (a + b)b*. Which one of the following is NOT accepted by the provided RE?

A. aa
B. aab
C. aba
D. abb

Which of the following is NOT true about the term alphabet?

A. It is usually denoted by Greek letter sigma
B. It can be an empty set
C. Strings are generated by concatenating its elements
D. It is a finite set of symbols

Which of the following is free of non-determinism?

A. FA
B. TG
C. NFA
D. NFA-^

The language of all strings defined over alphabet set = {a, b} containing 'bbb' will have the minimum string with length of:

A. 1
B. 2
C. 3
D. 4

The aa(a+b)*bb is the RE of the language defined over Σ={a,b}.The language must _____.

A. have at least two ab
B. have at least one aa and one bb
C. have at least one abbb
D. have at least one ba

Vu Topper RM

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Reverse of string "YxwzYz" defined over Σ ={w,x,Y,z} is _____.

A. zYzwxY
B. zYzxwY
C. zYwzxY
D. zYzwYx

If "r1" and "r2" are regular expressions, then which of the following is not a regular expression?

A. r1 + r2
B. r1*
C. r1 r2
D. r1 – r2

Which of the following string belongs to the language of the regular expression (aa*b)*?

A. baabab
B. aabaab
C. aaaaaa
D. abbbaa

FA of EVEN-EVEN language shows that it accepts the null string by declaring the _____ as a _____as well.

A. Initial state, final state
B. Initial sate, null state
C. Final state, initial state
D. Final state, null state

Let S = {a, bb, bab, baabb} be a set of strings, which one of the following will not be included in S*?

A. baba
B. bbbaabaabb
C. baabbabb
D. bbaaabb

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The language of all strings defined over alphabet set = {x, y} that ends with different letters will have the maximum length of:

A. 1
B. 2
C. infinite
D. 3

In an FA, when there is no path from the initial state to final state, then that FA_____.

A. accept all non empty strings
B. does not accept any string
C. accept all strings
D. accept null strings

If Σ= {a, b, c, d}. How many transitions will be there on each state of a finite automaton for any language defined over Σ?

A. 2
B. 4
C. 1
D. 3

Which of the following is the minimal number of states for a finite automaton accepting the language of all strings defined over any alphabet set?

A. 3
B. 4
C. 2
D. 1

How many states of a finite automaton will be final for accepting L = {^, b, bb, bbb}?

A. 3
B. 1

Vu Topper RM

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C. 4
D. 2

There is no compulsion that each state must have an on outgoing edge for every input variable in:
A. Transition Graph
B. Transition Table
C. Both Finite Automata and Transition Graph
D. Finite Automata

In TG, there can be more than one _____.
A. start state only
B. null state only
C. start state and final state
D. final state only

Substrings as input letters can be specified on edges in:
A. NFA
B. PDA
C. FA
D. TG

If we have the regular expression (a + b)*, then we can draw FA for the provided RE with minimum _____ number of state(s).
A. 2
B. 0
C. 1
D. 3

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Question No:1 **(Marks:1)** **Vu-Topper RM**

Σ={a,Aa,Abb}, then string aAaAbbAa has__length.

A. One
B. Two
C. Three
D. Four **Page 4**

Question No:2 **(Marks:1)** **Vu-Topper RM**

Languages generated by kleene star are always___.

A. Finite
B. Infinite **Page 7**
C. Sometimes finite & sometimes infinite
D. None of the these

Question No:3 **(Marks:1)** **Vu-Topper RM**

Let S = {aa, bb}, then S* will have the _____ string.

A. Λ **Page 7**
B. abba
C. aabbbaa
D. bbaab

Question No:4 **(Marks:1)** **Vu-Topper RM**

If r1 = (aa + bb) and r2 = (a + b) then the language (aa + bb)* will be generated by

A. (r1)(r2)
B. (r1 + r2)
C. (r2)*
D. (r1)* **Page 10**

Question No:5 **(Marks:1)** **Vu-Topper RM**

If a language can be expressed through FA, then it can also be expressed through TG.

A. True **Page 25**

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B. False

Question No:6 **(Marks:1)** **Vu-Topper RM**

If an alphabet has n number of letter, then number of strings of length m will be

A. n+m
B. (n)(m)
C. m^n
D. n^m Page 6

Question No:7 **(Marks:1)** **Vu-Topper RM**

In GTG, if a state has more than one incoming transitions from a state. Then all those incoming transitions can be reduced to one transition using sign

A. -
B. + Page 27
C. *
D. ( )

Question No:8 **(Marks:1)** **Vu-Topper RM**

Above given FA accepts___strings defined over Σ={a , b}

A. All Page 15
B. Some
C. All but not null
D. None of these

Question No:9 **(Marks:1)** **Vu-Topper RM**

One FA has 3 states and 2 letters in the alphabet. Then FA will have _____number of transitions in the diagram

A. 4
B. 5
C. 7
D. 6 Page 14

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Question No:10 **(Marks:1)** **Vu-Topper RM**

Every FA should be_____.

A. Deterministic **Page 25**

B. Non- Deterministic

C. Deterministic & Non- Deterministic

D. None of these

Question No:11 **(Marks:1)** **Vu-Topper RM**

Auto Meta mean

A. Manual work

B. Automatic work **Page 3**

C. Both

D. None of these

Question No:12 **(Marks:1)** **Vu-Topper RM**

NFA to FA will

A. Equal **Page 43**

B. Not equal

C. Not valid

D. None of given

Question No:13 **(Marks:1)** **Vu-Topper RM**

The length of output string in case of__is one more than the length of corresponding input string.

A. Finite Automaton **Page 55**

B. TG

C. GTG

D. NFA

Question No:14 **(Marks:1)** **Vu-Topper RM**

The_machine helps in building a machine that can perform the addition of binary numbers.

A. Incrementing **Page 60**

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B. Complementing
C. Decrementing
D. None of the given

Question No:15 **(Marks:1)** **Vu-Topper RM**

In proving Kleene Theorem II, if a state has two incoming transition edges labelled by RE from the same state, then replace all the edges with a single transition edge labelled by ------- of corresponding RE.

A. Sum **Page 27** **ok**
B. Edge
C. FA
D. RE

Question No:16 **(Marks:1)** **Vu-Topper RM**

Kleene Theorem III states that if the language can be expressed by RE then there exist -------- accepting the language.

A. FA **Page 32** **ok**
B. DFA
C. NFA
D. None

Question No:17 **(Marks:1)** **Vu-Topper RM**

If L1 and L2′ are regular languages, L1 ∩ (L2′ U L1′)’ will be

A. Regular **Page 10**
B. Ir-regular
C. Can’t be decided
D. Another Language which is not listed here

Question No:18 **(Marks:1)** **Vu-Topper RM**

A regular language can be:

A. irregular
B. infinite
C. non-deterministic

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D. **None of the given options**

Question No:19 **(Marks:1)** **Vu-Topper RM**

There _____ a language for which only FA can be built but not the RE.

A. is cannot be
B. is
C. may be ok
D. may not be

Question No:20 **(Marks:1)** **Vu-Topper RM**

For every three regular expressions R, S, and T, the languages denoted by R(S U T) and (RS) U (RT) are the _____ .

A. **Same**
B. Different
C. R(S U T) is Greater
D. None of the given options

Question No:21 **(Marks:1)** **Vu-Topper RM**

In _____ there must be transition for all the lettersof a string.

A. NFA
B. GTG
C. TG
D. FA

Question No:22 **(Marks:1)** **Vu-Topper RM**

We cannot construct an NFA for the language of _____ defined over alphabet set {a,b}.

A. Even
B. odd
C. Palindromes ok
D. Integers

Question No:23 **(Marks:1)** **Vu-Topper RM**

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Decomposing a string into its valid units is referred as:

A. Decomposing
B. Splitting
C. Tokenizing
D. Dividing

Question No:24 **(Marks:1)** **Vu-Topper RM**

Choose the correct word produced by RE (a + b)* (aa+bb).

A. Abab
B. Babab
C. aaaa
D. Ab

Question No:25 **(Marks:1)** **Vu-Topper RM**

Considering FA1 and FA2 having 2 states each. Now FA1+FA2 can have maximum _____ number of states.

A. 2
B. 3
C. more than 3 **ok**
D. None of these

Question No:26 **(Marks:1)** **Vu-Topper RM**

If R is a regular language and L is some language, and L U R is a _____, then L must be a _____.

A. Regular language
B. Finite Auto

Question No:27 **(Marks:1)** **Vu-Topper RM**

The minimum length of the strings(except null string) of a language that starts and ends in different letters will be:

A. 1 **ok**
B. 2
C. 3

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D. 4

Question No:28 **(Marks:1)** **Vu-Topper RM**

Consider we have languages L7 and L6. Which of the following represents their concatenation?

A. L7+L6 **ok**
B. L7/L6
C. L6L7
D. L7L6

Question No:29 **(Marks:1)** **Vu-Topper RM**

Let FA1 has x number of states and FA2 has y number of states. Now FA1+FA2 can have maximum _____ **number of states.**

A. x+y
B. x-y
C. x/y
D. None

Question No:30 **(Marks:1)** **Vu-Topper RM**

The language {a, ab, aba, bab} is _____ .

A. Irregular
B. Regular **ok**
C. Recursive
D. infinite

Question No:31 **(Marks:1)** **Vu-Topper RM**

If we have a finite language and the number of states in the FA is n then the maximum number of letters in the each word of the language that will be accepted by the given FA will be:

A. N
B. n-1
C. n+1
D. 1

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Question No:32 **(Marks:1)** **Vu-Topper RM**

Moore machine can have -------- final states.

A. 2
B. 4
C. 6
D. 8

Question No:33 **(Marks:1)** **Vu-Topper RM**

There _____ be dead states in NFA.

A. may not
B. must
C. should not
D. will

Question No:34 **(Marks:1)** **Vu-Topper RM**

Let L be the language of all strings, defined over ∑ = {0,1}, ending in 10. Which of the following strings are distinguishable with respect to L with z being 0?

A. 010, 101
B. 111, 101
C. 001, 101
D. 111, 111

Question No:35 **(Marks:1)** **Vu-Topper RM**

There _____ be a unique path for each valid string (called a word) in NFA.

A. May not
B. Must
C. Should not
D. Will

Question No:36 **(Marks:1)** **Vu-Topper RM**

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If we have only one state, having no transition for input letters, then it is an example of:

A. RE
B. FA
C. TG
D. NFA

Question No:37 (Marks:1) Vu-Topper RM

Strings x,y,z belongs to Σ^* such that $xz \in L$ but $yz \notin L$ where $L \subseteq \Sigma^*$ are:

A. Undetermined
B. Distinguishable
C. Indistinguishable
D. Both distinguishable and indistinguishable

Question No:38 (Marks:1) Vu-Topper RM

A _____ with "n" states must accept at least one string of length greater than "n".

A. DFA ok
B. RE
C. Irregular language
D. Irrelevant language

Question No:39 (Marks:1) Vu-Topper RM

In Moore machine, output is produced over the change of:

A. Transitions
B. Transitions and states
C. None of the mentioned
D. States

Question No:40 (Marks:1) Vu-Topper RM

Keeping in view the discussion by Martin, how many states are required to recognize the language of all strings of length 3 or more defined over

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∑= {a,b}, with ‘a’ being the third letter from right?

A. 10
B. 12
C. 14
D. 16

Question No:41 (Marks:1) Vu-Topper RM

Every _____ can be considered to be _____ as well, but the converse may not be true.

A. TG, FA
B. GTG
C. PDA
D. FA, TG Page 19 ok

Question No:42 (Marks:1) Vu-Topper RM

In the context of make NFA for the concatenation of FA1 and FA2 (FA1 accepting null string), which of the following option is correct?

A. Final states in both FAs ok
B. Initial states in both FAs
C. FA2 having initial state only
D. FA2 having final state only

Question No:43 (Marks:1) Vu-Topper RM

In order to make NFA for the union of FA1 and FA2, the new initial state should be linked to:

A. Initial states of both FAs ok
B. Initial and final states of FA1 and FA2 respectively
C. Initial state of FA1 only
D. Final and initial states of FA1 and FA2 respectively

Question No:44 (Marks:1) Vu-Topper RM

Keeping in view the discussion by Martin, how many states are required to recognize the language of all strings of length 2 or more defined over

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∑= {a,b}, with ‘b’ being the second letter from right?

A. 9
B. 6
C. 7
D. 8

Question No:45 **(Marks:1)** **Vu-Topper RM**

If we have an NFA having 3 states, and we convert that NFA to an FA. The resultant FA will contains _____ states.

A. 1
B. 2 **ok**
C. 3
D. 4

Question No:46 **(Marks:1)** **Vu-Topper RM**

Let FA3 be an FA corresponding to FA1FA2, then initial state of FA3 must correspond to the initial state of

A. FA1 only
B. FA2 only
C. FA1 and FA2
D. FA1 or FA2

Question No:47 **(Marks:1)** **Vu-Topper RM**

In which of the following machine, the length of output string is the same to that of input string?

A. Mealy machine
B. Moore machine
C. Finite automaton with output
D. Non-deterministic finite automaton

Question No:48 **(Marks:1)** **Vu-Topper RM**

Moore Machine is an application of:

A. None of the mentioned

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B. Finite automata with output
C. Finite automata without input **Google**
D. Non- Finite automata with output

Question No:49 **(Marks:1)** **Vu-Topper RM**
In NFA having multiple transitions at certain state, FA can be built by introducing:
A. Empty state **ok**
B. Combination of states
C. Initial state
D. Final state

Question No:50 **(Marks:1)** **Vu-Topper RM**
In Mealy machine the output depends on _____
A. Present state and Present input
B. Only present state
C. Nothing
D. Type of input

Question No:51 **(Marks:1)** **Vu-Topper RM**
If L is a regular language, then (L')' U L will be:
A. L
B. C
C. P
D. F

Question No:52 **(Marks:1)** **Vu-Topper RM**
A string will be accepted by an NFA if there exists _____ one successful path.
A. Atleast **ok**
B. Atmost
C. Maximum
D. None of the given options

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Question No:53 **(Marks:1)** **Vu-Topper RM**

If A and B are regular languages, !(A' U B') is:

A. Non regular
B. May be regular
C. None of the mentioned
D. Regular

Question No:54 **(Marks:1)** **Vu-Topper RM**

There is no question of accepting any language in:

A. Moore machine
B. FA
C. TG
D. GTG

Question No:55 **(Marks:1)** **Vu-Topper RM**

In _____ there must be transitions for all the alphabets over which a language is defined.

A. FA **ok**
B. TG
C. NFA
D. GTG

Question No:56 **(Marks:1)** **Vu-Topper RM**

Let FA3 be an FA corresponding to FA1FA2, then final state of FA3 must correspond to the final state of

A. FA2 only
B. FA1 only
C. FA1 or FA2
D. FA1 and FA2

Question No:57 **(Marks:1)** **Vu-Topper RM**

How many new states are introduced while developing NFA for the

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closure of an FA?

A. 2 ok

B. 4

C. 6

D. 8

Question No:58 (Marks:1) Vu-Topper RM

Subtraction of binary numbers is possible through:

A. Both complementing and incrementing machine

B. Complementing machine

C. Incrementing machine

D. Converting machine

Question No:59 (Marks:1) Vu-Topper RM

For a given Moore Machine, the input string is '101010', thus the output string would be of length:

A. Length of input string + 1

B. Length of input string – 1

C. Length of input string + 2

D. Length of input string -2

Question No:60 (Marks:1) Vu-Topper RM

Which one of the following machine is represented as a pictorial representation with states and directed edges labeled by an input letter along with an output character?

A. Mealy machine

B. Moore machine

C. Finite state machine

D. Deterministic finite state machine

Question No:61 (Marks:1) Vu-Topper RM

If FA1 corresponds to (a+b)* then FA1 must accept _____ string/strings.

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A. No
B. Odd length
C. Even length
D. Every

Question No:62 (Marks:1) Vu-Topper RM
Closure of an FA is the same as _____ of an FA with itself except that the initial state of the required FA is a final state as well.
A. Sum
B. Union
C. Intersection
D. Concatenation ok

Question No:63 (Marks:1) Vu-Topper RM
Given the language L = {ab, aa, baa}, which of the following strings are inL*?
abaabaaabaa
aaaabaaaa
baaaaabaaaab
baaaaabaa
A. 1, 2 and 3
B. 2, 3 and 4
C. 1, 2 and 4 ok
D. 1, 3 and 4

Question No:64 (Marks:1) Vu-Topper RM
FA and _____ are same except that _____ has unique symbol for each transition.
A. FA,TG
B. NFA,TG
C. NFA,FA ok
D. GTG,NFA

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Question No:65 **(Marks:1)** **Vu-Topper RM**

How many states of a finite automaton will be final for accepting the only string 'abb', if Σ= {a, b}?

A. 1
B. 2
C. 3
D. 4

Question No:66 **(Marks:1)** **Vu-Topper RM**

Two machines are said to be equivalent if they print the_output string when the__input string is run on them.

A. Same, Same
B. Same, different
C. Different, same
D. Unique, different

Question No:67 **(Marks:1)** **Vu-Topper RM**

Every NFA can be considered to be a -------- as well, but the converse may not be true.

A. TG
B. FA
C. GTG
D. PDA

Question No:68 **(Marks:1)** **Vu-Topper RM**

In which of the following machine, the length of output string is 1 more than that of input string?

A. Mealy machine
B. Non-deterministic finite automaton
C. Finite automaton with output
D. Moore machine

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Question No:69 **(Marks:1)** **Vu-Topper RM**

If S = {aa, bb} then S* will not contain _____.

A. abbbab

B. bbba

C. bbbbab

D. ababbb

Question No:70 **(Marks:1)** **Vu-Topper RM**

Which of the following machine has only one initial state and no final state?

A. Moore machine

B. Finite state machine

C. Deterministic finite state machine

Question No:71 **(Marks:1)** **Vu-Topper RM**

Which of the following diagram is very rigid in order to express any language?

A. TG

B. NFA

C. GTG

D. FA

Question No:72 **(Marks:1)** **Vu-Topper RM**

If S = {a}, then S+ will be _____.

A. {a, aaa, aaaa, aaaaa,…}

B. {a, aa, aaa, aaaa,…}

C. {a, aaa, aaaaa, aaaaaaa,…}

D. {aa, aaaa, aaaaaa, aaaaaaaa,…}

Question No:73 **(Marks:1)** **Vu-Topper RM**

Let L be the language of all strings. defined over ∑ = {0,1}. ending in 111. Melay machine can have final states.

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A. Zero
B. One
C. More than one but finite
D. More than one but infinite

Question No:74 **(Marks:1)** **Vu-Topper RM**
Let's we have two regular expressions R1=(xx+yy) and R2=(x+ y). Which one of the following is the correct regular expression for the Union of R1 and R2?
A. (xx+yy)(x+y)
B. (xx+yy)+(x+y)*
C. (xx+yy)+(x+y)
D. ((xx+yy)+(x+y))*

Question No:75 **(Marks:1)** **Vu-Topper RM**
The state where there is no way to leave after entry, is called _____.
A. Davey John locker
B. initial state
C. final state
D. non-final state

Question No:76 **(Marks:1)** **Vu-Topper RM**
Which one of the following word is not accepted by the given regular expression?
A. aaabab
B. aaaababb
C. abbaab
D. aabbabb

Question No:77 **(Marks:1)** **Vu-Topper RM**
According to theory of automata there are _____ types of languages.
A. One

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B. Two
C. Three
D. Four

Question No:78 **(Marks:1)** **Vu-Topper RM**
Question No:79 **(Marks:1)** **Vu-Topper RM**
Regular languages are closed under the following operations.
A. Union only
B. Concatenation, Closure only
C. Union, Concatenation and Closure ok
D. Regular languages are not closed under any operation

Question No:80 **(Marks:1)** **Vu-Topper RM**
There can be more than _____ FA for a certain language but for _____ FA there is only one language associated with it.
A. one, one
B. one, two
C. two, three
D. two, one

Question No:81 **(Marks:1)** **Vu-Topper RM**
There is one compulsion that each state must have an on outgoing edge forevery input variable in:
A. Finite Automata
B. Transition Graph
C. Both Finite Automata and Transition Graph
D. Transition Table

Question No:82 **(Marks:1)** **Vu-Topper RM**
FA is also called
A. TG
B. GTG
C. NFA

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D. DFA

Question No:83 **(Marks:1)** **Vu-Topper RM**

If r1 and r2 are regular expressions then (r1 * r2) is _____ .

A. FA
B. TG
C. GTG
D. RE ok

Question No:84 **(Marks:1)** **Vu-Topper RM**

Keep in view the language of all strings ending with 'a' defined over Σ = {a, b, c, d}. For which input letter, we will take a loop on the final state of its transition diagram?

A. a
B. b
C. c
D. d

Question No:85 **(Marks:1)** **Vu-Topper RM**

Which of the following statements is true about NFA with Null String?

A. Infinite states
B. Infinite set of letters
C. Infinite set of transitions
D. Transition of null string is allowed at any stage ok

Question No:86 **(Marks:1)** **Vu-Topper RM**

Introducing new start state in case of multiple start states is the step no. _____ of proving Kleene's theorem part II.

A. 1 ok
B. 2
C. 3
D. 4

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Question No:87 **(Marks:1)** **Vu-Topper RM**

Which of the following diagrams expresses languages more simply?

A. FA
B. NFA
C. TG
D. GTG

Question No:88 **(Marks:1)** **Vu-Topper RM**

The language of all strings defined over alphabet set = {a, b} that does not end with 'a' actually ends with:

A. b
B. b and ^
C. ^
D. ^ and a

Question No:89 **(Marks:1)** **Vu-Topper RM**

In NFA having no transition at certain state, FA can be built by introducing:

A. Empty state ok
B. Combination of states
C. Initial state
D. Final state

Question No:90 **(Marks:1)** **Vu-Topper RM**

Formal is also known as

A. Syntactic language
B. Semantic language
C. Informal language
D. None of these

Question No:91 **(Marks:1)** **Vu-Topper RM**

There may be more than one transition for a certain letter on a state in:

A. Finite automata

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B. Non-Deterministic Finite Automata ok
C. Transition Table
D. Moore Machine

Question No:92 (Marks:1) Vu-Topper RM
FA of EVEN language shows null string when
A. Initial state is final as well
B. EVEN does not accept null
C. One state is declared null
D. None of the these

Question No:93 (Marks:1) Vu-Topper RM
Which of the following statement is true about GTG?
A. Transitions are based on input letters
B. Transitions are based on specified substrings
C. Transitions are based on regular expressions
D. Transitions are based on alphabet set

Question No:94 (Marks:1) Vu-Topper RM
In GTG, there can be more than one:
A. Start state
B. Final state
C. Start state and final state
D. Null state

Question No:95 (Marks:1) Vu-Topper RM
GTG for the expression (aa+aba)* may have minimum number of states:
A. 1
B. 2
C. 3
D. 4

Question No:96 (Marks:1) Vu-Topper RM

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In regular expressions, the operator '*' stands for

A. Concatenation ok

B. Iteration

C. Selection

D. Add

Question No:97 (Marks:1) Vu-Topper RM

If r1 is a regular expression then (r1)* is____.

A. A generalized transition graph

B. A non-deterministic finite automaton

C. A finite automaton

D. Also, a regular expression

Question No:98 (Marks:1) Vu-Topper RM

Which of the following is the bypass and state elimination step in the context of Kleene's theorem part II proof?

A. 1

B. 2

C. 3

D. 4 ok

Question No:99 (Marks:1) Vu-Topper RM

Kleene's theorem states that

A. All representations of a regular language are equivalent. ok

B. Finite Automata are less powerful than Pushdown Automata.

C. All representations of a context free language are equivalent.

D. All representations of a recursive language are equivalent

Question No:100 (Marks:1) Vu-Topper RM

Melay machine to increase the output string in magnitude by 1 is called:

A. Complementing machine

B. Incrementing machine

C. Decrementing machine

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D. Converting machine

Question No:101 **(Marks:1)** **Vu-Topper RM**

Kleene's Theorem Part I expresses the relationship between_____.

A. FA and TG
B. TG and RE
C. RE and FA
D. FA and RE

Question No:102 **(Marks:1)** **Vu-Topper RM**

Suppose we have FA3 (which is equal to FA1 + FA2), then the final state of FA3 will be declared final if:

A. It corresponds to final states of both FA1 and FA2
B. It corresponds to final states of FA1 only
C. It corresponds to final states of FA2 only
D. It corresponds to any of the final states in FA1 or FA2

Question No:103 **(Marks:1)** **Vu-Topper RM**

Null strings can be specified on edges in:

A. Finite Automata
B. Non-Deterministic Finite Automata
C. Transition Graph
D. Melay Machine

Question No:104 **(Marks:1)** **Vu-Topper RM**

What is false about the PALINDROME LANGUAGE?

A. Every word is reverse of itself.
B. It is an infinite language.
C. FA can be build for it.
D. None of the given option

Question No:105 **(Marks:1)** **Vu-Topper RM**

While finding RE corresponding to TG, If TG has more than one startstate

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then

A. Introduce the new start state ok

B. Eliminate the old start state

C. Replace the old start stat with final state

D. Replace the old final state with new start state

Question No:106 (Marks:1) Vu-Topper RM

All possible combinations of strings of a language including null string is referred as:

A. Concatenation of a language with itself

B. Kleene star closure of a language ok

C. Multiplication of language with itself

D. Addition of a language with itself

Question No:107 (Marks:1) Vu-Topper RM

n! will be equal to:

A. n*n

B. n*(-n)!

C. n*(n-1)

D. n*(n-1)!

Question No:108 (Marks:1) Vu-Topper RM

While finding RE corresponding to a TG, we connect the new start state with the old start state by _____ transition.

A. a

B. b

C. Null ok

D. RE

Question No:109 (Marks:1) Vu-Topper RM

In proving Kleene Theorem II, if three states are connected then middle state is removed by connecting first and third state and writing corresponding RE in:

A. Sum

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B. Concatenation **ok**
C. Difference
D. Asterisk

Question No:110 **(Marks:1)** **Vu-Topper RM**
In___there must be transition for all the letters of a string.
A. NFA
B. GTG
C. TG
D. FA

Question No:111 **(Marks:1)** **Vu-Topper RM**
There is no question accepting any language in:
A. FA
B. TG
C. GTG
D. Moore machine

Question No:112 **(Marks:1)** **Vu-Topper RM**
The FA can be drawn for the regular expression (a+b)* with minimum state(s).
A. 1
B. 2
C. 3
D. 4

Question No:113 **(Marks:1)** **Vu-Topper RM**
Which of the following does not contribute while finding out the length of strings?
A. ^
B. a
C. b
D. a+b

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Question No:114 **(Marks:1)** **Vu-Topper RM**

The language of all strings defined over alphabet set = {x, y} that ends with same letters will have the maximum length of:

A. 1
B. 2
C. 3
D. Infinite

Question No:115 **(Marks:1)** **Vu-Topper RM**

Considering FA1 and FA2 states each. Now FA1+FA2 can have maximum_number of states.

A. 2
B. 3
C. More than 3
D. None of the given option

Question No:116 **(Marks:1)** **Vu-Topper RM**

Which one of the following is the RE for the language defined over Σ= {a, b} having all the words starting with a?

A. (a + b)*
B. aa(a + b)+
C. a(a + b)*
D. a*(a + b)

Question No:117 **(Marks:1)** **Vu-Topper RM**

An _____ can be considered to be an intermediate structure between Finite automaton and Transition Graph.

A. RE
B. GTG
C. NFA ok
D. None of the given options

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Question No:118 **(Marks:1)** **Vu-Topper RM**

Suppose a language L1 has 2 states and L2 has 2 states. If we have a machine M that accepts L1 ∩ L2. Then, the total number of states in M is equal to _____.

A. 2
B. 4
C. 6
D. 8

Question No:119 **(Marks:1)** **Vu-Topper RM**

FA corresponding to an NFA can be built by introducing a state corresponding to the combination of states, for a letter having

A. No transition at certain state **ok**
B. One transition at certain state
C. Two transitions at certain state
D. More than two transitions at certain state

Question No:120 **(Marks:1)** **Vu-Topper RM**

Automata is the plural of _____.

A. Automate
B. Automaton
C. Automation
D. Automatic

Question No:121 **(Marks:1)** **Vu-Topper RM**

In NFA having no transition at certain. FA can be built by introducing:

A. Empty state
B. Combination of states
C. Initial state
D. Final state

Question No:122 **(Marks:1)** **Vu-Topper RM**

If S = { x }, then S* will be _____.

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A. {^,x,xxx,xxxx,xxxxx,…}
B. {^,x,xx,xxx,xxxx,…}
C. {^,x,xxx,xxxxx,xxxxxxx,…}
D. {^,xx,xxxx,xxxxxx,xxxxxxxx,…}

Question No:123 **(Marks:1)** **Vu-Topper RM**
In TG, the string is supposed to be _____ if there is no path for a string from initial to final state.
A. Accept null string
B. Accept all strings
C. Accept all non-empty strings
D. Does not accept any string

Question No:124 **(Marks:1)** **Vu-Topper RM**
In Moore machine, if the length of input string is 9, then the length of output string will be:
A. 7
B. 8
C. 9
D. 10

Question No:125 **(Marks:1)** **Vu-Topper RM**
When ODD language is expressed by an FA, then it will have minimum _____ states.
A. One
B. Two
C. Three
D. Four

Question No:126 **(Marks:1)** **Vu-Topper RM**
[(a + b)(a + b)]*, given RE cannot generate the string _____.
A. abbaabab
B. abbbaa

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C. bbbbbb
D. abbbaaaaa

Question No:127 **(Marks:1)** **Vu-Topper RM**
The recursive method for defining a language has _____ steps.
A. One
B. Two
C. Three
D. Four

Question No:128 **(Marks:1)** **Vu-Topper RM**
Consider the following RE:
a(a + b)b*
All of the following words are accepted except___.
A. aab
B. abb
C. aa
D. aba

Question No:129 **(Marks:1)** **Vu-Topper RM**
For every three regular expressions R, S, T, the languages denoted by R(S U T) and (RS) U (RT) are the___.
A. Same
B. Different
C. R(S U T) is greater
D. None of the given options

Question No:130 **(Marks:1)** **Vu-Topper RM**
Alphabet S = {a, bc, cc} has____number of letters.
A. One
B. Two
C. Three
D. Four

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Question No:131 **(Marks:1)** **Vu-Topper RM**

Two FAs are said to be equivalent, if they _____.

A. Accept null string
B. Accept same language
C. Accept different language
D. None of the given options

Question No:132 **(Marks:1)** **Vu-Topper RM**

---------- can also help in proving Kleene Theorem III.

A. NFA ok
B. PDA
C. Moore machine
D. Melay machine

Question No:133 **(Marks:1)** **Vu-Topper RM**

Kleene's Theorem Part II expresses the relationship between _____.

A. FA and TG
B. TG and RE
C. RE and FA
D. FA and RE

Question No:134 **(Marks:1)** **Vu-Topper RM**

If two RE's generate same language then these RE's are called _____.

A. Same RE
B. Equal RE
C. Similar RE
D. Equivalent RE

Question No:135 **(Marks:1)** **Vu-Topper RM**

Every FA should be__.

A. Deterministic

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B. Non-deterministic
C. Deterministic and non-deterministic
D. Not depends on language

Question No:136 (Marks:1) Vu-Topper RM
What statement is true?
A. A letter is always a combination of symbols
B. A letter may consist of one symbol
C. There is no difference between symbol and letter
D. Letters and symbols are the same thing

Question No:137 (Marks:1) Vu-Topper RM
If ∑= {ab, bb}, then ∑* will not contain
A. abbbab
B. bbba
C. bbbbab
D. ababbb

Question No:138 (Marks:1) Vu-Topper RM
Choose the correct word produced by RE (a + b)*ab.
A. abb
B. abab
C. bbbb
D. aaaa

Question No:139 (Marks:1) Vu-Topper RM
According to 1st part of the Kleene's theorem, If a language can be accepted by an FA then it can be accepted by a___as well
A. FA
B. CFG
C. GTG
D. TG

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Question No:140 **(Marks:1)** **Vu-Topper RM**

"One language can be expressed by___GTG".

A. Only one
B. Only two
C. **More than one**

Question No:141 **(Marks:1)** **Vu-Topper RM**

If a TG has more than one start states, then we can make a single startstate by introducing a new state and connecting it with all the previously existing start states by using.

A. Any infinite string
B. Single letter string
C. **Null string**
D. Any finite string

Question No:142 **(Marks:1)** **Vu-Topper RM**

If in a NFA, ^ is allowed to be a label of an edge then that NFA iscalled _____.

A. TG
B. RE
C. **NFA with null string**
D. RE

Question No:143 **(Marks:1)** **Vu-Topper RM**

If we want to make a Moore machine equivalent to mealy machinethen

A. **We should ignore the extra character printed by the Moore machine.**
B. We should ignore the extra character printed by the Mealy machine.
C. We will make the initial state as a no carry state.
D. We should not ignore the extra character printed by the Moore machine.

Question No:144 **(Marks:1)** **Vu-Topper RM**

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Two machines are said to be equivalent if they print the output string when same input string is run no them.

A. Same
B. Different
C. Inverse
D. Null

Question No:145 **(Marks:1)** **Vu-Topper RM**

The length of output in case of___is one more than the length of corresponding input string

A. Moore machine
B. Mealy machine
C. Incremental machine
D. Adding machine

Question No:146 **(Marks:1)** **Vu-Topper RM**

A is not a valid transition in

A. TG
B. GTG
C. NFA
D. RE

Question No:147 **(Marks:1)** **Vu-Topper RM**

Dead states are also called

A. John Davey Lockers
B. Davey John Lockers
C. Mutex Lockers
D. Semaphores

Question No:148 **(Marks:1)** **Vu-Topper RM**

Language of all strings whose length is odd and number of y's even defined over alphabet set ∑ = {x, y} .__will be accepted by the given

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language.

A. xxyxyxyyyx
B. xxyxyxyyyxy
C. xxyxyxyyyxx
D. xxyxyxyyy

Question No:149 (Marks:1) Vu-Topper RM

If an effectively solvable problem has answer in Yes or NO. then the solution is called

A. Infinite problem
B. Decision procedure
C. Finite solution
D. Optimal procedure

Question No:150 (Marks:1) Vu-Topper RM

If the intersection of two regular languages is regular then thecomplement of the intersection of these two languages is

A. Regular
B. Irregular
C. Irregular but finite
D. Irregular but infinite

Question No:151 (Marks:1) Vu-Topper RM

If R is regular language and Q is any language (regular/non-regular). Then Pref(_in___) is regular.

A. Q, Q
B. Q, R
C. R, Q
D. R, R

Question No:152 (Marks:1) Vu-Topper RM

The strings or words which do not belong to a language are called of that language

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A. Intersection
B. Union
C. Complement
D. Quotient

Question No:153 (Marks:1) Vu-Topper RM
Prime is a_language.
A. Finite
B. Both context free and regular
C. Regular
D. Non-regular

Question No:154 (Marks:1) Vu-Topper RM
Finite Automaton (FA) must have____number of states while alanguage has__words.
A. Infinite, finite
B. Finite, finite
C. Finite, infinite
D. Infinite, infinite

Question No:155 (Marks:1) Vu-Topper RM
The language "PRIME" is an example of___language.
A. Regular but finite
B. Regular
C. Non regular but finite
D. Non regular Page 75

Question No:156 (Marks:1) Vu-Topper RM
If L1 and L2 are regular languages then which statement is NOT true?
A. L1 + L2 is always regular
B. L1 L2 is always regular
C. L1/L2 is always regular
D. L1* is always regular

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Question No:157 **(Marks:1)** **Vu-Topper RM**

If a language is regular it must generate_____number of distinctclasses.

A. Finite
B. Infinite
C. Two
D. three

Question No:158 **(Marks:1)** **Vu-Topper RM**

The operators like (* . +) in the parse tree are considered as

A. Terminals
B. Non-terminals
C. Productions
D. Intermediates

Question No:159 **(Marks:1)** **Vu-Topper RM**

Set of all palindromes over {a,b} is:

A. Regular
B. Regular and finite
C. Regular and infinite
D. Non-regular

Question No:160 **(Marks:1)** **Vu-Topper RM**

Which one of the following languages is a non-regular language?

A. Even-even
B. Containing double a
C. Start and end with same letter
D. Palindrome

Question No:161 **(Marks:1)** **Vu-Topper RM**

The language of all strings partition ∑* into_class(es).

A. One

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B. Two
C. Three
D. Four

Question No:162 **(Marks:1)** **Vu-Topper RM**
The language of all strings not beginning with ‘b’ partitions ∑* into distinct classes.
A. Two
B. Three
C. Four
D. Five

Question No:163 **(Marks:1)** **Vu-Topper RM**
The values of input (say a & b) do not remain same in one cycle dueto
A. NAND gate
B. Clock pulse
C. OR gate
D. NOT gate

Question No:164 **(Marks:1)** **Vu-Topper RM**
In a CFG, the non-terminals are denoted by
A. Small letters
B. Numbers
C. Capital letters
D. Small letters and numbers

Question No:165 **(Marks:1)** **Vu-Topper RM**
a* + b* = (a + b)* this expression is
A. True
B. False

Question No:166 **(Marks:1)** **Vu-Topper RM**
Length of EVEN-EVEN language is always_____.
A. Even

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B. Odd
C. Sometimes even & sometimes odd
D. Such language doesn't exist

Question No:167 (Marks:1) Vu-Topper RM
While finding RE corresponding to TG, we connect the new start stateto the old start state by the transition labeled by
A. a
B. b
C. null
D. none of the given options

Question No:168 (Marks:1) Vu-Topper RM
Given S, Kleene star closure is denoted by
A. S*
B. S+
C. S-
D. None of these

Question No:169 (Marks:1) Vu-Topper RM
Which of the following steps replaces multiple incoming transitionedges with a single one in proving Kleene's theorem part ||?
A. 1
B. 2
C. 3
D. 4

Question No:170 (Marks:1) Vu-Topper RM
If r1 = (aa + bb) and r2 = (a + b) then the language (aa + bb)(a + b) will be generated by _____.
A. (r1)(r2)
B. (r1 + r2)
C. (r2)(r1)

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D. (r1)*

Question No:171 **(Marks:1)** **Vu-Topper RM**

The language having even number of a's and even number of b's defined over S = {a, b} is called _____.

A. EVEN-EVEN
B. ODD-ODD
C. PALINDROME
D. FACTORIAL

Question No:172 **(Marks:1)** **Vu-Topper RM**

If L1' and L2' are regular languages. Then L1,L2 will be

A. Regular
B. Non regular
C. May be regular
D. None of the mentioned

Question No:173 **(Marks:1)** **Vu-Topper RM**

f FA1 corresponding to (a+b)* then FA1 must accept string/strings

A. No
B. Odd length
C. Even length
D. Every

Question No:174 **(Marks:1)** **Vu-Topper RM**

In FA, initial state can be represented by:

A. Drawing an arrow head before that state
B. Drawing a circle in that state
C. leave the state empty
D. Drawing '+' sign in that state

Question No:175 **(Marks:1)** **Vu-Topper RM**

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An FA is a collection of:

A. Finite states, finite transition and finite input letters
B. Infinite states, infinite transition and infinite input letters
C. Only finite states and finite transitions
D. Only infinite states and infinite transitions

Question No:176 **(Marks:1)** **Vu-Topper RM**

NFA with null string has ---------- initial state(s).

A. One ok
B. Two
C. Four
D. Three

Question No:177 **(Marks:1)** **Vu-Topper RM**

The difference between number of states with regular expression (a +b) and (a + b)* is:

A. 0
B. 1
C. 2
D. 3

Question No:178 **(Marks:1)** **Vu-Topper RM**

A transition graph is converted into a(n)____in order to obtain regular expression.

A. FA
B. GTG
C. NFA
D. NFA

Question No:179 **(Marks:1)** **Vu-Topper RM**

Consider the languages L1 = and L2 = {a}. Which one of thefollowing represents L1 L2* ∪ L1*

A. ^

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B. a*
C. All of the mentioned
D. None of the mentioned

Question No:180 **(Marks:1)** **Vu-Topper RM**
If S = {a, b} then which of the following RE will generate all possible strings?
A. a* + b*
B. (ab)*
C. (a + b)*
D. (ab + ba)*

Question No:181 **(Marks:1)** **Vu-Topper RM**
In drawing FA3 (which is equal to FA1 + FA2), a state will bedeclared final if
A. It corresponds to final states of both FA1 and FA2
B. It corresponds to final states of FA1
C. It corresponds to final states of FA2
D. It corresponds to any of the final states in FA1 or FA2

Question No:182 **(Marks:1)** **Vu-Topper RM**
Let S = {a, bb, bab, baabb} be a set of strings, which one of the following will not be included in S*?
A. baba
B. baabbabb
C. bbaaabb
D. bbbaabaabb

Question No:183 **(Marks:1)** **Vu-Topper RM**
The length of string "AbBAbcd" defined over Σ ={Ab,B,c,d} is _____.
A. One
B. Two

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C. Five
D. Four

Question No:184 **(Marks:1)** **Vu-Topper RM**
In case of finite automaton there _____ be a transition on each _____ for every letter of the alphabet set.

A. Must, state
B. May be, state
C. Often, edge
D. Must, edge

Question No:185 **(Marks:1)** **Vu-Topper RM**
Which one of the following word is not accepted by the given regular expression? (a+b)*(aaa+bbb)(a+b)*

A. Ababaaaab
B. Bababbbba
C. Baabaabba
D. Abbaaabba

Question No:186 **(Marks:1)** **Vu-Topper RM**
1 Let FA1 accepts many strings and FA2 accepts none then FA1+FA2 will be equal to:

A. FA1
B. FA2
C. FA2-FA1
D. (FA2)

Question No:187 **(Marks:1)** **Vu-Topper RM**
Edges are expressed with a regular expression in:

A. GTG **Page 23**
B. FA
C. NFA
D. TG

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Question No:188 **(Marks:1)** **Vu-Topper RM**

NFA corresponding to union of FAs is built by introducing a new start state and connect it to the states originally connected to the old start state with the --------- transitions as the old start state:

A. Same **ok**

B. Union of

C. Different

D. Concatenated

Question No:189 **(Marks:1)** **Vu-Topper RM**

---------- state is not important in Moore machine.

Final

Start

Question No:190 **(Marks:1)** **Vu-Topper RM**

If we subtract a binary number 1010 from the binary number 1101(ignore the overflow), then the result will be:

1100

0011

Question No:191 **(Marks:1)** **Vu-Topper RM**

In concatenation, we include the initial state of FA2 automatically after the final state of FA1 because of:

A. We need just two initial states

B. We need just one initial state **ok**

C. Some part of the string may be accepted by FA2

D. The strings of FA2 are accepted first before the strings of FA1

Question No:192 **(Marks:1)** **Vu-Topper RM**

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a(a+b)*b + b(a+b)*a is the regular expression of language defined over Σ={a,b} that is _____.

starting with a and ending in a

Question No:193 (Marks:1) Vu-Topper RM

GTG for the expression (a+b)*bb may have minimum number of states:

Aaabcbbcbacc

Question No:194 (Marks:1) Vu-Topper RM

Which of the following state is introduced while developing NFA for the closure of an FA?

A. Final state
B. Simply an initial state
C. An initial state with loop for all letters
D. An initial state which should be final as well ok

Question No:195 (Marks:1) Vu-Topper RM

In NFA,if null word (lambda) is allowed to be a label of an edge, then that NFA is called _____.

A. NFA with one string
B. NFA with two strings
C. NFA with null string
D.NFA without null string

Question No:196 (Marks:1) Vu-Topper RM

Which one of the following is a correct word produced by the RE (a*b*)ab?

abab

Question No:197 (Marks:1) Vu-Topper RM

While developing NFA for the union of FA1 and FA2, if there is a loop of ‘a’ at the initial state of FA1 then the new initial state will have a transition for ‘a’ that goes straight to:

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A. the final state of FA1
B. The initial state of FA1 ok
C. the initial state of FA2
D. the initial state of FA1*FA1

Question No:198 (Marks:1) Vu-Topper RM
Let L be the language of all strings, defined over Σ = {0,1}, ending in 111. Which of the following strings are distinguishable with respect to L with z being 11?
111, 101

Question No:199 (Marks:1) Vu-Topper RM
Which one of the following word is not accepted by the given regular expression?
abbbbaa

Question No:200 (Marks:1) Vu-Topper RM
Which of the following is not a step-in elimination of states procedure?
Unify single transitions to multi transitions that contains union of input

Question No:201 (Marks:1) Vu-Topper RM
In Moore machine the output depends on
The state

Question No:202 (Marks:1) Vu-Topper RM
While developing NFA for the union of FA1 and FA2, there will be
The initial state of FA1

Question No:203 (Marks:1) Vu-Topper RM
Let FA3 be an FA corresponding to FA1FA2, then the final state of FA3 must correspond to the final state of
A. FA2 only ok

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B. FA1 only
C. FA1 or FA2
D. FA1 and FA2

Question No:204 (Marks:1) Vu-Topper RM
Let FA3 be an FA corresponding to FA1FA2, then the initial state of FA3 must correspond to the initial state of
A. FA1 only
B. FA2 only
C. FA1 or FA2 ok
D. FA1 and FA2

Question No:205 (Marks:1) Vu-Topper RM
Mealy machine is equivalent to Moore machine, if we:
Applications of complementing and incrementing machines

Question No:206 (Marks:1) Vu-Topper RM
In the context of make NFA for the concatenation of FA1 and FA2 (FA2 accepting null string), which of the following option is correct?
A. Final states in both FAs ok
B. Initial states in both FAs
C. FA2 having final state only
D. FA2 having initial state only

Question No:207 (Marks:1) Vu-Topper RM
In the context of make NFA for the concatenation of FA1 and FA2 (none accepting null string), which of the following option is correct?
A. No final state in FA2 only
B. No initial state in FA1 only
C. No final and initial states in FA1 and FA2 respectively
D. No initial and final states in FA1 and FA2 respectively

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Question No:208 **(Marks:1)** **Vu-Topper RM**

Let FA1 accepts many strings and FA2 accepts no string, then FA1+FA2 will be equal to:

A. FA1
B. FA2
C. (FA2)*
D. FA2-FA1 **ok**

Question No:209 **(Marks:1)** **Vu-Topper RM**

The minimum length of the strings(except null string) of a language that starts and ends in the same letters will be:

A. 1
B. 2 **ok**
C. 3
D. 4

Question No:210 **(Marks:1)** **Vu-Topper RM**

While developing NFA for the union of FA1 and FA2, there will be _____ transition/transitions for both ‘a’ and ‘b’ on the new initial state.

A. Single
B. Multiple **ok**
C. Only one
D. Only three

Question No:211 **(Marks:1)** **Vu-Topper RM**

Which of the following form correctly expressed the regular expression RR*?

A. R+ **ok**
B. R-
C. R*
D. R+R-

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Question No:212 **(Marks:1)** **Vu-Topper RM**

Which of the following is not a step in elimination of states procedure?

A. Unifying all the final states into one using e-transitions
B. Get the resulting regular expression by direct calculation
C. Remove states until there is only starting and accepting states
D. Unify single transitions to multi transitions that contains union of input

Question No:213 **(Marks:1)** **Vu-Topper RM**

In the context of make NFA for the concatenation of FA1 and FA2 (Both FAs accepting null string), which of the following option is correct?

A. Initial states in both FAs
B. Final states in both FAs **ok**
C. FA2 having initial state only
D. FA2 having final state only

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CS-402

Final Term

Quiz-3,4

by Attiq Kundi

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CS402

Up Dated on 30-01-2023

If the intersection of two regular languages is regular then the complement of the intersection of these two languages is _____.

Regular

The language of all strings partition ∑* into _____ class(es).

Two

The language of all strings not beginning with 'b' partitions ∑* into _____distinct classes.

Two

If Q = {xx, xyxxxy }, and R = {xyxyxyxxyy, xyxyyyxx} then Pref(Q in R) = _____

xyxyyy

A language ending with ‘b’ partitions ∑* into _____distinct classes.

Three

If R is regular language and Q is any language (regular/ non-regular), then Pref(_____in _____) is regular.

Q,R

The reverse of the string sbfsbb over { sb, f, b }

Bsbfsb

The basic approach of Myhill Nerode theorem is similar to the concept of:

concatenation of FAs

If there is no final state of two FAs then their _____ also have no _____ state

union, final

If an FA has N states then it must accept the word of length

N

For a machine with N number of sta., the total number of strings to be tested, defined over an alphabet of m letters, is

mN +mN+1+ mN,-2 ,m2N-1

Which of the following is not a true theorem?

Pseudo theorem

The language "PRIME" is an example of language.

non regular

The product of two regular languages is

Regular

One language can have _____ CFG(s).

More than one

Which of the following is a non-regular language?

Prime

If the FA has N states. then test the words of length less than N. If no word is accepted by this FA. then it will _____ word/words.

accept no

In large FA with thousands of states and millions of directed edges, without an effective procedure it is _____ to find a path from initial to final state.

Impossible

A problem that has decision procedure is called problem.

Decidable problem

Which one of the following languages is a non regular language?

Palindrome

Using Myhill Nerode theorem we partition sigma star into distinct

Classes

In pumping lemma theorem (x y"n z) the range of n is

n=1. 2, 3, 4.....

The values of input (say a & b) do not remain same in one cycle due to

NOT gate

The operators like (*" +) in the parse tree are considered as

Terminals

Even-Even language partitions ∑* into _____ distinct classes.

Four

The strings or words which do not belong to a language are called _____ of that language.

Complement

The production S —> SS lalbl^ can be expressed by Regular expression

(a+b)+

if L1 and L2 are two regular languages. then they expressed by FAs.

can be

The grammatical rules which involve meaning of words are called

Semantics

Set of all palindromes over (a,b) is:

Regular and finite

The language of all strings not beginning with partitions “b" into distinct classes.

Two

The CFG is said to be ambiguous if there exist at least one word of its language that can be generated by production trees.

More than one

The CFG S —> aSb|abl^ is used to express the language

Palindrome

A non regular language can be represented by

None of the given options

In large FA with thousands of states and millions of directed edges, without an effective procedure it is _____ to find a path from initial to final state.

Impossible

In polish notation, (o-o-o) is the abbreviation of _____.

Operator - Operand – Operand

If an FA has N states then it must accept the word of length

N

Using Myhill Nerode theorem we partition sigma star into distinct _____.

classes

If a language is regular it must generate _____ number of distinct classes.

finite

If L1 and L2 are regular languages then which statement is NOT true?

L1/L2 is always regular

If the FA has N states, then test the words of length less than N. If no word is accepted by this FA, then it will _____ word/words.

accept no

A problem that has decision procedure is called _____ problem.

decidable

If L1 and L2 are two regular languages, then they _____ expressed by FAs.

can be

A language that can be expressed by RE, is said to be a _____ language.

regular

The values of input (say a & b) do not remain same in one cycle due to

NOT gate

Prime is a _____ language.

non-regular

If an effectively solvable problem has answer in YES or NO, then the solution is called _____.

decision procedure

To write the expression from the tree, it is required to traverse from _____.

Left side of the tree

If there is no final state of two FAs then their _____ also have no _____ state

union,final

In CFG, symbols that cannot be replaced by anything are called _____.

terminals

Finite **Automaton (FA) must have _____ number of states while a language has _____ words.**

finite, infinite

The language "PRIME" is an example of _____ language.

non regular

Using Myhill Nerode theorem we partition sigma star into distinct _____.

classes

Even-Even language partitions ∑* into _____ distinct classes.

four

What will be the 9's complement of the number 872?

127

In pref(Q in R), Q is _____ to/than R.

Not equal

There is at least one production in CFG that has one _____ on its left side.

Non terminal

In pumping lemma theorem (x y^n z) the range of n is

n=1, 2, 3, 4…….

A language ending with 'b' partitions ∑* into _____distinct classes.

three

The operators like (* , +) in the parse tree are considered as _____.

terminals

For a machine with N number of states, the total number of strings to be tested, defined over an alphabet of m letters, is _____.

mN +mN+1+ mN+2 +… +m2N-1

In a CFG, the non-terminals are denoted by _____.

Capital letters

If an FA accepts a word then there must exist a path from _____.

Incase of Myhill Nerode theorem, if a language L partitions sigma star into distinct classes and L is also regular then L generates _____ number of classes.

finite

Which of the following is pumped to generate further strings in the definition of Pumping Lemma?

y

The complement of a regular language is also _____.

regular

An FA has same initial and _____ state, then it means that it has no _____ state.
Select correct option:

final, initial

The product of two regular languages is _____.

regular

According to Myhill Nerode theorem, if L generates finite no. of classes then L is.....
Select correct option:

Regular

Two languages are said to belong to same class if they end in the same state when they run over an FA, that state

May be final state or not

In pref(Q in R) Q is …… to (than) R

Not equal

For language L defined over {a, b},then L partitions {a, b}* into …… classes
Distinct

Which of the following is not a true theorem?
Pseudo theorem

If a regular expression contains * then it _____ define an _____ language.

may, infinite

a^n b^n generates the …… language

non regular

To examine whether a certain FA accepts any words, it is required to seek the paths _____ state.

from initial to final

If r1 and r2 are regular expressions then which of the following is not regular expression

r1 – r2

Kleene star closure can be defined

Over any set of string

Which of following string(s) belongs to the language of the regular expression (aa*b)*?

aabaab

According to theory of automata there are _____ types of languages
Select correct option:

Two

If S = {aa, bb}, then S* will not contain

aaabbb

Every non deterministic Finite Automata can be converted into

Regular Expression
Deterministic Finite Automata
Trasition Graph
All of the given options

The states in which there is no way to leave after entry are called

Davey John Lockers

Dead States

Waste Baskets

All of the given options

(a* + b*)* = (a + b)* this expression is _____

True

What is false about the PALINDROME LANGUAGE?

Every word is reverse of itself.

It is an infinite language.

FA can be build for it.

None of the given optio

FA is also called

DFA

Kleene star closure can be defined

Over any set of string

[(a + b)(a + b)]*, given RE cannot generate the string _____

bbbbbb

In an FA, when there is no path starting from initial state and ending in final state then that FA

does not accept any string

While finding RE corresponding to TG, we connect the new start state to the old start state by the transition labeled by

null string

According to theory of automata there are _____ types of languages

Two

While finding RE corresponding to TG, If TG has more than one final state then Introduce the new final state

The states in which there is no way to leave after entry are called

Davey John Lockers
Dead States
Waste Baskets
All of the given options

What is false about the term alphabet?
It can be an empty set.

Which of the following is used to delay the transmission of signal along the wire by one step (clock pulse)?

Delay box

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85 To 100% Marks

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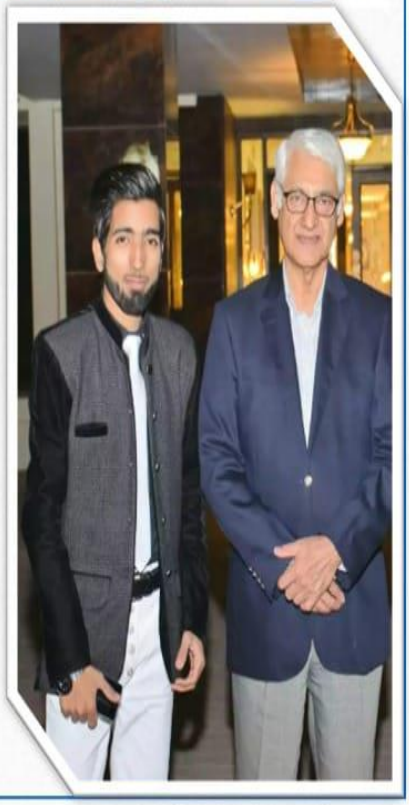
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Consider the following CFG:
S->a|Xb|aYa
X->Y|^ (NOTE: ^ means NULL)
Y->b|X
Which Non-terminals are nullable?

A. X
B. Y
C. Z
D. S,X and Y

The CFG S--> aSa | bSb | a | b | ^ represents _____ language.

A. EQUAL
B. ODD-ODD
C. EVEN-EVEN
D. PALINDROME

The structure given below is called _____
S -> aaBm
A -> Asia
B -> sub

A. RE
B. TG
C. CFG
D. PDA

One language can have _____ CFG(s).

A. Only one
B. At most one
C. At least one
D. More than one

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Consider the Following CFG: (NOTE: ^ means NULL)
S-◊Xa
X◊aX|bX|^
Above give a CFG can be represented by RE

A. a*b*a
B. a*b*
C. (a+b)*a
D. a(a+b)*a

The tree which produces all the strings of a language is called _____.

A. Derivation tree
B. Ambiguous tree
C. Total language tree **Page 96**
D. Non ambiguous tree

The language of all strings partition ∑* into _____ class(es).

A. Two
B. Five
C. Four
D. Three

There is at least one production in CFG that has one _____ on its left side.

A. Terminal
B. Non terminal **Page 87**
C. Unit production
D. Null production

The CFG that generates the regular language is called _____.

A. finite automata
B. regular expression
C. regular grammar **Google**

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D. non-regular grammar

Prime is a _____ language.

A. Finite
B. Regular Page 75
C. Non-regular
D. Both context free and regular

Which of the following cannot be represented by a regular expression?

A. Language of odd-odd
B. Language of even-even
C. String of 0's with an odd length
D. String of 0's with a prime length

"CFG" stands for _____.

A. Context Free Graph
B. Context Finite Graph
C. Context Free Grammar Page 87
D. Context Finite Grammar

In pref(Q in R), Q is _____ to/than R.

A. Equal
B. Smaller
C. Greater
D. Not equal Page 79

The operators like (* , +) in the parse tree are considered as _____.

A. Terminals Page 93
B. Productions
C. Intermediates
D. non-terminals

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A problem is said to be _____ if there exists an algorithm that provides the solution in _____ number of steps.

A. effectively solvable, finite **Page 80**
B. effectively solvable, infinite
C. effectively unsolvable, finite
D. effectively unsolvable, infinite

Which of the following refers to the set of strings of letters that when concatenated to the front of some word in Q produces some word in R?

A. Pref(Q in R) **Page 78**
B. Postf(R in Q)
C. Postf(Q in R)
D. Pref(R in Q)

If a CFG has a null production, then it is _____.

A. Called NULL CFG
B. Called Chmosky Normal Form (CNF)
C. Possible to construct another CFG without null production accepting the same language with the exception of the word ^
D. Not possible to construct another CFG without null production accepting the same language with the exception of the word ^

For a machine with N number of states, the total number of strings to be tested, defined over an alphabet of m letters, is _____.

A. Nm
B. Mn
C. Nm +Nm+1+ N m+2 +… + N2m-1
D. mN +mN+1+ mN+2 +… +m2N-1

In large FA with thousands of states and millions of directed edges, without an effective procedure it is _____ to find a path from initial to final state.

A. Impossible **Page 81**
B. Always easy

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C. Always impossible
D. May be good

The basic approach of Myhill Nerode theorem is similar to the concept of:

A. Union of FAs
B. Closure of FAs
C. Concatenation of FAs
D. Distinguishable and indistinguishable strings

The product of two regular languages is _____.

A. Infinite
B. Regular Page 78
C. non-regular
D. closure of a regular language

If there is no final state of two FAs then their _____ also have no _____ state

A. union,final Page 83
B. final, union
C. initial, union
D. union, initial

The production of the form: nonterminal --> one nonterminal is called the _____

A. Unit production Page 100
B. NULL production
C. Terminal production
D. Non-Terminal production

To examine whether a certain FA accepts any words, it is required to seek the paths _____ state.

A. FromFinal to initial
B. From Initial to final Page 81

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C. From Final to final back
D. From Initial to initial back

The production S --> SS | a | b | ^ can be expressed by Regular expression _____.

A. (ab)*
B. (a+b)
C. (a+b)* Page 88
D. (a+b)+

If Q = {xx, xyxxxy }, and R = {xyxyxyxxyy, xyxyyyxx} then Pref(Q in R) = _____

A. Xx
B. Yy
C. Xyxyyy
D. Xyxyxy

In polish notation, (o-o-o) is the abbreviation of _____.

A. Operand -Operand – Operand
B. Operand - Operand- Operator
C. Operand - Operator – Operand
D. Operator -Operand – Operand Page 94

In a CFG, the non-terminals are denoted by _____.

A. Numbers
B. Small letters
C. Capital letters
D. Small letters and numbers

Even-Even language partitions ∑* into _____ distinct classes.

A. Two
B. Five
C. Four
D. Three

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The CFG S → aSb|ab|Λ is used to express the language _____.

A. Even
B. Equal
C. Prime
D. Palindrome

In the null production N --> ^, N is a _____.

A. word
B. terminal
C. Semi word
D. Non terminal **Page 99**

In CFG, symbols that cannot be replaced by anything are called _____.

A. Terminals **Google**
B. Productions
C. non-terminals
D. null productions

The production of the form: Non-terminal-> ^ is said to be _____ production.

A. CNF
B. UNIT
C. NULL **Page 99**
D. Chomsky form production

The production of the form: non-terminal ----> one non-terminal is called the _____.

A. NULL production
B. Unit production
C. Terminal production
D. Non Terminal production

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If R is regular language and Q is any language (regular/ non-regular), then Pref(_____in _____) is regular.

A. Q,Q
B. R,R
C. R,Q
D. Q,R

If an FA accepts a word then there must exist a path from _____.

A. Initial to each state
B. Initial to final state
C. Initial to each state but not to final state
D. Initial to final state by traversing each state

Consider the CFG given below:
S->A|bbA->
B|bB->
S|a
Which of the following is a unit production

A. A->B
B. A->b
C. S->bb
D. B->a

By removing null and unit productions, _____.

A. CNF can be converted into FA
B. CNF can be converted into CFG
C. CFG can be converted into CNF **Page 102**
D. CNF can be converted into Turing machine

Which of the following is not a true theorem?

A. Pseudo theorem
B. Decidability theorem
C. Equivalency theorem
D. Mytill Neroce theorem

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In a CFG the non-terminal that occurs first from the left in the working string, is said to be _____.

A. Left most derivate
B. Left most nonterminal **Page 103**
C. Most Significant nonterminal
D. Least Significant nonterminal

The CFG is said to be ambiguous if there exist at least one word of its language that can be generated by _____ production tree(s).

A. Zero
B. One
C. At most one
D. More than one

Using Myhill Nerode theorem we partition sigma star into distinct _____.

A. Objects
B. Classes
C. Instances
D. Templates

Incase of Myhill Nerode theorem, if a language L partitions sigma star into distinct classes and L is also regular then L generates _____ number of classes.

A. Add
B. Finite **Page 75**
C. Infinite
D. Specified

To write the expression from the tree, it is required to traverse from _____.

A. Left side of the tree
B. Right side of the tree
C. Top to bottom of the tree

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D. Bottom to top of the tree

If L1 and L2 are two regular languages, then they _____ expressed by FAs.

A. Can be **Page 68**
B. May be
C. Cannot be
D. may or may not be

Null production is a _____.

A. Word
B. String
C. Terminal
D. All of the given

Which of the following is a non-regular language?

A. Prime
B. Odd-Odd
C. Even-Even
D. Language of strings ending in abba

Set of all palindromes over {a,b} is:

A. Regular
B. Regular and finite
C. Regular and infinite
D. Non-regular **Page 71**

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Question No:1 **(Marks:1)** **Vu-Topper RM**

In which of the following machine, the length of output string is the same to that of input string?

A. Mealy machine
B. Moore machine
C. Finite automaton with output
D. Non-deterministic finite automaton

Question No:2 **(Marks:1)** **Vu-Topper RM**

Which of the following machine has only one initial state and no final state?

A. Moore machine
B. Finite state machine **Google**
C. Deterministic finite state machine
D. Non deterministic finite state machine

Question No:3 **(Marks:1)** **Vu-Topper RM**

Which one of the following machine is represented as a pictorial representation with states and directed edges labeled by an input letter along with an output character?

A. Moore machine
B. Mealy machine **Google**
C. Finite state machine
D. Deterministic finite state machine

Question No:4 **(Marks:1)** **Vu-Topper RM**

In Moore machine, output is produced over the change of:

A. States
B. Transitions **Google**
C. Transitions and states
D. None of the mentioned

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Question No:5 **(Marks:1)** **Vu-Topper RM**

Moore Machine is an application of:

A. None of the mentioned
B. Finite automata with output
C. Finite automata without input **Google**
D. Non- Finite automata with output

Question No:6 **(Marks:1)** **Vu-Topper RM**

For a given Moore Machine, the input string is '101010', thus the output string would be of length:

A. Length of input string – 1
B. Length of input string – 2
C. Length of input string + 2
D. Length of input string + 1 **Google**

Question No:7 **(Marks:1)** **Vu-Topper RM**

Which of the following should not be NULL in the context of Pumping Lemma?

A. N
B. X
C. Y
D. Z

Question No:8 **(Marks:1)** **Vu-Topper RM**

In Moore machine, if the length of input string is 9, then the length of output string will be:

A. 7
B. 8
C. 9
D. 10

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Question No:9 **(Marks:1)** **Vu-Topper RM**

Let L be the language of all strings, defined over Σ = {0,1}, ending in 10. Which of the following strings are indistinguishable with respect to L with z being 0?

A. 010,101
B. 110,101
C. 100,101
D. 111,101

Question No:10 **(Marks:1)** **Vu-Topper RM**

Keeping in view the discussion by Martin, how many states are required to recognize the language of all strings of length 2 or more defined over ∑= {a,b}, with 'b' being the second letter from right?

A. 6
B. 7
C. 8
D. 9

Question No:11 **(Marks:1)** **Vu-Topper RM**

Melay machine can have -------- final states.

A. One
B. Zero
C. More than one but infinite
D. More than one but finite

Question No:12 **(Marks:1)** **Vu-Topper RM**

Subtraction of binary numbers is possible through:

A. Both complementing and incrementing machine
B. Complementing machine
C. Incrementing machine
D. Converting machine

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Question No:13 **(Marks:1)** **Vu-Topper RM**

In Moore machine the output depends on

A. Nothing
B. Type of input
C. Only present state
D. Present state and present input

Question No:14 **(Marks:1)** **Vu-Topper RM**

1's complement for 01101 will be:

A. 10111
B. 10010 **Google**
C. 00100
D. 00000

Question No:15 **(Marks:1)** **Vu-Topper RM**

Let L be the language of all strings, defined over $\Sigma = \{0,1\}$, ending in 111. Which of the following strings are indistinguishable with respect to L with z being 11?

A. 110,101
B. 111,101
C. 010,101
D. 100.101

Question No:16 **(Marks:1)** **Vu-Topper RM**

---------- state is not important in Melay machine.

A. Initial
B. Final
C. Empty
D. Combination of

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Question No:17 **(Marks:1)** **Vu-Topper RM**

Keeping in view the discussion by Martin, how many states are required to recognize the language of all strings of length 3 or more defined over ∑= {a,b}, with 'a' being the third letter from right?

A. 10
B. 12
C. 14
D. 16

Question No:18 **(Marks:1)** **Vu-Topper RM**

Strings x,y,z belongs to Σ * such that both xz or yz ∈ L where L ⊆ Σ* are:

A. Undetermined
B. Distinguishable
C. Indistinguishable
D. Both distinguishable and indistinguishable

Question No:19 **(Marks:1)** **Vu-Topper RM**

If we subtract a binary number 1010 from the binary number 1101(ignore the overflow), then the result will be:

A. 1100
B. 0011
C. 1010
D. 0010

Question No:20 **(Marks:1)** **Vu-Topper RM**

A loop at a state is supposed to be ---------- transition while converting Moore machine into an equivalent Melay machine.

A. Complex
B. Incoming **Page 61**
C. Outgoing
D. Both incoming and outgoing

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Question No:21 **(Marks:1)** **Vu-Topper RM**

Two machines are said to be equivalent if they print the _____ output string when the _____input string is run on them.

A. Same, Same
B. Same, different
C. Different, same
D. Unique, different

Question No:22 **(Marks:1)** **Vu-Topper RM**

In which of the following machine, the length of output string is 1 more than that of input string?

A. Mealy machine
B. Moore machine
C. Finite automaton with output
D. Non-deterministic finite automaton

Question No:23 **(Marks:1)** **Vu-Topper RM**

Which of the following is used to delay the transmission of signal along the wire by one step (clock pulse)?

A. Slow box
B. Delay box
C. Holdup box
D. Reduce box

Question No:24 **(Marks:1)** **Vu-Topper RM**

Which of the following is pumped to generate further strings in the definition of Pumping Lemma?

A. X
B. Y
C. N
D. Z

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Question No:25 **(Marks:1)** **Vu-Topper RM**

The strings or words which do not belong to a language are called _____ of that language.

A. Union
B. Quotient
C. Intersection
D. Complement **Page 66**

Question No:26 **(Marks:1)** **Vu-Topper RM**

If L1 and L2 are regular languages then which statement is NOT true?

A. L1* is always regular
B. L1 L2 is always regular
C. L1/L2 is always regular
D. L1 + L2 is always regular

Question No:27 **(Marks:1)** **Vu-Topper RM**

For a non-regular language, there exists _____ FA.

A. No
B. One
C. At least one
D. At most one

Question No:28 **(Marks:1)** **Vu-Topper RM**

Melay machine to increase the output string in magnitude by 1 is called:

A. Complementing machine
B. Incrementing machine
C. Decrementing machine
D. Converting machine

Question No:29 **(Marks:1)** **Vu-Topper RM**

If the intersection of two regular languages is regular then the complement of the intersection of these two languages is _____.

A. Irregular but finite
B. Regular

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C. Irregular
D. Irregular but infinite

Question No:30 **(Marks:1)** **Vu-Topper RM**
The language "PRIME" is an example of _____ language.
A. Regular but infinite
B. Non regular but infinite
C. Regular
D. Non regular **Page 75**

Question No:31 **(Marks:1)** **Vu-Topper RM**
In pumping lemma theorem (x y^n z) the range of n is
A. n=1, 2, 3, 4…….
B. n=0, 1, 2, 3, 4…….
C. n=…….-3,-2,-1, 1, 2, 3, 4……
D. n=…….-3,-2,-1, 0, 1, 2, 3, 4……

Question No:32 **(Marks:1)** **Vu-Topper RM**
Which of the following represent the absence and presence of current in sequential circuit respectively??
A. 0,1
B. 0,0
C. 1,0
D. 1,1

Question No:33 **(Marks:1)** **Vu-Topper RM**
The values of input (say a & b) do not remain same in one cycle due to
A. Clock plus
B. OR gate
C. NAND gate
D. NOT gate

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Question No:34 **(Marks:1)** **Vu-Topper RM**

If new A =1 NAND (1 AND 1), then what will be the value of new A?

A. 0
B. 10
C. 1
D. 01

Question No:35 **(Marks:1)** **Vu-Topper RM**

Question No:36 **(Marks:1)** **Vu-Topper RM**

If L1 and L2 are two regular languages, then L1 Intersection L2 is:

A. Finite
B. Infinite
C. Iregular
D. Regular **Page 67**

Question No:37 **(Marks:1)** **Vu-Topper RM**

If an effectively solvable problem has answer in YES or NO, then the solution is called _____.

A. Infinite problem
B. Decision procedure **Page 80**
C. Finite solution
D. Optimal procedure

Question No:38 **(Marks:1)** **Vu-Topper RM**

What will be the 9's complement of the number 872?

A. 127
B. 170
C. 172
D. 271

Question No:39 **(Marks:1)** **Vu-Topper RM**

Question No:40 **(Marks:1)** **Vu-Topper RM**

A non regular language can be represented by

A. TG

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B. RA
C. FA
D. None of the given options Page 71

Question No:41 (Marks:1) Vu-Topper RM
If a language is regular it must generate _____ number of distinct classes.
A. Two
B. Finite
C. Three
D. Infinite

Question No:42 (Marks:1) Vu-Topper RM
The language of all strings not beginning with 'b' partitions ∑* into _____distinct classes.
A. Two
B. Five
C. Four
D. Three

Question No:43 (Marks:1) Vu-Topper RM
Question No:44 (Marks:1) Vu-Topper RM
Question No:45 (Marks:1) Vu-Topper RM
Which one of the following languages is a non regular language?
A. Even-even
B. Palindrome
C. Containing double a
D. Start and end with same letter

Question No:46 (Marks:1) Vu-Topper RM
Question No:47 (Marks:1) Vu-Topper RM
Question No:48 (Marks:1) Vu-Topper RM
Question No:49 (Marks:1) Vu-Topper RM
Question No:50 (Marks:1) Vu-Topper RM

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The language of all string not beginning with ‘b’partition ∑* into _____distinct classes.

A. Five
B. Four
C. Two
D. three

Question No:51 (Marks:1) Vu-Topper RM

The language L defined over ∑,not belonging to l, is called ____of the language L.

A. closure
B. complement
C. intersection
D. union

Question No:52 (Marks:1) Vu-Topper RM

A problem that has decision procedure is called _____ problem.

A. Decidable
B. Regular language
C. Un-decidable
D. Infinite

Question No:53 (Marks:1) Vu-Topper RM

A language that can be expressed by RE, is said to be a _____ language.

A. Finite
B. Infinite
C. Irregular
D. Regular

Question No:54 (Marks:1) Vu-Topper RM

Question No:55 (Marks:1) Vu-Topper RM

A non- regular language can be represented by

A. TG

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B. RE
C. FA
D. None of the given option

Question No:56 (Marks:1) Vu-Topper RM
If Q={xx,xyxxxy},and R={xyxyxyxxyy,xyxyyyxx}then pref(Q in R)=----------
A. Xyxyxy
B. Xxy
C. Xx
D. Xyxyyy

Question No:57 (Marks:1) Vu-Topper RM
a^b^n generates the_____ language
A. non regular
B. EQUAL and non regular
C. Regular
D. EQUAL and regular

Question No:58 (Marks:1) Vu-Topper RM
Question No:59 (Marks:1) Vu-Topper RM
Set of all palindromes over {a,b}is :
A. Regular and infinite
B. Regular and infinite
C. Non-regular
D. Regular

Question No:60 (Marks:1) Vu-Topper RM
The language of all string partition∑*into __ ____class(es).
A. Two
B. Four
C. One
D. three

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Question No:61 **(Marks:1)** **Vu-Topper RM**

If the FA has N states, then test the words of length less than N. If no word is accepted by this FA, then it will _____ word/words.

A. reject no
B. accept all
C. accept no
D. accept some

Question No:62 **(Marks:1)** **Vu-Topper RM**
Question No:63 **(Marks:1)** **Vu-Topper RM**
Question No:64 **(Marks:1)** **Vu-Topper RM**
Question No:65 **(Marks:1)** **Vu-Topper RM**
Question No:66 **(Marks:1)** **Vu-Topper RM**

The complement of a regular language is also _____.

A. Regular
B. Irregular
C. irregular but finite
D. irregular but infinite

Question No:67 **(Marks:1)** **Vu-Topper RM**

A language ending with 'b' partitions ∑* into _____distinct classes.

A. Two
B. Four
C. One
D. Three

Question No:68 **(Marks:1)** **Vu-Topper RM**

The language L defined over Σ, not belonging to L, is called _____ of the language L.

A. Union
B. Quotient
C. Intersection
D. Complement

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Question No:69 **(Marks:1)** **Vu-Topper RM**
Question No:70 **(Marks:1)** **Vu-Topper RM**
The reverse of the string sbfsbb over { sb, f, b }

A. Bsfbsb
B. Sbbfsb
C. Bbsfbs
D. Bsbfsb

Question No:71 **(Marks:1)** **Vu-Topper RM**
Question No:72 **(Marks:1)** **Vu-Topper RM**
If an FA has N states then it must accept the word of length

A. N
B. 2n
C. n-1
D. n+1

Question No:73 **(Marks:1)** **Vu-Topper RM**
Question No:74 **(Marks:1)** **Vu-Topper RM**
Question No:75 **(Marks:1)** **Vu-Topper RM**
Question No:76 **(Marks:1)** **Vu-Topper RM**
a^n b^n generates the …… language

A. regular
B. non regular
C. EQUAL and regular
D. EQUAL and non regular **Page 71**

Question No:77 **(Marks:1)** **Vu-Topper RM**
Finite Automaton (FA) must have _____ number of states while a language has _____ words.

A. finite, finite
B. infinite, finite
C. finite, infinite
D. infinite, infinite

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Question No:78 **(Marks:1)** **Vu-Topper RM**

Question No:79 **(Marks:1)** **Vu-Topper RM**

To describe the complement of a language, it is very important to describe the ---------- of that language over which the language is defined.

A. Word
B. String
C. Alphabet
D. Regular Expression

Question No:80 **(Marks:1)** **Vu-Topper RM**

---------- is obviously infinite language.

A. EVEN-EVEN
B. FACTORIAL
C. PALINDROME
D. EQUAL-EQUAL

Question No:81 **(Marks:1)** **Vu-Topper RM**

The language Q is said to be quotient of two regular languages P and R, denoted by--- if PQ=R.

A. R=Q/P
B. Q=R/P
C. Q=P/R
D. P=R/Q

Question No:82 **(Marks:1)** **Vu-Topper RM**

If R is regular language and Q is any language (regular/ non regular), then Pref (Q in R) is ---------.

A. Equal
B. Infinite
C. Regular
D. Non-regular

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Question No:83 **(Marks:1)** **Vu-Topper RM**

Question No:84 **(Marks:1)** **Vu-Topper RM**

The part of an FA, where the input string is placed before it is run, is called _____

A. State
B. Transition
C. Input Tape
D. Output Tape

Question No:85 **(Marks:1)** **Vu-Topper RM**

In new format of an FA (discussed in lecture 37), This state is like dead-end non final state

A. Read
B. Start
C. Reject
D. Accept

Question No:86 **(Marks:1)** **Vu-Topper RM**

For language L defined over {a, b}, then L partitions {a, b}into …… classes

A. Finite
B. Infinite
C. Distinct
D. Non- Distinct

Question No:87 **(Marks:1)** **Vu-Topper RM**

The major problem in the earliest computers was

A. To display mathematical formula
B. To store the contents in the registers
C. To calculate the mathematical formula
D. To load the contents from the registers

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Question No:88 **(Marks:1)** **Vu-Topper RM**
Grammatical rules which do not involve the meaning of words are called ----------

A. Syntactic
B. Semantics
C. Both a and b
D. None of given

Question No:89 **(Marks:1)** **Vu-Topper RM**
The symbols that can't be replaced by anything are called --- ----------

A. Terminals
B. Productions
C. Non-terminals
D. All of the above

Question No:90 **(Marks:1)** **Vu-Topper RM**
The symbols that must be replaced by other things are called _____

A. Terminals
B. Productions
C. Non-terminals
D. None of the given

Question No:91 **(Marks:1)** **Vu-Topper RM**
The grammatical rules are often called_____

A. Terminals
B. Productions
C. Non-terminals
D. None of the given

Question No:92 **(Marks:1)** **Vu-Topper RM**
The language generated by _____ is called Context Free Language (CFL).

A. FA

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B. TG
C. CFG
D. NFA

Question No:93 **(Marks:1)** **Vu-Topper RM**
If a CFG has only productions of the form nonterminal -> string of two nonterminal or nonterminal -> one terminal then the CFG is said to be in PDA form
A. NULL able form
B. None of the these
C. Unit production form
D. Chomsky Normal Form (CNF)

Question No:94 **(Marks:1)** **Vu-Topper RM**
Question No:95 **(Marks:1)** **Vu-Topper RM**
Which of the following states is not part of PDA?
A. Start
B. Write
C. Reject
D. Accept

Question No:96 **(Marks:1)** **Vu-Topper RM**
The PDA is called non-deterministic PDA when there are more than one out going edges from…… state
A. PUSH or POP
B. READ or POP
C. POP or REJECT
D. START or READ

Question No:97 **(Marks:1)** **Vu-Topper RM**
Question No:98 **(Marks:1)** **Vu-Topper RM**
In nondeterministic PDA a string is supposed to be accepted, if there exists at least one path traced by the string, leading to state.
A. Start

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B. Write
C. Reject
D. Accept

Question No:99 (Marks:1) Vu-Topper RM
The CFG which generates the regular language is called
A. Finite Automata
B. Regular grammar
C. Regular expression
D. None of the given options

Question No:100 (Marks:1) Vu-Topper RM
PDA stands for _____
A. None of given options
B. Push Down Automaton
C. Pop and Drop Automaton
D. Push and Drop Automaton

Question No:101 (Marks:1) Vu-Topper RM
Halt states are
A. Start and accept
B. Read and Reject
C. Start and Reject
D. Accept and Reject

Question No:102 (Marks:1) Vu-Topper RM
In an FA, when there is no path starting from initial state and ending in final state then that FA
A. Accept null string
B. Accept all strings
C. Does not accept any string
D. Accept all non-empty strings

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Vu Topper RM

Question No:103 **(Marks:1)** **Vu-Topper RM**

While finding RE corresponding to TG, we connect the new start state to the old start state by the transition labelled by

A. A
B. B
C. Null string
D. None of the given options

Question No:104 **(Marks:1)** **Vu-Topper RM**

According to theory of automata there are _____ types of languages

A. One
B. Two
C. Four
D. Three

Question No:105 **(Marks:1)** **Vu-Topper RM**

While finding RE corresponding to TG, If TG has more than one final state then

A. Eliminate the old final state
B. Introduce the new final state
C. Replace the old final state with start state
D. Replace the old final state with new start state

Question No:106 **(Marks:1)** **Vu-Topper RM**

The states in which there is no way to leave after entry are called

A. Dead States
B. Waste Baskets
C. Davey John Lockers
D. All of the given options

Question No:107 **(Marks:1)** **Vu-Topper RM**

What is false about the term alphabet?

A. It can be an empty set
B. It is a finite set of symbols

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Vu Topper RM

C. Strings are made up of its element
D. It is usually denoted by Greek letter sigma

Question No:108 (Marks:1) Vu-Topper RM

A PDA consists of the following:

A. All of the given options
B. An input TAPE with infinite
C. Many locations in one direction
D. An alphabet (Sigma) of input letters.

Question No:109 (Marks:1) Vu-Topper RM

Question No:110 (Marks:1) Vu-Topper RM

A _____ is the one for which every input string has a unique path through the machine

A. Input Tape
B. Push Down store
C. Deterministic PDA
D. Non deterministic PDA

Question No:111 (Marks:1) Vu-Topper RM

The input string is placed, before it runs, in

A. Ram
B. Tape
C. Stack
D. Memory

Question No:112 (Marks:1) Vu-Topper RM

In a CFG the nonterminal that occurs first from the left in the working string, is said to be _____

A. Left most derivate
B. Left most nonterminal
C. Least Significant nonterminal
D. Most Significant nonterminal

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Question No:113 **(Marks:1)** **Vu-Topper RM**

The unit production is

A. Terminal --> Terminal

B. Non terminal --> Terminal

C. Terminal --> non-Terminal

D. Non terminal --> non-Terminal

Question No:114 **(Marks:1)** **Vu-Topper RM**

A _____ operator adds a new letter at the top of STACK

Push

Question No:115 **(Marks:1)** **Vu-Topper RM**

The locations into which we put the input letters on "Input Tap" are called _____

Cells

Question No:116 **(Marks:1)** **Vu-Topper RM**

We cannot write regular expressions for all _____.

CFG's

Question No:117 **(Marks:1)** **Vu-Topper RM**
Question No:118 **(Marks:1)** **Vu-Topper RM**
Question No:119 **(Marks:1)** **Vu-Topper RM**
Question No:120 **(Marks:1)** **Vu-Topper RM**
Question No:121 **(Marks:1)** **Vu-Topper RM**

The grammatical rules which involve meaning of words are called

Semantics

Question No:122 **(Marks:1)** **Vu-Topper RM**
Question No:123 **(Marks:1)** **Vu-Topper RM**
Question No:124 **(Marks:1)** **Vu-Topper RM**
Question No:125 **(Marks:1)** **Vu-Topper RM**
Question No:126 **(Marks:1)** **Vu-Topper RM**
Question No:127 **(Marks:1)** **Vu-Topper RM**

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Vu Topper RM

Which of the following is a non-regular language?
Language of strings ending in abba

Question No:128 **(Marks:1)** **Vu-Topper RM**
Tape and Stack alphabets
Must be different

Question No:129 **(Marks:1)** **Vu-Topper RM**
Choice of path can be determined by left most derivation of the string belonging to CFL at…… state
Accept

Question No:130 **(Marks:1)** **Vu-Topper RM**
Identify the TRUE statement about following CFG: S -> SB|AB A -> CC B -> b C -> a
The given CFG is in CNF
The given CFG has 8 Terminals

Question No:131 **(Marks:1)** **Vu-Topper RM**
For the given input, AND box provides the Boolean AND output.
True
False

Question No:132 **(Marks:1)** **Vu-Topper RM**
The current in the wire is indicated by 1 and 0 indicates the absence of the current.
True
False

Question No:133 **(Marks:1)** **Vu-Topper RM**
Any language that cannot be expressed by a RE is said to be regular language.
True
False

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Vu Topper RM

Question No:134 **(Marks:1)** **Vu-Topper RM**
For a certain language L, the complement of Lc is the given language L i.e. (Lc)c = Lc
True
False

Question No:135 **(Marks:1)** **Vu-Topper RM**
The high-level language is converted into assembly language codes by a program called compiler.
True
False

Question No:136 **(Marks:1)** **Vu-Topper RM**
If a CFG has a null production, then it is possible to construct another CFG accepting the same language without null production
True
False

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Updated 20-Feb-2013

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FAQ's about Lectures 1 to 5

QNo1.What is the difference between the strings and the words of a language?

Answer:A string is any combination of the letters of an alphabet where as the words of a language are the strings that are always made according to certain rules used to define that language.For example if we take
Alphabet Σ = { a , b } Here a , b are the letters of this alphabet.
As you can see we can make a lot of strings from these letters a and b.
For example a,b,aa,ab,ba,bb,aaa,aab,aba,baa,..... and so on.
But when we define a language over this alphabet having no **a's** and only odd number of **b's**. Then the **words** of this language would have only those**strings** that have only odd number of **b's** and no **a's**.some example words of our defined language are
b , bbb , bbbbb , bbbbbbb ,.....and so on.
So we can say that all the words are strings but all the strings may not be the words of a language.Hence strings are any combination of letters of an alphabet and the words of a language are strings made according to some rule.

QNo.2 What is the difference between an Alphabet and an element of a set. Whether Alphabet is an element of a set or it is a set itself?

Answer: An Alphabet is a set in itself. The elements of an Alphabet are called letters .
For example
Binary Alphabet Σ = {0,1}
Here 0,1 are the letters of binary alphabet.
Binary Alphabet is very important because it the Alphabet used by the computer.
Set of Natural Numbers
N={1,2,3,4,5,.....}
Here 1,2,3..... are the elements of set of Natural Numbers.

QNo.3 What is Null String (Λ) ?

Answer: The string with zero occurrences of symbols (letters) from ∑.
It is denoted by (Small Greek letter Lambda) λ or (Capital Greek letter Lambda) Λ, is called an empty string or null string.
The capital lambda will mostly be used to denote the empty string, in further discussion.

QNo.4 What is PALINDROME ?

Answer: The language consisting of Λ (Null String) and the strings s defined over an Alphabet Σ such that Rev(s)=s.
Some example words of this language are
aa
As Rev(aa) = aa
aba
As Rev(aba) = aba
bbb
As Rev(bbb) = bbb
aabaa
As Rev(aabaa) = aabaa
bbbaaabbb
As Rev(bbbaaabbb) = bbbaaabbb
It is to be noted that the words of PALINDROME are called palindromes.

QNo5.What is the concept of valid and invalid alphabets ?

Answer: While defining an alphabet of letters consisting of more than one symbols, no letter should be started with any other the letter of the same alphabet i.e. one letter should not be the prefix of another. However, a letter may be

ended in the letter of same alphabet i.e. one letter may be the suffix of another.
Σ= { a , b } (Valid Alphabet)

Σ= { a , b , cd } (Valid Alphabet)

Σ= { a , b , ac } (Invalid Alphabet)

QNo 6. What is ALGOL ?

Answer:ALGOL (ALGOrithmic Language) is one of several high level languages designed specifically for programming scientific computations. It started out in the late 1950's, first formalized in a report titled ALGOL 58, and then progressed through reports ALGOL 60, and ALGOL 68. It was designed by an international committee to be a universal language. Their original conference, which took place in Zurich, was one of the first formal attempts to address the issue of software portability. ALGOL's machine independence permitted the designers to be more creative, but it made implementation much more difficult. Although ALGOL never reached the level of commercial popularity of FORTRAN and COBOL, it is considered the most important language of its era in terms of its influence on later language development. ALGOL's lexical and syntactic structures became so popular that virtually all languages designed since have been referred to as "ALGOL - like"; that is they have been hierarchical in structure with nesting of both environments and control structures.

QNo7. What are the Sequential Operators?

Answer:Sequencing Operators:

Sequencing operators

a >> b	Sequence	Match a and b in sequence
a && b	Sequential-and	Sequential-and. Same as above, match a and b in sequence
a || b	Sequential-or	Match a or b in sequence

The sequencing operator >> can alternatively be thought of as the sequential-and operator. The expression a && b reads as match a and b in sequence. Continuing this logic, we can also have a sequential-or operator where the expression a || b reads as match a or b and in sequence. That is, if both a and b match, it must be in sequence; this is equivalent to a >> !b | b.

QNo 8.What is Non-Determinism and Determinism and what is the difference between them ?

Answer: Determinism means that our computational model (machine) knows what to do for every possible inputs.
Non determinism our machine may or may not know what it has to do on all possible inputs.
As you can conclude from above definition that Non-Deterministic machine can not be implemented (used) on computer unless it is converted in Deterministic machine.

QNo 9. What is meant by equivalent FA's ?

Answer:FA's that accept the same set of languages are called Equivalent FA's.

QNo 10. What is the difference between Palindrome and Reverse function?

Answer: It is to be denoted that the words of PALINDROME are called palindromes.
Reverse (w) = w
Example: Σ={a,b},
PALINDROME={Λ , a, b, aa, bb, aaa, aba, bab, bbb, ...}
If a is a word in some language L, then reverse (a) is the same string of letters spelled backwards, called the reverse of a.
e.g
reverse (xxx) = xxx
reverse (623) = 326
reverse (140) = 041

QNo11.Define Kleene Star?

Answer: Given Σ, then the Kleene Star Closure of the alphabet Σ, denoted by Σ*, is the collection of all strings

defined over Σ, including Λ
It is to be noted that Kleene Star Closure can be defined over any set of strings.
Examples
If Σ = {x}
Then Σ* = {Λ, x, xx, xxx, xxxx, ….}
If Σ = {0,1}
Then Σ* = {Λ, 0, 1, 00, 01, 10, 11, ….}
If Σ = {aaB, c}
Then Σ* = {Λ, aaB, c, aaBaaB, aaBc, caaB, cc, ….}
Note:
Languages generated by Kleene Star Closure of set of strings, are infinite languages. (By infinite language, it is supposed that the language contains infinite many words, each of finite length)

QNo12.Valid/In-Valid alphabets?

Answer: Any alphabet is valid if any of its letter does not appear in the start of any other letter otherwise it is invalid.

QNo13.What is Reverse of a string?

Answer: Alphabet provides only a set of symbols. A string is a concatenation of these symbols. Reverse of the string means to write the string in reverse order. It has no effect on alphabet. Alphabet will remain same.

QNo14.Differentiate Kleene Star Closure and PLUS?

Answer: Given Σ, then the Kleene Star Closure of the alphabet Σ, denoted by Σ*, is the collection of all strings defined over Σ, including Λ.
Plus Operation is same as Kleene Star Closure except that it does not generate Λ (null string), automatically.
You can use other symbol for alphabet but we are mostly use sigma symbol.

QNo15.Define Regular Expression?

Answer: Regular Expression is the generalized form of any regular language through which you can construct any string related to that language.
Take an example from your handouts
L_1 = {Λ, a, aa, aaa, …} and L_2 = {a, aa, aaa, aaaa, …} can simply be expressed by a^* and a^+, respectively.
so a^* and a^+ are the generalized form of Languages L_1, L_2.
And a^* and a^+ are called the regular expressions (RE) for L_1 and L_2 respectively.

FAQ's about Lectures 6 to 10

Q No.1 What is the concept of FA also known as FSM (Finite State Machine) ?

FA (Finite Automaton) is a finite state machine that recognizes a regular language. In computer science, a finite-state machine (FSM) or finite-state automaton (FSA) is an abstract machine that has only a finite, constant amount of memory. The internal states of the machine carry no further structure. This kind of model is very widely used in the study of computation and languages.

Q No.2 What is the difference between FA , TG , GTG. ?

In every FA, we mark transitions with single letter of the given alphabet but in TG transitions can be marked with letters or strings (combination of letters).
In every FA, every state shows transition for all letters of given alphabet but in any TG it is not necessary to show all transition for all letters of given alphabet. In TG, we may or may not show all letter transitions according to requirement. We can also show transitions on reading any strings in TGs but it is not possible in FA's. In GTG Directed edges connecting some pair of states are labeled with regular expressions . It may be noted that in GTG, the labels of transition edges are corresponding regular expressions. In TG we write strings and in GTG we are bound to write RE. Every FA is also a TG but not every TG is FA.

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Q No.3 What is the difference between FA's and TG's .Why we need TG's when we have FA's?

The Transition Graphs (TG) differ from FA in the following areas

- TG's are generalizations of FA's.
- TG's can change state without an input (Null transition).
- Can read more than one letter (words of the language they are accepting) along the transition edges at a time.
- Can have a regular expression as a edge label.
- Can have more then one start state.

We have been given more freedom in TG's. But this freedom is on the cost of more memory and processing power it means that if we implement TG's on computer using some programming language it will need more memory and processing power of computer than used in the implementation of FA's.

Q No.4 What is the concept of the Union of FA's ?

When we take Union of two FA's it means that resultant FA's should accept all the words that were accepted by the two FA's individually. It is like taking union of two sets, the resultant set contain members of both sets.

For example

Let A ={1,3,5,7,9}

and

B = {0,2,4,6,8,10}

then, A U B = { 0,1,2,3,4,5,6,7,8,9,10 }

you can see that A U B contain elements of both sets **similar is the case with FA's**.

Q No.5 What is the difference between is TG and GTG ?

In TG, there are letter transitions for the strings. While in GTG, one can write whole RE as a transition from one state to another one.

Q No.6 How one can create RE of a particular language?

First thing about RE and FA is that there is no hard and fast formula or method to generate these. One can generate them by its mental approach. And this mental approach can be acquired through only PRACTICE.

Here are some useful tips to write RE's,

-

Let our language consist of the words of length three exactly over alphabet Σ= {a,b}

then it consists of the words

L = {aaa, aab, aba,abb,baa,bab,bba,bbb}.

Its RE can be simply written as

RE = aaa + aab + aba + abb + baa + bab + bba + bbb

which simply means that our language consists of **only** these words.

So we can make RE for a finite language by writing its all words with + operator between them.

-

We should also keep the **null string** in our mind. If our language generates null string than our RE should also generate it)

For example language having all the words of even length has null string in it as well so we can write its RE as follows

RE = ((a+b)(a+b))*

This RE also generates null string.

If a language generates all strings starting with a. then strings will be of type

a , aa, ab, aab, aaa, aba, abb,….

Here RE should start with ‘a’ and then all strings including null. So this will be (a + b)* and complete RE is a (a+ b)*.

Similarly languages of strings ending in b will have RE (a + b)*b.

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Q No.7 What is the diagrammatically difference between FA's and TG's?

The main differences between FA's and TG's are as follows

-
-
-

Q No.8 What is the corresponding FA for RE =aa((a+b)(a+b))*

RE is aa((a + b)(a + b))*. Its corresponding FA is as follows.

Q No.9 What is difference between FA's and NFA's. Are they opposite to each other ?

FA stands for finite automata while NFA stands for non-deterministic finite automata

In FA there must be a transition for each letter of the alphabet from each state. So in FA number of transitions must be equal to (number of states * number of letter in alphabet).

While in NFA there may be more than one transition for a letter from a state. And finally every FA is an NFA while every NFA may be an FA or not.

Q No.10 Differentiate between (a,b) and (a+b)?

(a, b) = Represents a and b.

(a + b) = Represents either a or b.

FAQ's about Lectures 11 to 15

Q No.1 What is the difference between how's FA and TG .Why we need TG's when we have FA's?

The Transition Graphs (TG) differ from FA in the following areas

- TG's can change state without an input (Null transition).

We have been given more freedom in TG's. But this freedom is on the cost of more memory and processing power it means that if we implement TG's on computer using some programming language it will need more memory and processing power of computer than used in the implementation of FA's.

Q No.2 What is the concept of the Union of FA's ?

When we take Union of two FA's it means that resultant FA's should accept all the words that were accepted by the two FA's individually. It is like taking union of two sets the resultant set contain members of both sets.

For example

Let A ={1,3,5,7,9}

and

B = {0,2,4,6,8,10}

then, A U B = { 0,1,2,3,4,5,6,7,8,9,10 }

you can see that A U B contain elements of both sets similar is the case with FA's.

Q No.3 What is the difference between GT and GTG ?

In TG, there are transitions for the strings. While in GTG, one can write whole RE as a transition from one state to another one.

Q No.4 How to create a RE of a particular Language?

Regular expression is used to express the infinite or finite language, these RE are made in such a way that these can generate the strings of that unique language also for the cross check that the defined RE is of a specified

language that RE should accept all the string of that language and all language strings should be accepted by that RE.

Q No.5 How diagrams of FA's are created ?

It depends upon the question how many states involve in a FA. There is not any formal procedure to design FA for a language. This ability just improves with time and practice.

Every FA is also a TG but not every TG is FA. In every FA, every state shows transition of all letters of given alphabet but in any TG it is not must. In TG, we may or may not show all letters transition according to requirement. We can also show transitions on reading any strings in TGs but it is not possible in FAs.

Q No.6 How one can create RE of a particular language?

First thing about RE and FA is that there is no hard and fast formula or method to generate these. One can generate them by their mental approach. And this mental approach can be acquired through only PRACTICE. I am giving you few tips. I hope those will help you.

If we have a finite language then it will always be regular and will not have * in RE.

e.g. L={aaa, aba, bb}. L language generates given three strings then its RE will be

(aaa + aba + bb}. So in finite language + of all strings can be it's RE.

If we have an infinite language, then there will be * in it's RE.

We should also keep the null string in our mind.

For practice just try to create RE of simple languages. Don't try to confuse yourself with complex languages.

For example if a language generates all strings starting with a. then strings will be of type

a , aa, ab, aab, aaa, aba, abb,….

Here RE should start with 'a' and then all strings including null. So this will be (a + b)* and complete RE is a (a+ b)*.

Similarly languages of strings ending in b will have RE (a + b)*b.

I hope now you will be able to generate the RE of simpler languages. Gradually, increase the complexity of languages to become a perfect in RE's.

Now as similar to RE, FA of finite language will not have any loop in it.

If language is infinite then there will always be at least one loop in its FA.

From RE, if you want to generate its FA, then first get the smallest strings and generate their FA and then gradually get the strings of bigger length and keep amending the created FA. After some practice, you will be able to generate the FA's.

And the last thing nobody can do the new task accurately for the first time. Practice is the key to success. In the start you will have lot of mistakes but after practice you will be able to clear all of them.

Q No.7 What is the difference between FA's ,and TG's ?

There are two or three big differences between FA's and TG's.

In FA there can be maximum one initial or starting state while in TG there may be more than one initial state.

In FA there can be transition for letters only while in TG transitions from a state to another one can be for strings.

In FA there must be transition from each state for each letter (deterministic) while in TG there may be no transition for specific letter from a state and there may be more than one path for a string or letter from a state.

Q No.8 What is the exact definition of FA ?

Definition:

A Finite automaton (FA), is a collection of the followings

Finite number of states, having one initial and some (maybe none) final states.

Finite set of input letters (Ó) from which input strings are formed.

Finite set of transitions i.e. for each state and for each input letter there is a transition showing how to move from one state to another.

Q No.9 What is the difference between TG and GTG ?

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In TG, there are transitions for the strings. While in GTG, one can write whole RE as a transition from one state to another one.
For RE =aa((a+b)(a+b))* what will be its corresponding FA ?
RE is aa((a + b)(a + b))*. Its corresponding FA is as follows.

Q No.10 What is the difference between FA and NFA ?

FA stands for finite automata while NFA stands for non-deterministic finite automata
In FA there must be a transition for each letter of the alphabet from each state. So in FA number of transitions must be equal to (number of states * number of letter in alphabet).
While in NFA there may be a transition for a letter from a state. In NFA there may be more than one transition for a letter from a state. And finally every FA is an NFA while every NFA may be an FA.
FA:

NFA:

Q No.11 What is the method to understanding FA's and NFA's

Firstly we know that an FA is used to describe a language. Now a language consists of strings. FA will describe the specific language only if it accepts all the strings of that particular language and all the strings generated by the FA are in the language. So confirmation is of two ways.
Now, how to traverse the FA. It is very easy. Every FA has one initial state (state with -sign). From every state of FA there is one transition for every letter of the alphabet. Read the string letter by letter and move according to transitions from state to state. If the string ends in the final state (state with a + sign), that particular string will be accepted otherwise rejected.
So, every string ending in final state will be accepted by FA and will be a word of the language.
For NFA, there may be no path or more than one path for a letter from a specific state. As similar to FA just start traversing from the initial state and if the string ends in the final state, it will be accepted.
Remember, as there may be more than one path for a letter from a state. So any path can be used. Goal is to reach the final state. Remaining theory is same to the FA.
Practice is the key to success. Just try simple FA's and NFA's in the start.

FAQ's about Lectures 16 to 20

Q No 1.What is the concept of Nondeterministic Finite Automaton (NFA) ?Nondeterminism plays a key role in the theory of computing. A nondeterministic finite state automaton is one in which the current state of the machine and the current input do not uniquely determine the next state. This just means that a number of subsequent states (zero or more) are possible next states of the automaton at every step of a computation.
Of course, nondeterminism is not realistic, because in real life, computers must be deterministic. Still, we can simulate nondeterminism with deterministic programs. Furthermore, as a mathematical tool for understanding computability, nondeterminism is invaluable.
As with deterministic finite state automata, a nondeterministic finite state automaton has five components.

- a set of states
- a finite input alphabet from which input strings can be constructed
- a transition function that describes how the automaton changes states as it processes an input string
- a single designated starting state
- a set of accepting states

The only difference lies in the transition function, which can now target subsets of the states of the automaton rather than a single next state for each state, input pair.

Q No 2. If a language can be expressed in the form of FA than why it is needed to use NFA ?

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NFA stands for non-deterministic FA and this sort of structure has relaxation compared with FA. So it is rather more easy to represent a language using NFA.
We have methods to convert NFA into FA's so sometimes it is easier to build NFA of a given language and than convert its NFA into FA using these methods rather than directly building an FA for a language which may be very difficult.

Q No 3.How to made NFA corresponding to the closure of an FA ?

While generating NFA corresponding to closure of an FA one should take care of the null string. Simple way to accept null string is declare initial state, final as well. But in this way a lot of other strings will also be accepted. Therefore, accurate way is draw another state. Declare the new state initial as well as final. Connect the new state with the states originally connected with the old start state with the same transitions as the old start state. Newly drawn diagram will be an NFA representing the language closure of the given FA

Q No 4.What is the difference between Union of two FA's , Concatenation of two FA's and closure of two FA's ?

Consider two FA's given below
a
a
b
b
a
b
a
b
Y2+
Y1-
X2+
X1-
FA1
FA2
Here FA1 accepts all strings ending in a and FA2 accepts all strings ending b.
An FA corresponding to FA1UFA2 will accept all the strings ending in a or ending in b. for example, aba,bbaaab,bbb
An FA corresponding to FA1FA2 will accept all the strings whose first substring belongs to FA1 and second substring belongs to FA2. for example, ababab, bbabbb.
An FA corresponding to FA1* will accepts all the strings of FA1 including null string. if FA1 represents RE r1 then FA1* will correspond to RE r1*.

FAQ's about Lectures 21 to 25

Q No 1.How Moore and Mealy machine works in Computer Memory what is their importance in Computing ?

Mealy & Moore Machines work in computing as incrementing machine & 1's complement machine etc. These operations as basic computer operations so these machines are very important.

Q No 2.What is sequential circuit ?

Sequential Circuit:
A sequential circuit contains a memory component.
The memory component provides a state input. A flip-flop is often used as a memory component.
The state variable indicates the states of the sequential machine, i.e. the status or stage or progress of the whole event.
The state of a sequential circuit is indicated by the output of a flip-flop. A single flip-flop can be used to indicate two states (q=0 and q=1). When there are more than two states, additional flip-flops are used. Given n flip-flops, a total of

2^n states can be represented.
In other words, a sequential machine can be put into a number of different states depending on the particular inputs given.
The output is a function of both the Present Inputs and the Present States.
In addition to the outputs, the circuit must also generate an update to the memory components so that the state of the machine can also be changed with respect to the new inputs. The update is called the Next State Function and is also a function of the Present Inputs and the Present States.
Both the output functions and the Next State Functions are combinational circuits.
$Z=f(X,S^t)$
$S=g(X,S^t)$
The superscript t indicates the present time period while the superscript (t+1) indicates the next time period.
The characteristic of a sequential circuit is completely defined by a state transition diagram that enumerates all possible transitions for every possible input combination.

Q No 1.What is the concept of Pumping Lemma I and II and what is the difference between pumping Lemma 1 and pumping Lemma 2 ?

In fact PLI & PLII are same (A way to recognize Non Regular language). The only difference is that the conditions in pumping lemma II are more stricter than Pumping Lemma I some language that are difficult to proof Non Regular by Pumping Lemma I are proved Non Regular by pumping Lemma II easily.
Further mare in pumping lemma I we have to generate all words to of a language but in Pumping Lemma II we have to generate a single word to prove a language non regular.
Explanation:
Some languages like PALINDROME that are proved to be regular by first version
due to some of their symmetrical words when we pump these words they remain to be
the parts of the language like
bbabb
By pumping lemma 1
Let y = a
Now repeating y three times results in
bbaaabb
That is also a valid word of PALINDROME so by pumping lemma I PALINDROME can not be proved non regular, so there was the need of pumping lemma version version 2.
Now consider for the word
bbabb
if we take N=2
Then by pumping y (let we take it b) two times results in
bbbbabb
That word is not in PALINDROME.
But if we take N=3 and y = a
Then by pumping y two times results in
bbaaabb
That word is in PALINDROME. So be careful in taking total no of states of the FA
and also the repeating factor (y) to prove an infinite language non regular you
need to prove only one word that is not part of the language.

Q No 2. What is the significance of Pumping Lemma II ?

The significance of 2nd version of 'pumping lemma' is that there are some infinite non regular languages like PALINDROME we can built FA that can accept there certain words but if we increase the length of their words

that FA don't accept these words so by pumping lemma version I it is very difficult to prove them non regular but with the second version we can prove that a language is Non regular even it's some words may be accepted by some FA's.
See page 195 of the book for further example.

Q No 3.Moore and Mealy machine?

1. In order to run a string on a Mealy or Moore machine, you can take directions from transition table. Running string on Mealy or Moore machine is similar to running string on a FA. For example, if want to run abba on the machine, take start from initial state. Check what is the transition for a, what state it goes. After that check what is the path of b from that state and so on. In this way you will be able to run whole of the string. Note that there is no final state in Mealy or Moore machine. So there is no case of acceptance or rejection of string. You just have to determine what the output is. I hope that will clear your mind for further clarification please listens to your lecture carefully.
2. The string is taken for the testing purposes. You can take any sort of string and determine its output using machine.

FAQ's about Lectures 31 to 35

Q No 1.What is the difference between semiword and word please also give an example regarding this?

Word:

A word is complete combinations of terminals only e.g. abba or ab or a or null string.

Semiword:

A semiword is a string of terminals (may be none) concatenated with exactly one nonterminal on the right i.e. a semi word, in general, is of the following form
(terminal)(terminal) ---------- (terminal)(nonterminal)
For example
aaaaaaB , aabbaaaA , A.
What is the difference between derivation tree and total tree ?
A Derivation tree is the one that shows how to derive any specific word of the language described by CFG but Total Language Tree shows all words of the Language described by CFG on it

Q No 2.What does mean the LANGUAGE IS CLOSED?

When we say that a Language is closed it is always with respect to certain operation.
A simple example may be that the set of integers is closed under addition. It means when we take two numbers from set of integers say 3, 7 the result of their addition would also be in the set of integers.
Similarly if the result of an operation on the words of a language results in the word of the same language we say that the language is closed under that operation.

Q No 3.What are the Productions?

Productions are the grammatical rules and regulations. These rules express the behavior of CFG. Using production in CFG terminals are converted into non-terminals and when all the terminals are converted using productions, a word is acquired.

Q No 4.What is the difference between concatenation and intersection of two FA's also what is the difference among Union of two FA's and addition of them?

In intersection of two FA's only those strings are accepted which are independently accepted by both FA's, while in concatenation of two FA's only those strings will be accepted in which first part of string is accepted by first FA and remaining part of string is accepted by the second FA.

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While taking union of two FA's one can represent it using + sign. So (FA1 U FA2) and (FA + FA2) both are same. There is no difference between them.

FAQ's about Lectures 36 to 40

Q No 1.What is the Difference between Nullable and Null production? How to make eliminate Nullable and for Null Productions from the CFG ?

The production of the form
nonterminal ® L
is said to be ***null production***.

Example:
Consider the following CFG
S ® aA|bB|L, A ® aa|L, B ® aS
Here S ® L and A ® L are null productions.
A production is called ***nullable production*** there is a derivation that starts at Non Terminal and leads to L *i.e.*
S ----------> *aA* | *bB* | *aa*
A----------> *C* | *bb*
C----------> L
Here A nullable Non Terminal due to Nullable production A----------> C as C leads to null.

Example:
Consider the following CFG
S ® XY, X ® Zb, Y ® bW
Z ® AB, W ® Z, A ® aA|bA|L
B ®Ba|Bb|L.
Here A ® L and B ® L are null productions, while Z ® AB, W ® Z are nullable productions.

Method:
Delete all the Null productions and add new productions *e.g.*
Consider the following productions of a certain CFG X ® aNbNa, N ® L, delete the production N ® L and using the production
X ® aNbNa, add the following new productions
X ® aNba, X ® abNa and X ® aba
Thus the new CFG will contain the following productions X ® Nba|abNa|aba|aNbNa
Note: It is to be noted that X ® aNbNa will still be included in the new CFG.

Method:
Consider the following CFG
S ® XY, X ® Zb, Y ® bW
Z ® AB, W ® Z, A ® aA|bA|L
B ®Ba|Bb|L.
Here A ® L and B ® L are null productions, while Z ® AB, W ® Z are nullable productions. The new CFG after, applying the method, will be
S ® XY
X ® Zb|b
Y ® bW|b
Z ® AB|A|B
W ® Z

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A ® aA|a|bA|b
B ®Ba|a|Bb|b
Note: While adding new productions all Nullable productions should be handled with care. All Nullable productions will be used to add new productions, but only the Null production will be deleted

Q No 2. Is it possible to make CFG for infix and postfix expression's using derivation tree ?
Derivation tree is only used to derive words of language that is described by a CFG. Yes, we can create CFG for languages infix expressions, postfix expressions.

Q No 3 what is the uses of push down automata in computing ?
PDA is just an enhancement in FAs. i.e Memory is attached with machine that recognizes some language. FA is basic structure for most advanced electronic machines such as computer etc.

Q No 4 What is difference between PUSH DOWN STACK and PUSH DOWN STORE ?
No difference at all. Both terms are used to describe memory structure attached with FAs to store some characters in it.

Q No 5 How we can distinguish between "CFG" and "CNF" in the questions ?
Chomsky Normal Form (CNF)
If a CFG has only productions of the form
nonterminal ---------◊ string of two nonterminals
or
Nonterminal ----------◊ one terminal
Then the CFG is said to be in Chomsky Normal Form (CNF).
Thus if the given CFG is in the form specified above it will be called in CNF.

Q No 6.What is meant by the terms stack consistence and input tape consistence ?
Term **Stack consistent** means we can pop any character from the top of the stack only. PDA should not be able to pop any character other than that is present on the top of the stack.
Term **Tape consistent** means we can read only the first letter on the tape not any other letter of the tape after the first one.

Q No 7 What is the concept of unit production ?
The productions of the form
one Nonterminal --------◊ one Nonterminal
Are called unit productions.
For example
S --------◊ A (Unit Produciton)
A--------◊ a | b
Here there is no need of Unit Production S→A. we can directly write
S ----→ a | b

Q No 8 Why Context Free Grammars are called "Context Free?
Context Free Grammars are called context free because the words of the languages of Context Free Grammars have words like “aaabbb”(PALINDROME). In these words the value of letters (a , b) is the same on whatever position they appear. On the other hand in context sensitive grammars their value depend on the position they appear in the word a simple example may be as follows
Suppose we have a decimal number **141** in our language **.** When compiler reads it, it would be in the form of string. The compiler would calculate its decimal equivalent so that we can perform mathematical functions on it. In calculating its decimal value , weight of first **“1”** is different than the second “1” it means it is **context sensitive** (depends on in which position the “1” has appeared).

i.e.

$$14 = 10^0 * 1 + 10^1 * 4 + 10^2 * 1$$

(value of one is 100) (value of one is just one)

That is not the case with the words of Context Free Languages. (The value of "**a**" is always same in whatever position **"a"** appears).

Q No 9. What is Unit Production?

The production in which one non-terminal leads to only one non-terminal.

Q No 10.What is Left most Derivation in CFG?

It is a method of generation of strings from a CFG starting from left most letter of the string.

FAQ's about Lectures 41 to 45

Q No 1.Give a example of converting a CFG to CNF?

Consider the CFG given below

S→ ABC

A→ aa | b

B→ c

C→d

Its CNF will be

S→ DC

D → AB

A→ EE | b

E→a

B→c

C→d

Q No 2.In the lecture 41 's example, we have converted PDA to conversion form and a word 'aaaabb' is derived from this conversion form PDA. What are the derivation steps.

The PDA converted to conversion form has some specific features that are important to understand first. These features are

The states named START, READ, HERE and ACCEPT are called joints of the machine.

With the help of the conversion form we have been able to achieve that POP state has only one path out of it and the path taking (multiple paths) decisions take place only on the READ state.

The word 'aaaabb' is generated as follows from the PDA

START-POP4-PUSH $

This step pops $ and then pushes it to ensure that stack contains $ at the beginning.

READ1-POP6-PUSH $-PUSH a

As first time after reading "a" there is $ at the top of stack so we will follow path segment READ1-POP6-PUSH $-PUSH a

READ1-POP5-PUSH a-PUSH a

Now a is on the top of the stack so we will follow READ1-POP5-PUSH a-PUSH a

READ1-POP5-PUSH a-PUSH a

Again following same segment for a

READ1-POP5-PUSH a-PUSH a

Again following same segment for a

READ1-POP1- HERE-POP2
As we read b on input tape.
READ2-POP1-HERE-POP2
As we read b on input tape.
READ2-POP3-ACCEPT.
As we read Δ from the input tape

Q No 3.How to differentiate between "wanted" and "unwanted branch" ?

When we derive a word in Top down parsing beginning with the starting Non Terminal the branches of the tree that do not lead to our required word are left aside these branches are called unwanted branches.
For example for CFG
S----->AA
A----->a | b
If we want to generate the word "aa" we will leave the branch generated by the production A------>b.

Q No 4.What is the difference between intersection and union of a language?

Intersection of two languages will consist of all those words which are in both languages while union of two languages will consist of all those words which are present in at least one language. Symbol for intersection is ∩ and for union is U.

Q No 5.What is the difference between Context free languages and regular languages?

Regular languages can be represented by FA's because we do not need any memory to recognize (accept or reject them on FA) them but there is another class of languages that can not be represented by FA's because these languages require that we have some memory (with the help of memory we can store letters of the string we are checking so that we can compare them with next coming letters in the string).
For example language anbn requires that we must store a's and then compare their count with next coming b's so that we can check whether a's are equal to b's or not.
Due to this reason we use Context Free Grammars to represent them because we can5t write RE's for them.
So Context Free Languages represent a broader category this category also include regular languages as subcategory. It means that context free languages include regular languages as well as some other languages.

Q No 6.What is the difference between Moore and Mealey machines?

In Mealy Machine we read input string letters and generate output while moving along the paths from one state to another while in Moore machine we generate output on reaching the state so the output pattern of Moore machine contains one extra letter because we generated output for state q0 where we read nothing.

Q No 7.What does the following terms mean

i. STACK Consistent
ii. Y-able Paths
iii. Working string
iv. Semi Word means

Stack consistence means that in the PDA converted in the conversion form, when we follow a path segment (which is formed by combining **start, read or here state with next read, here or accept state on the path)** along the PDA its pop state should have the path for the same letter that is present on the top of the stack at that stage. If this doesn't happen our PDA will crash because in conversion form of the PDA the pop state has only one letter path, so if we could not be able to

find that letter on the top of the stack our PDA will crash (if will not find path where to go from that state)

Working string means the string present on the input tape.

Y-able Paths means that when we follow a certain sequence of rows from the row table to generate a path for a word form start state to accept state. The path (sequence of rows) should be stack as well as joint consistent it means that rows should end at the same read or here state (join consistency) and the rows should be able to pop the letter from the top that is indicated in the pop state of the row.

Semi word is the string of terminals it may be null string ending with a Non terminals on the right. For example some semi words are

aaS

aabbA

B

Is Automata Theory is a Programming Subject or theoretical?

Automata theory is the study of *abstract* computing devices, or "machines". This topic goes back to the days before digital computers and describes *what is possible to compute using an abstract machine*.

These ideas directly apply to creating compilers, programming languages, and designing applications. They also provide a formal framework to analyze new types of computing devices, e.g. biocomputers or quantum computers

What are practical Examples of the implications of Automata Theory and the formal Languages?

Grammars and languages are closely related to automata theory and are the basis of many important software components like:

- Compilers and interpreters
- Text editors and processors
- Text searching
- System verification

What are the Types of Automata?

- The Types of Automata Theory are
- Finite Automata
- Regular Languages
- Linear-bounded Automata
- Context Sensitive Languages
- Push-Down Automata
- Context Free Languages
- Turing Machines
- Recursively innumerable languages

There are others as well like,

- Random Access Machines
- Parallel Random Access Machines
- Arrays of Automata

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Question:	**How types of Automata Differ?**
Answer:	They differ in the following areas Complexity (or Simplicity) Power In the function that can be computed. In the languages that can be accepted.

Question:	**What is the difference between the alphabet and an element of a set?**
Answer:	Alphabets is a set of letters nothing else but a set of strings (elements) can have more than one letters in one string.
Question:	**Difference between Palindrome and Reverse function?**
Answer:	The language consisting of Λ and the strings s defined over Σ such that Rev(s)=s. It is to be denoted that the words of PALINDROME are called palindromes. Reverse (w) = w Example: Σ={a,b}, PALINDROME={Λ , a, b, aa, bb, aaa, aba, bab, bbb, ...} If a is a word in some language L, then reverse (a) is the same string of letters spelled backwards, called the reverse of a. e.g reverse (xxx) = xxx reverse (623) = 326 reverse (140) = 041

Question:	**Define Strings?**
Answer:	Concatenation of finite letters from the alphabet is called a string. e.g If Σ= {a,b} then a language L can be defined as L = {a, abab, aaabb, abababababababab,.....} it's mean all words with a's more or equal to b's

Question:	**Define empty or null strings?**
Answer:	Concatenation of finite letters from the alphabet is called a string. Sometimes a string with no symbol at all is used, denoted by (Small Greek letter Lambda) λ or (Capital Greek letter Lambda) Λ, is called an empty string or null string.

Question:	**Difference between string and word?**
Answer:	Any combination of letters of alphabet that follows rules of language is called a word. A string is a finite sequence of symbols from an alphabet.

Question:	**There are as many palindromes of length 2n as there are of length 2n-1, please explain?**
Answer:	If we try to create palindromes then middle elements (2 in even palindromes & 1 in odd palindrome) does not cause any change in no. of palindromes Defining the language PALINDROME, of length 2n and 2n-1 defined over S = {a,b}

e.g if we take n= 2 for 2n
Length (2n) = 4 and string can be written as
{aaaa, abba, baab, bbbb}
And if we take n = 2 for 2n-1
Length (2n-1) = 3 and string can be written as
{aaa, aba, bab, bbb}

Question: **Define Kleene Star?**

Answer: Given Σ, then the Kleene Star Closure of the alphabet Σ, denoted by Σ*, is the collection of all strings defined over Σ, including Λ.
It is to be noted that Kleene Star Closure can be defined over any set of strings.
Examples
If Σ = {x}
Then Σ* = {Λ, x, xx, xxx, xxxx, ….}
If Σ = {0,1}
Then Σ* = {Λ, 0, 1, 00, 01, 10, 11, ….}
If Σ = {aaB, c}
Then Σ* = {Λ, aaB, c, aaBaaB, aaBc, caaB, cc, ….}
Note:
Languages generated by Kleene Star Closure of set of strings, are infinite languages. (By infinite language, it is supposed that the language contains infinite many words, each of finite length).

Question: **Why do not we can write" ba" in the set of PALINDROME while it is reverse of "ab".**

Answer: The language consisting of Λ and the strings s defined over Σ such that Rev(s)=s.
It is to be denoted that the words of PALINDROME are called palindromes.
Example
For Σ={a,b},
PALINDROME={Λ , a, b, aa, bb, aaa, aba, bab, bbb, ...}
All two length string cannot satisfied the palindrome. aa and bb in palindrome but ba and ab are not in palindrome.

Question: **What are the steps of Recursive Definition of Languages?**

Answer: A recursive definition is characteristically a three-step process.
First, we specify some basic objects in the set.
Second, we give rules for constructing more objects in the set from ones we already know.
Third, we declare that no objects except those constructed in this way are allowed in the set.

Question: **Strings that ending in "a " and strings containing exactly one "a".**

Answer: Its means all string ending in a
e.g Σ= {a, b}
{a, aa, ba, aba, baa,…….}
Exactly a, defined over Σ= {a, b}
{ab, ba, abb, bba,…….. }

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Question: **What is Lexical Analyzer?**

Answer: The first phase of the compiler is the lexical analyzer, also known as the scanner, which recognizes the basic language units, called tokens.

- The exact characters in a token is called its lexeme.
- Tokens are classified by token types, e.g. identifiers, constant literals, strings, operators, punctuation marks, and key words.
- Different types of tokens may have their own semantic attributes (or values) which must be extracted and stored in the symbol table.
- The lexical analyzer may perform semantic actions to extract such values and insert them in the symbol table.

Question: **What is accepting string language?**

Answer: The strings which follow rules for the language are accepted in language.

- Let u and v be strings. Then uv denotes the string obtained by concatenating u with v, that is, uv is the string obtained by appending the sequence of symbols of v to that of u. For example if u = aab and v = bbab,
then uv = aabbbab. Note that vu = bbabaab uv. We are going to use first few symbols of English alphabet such as a and b to denote symbols of an alphabet and those toward the end such as u and v for strings.

Question: **What is transition table?**

Answer: A complete transition table contains one column for each character. To save space, table compression may be used. Only non-error entries are explicitly represented in the table, using hashing, indirection or linked structures.
Tabular representation of a function that takes two arguments and returns a value

	0	1
◊ q0	q2	q0
*q1	q1	q1
q2	q2	q1

- Rows correspond to states
- Columns correspond to inputs
- Entries correspond to next states
- The start state is marked with an arrow
- The accepting states are marked with a star

Question: **What does it means by the transition?**

Answer: Transition means which letter, after being read, is transfer from which place to which place. It is necessary to show transition of every letter from each and every state.

Question: **What is Null?**

Answer: Λ is a string having no letter in it. e.g (A box having no object in it).
Let us observe that if the alphabet has no letters, then its closure is the language with the null string as its only word, because Λ is always a word in a Kleen closure. Symbolically,
we write
if Σ = {the empty set}

then Σ* = {Λ},
This is not the same as
if S = {Λ}
then S* = {Λ}
which is also true but for a different reason, that is ΛΛ = Λ.
Example
If L is any language, then
LΛ = ΛL = L
If Λ string concatenates with any string S, it does not cause any change in the string S, if we use Λ in any string then it generates some result that is below here
Λ for both side then string is ΛaaΛ = aa
b for left and Λ for right then string is baaΛ = baa
Λ for left and b for right then string is Λaab = abb

Question:	**What is the difference between Regular Languages and Non Regular Languages?**
Answer:	The language determined by a regular expression is regular otherwise non regular.

Question:	**What is NFA?**
Answer:	Nondeterminism plays a key role in the theory of computing. A nondeterministic finite state automaton is one in which the current state of the machine and the current input do not uniquely determine the next state. This just means that a number of subsequent states (zero or more) are possible next states of the automaton at every step of a computation. Of course, nondeterminism is not realistic, because in real life, computers must be deterministic. Still, we can simulate nondeterminism with deterministic programs. Furthermore, as a mathematical tool for understanding computability, nondeterminism is invaluable. As with deterministic finite state automata, a nondeterministic finite state automaton has five components. a set of *states* a finite *input alphabet* from which input strings can be constructed a *transition function*that describes how the automaton changes states as it processes an input string a single designated*starting state* a set of *accepting states* The only difference lies in the transition function, which can now target subsets of the states of the automaton rather than a single next state for each state, input pair.
Question:	**What is a main difference between NFA and FA?**
Answer:	Finite Automata (FA) A finite automaton with unique transitions from each state. There are no choices There is only 1 letter of the alphabet per transition (the label on the edges in the graph is limited to 1) Λ transitions are not allowed. No implied trap states. That is, if the letter of alphabet has n letters in it, every state will have n edges coming out of it. If the letters are not part of a valid word, then the edges will go into a special state, called the trap states. Trap states are the NO states. Nondeterministic Finite Automaton (NFA) Has the freedom to do various different moves when in a state and seeing some input

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This is modeled mathematically as
The ability to be in various states at once
Accepting a string whenever at least one of those states is accepting.

Question:	**How to obtain 9's complement?**
Answer:	The (r – 1)'s Complement Given a positive number N is base r with an integer part of n digits and a fraction part of m digits, the (r-1)'s complements of N is defined as $r^n - r^{-m}$ – N. Some numerical examples follow: The 9's complement of $(52520)_{10}$ is $(10^5 - 1 - 52520) = 99999 - 52520 = 47479$. No fraction part, so $10^{-m} = 10^0 = 1$. The 9's complement of $(0.3267)_{10}$ is $(1 - 10^{-4} - 0.3267) = 0.9999 - 0.3267 = 0.6732$ No integer part, so $10^n = 10^0 = 1$. The 9's complement of $(25.639)_{10}$ is $(10^2 - 10^{-3} - 25.639) = 99.9999 - 25.63967 = 74.360$

Question:	**What is DELAY box?**
Answer:	It is a component which held input for some time and then forwards it just a holder.

Question:	**What is the difference between pumping Lemma 1 and pumping Lemma 2?**
Answer:	Infact PLI & PLII are same (A way to recognize Non Regular language). The only difference is in PLII we take care about the substring x & y that length (x) + length (y) less than or equal no. of state of machine. This is because through PLI palindrome (that is Non Regular) is proved to be regular and through PLII this problem is fixed.

Question:	**What is pumping lemma? And what is history?**
Answer:	A theorem to check validity (Regularity) of an infinite language should not be used with finite languages. Whenever an infinite is regular then there must be a loop (circuit) because without a loop means infinite no. of states that is not possible practically. (Machine can have finite states only)

Question:	**What is the difference between semi word and word?**
Answer:	A word is complete combinations of terminals only e.g. abba or ab or a or null string. Semiword: A semiword is a string of terminals (may be none) concatenated with exactly one nonterminal on the right i.e. a semiword, in general, is of the following form (terminal)(terminal)… (terminal)(nonterminal)

Question:	**What is the difference between derivation tree and total tree?**
Answer:	A Derivation tree is the one that shows how to derive any specific word of the language described by CFG but Total Language Tree shows all words of the Language described by CFG on it.

Question:	**How to identify a production by it, ambiguity will be removed?**
Answer:	It is a matter of practice that one can know how to remove ambiguity from it, only practice makes you efficient enough to do it in less time.

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Question: **Difference between Nullable and Null production? How to make CFG for Nullable and for Null?**

Answer: The production of the form
nonterminal ® L
is said to be ***null production***.

Example:
Consider the following CFG
S ® aA|bB|L, A ® aa|L, B ® aS
Here S ® L and A ® L are null productions.
A production is called ***nullable production*** if it is of the form
N ® L
or
there is a derivation that starts at N and leads to L *i.e.*
N1 ® N2, N2 ® N3, N3 ® N4, …, Nn ® L, where N, N1, N2, …, Nn are non terminals.

Example:
Consider the following CFG
S ® XY, X ® Zb, Y ® bW
Z ® AB, W ® Z, A ® aA|bA|L
B ®Ba|Bb|L.
Here A ® L and B ® L are null productions, while Z ® AB, W ® Z are nullable productions.

Method:
Delete all the Null productions and add new productions *e.g.*
Consider the following productions of a certain CFG X ® aNbNa, N ® L, delete the production N ® L and using the production
X ® aNbNa, add the following new productions
X ® aNba, X ® abNa and X ® aba
Thus the new CFG will contain the following productions X ® Nba|abNa|aba|aNbNa
Note: It is to be noted that X ® aNbNa will still be included in the new CFG.

Method:
Consider the following CFG
S ® XY, X ® Zb, Y ® bW
Z ® AB, W ® Z, A ® aA|bA|L
B ®Ba|Bb|L.
Here A ® L and B ® L are null productions, while Z ® AB, W ® Z are nullable productions. The new CFG after, applying the method, will be
S ® XY
X ® Zb|b
Y ® bW|b
Z ® AB|A|B
W ® Z
A ® aA|a|bA|b
B ®Ba|a|Bb|b
Note: While adding new productions all Nullable productions should be handled with care. All Nullable productions will be used to add new productions, but only the Null production will be deleted.

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Question:	**Is it possible to make CFG for infix and postfix expression's using derivation tree?**
Answer:	Derivation tree is only used to derive words of language that is described by a CFG. Yes, we can create CFG for languages infix expressions, postfix expressions.
Question:	**What are the uses of push down automata in computing?**
Answer:	PDA is just an enhancement in FAs. i.e Memory is attached with machine that recognizes some language. FA is basic structure for most advanced electronic machines such as computer etc.

Question:	**What is difference between PUSH DOWN STACK and PUSH DOWN STORE?**
Answer:	No difference at all. Both terms are used to describe memory structure attached with FAs to store some characters in it.

Question:	**How to accommodate NULL string if it is part of language during converting from CFG to CNF and building FA's?**
Answer:	When we convert CFG to CNF and Null is a part of language then null string is not part of language in CNF. This is the only change a language gets in CNF. When we draw an FA for a CFG, there is no change in language and simply draws FA that accepts the language of CFG.

Question:	**How to accommodate NULL string if it is part of language during converting from CFG to CNF and in building PDA?**
Answer:	When we convert CFG to CNF and Null is a part of language then null string is not part of language in CNF. This is the only change a language gets in CNF. When we draw an PDA for a CFG, there is no change in language and simply draws PDA that accepts the language of CFG.

Question:	**What is Push down Automata?**
Answer:	Pushdown Automaton (PDA), consists of the following An alphabet S of input letters. An input TAPE with infinite many locations in one direction. Initially the input string is placed in it starting from first cell; the remaining part of the TAPE is empty. An alphabet G of STACK characters. A pushdown STACK which is initially empty, with infinite many locations in one direction. Initially the STACK contains blanks. One START state with only one out-edge and no in-edge. Two halt states i.e. ACCEPT and REJECT states, with in-edges and no out-edges. A PUSH state that introduces characters onto the top of the STACK. A POP state that reads the top character of the STACK (may contain more than one out-edges with same label). A READ state that reads the next unused letter from the TAPE (may contain more than one out-edges with same label).
Question:	**Why we study Automata?**
Answer:	Automata theory is the study of abstract computing devices, or "machines". This topic goes back to the days before digital computers and describes what is possible to compute using an abstract machine.

These ideas directly apply to creating compilers, programming languages, and designing applications. They also provide a formal framework to analyze new types of computing devices, e.g. biocomputers or quantum computers. Finally, the course should help to turn you into mathematically mature computer scientists capable of precise and formal reasoning.
More precisely, we'll focus primarily on the following topics. Don't worry about what all the terms mean yet, we'll cover the definitions as we go:
1. Finite state automata: Deterministic and non-deterministic finite state machines; regular expressions and languages. Techniques for identifying and describing regular languages; techniques for showing that a language is not regular. Properties of such languages.
2. Context-free languages: Context-free grammars, parse trees, derivations and ambiguity. Relation to pushdown automata. Properties of such languages and techniques for showing that a language is not context-free.
3. Turing Machines: Basic definitions and relation to the notion of an algorithm or program. Power of Turing Machines.
4. Undecidability: Recursive and recursively enumerable languages. Universal Turing Machines. Limitations on our ability to compute; undecidable problems.
5. Computational Complexity: Decidable problems for which no sufficient algorithms are known. Polynomial time computability. The notion of NP-completeness and problem reductions. Examples of hard problems.

Question: **What is valid and invalid alphabets explain with example?**

Answer: Example 1
If s=abc is a string defined over Σ= {a,b,c}
then Rev(s) or sr = cba
Σ= {a,b}
s=abbaa
Rev(s)=aabba
When more then letter in the alphabet you have to be quite careful that don't reverse the symbols however you write the letter from right to left.
Example 2
Σ= {B, aB, bab, d}
s=BaBbabBd
Rev(s)=dBbabaBB
Example 3
Σ= {ab, b, aa}
s=abbaa
Rev(s)=aabab
Σ1= {B, aB, bab, d} is valid alphabet as there is no letter in Σ1 that lies in start of any other letter means all the tokens of any word (string) will be unique. Whereas in Σ2= {B, Ba, bab, d} letter B lies in start of letter Ba.
This makes it difficult to decide which token to select at some point if B occurs in any string.

Question: **Why we use Capital Letters for Languages. Is it possible to combine two languages together like EVEN-EVEN & EQUAL, and so on?**

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Answer:	We use capital letter for our convenient and yes you can combine two languages.

Question:	**What are the rules to form WORDS in languages developed by Automata? Are strings not following any rule?**
Answer:	Rules are different for different languages. e.g Σ={a,b} The language L of strings of even length, defined over Σ= {a,b}, can be written as Valid for even length L= {aa, bb, aabb, bbaa, baab, abba …..} Invalid for even length L= {a, b, aaa, bbb, aba, bab, …….} The language L of strings of odd length, defined over Σ= {a,b}, can be written as Valid for odd length L1= {a, b, aaa, bbb, aba, bab, …….} Invalid for odd length L= {aa, bb, aabb, bbaa, baab, abba …..} Strings cannot follow any rule.

Question:	**What are graphs of palindromes of length 2n and length 2n-1?**
Answer:	Palindromes of even length are always symmetric about the middle line and palindromes of odd length are always symmetric about middle letter. If we try to create palindromes then middle elements (2 in even palindromes & 1 in odd palindrome) does not cause any change in no. of palindromes Defining the language PALINDROME, of length 2n and 2n-1 defined over S = {a,b} e.g if we take n= 2 for 2n Length (2n) = 4 and string can be written as {aaaa, abba, baab, bbbb} And if we take n = 2 for 2n-1 Length (2n-1) = 3 and string can be written as {aaa, aba, bab, bbb}
Question:	**How can we write a RE for a given number of words?**
Answer:	In example let us consider a finite language L that contains all the strings of a's and b's of length three exactly: L = {aaa aab aba abb baa bab bba bbb} The first letter of each word in L is either an a or a b. The second letter of each word in L is either an a or a b. The third letter of each word in L is either an a or a b. So, we may write L = language ((a+b)(a+b)(a+b)) Or L = language $((a+b)^3)$ If we want to define the set of all seven-letter strings of a's and b's, we could write $(a+b)^7$. In general, if we want to refer to the set of all possible strings of a's and b's of any length whatsoever, we could write (a+b)* This is the set of all possible strings of letters from the alphabet ∑ = {a, b} including the null string. This is a very important expression and we shall use it often. Again, this expression represents a language. If we choose that * stands for 5, then (a+b)* gives $(a+b)^5$ = (a+b)(a+b)(a+b)(a+b)(a+b)

We now have to make five more choices: either a or b for the first letter, either a or b for second letter, and so on.

21. Please explain that in some expression having more then one plus sign the resulting string is only one from them or it can be more then one? For example if there is an expression: a +b + c, with out any small bracket between them the resultant string is "a or b or c" OR it cans both "a or b and c","a and b or c"

The resulting string is only one from them. Whenever we put + signs between n words that means one option (only) out of all available.

Question: **One Language generates many REs?**

Answer: Sometimes we generate many Regular Expressions (RE) for one language these REs are called Equal RE.

Example:

Consider the following regular expressions

r1= (a + b)* (aa + bb)

r2= (a + b)*aa + (a + b)*bb then

both regular expressions define the language of strings ending in aa or bb.

This RE (aa+bb) is separated by +. Whenever RE is separated by +, two possibilities occur

1. Before + part
2. After + part

(a+b)*aa comes before + part, means RE generate all strings that end with aa. (a+b)*bb comes after + part this means RE generate all strings that end with bb. In short we can say r2 generates the language of strings ending either aa or bb this is equal to r1.

Question: **Rules for determining RE for a given language defined on a set?**

Answer: The following rules define the language associated with any regular expression:

Rule 1: The language associated with the regular expression that is just a single letter is that one-letter word alone and the language associated with null is just {null}, a one-word language.

Rule 2: If r1 is a regular expression associated with the language L1 and r2 is regular expression associated with the language L2, then:

- The regular expression $(r_1)(r_2)$ is associated with the product L_1L_2 that is the language L_1 times L_2

language $(r_1r_2) = L_1L_2$

- The regular expression $r_1 + r_2$ is associated with the language formed by the union of the sets L_1 and L_2:

language $(r_1 + r_2) = L_1 + L_2$

- The language associated with the regular expression $(r_1)^*$ is L_1^*, the Kleene closure of the set L_1 as a set of words:

language$(r_1^*) = L_1^*$

Once again, this collection of rules proves recursively that there is some language associated with every regular expression. As we build up a regular expression from the rules, we simultaneously are building up the corresponding language.

Question: **What is EVEN - EVEN LANGUAGE?**

Answer: Even-Even means count of a's is even and cout of b's is also even.

Even + Even = Even (Proved)

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So we can divide any string excluding Λ which is also in Even-Even in substrings of length 2 each.
It gives us following combinations
aa, bb makes no change in string status
ab, ba create disorder in string status
so (aa+bb+(ab+ba)(aa+bb)*(ab+ba))*.

Question: **What is tokenizing string?**
Answer: Tokenize a string means make its valid units.
Question: **What is whole star?**
Answer: Whole star of any RE means all possible combinations of that RE including Λ.

Question: **How to use + operator in Automata?**
Answer: Plus Operation is same as Kleene Star Closure except that it does not generate Λ (null string), automatically.

Question: **How to know what is RE?**
Answer: It is a matter of practice that you come to know what does an RE represent. You may start with simpler REs and later you will be able to recognize different REs gradually.

Question: **Why we use null string in FA?**
Answer: If null string is part of our language then we have to handle it in FA, its not compulsion.

Question: **What is tree structure?**
Answer: A tree is a connected undirected graph with no simple circuits. Since a tree cannot have a simple circuit, a tree cannot contain multiple edges or loops. Therefore any tree must be a simple graph.
Question: **What is difference between (a, b) & (a + b)?**
Answer: (a, b) & (a + b) are same and both represents either a or b.

Question: **Difference between FA & TG?**
Answer: Finite Automata (FA)
· A finite automaton with unique transitions from each state.
· There are no choices
· There is only 1 letter of the alphabet per transition (the label on the edges in the graph is limited to 1)
· Λ transitions are not allowed.
· No implied trap states. That is, if the letter of alphabet has n letters in it, every state will have n edges
coming out of it. If the letters are not part of a valid word, then the edges will go into a special state, called the trap states. Trap states are the NO states.
Transition Graphs (TG)
·TG are generalizations of FA.

· Can change state without an input.
· Can read more than one letter at a time.
· Can have a regular expression as a edge label.
· Can have more then one start state.
We are not bound in TG. We are only given a freedom or relation which we are not forced to use. We may or may not use it on will.
In fact we enjoy freedom of staying at multiple places at one time in TGs while reading any letter strings which provides us a facility that any one available path it leads us to final state, word is accepted.

Question: **Difference between $(a+b)^+$ and $(a+b)^*$?**

Answer: $(a + b)^+$ means, we repeat RE a + b infinite (any) no. of times but minimum once, whereas (a + b)* means we may repeat a + b any no. of times even zero times. () are only used to clear (distinguish) the one RE from some other RE.

Question: **What is length of string?**

Answer: The length of a string indicates how many symbols are in that string.
For example, the string 0101 using the binary alphabet has a length of 4. The standard notation for a string w is to use |w|.
For example:
Length of string: |0101| is 4.
Length of string: |0010| = 4, |aa| = 2, | |= 0

Question: **After looking the on diagram how can we say it is TG or is FA?**

Answer: Every FA is also a TG but not every TG is FA.
In every FA, every state shows transition of all letters of given alphabet but in any TG it is not must. In TG, we may or may not show all letters transition according to requirement. We can also show transitions on reading any strings in TGs but it is not possible in FAs.

Question: **Differentiate between FA, TG and GTG?**

Answer: Every FA is also a TG but not every TG is FA.
In every FA, every state shows transition of all letters of given alphabet but in any TG it is not must. In TG, we may or may not show all letters transition according to requirement. We can also show transitions on reading any strings in TGs but it is not possible in FAs. In GTG Directed edges connecting some pair of states labeled with regular expression. It may be noted that in GTG, the labels of transition edges are corresponding regular expressions. In TG we write strings and in GTG we are bound to write RE.

Question: **Difference between even clumps and odd clumps?**

Answer: Letters may be a's (for example) in even count at one place.
e.g.
aab = valid
baa = valid
aba = invalid
abab = invalid

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Question:	**Difference between containing and consisting?**
Answer:	Containing something (e.g. R1) means R1 is there (must), whatever other things are, we don't care. Consisting something (e.g. R1) means only R1 is there all other things should be rejected.

Question:	**Define the main formula of Regular expressions? Define the back ground of regular expression?**
Answer:	Regular expressions are a notation that you can think of similar to a programming language. In fact, regular expressions are quite fundamental in some programming languages like perl and applications like grep or lex. Regular expressions are similar to NFA and end up describing the same things we can express with a finite automaton. However, regular expressions are declarative in what strings are accepted, while automata are machines that accept strings. We use Regular expressions for defining the languages. Say that R is a regular expression if R is: 1. a for some a in the alphabet Σ, standing for the language {a} 2. Λ , standing for the language { Λ} 3. R1+R2 where R1 and R2 are regular expressions, and + signifies union 4. R1R2 where R1 and R2 are regular expressions and this signifies concatenation 5. R* where R is a regular expression and signifies closure 6. (R) where R is a regular expression, then a parenthesized R is also a regular expression A set of strings from an alphabet. The set may be empty, finite or infinite. The building blocks of regular languages are symbols, concatenation of symbols to make strings (words), set union of strings and Kleene closure (denoted as *, also called the Kleene star, it should be typed as a superscript but this is plain text.) Informally, we use a syntax for regular expressions. Using sigma as the set {0, 1} (an alphabet of two symbols) 01110 is a string starting with the symbol 0 and then concatenating 1, then 1, then 1, and finally concatenating 0. No punctuation is used between symbols or strings that are concatenated. (01+10) is a union of the two strings 01 and 10. The set {01, 10} (00+11)* is the Kleene closure of the union of 0 concatenated with 0 and 1 concatenated with 1. The Kleene closure (star) is defined as the concatenation of none, one, two, or any countable number strings it applies to. Examples of Kleene star: 1* is the set of strings {Λ, 1, 11, 111, 1111, 11111, etc. } This set is infinite. (1100)* is the set of strings {Λ, 1100, 11001100, 110011001100, etc. } (00+11)* is the set of strings {Λ, 00, 11, 0000, 0011, 1100, 1111, 000000, 000011, 001100, etc. } Note how the union (+ symbol) allows all possible choices of ordering when used with the Kleene star. (0+1)* is all possible strings of zeros and ones, often written as Σ * where Σ = {0, 1}(0+1)* (00+11) is all strings of zeros and ones that end with either 00 or 11. Note that concatenation does not have an operator symbol. (w)+ is a shorthand for (w)(w)* w is any string or expression and the superscript plus, + , means one or more copies of w are in the set defined by this expression.

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Question:	**Are S* and S^{+}same?**
Answer:	No because S+ means same as Kleene Star Closure except that it does not generate Λ (null string), automatically. So in the above example, there is no null string. Concatenation of finite letters from the alphabet is called a string. If we have S={a, bb, bab, abaab}, first we factorize the string like (a) (bb) (bab) (abaab) then concatenate to each other and make more string to its concatenation but the string abbabaabab is not in S* because the last member (ab) of the group does not belong to S, so abbabaabab is not in S.
Question:	**What is set?**
Answer:	Set is a collection of distinct objects.

Question:	**How many Methods of defining the languages?**
Answer:	1. You can describe a language in English like statement 2. You can define a language by putting all its words in a set 3. You can define a language in a mathematical way 4. You can define a language by Recursive Definition 5. You can define a language by Regular Expression 6. You can define a language by Finite Automata 7. You can define a language by Transition Graph 8. You can define a language by Context Free Grammar

Question:	**What is difference between Palindrome, Kleene star closure and plus operation?**
Answer:	The language consisting of Λ and the strings s defined over Σ such that Rev(s)=s. or A string x is a palindrome if x^{R}=x. It is to be denoted that the words of PALINDROME are called palindromes. Reverse (w) = w Example: Σ={a,b}, PALINDROME={Λ , a, b, aa, bb, aaa, aba, bab, bbb, ...} If a is a word in some language L, then reverse (a) is the same string of letters spelled backwards, called the reverse of a. e.g reverse (xxx) = xxx reverse (623) = 326 reverse (140) = 041 Given Σ, then the Kleene Star Closure of the alphabet Σ, denoted by Σ*, is the collection of all strings defined over Σ, including Λ. Plus Operation is same as Kleene Star Closure except that it does not generate Λ (null string), automatically.

Question:	**What is inside language?**
Answer:	Any language contains words in it and certain rules to validate strings for that language.

Question:	**What is Equal RE?**
Answer:	Sometimes we generate many REs for one language these are called Equal RE.

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Question: **How can we make Finite Automaton from a language and a language from FA?**

Answer: There is not any formal procedure to design FA for a language. This ability just improves with time and practice.

Question: **Could we just use +, - symbols with x not with y in FA?**

Answer: Yes, you can use only + or – for the place of x and y, but remember when you don't write + or –, So you should write start and final at the beginning or ending state Or you should indicated by an arrow and a final state by drawing box or another circle around its circle because if you don't write how can we indicate the start and final state.

Question: **Explain the language L of string, defined over ∑= {0,1}, having double 0's and double 1's?**

Answer: Language of strings with 00 or 11 means string that have substrings 00 or 11 in them at least. Minimum words which are included in this language are 00 and 11. This language does not accept null and it also does not accept 0 or 1.

Question: **What are the difference between single 1 and 0 and double 1's and 0's?**

Answer: 1. Consider the language L of strings, defined over
If Σ={0, 1}, having words with either 0's or 1's without null. The language L may be expressed by RE
$(0 + 1)^+$
When you make string by above RE you have all possible combination of 0's and 1's except null i.e {0, 1, 00, 01, 10, 11,…….}. Minimum words which are included in this language are 0 and 1.
2. Consider the language L of strings, defined over
If Σ={0, 1}, having double 0's or double 1's, The language L may be expressed by the RE

$$(0+1)^* (00 + 11) (0+1)^*$$

Double 1's and 0's means clumps of letter which will always come together. Minimum words which are included
in this language are 00 and 11.

Question: **On what basis we select initial and final states?**

Answer: It depends on the expression given to us.

Question: **How we know that the given expression has how many states?**

Answer: There is not any formal procedure to know the number of states. This ability just improves with time and practice.

Question: **How will we develop the rules of transition?**

Answer: Transition means which letter, after being read, is transfer from which place to which place. It is necessary to show transition of every letter from each and every state.

Question: **Can we accept the strings going from final to initial?**

Answer: It is to be noted that if any state start from the final state it does not accept any string. Even it does not accept the null string, because there is no path starting from initial state and ending in final state.

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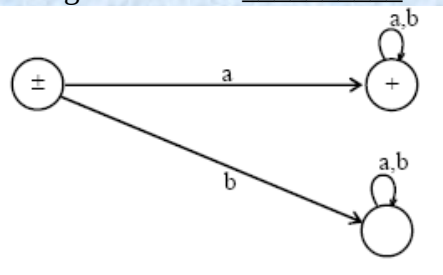
Question:	**What are the basic rules to build FA?**
Answer:	One and only rule is to build a Finite Automata (FA) should accept all words of the language and reject all the words which are not part of the language. Any FA that ensures these above things is the right FA for the language. Note: One language can have many FA.

Question:	**What is Dead state?**
Answer:	The DEAD STATE is introduced to be able to make an automaton complete without altering its behavior.

FINALTERM EXAMINATION
Fall 2012
CS402- Theory of Automata

Question No: 1 (Marks: 1) - Please choose one
If Σ = {aa, bb} , then Σ* will not contain
►**aaabbb**
►aabbbb
►aabbaa
►bbaabbbb

Question No: 2 (Marks: 1) - Please choose one
Below given FA has _____ RE.



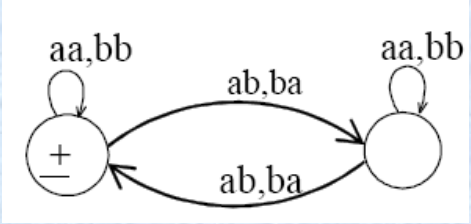
►**a(a+b)*** **(Page 14)**
► (a(a+b)*)*
►a(a+b)*a
►a(a+b)*a + b(a+b)*b

Question No: 3 (Marks: 1) - Please choose one
"One language can have _____ TG's".
►Only one
►Only two
►**More than one**
►Only three

دنیا میں سب سے مشکل کام اپنی اصلاح اور سب سے آسان کام دوسروں پر نکتہ چینی کرنا ہے

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Question No: 4 (Marks: 1) - Please choose one



Above given TG represents the language i.e.

►**EVEN-EVEN (Page 22)**
►PALINDROME
►FACTORIAL
►None of these

Question No: 5 (Marks: 1) - Please choose one

According to 1st part of the Kleene's theorem, If a language can be accepted by an FA then it can be accepted by a _____ as well.

►FA
►CFG
►GTG
►**TG (Page 25)**

Question No: 6 (Marks: 1) - Please choose one

Even-palindrome is a _____ language.

►**Non-regular** click here for detail
►Regular
►Regular but infinite
►Regular but finite

Question No: 7 (Marks: 1) - Please choose one

If L is a regular language then, L^c is also a _____ language.

► **Regular (Page 66)**
► Non-regular
► Regular but finite
► None of the given

Question No: 8 (Marks: 1) - Please choose one

Pumping lemma is generally used to prove that:

► A given language is infinite
► **A given language is not regular** Click here for detail
► Whether two given regular expressions of a regular language are equivalent or not
► None of these

بری صحبت سے تنہائی بہتر ہے اور تنہائی سے نیک صحبت بہتر ہے

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Question No: 9 (Marks: 1) - Please choose one
If the FA has N states, then test the words of length less than N. If no word is accepted by this FA, then it will _____ word/words.

►accept all
►**accept no (Page 85)**
►accept some
►reject no

Question No: 10 (Marks: 1) - Please choose one
In CFG, the symbols that can't be replaced by anything are called___.

► **Terminal (Page 87)**
► Non-Terminal
► Production
► All of given

Question No: 11 (Marks: 1) - Please choose one
Which of the following is a regular language?

► **String of odd number of zeroes** Click here for detail
► Set of all palindromes made up of 0's and 1's
► String of 0's whose length is a prime number
► All of these

Question No: 12 (Marks: 1) - Please choose one
Which of the following pairs of regular expressions are equivalent?

►1(001)* and (10)*10
►**x(xx)* and (x)*x**
► X^+ and X*
► X^+ and X* X^+

Question No: 13 (Marks: 1) - Please choose one
An alphabet of Σ is valid if

►No letter of Σ appears in middle of any other letter
►No letter of Σ appears at end of any other letter
►**No letter of Σ appears at start of any other letter (Page 4)**
►No letter of Σ appears at end or middle of any other letter

اللہ کا خوف سب سے بڑی دانائی ہے

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Question No: 14 (Marks: 1) - Please choose one
Which of the following statement is true

►The length of the output string is greater than length of input string in moore machine. Click here for detail
►The length of the output string is greater than length of input string in mealy machine.
►The length of the output string is equal to length of input string in moore machine.
►The length of the output string is less than length of input string in mealy machine.

Question No: 15 (Marks: 1) - Please choose one
If a CFG has only productions of the form
nonterminal → string of two nonterminals
or
nonterminal → one terminal
then the CFG is said to be in _____

►**Chomsky Normal Form (Page 101)**
►Ambiguous Form
►Left Aligned Form
►Right Aligned Form

Question No: 16 (Marks: 1) - Please choose one
We can also represent an FA using different states e.g Accept state; Reject state, Read state etc.
The _____ state behaves as final state of an FA
►**Accept (Page 105)**
►Pop
►Push
►Reject

Question No: 17 (Marks: 1) - Please choose one
where the input string is placed before it is run, is called _____
►Date tape
►**Input Tape (Page 105)**
►Output Tape
►Magnetic tape

Question No: 18 (Marks: 1) - Please choose one
An FSM can be considered as TM

►Of finite tape length, rewinding capability and unidirectional tape movement
►Of finite tape length, without rewinding capability and bidirectional tape movement
►Of finite tape length, rewinding capability and bidirectional tape movement
►**Of finite tape length, without rewinding capability and unidirectional tape movement** click here for detail

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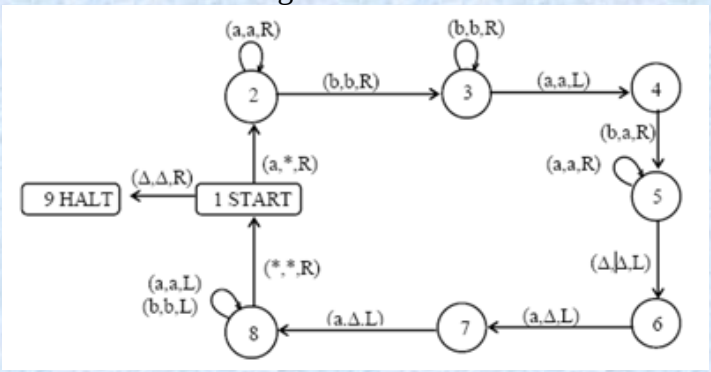
Question No: 19 (Marks: 1) - Please choose one
The process of finding the derivation of the word generated by particular grammar is called _____

►Processing
►**Parsing (Page 136)**
►Programming
►Planning

Question No: 20 (Marks: 1) - Please choose one
The first rule of converting the given "CFG in CNF", is _____

►CNK algorithm
►**CYK algorithm (Page 135) Algorithm 4 (The CYK algorithm)**
►CKY algorithm
►KYC algorithm

Question No: 21 (Marks: 1) - Please choose one
Consider the following TM



►Above TM accepts the non-CFL {a b c}
►**Above TM accepts the non-CFL** $\{a^n\ b^n\ a^n\}$ **(Page 142)**
►Above TM accepts the non-CFL $\{a^n\ b^{n+2}\ a^n\}$

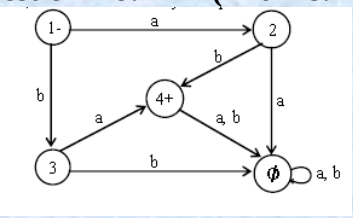
Question No: 22 (Marks: 1) - Please choose one
Alphabet Σ = {a, bc, cc} has number of letters

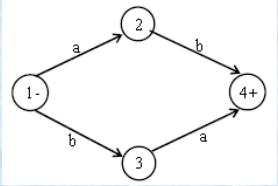
►One
►Two
►**Three**
►Four

دنیا کی سب سے بڑی فتح نفس پر قابو رکھنا ہے

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Question No: 23 (Marks: 1) - Please choose one
If r1 is a regular expression then r1* is a _____
►GTG
►NFA
►FA
►**RE (Page 9)**

Question No: 24 (Marks: 1) - Please choose one
(a)


(b)


► **(a) is FA, (b) is NFA (Page 43)**
► (a) is NFA, (b) is FA
► (a) is TG, (b) is FA
► (a) is TG, (b) is GTG

Question No: 25 (Marks: 1) - Please choose one
We cannot write regular expressions for all _____.

►FA's
►TG's
►NFA's
►**CFG's (Page 97)**

Question No: 26 (Marks: 1) - Please choose one
For every Context Free Grammar (CFG), we can make the corresponding _____.

►FA
►TG
►**PDA** click here for detail
►Regular Grammar

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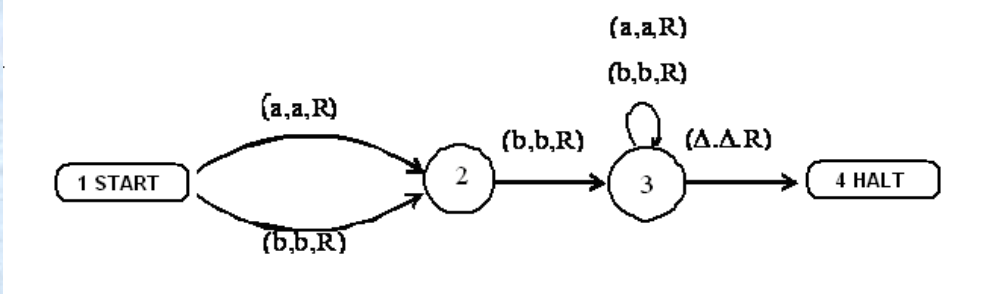
Question No: 27 (Marks: 1) - Please choose one
Pumping Lemma II says that length(x) + length(y) should be _____.

►**Less than number of states (Page 75)**
►Equal to number of states
►Greater than number of states
►Greater than or equal to number of states

Question No: 28 (Marks: 1) - Please choose one
Chomsky normal form (CYK) algorithm was proposed by _____.

►**John cock (Page 135)**
►James Cock
►Daniel I.A.
►John Weiss

Question No: 29 (Marks: 1) - Please choose one



The above machine is a/anTG _____

► Finite Automata
► **Turing machine (Page 141)**
► FA
► TG

Question No: 30 (Marks: 1) - Please choose one
The language of Palindromes defined over an alphabet set {a, b} can be recognized by _____.

►FA
►NFA
►TG
►**PDA (Page 91)**
Hint: - as it is non-regular so its CFG and PDA are possible.

ایماندار کو غصہ دیر سے آتا ہے اور جلدی دور ہو جاتا ہے

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Question No: 31 (Marks: 1) - Please choose one
Which of the following statement(s) is/are true or false?
(1)The Turing Machine is similar to a finite automation but with an unlimited and unrestricted memory.
(2) A Turing machine much more accurate model of a general purpose computer.

►**Statement 1 is true** Click here for detail
►**Statement 2 is true** Click here for detail
►Both statements (1 & 2) are false
►Statements 2 is false

Question No: 32 (Marks: 1) - Please choose one
Which of the following is the first phase of compiler on the basis of functionality?

►Parser
►Lexical analyzer
►**Scanner** Click here for detail
►Interpreter
Hint: - The first phase of a compiler is called lexical analysis (and is also known as a lexical scanner).

Question No: 33 (Marks: 1) - Please choose one
(Σ* - L) represent the _____ of a language L.

►**Complement (Page 66)**
►Kleene's closure
►Union
►intersection

Question No: 34 (Marks: 1) - Please choose one
If we have two transition graphs then their union will be expressed by
►**taking a common start state and joining them by two null transitions (Page 65)**
►just connecting both start states by null transitions
►connecting final state of first TG to the initial state of second TG
►connecting the final state of first TG to the final state of second TG

Question No: 35 (Marks: 1) - Please choose one
_____ and _____ are removed in order to make a CFG in Chomsky Normal Form(CNF).

►Null, nullable productions
►Nullable , unit productions
►**Null, unit productions (Page 102)**
►String of length 0, null

زندگی میں کامیابی کا یہی راز ہے کہ پریشانیوں سے پریشان مت بنو

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Question No: 36 (Marks: 1) - Please choose one
If L1 and L2 are expressed by regular languages then L1 + L2 is also a_____ Language.

► **Regular (Page 10)**
► Ir-regular
► PDA
► Hybrid

Question No: 37 (Marks: 1) - Please choose one
Which of the following is a regular Context Free Grammar:

►**S → abS| baS | ^** **ab(ab+ba)*ba + ba(ab+ba)*ab**
►S → aSb| baS | ^
►S → abS| bSa | ^
►S → aSb| Sa | ^
Hint :- remaining represents palindromes language which is non-regular

Question No: 38 (Marks: 1) - Please choose one
A read state can have _____ outgoing edge/ edges.

►1
►2
►3
►**Any number of (Page 111)**

Question No: 39 (Marks: 1) - Please choose one
Finite Automation (FA) and Nondeterministic Finite Automation (NFA) are equivalent if

►**FA and NFA accept the same language (Page 43)** Also click here for detail
►FA shape is same like an NFA
►FA accept the null string also
►NFA accept the null string also

Question No: 40 (Marks: 1) - Please choose one
_____ is always Deterministic.

►**Finite Automation (Page 25)**
►Transition Graph
►Generalize Transition Graph
►Non-deterministic finite automation

جھوٹ انسان اور ایمان دونوں کا دشمن ہے

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FINALTERM EXAMINATION
Spring 2010
CS402- Theory of Automata (Session - 1)

Question No: 1 (Marks: 1) - Please choose one
If r1 = (aa + bb) and r2 = (a + b) then the language (aa + bb)(a + b) will be generated by

- **(r1)(r2) (Page 10)**
- (r1 + r2)
- (r2)(r1)
- (r1)*

Question No: 2 (Marks: 1) - Please choose one
"One language can be expressed by more than one FA". This statement is _____

- **True (Page 14)**
- False
- Some times true & sometimes false
- None of these

Question No: 3 (Marks: 1) - Please choose one
Who did not invent the Turing machine?

- Alan Turing
- **A. M. Turing (Page 140)**
- Turing
- None of these

Question No: 4 (Marks: 1) - Please choose one
Which statement is true?

- **The tape of turing machine is infinite. (Page 140)**
- The tape of turing machine is finite.
- The tape of turing machine is infinite when the language is regular
- The tape of turing machine is finite when the language is nonregular.

Question No: 5 (Marks: 1) - Please choose one
A regular language:

- **Must be finite (Page 11)**
- Must be infinite
- Can be finite or infinite
- Must be finite and cannot be infinite

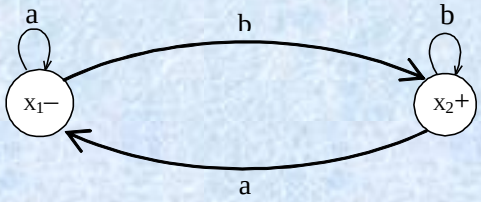
عقل مند کہتا ہے میں کچھ نہیں جانتا جبکہ بے وقوف کہتا ہے کہ میں سب کچھ جانتا ہوں

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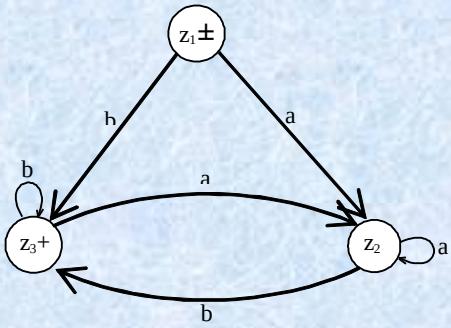
Question No: 6 (Marks: 1) - Please choose one
Every regular expression can be expressed as CFG but every CFG cannot be expressed as a regular expression. This statement is:

- ► Depends on the language
- ► None of the given options
- ► **True (Page 97)**
- ► False

Question No: 7 (Marks: 1) - Please choose one



Above given FA corresponds RE r. then FA corresponding to r* will be



This statement is

- ► **True (Page 38)**
- ► False
- ► Depends on language
- ► None of these

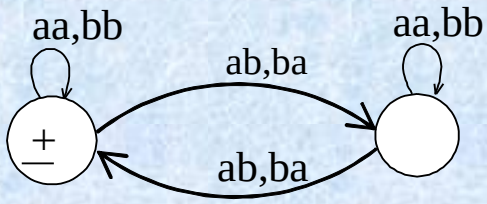
Question No: 8 (Marks: 1) - Please choose one
Consider the language L of strings, defined over Σ = {a,b}, ending in a

- ► **There are finite many classes generated by L, so L is regular (Page 76)**
- ► There are infinite many classes generated by L, so L is regular
- ► There are finite many classes generated by L, so L is non-regular
- ► There are infinite many classes generated by L, so L is non-regular

خود کو تمھیں سے بڑھ کر کوئی اچھا مشورہ نہیں دے سکتا

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Question No: 9 (Marks: 1) - Please choose one



Above given TG has _____ RE.

- ► (aa+aa+(ab+ab)(aa+ab)*(ab+ba))*
- ► **(aa+bb+(ab+ba)(aa+bb)*(ab+ba))*** **(Page 22)**
- ► (aa+bb+(ab+ba)(aa+bb)(ab+ba))*
- ► None of these

Question No: 10 (Marks: 1) - Please choose one
The word 'formal' in formal languages means

- ► The symbols used have well defined meaning
- ► They are unnecessary, in reality
- ► **Only the form of the string of symbols is significant** Click here for detail
- ► None of these

Question No: 11 (Marks: 1) - Please choose one
Let A = {0, 1}. The number of possible strings of length 'n' that can be formed by the elements of the set A is

- ► n!
- ► n^2
- ► n^m
- ► **2^n**

Question No: 12 (Marks: 1) - Please choose one
Choose the correct statement.

- ► A Mealy machine generates no language as such
- ► A Moore machine generates no language as such
- ► A Mealy machine has no terminal state
- ► **All of these** click here for detail

Question No: 13 (Marks: 1) - Please choose one
TM is more powerful than FSM because

- ► The tape movement is confined to one direction
- ► It has no finite state control
- ► **It has the capability to remember arbitrary long sequences of input symbols** Click here for detail
- ► None of these

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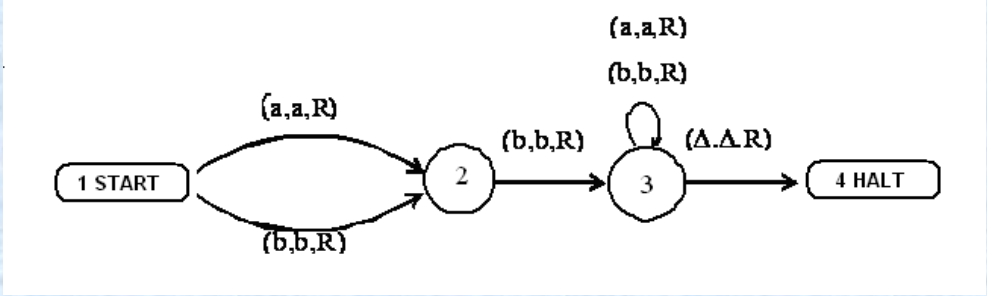
Question No: 14 (Marks: 1) - Please choose one
If L1 and L2 are expressed by regular expressions r1 and r2, respectively then the language expressed by r1 + r2 will be _____

- **Regular (Page 10)**
- Ir-regular
- Can't be decided
- Another Language which is not listed here

Question No: 15 (Marks: 1) - Please choose one
Like TG, a PDA can also be non-deterministic

- **True (Page 111)**
- False

Question No: 16 (Marks: 1) - Please choose one



The above machine is a/an _____

- Finite Automata
- **Turing machine (Page 141) rep**
- FA
- TG

Question No: 17 (Marks: 1) - Please choose one
The language of all words (made up of a's and b's) with at least two a's can not be described by the regular expression.

- a(a+b)*a(a+b)*(a+b)*ab*
- (a+b)* ab* a(a+b)*
- b*ab* a(a+b)*
- **none of these**

a^nb^n {where n>0} is the language will at least one a and b and cannot be described by RE.

Question No: 18 (Marks: 1) - Please choose one
In FA, if one enters in a specific state but there is no way to leave it, then that specific state is called

- Dead State
- Waste Basket
- Davey John Locker
- **All of these (Page 17)**

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Question No: 19 (Marks: 1) - Please choose one
If L is a regular language then, L^c is also a _____ language.

► **Regular (Page 66) rep**
► Non-regular
► Regular but finite
► None of the given

Question No: 20 (Marks: 1) - Please choose one
In CFG, the symbols that can't be replaced by anything are called___

► **Terminal (Page 87) rep**
► Non-Terminal
► Production
► All of given

Question No: 21 (Marks: 1) - Please choose one
Which of the following is NOT a regular language?

► String of 0's whose length is a perfect squere
► Set of all palindromes made up of 0's and 1's
► String of 0's whose length is a prime number
► **All of the given options** Click here for detail

Question No: 22 (Marks: 1) - Please choose one
Choose the incorrect (FALSE) statement.

► A Mealy machine generates no language as such
► A Mealy machine has no terminal state
► **For a given input string, length of the output string generated by a Moore machine is not more than the length of the output string generated by that of a Mealy machine** click here for detail
► All of these

Question No: 23 (Marks: 1) - Please choose one
Pumping lemma is generally used to prove that:

► A given language is infinite
► **A given language is not regular** Click here for detail **rep**
► Whether two given regular expressions of a regular language are equivalent or not
► None of these

Question No: 24 (Marks: 1) - Please choose one
Which of the following is a regular language?

► **String of odd number of zeroes** Click here for detail **rep**
► Set of all palindromes made up of 0's and 1's
► String of 0's whose length is a prime number
► All of these

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Question No: 25 (Marks: 1) - Please choose one
Choose the incorrect statement:
► (a+b)*aa(a+b)* generates Regular language.
► **A language consisting of all strings over ∑={a,b} having equal number of a's and b's is a regular language**
► Every language that can be expressed by FA can also be expressed by RE
► None of these

Question No: 26 (Marks: 1) - Please choose one
Left hand side of a production in CFG consists of:
► One terminal
► More than one terminal
► **One non-terminal (Page 87)**
► Terminals and non-terminals

FINALTERM EXAMINATION
SPRING 2007

Question No: 1 (Marks: 1) - Please choose one
PDA is only used to represent a regular language.
► True
► **False** Click here for detail

Question No: 2 (Marks: 1) - Please choose one
If L is a regular language then LC is also a regular language.
► **True (Page 66) rep**
► False

Question No: 3 (Marks: 1) - Please choose one
A production of the form non-terminal ⇾ string of two non-terminal is called a live Production.
► **True (Page 127)**
► False

Question No: 4 (Marks: 1) - Please choose one
We can find a CFG corresponding to a DFA.
► **True (Page 97)**
► False

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Question No: 5 (Marks: 1) - Please choose one
START, READ, HERE and ACCEPTS are conversions of the machine
► **True (Page 122)**
► False

Question No: 6 (Marks: 1) - Please choose one
A CFG is said to be ambiguous if there exists at least one word of its language that can be generated by different production trees
► **True (Page 95)**
► False

Question No: 7 (Marks: 1) - Please choose one
Syntax tree or Generation tree or Derivation tree are same tree
► **True (Page 92)**
► False

Question No: 8 (Marks: 1) - Please choose one
The symbols that cannot be replaced by anything are called terminals
► **True (Page 87) rep**
► False

Question No: 9 (Marks: 1) - Please choose one
The production of the form non-terminal ⇾ one non-terminal is called unit production
► **True (Page 100)**
► False

Question No: 10 (Marks: 1) - Please choose one
DFA and PDA are equal in power.
► True
► **False (Page 105)**

FINALTERM EXAMINATION
Spring 2006
CS402- Theory of Automata

Question No. 1
A production of the form non-terminal ⇾ non-terminal is called a dead Production.
True
False (Page 127)

جو شخص ناکامیوں سے ڈر کر بھاگتا ہے کامیابی اُس سے ڈر کر بھاگتی ہے

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Question No. 2
Semi-word is a string having some terminals and one non-terminal at the right of string.
True (Page 97)
False

Question No. 3
Two FAs are equivalent if they have same no. of states.
True (Page 15)
False

Question No. 4
There exist exactly two different derivations in an ambiguous CFG for a word.
True (Page 93)
False

Question No. 6
Regular languages are closed under Union, Concatenation and Kleene star.
True (Page 10)
False

Question No. 7
CFG may also represent a regular language.
True (Page 97)
False

Question No. 9 Marks : 1
PDA is stronger than FA.
True (Page 105)
False

FINALTERM EXAMINATION
Spring 2005
CS402- Theory of Automata

Question No. 1
A Total Language Tree has
All languages over Σ
All strings over Σ (Page 96)
All words of all languages over Σ
All words of one language over Σ

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Question No. 2
What Turing Machine does not have?
Stack
Tape
Head
Word
Turing machine has stack but insertion and deletion can be done from both sides. Tape and head to.

Question No. 3
CFG given S ⇗ bS|Sb|aa represents language
b*aa
aab*
b*aab*
b*(aa)*b*

Question No. 4
A Language that is finite but not regular
Λ
(a+b)*
Φ (not sure)
All strings of a's in Σ = {a,.b}

جو لوگوں کے سامنے فخر کرتا ہے وہ لوگوں کی نظروں سے گر جاتا ہے

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CS402 – Quiz No.3

Question # 1 of 10 (Total Marks: 1) **Select correct option:**
The values of input (say a & b) does not remain same in one cycle due to
NAND gate
Click plus
OR gate
NOT gate

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
Set of all palindromes over {a,b}is regular

True
False (Page 74)

Question # 3 of 10 (Total Marks: 1) **Select correct option:**
In CFG, the symbols that cannot be replaced by anything are called

Terminals (Page 87) rep
Non terminals
Productions
None of the given options

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
a^n b^n generates the …… language

regular
non regular
EQUAL and non regular (Page 71)
EQUAL and regular

Question # 5 of 10 (Total Marks: 1) **Select correct option:**
The grammatical rules which involves meaning of words are called:

Semantic (Page 87)
Sytactics
Alphabets
None of the given options

عقل مند اپنے عیب خود دیکھتا ہے اور بیوقوفوں کے عیب دنیا دیکھتی ہے

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Question # 6 of 10 (Total Marks: 1) **Select correct option:**
The reverse of the string sbfsbb over { sb, f, b }

bbsfbs
bsbfsb
sbbfsb
bsfbsb

Question # 7 of 10 (Total Marks: 1) **Select correct option:**
If an FA has N state then it must accept the word of length

N-1
N+1
N+2N

Question # 8 of 10 (Total Marks: 1) **Select correct option:**
Two languages are said to belong to same class if they end in the same state when they run over an FA, that state

Must be final state
May be final state or not (Page 75)
May be start or not
None of the given options

Question # 9 of 10 (Total Marks: 1) **Select correct option:**
In pref(Q in R) Q is …… to (than) R

Equal
Not Equal (Page 79)
Greater
Smaller

Question # 10 of 10 (Total Marks: 1) **Select correct option:**
According to Myhill Nerode theorem, if L generates finite no. of classes then L is.....

Finite
Infinite
Regular (Page 76)
Non Regular

عقل مند آدمی اس وقت تک نہیں بولتا جب تک خاموشی نہیں ہو جاتی

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Question # 1 of 10 (Total Marks: 1) **Select correct option:**
If the intersection of two regular languages is regular then the complement of the intersection of these two languages is also regular

True (Page 68)
False

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
In pumping lemma theorem (x y^n z) the range of n is

n=1,2,3,4..... (Page 74)
n=0,1,2,3,4....
n=-3,-2,-1,0,1,2,3,4.....
n=-3,-2,-1,1,2,3,4.....

Question # 3 of 10 (Total Marks: 1) **Select correct option:**
The complement of a regular language is also a regular

True rep
False

CS402 – Quiz No.3

Question # 1 of 10 (Total Marks: 1) **Select correct option:**
For a non regular language there exist …… FA

One
At least one
At most one
No (Page 71)

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
The strings or words which do not belong to a language is called……. of that language

Intersection
Union
Complement (Page 66)
Quotient

انسان دکھ نہیں دیتے بلکہ انسانوں سے وابستہ امیدیں دکھ دیتی ہیں

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Question # 3 of 10 (Total Marks: 1) **Select correct option:**
A non regular language can be represented by
RE
FA
TG
None of the given options (Page 71)

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
For language L defined over {a, b},then L partitions {a, b}* into …… classes

Infinite
Finite
Distinct (Page 75)
Non distinct

Question # 5 of 10 (Total Marks: 1) **Select correct option:**
If an FA accept a word then there must exist a path from

Initial to final state (Page 81)
Initial to each state
Initial to each state but not to final state
Initial to final state by traversing each state

Question # 6 of 10 (Total Marks: 1) **Select correct option:**
Does the empty string match the regular expression |y+a|?

Yes
No (Page 3)

Question # 7 of 10 (Total Marks: 1) **Select correct option:**
If an FA already accepts the language expressed by the closure of certain RE, then the given FA is the required FA.

True (Page 37)
False

Question # 8 of 10 (Total Marks: 1) **Select correct option:**
Which of the following statement is true about NFA with Null String?

Infinite states
Infinite set of letters
Infinite set of transitions
Transition of null string is allowed at any stage (Page 71)

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Question # 9 of 10 (Total Marks: 1) **Select correct option:**
If R is a regular language and L is some language, and L U R is a regular language, then L must be a regular language.

True (page 10)
False

Question # 10 of 10 (Total Marks: 1) **Select correct option:**
FA corresponding to an NFA can be built by introducing an empty state for a letter having

no transition at certain state (Page 43)
one transition at certain state
two transition at certain state
more than two transitions at certain state

Question # 1 of 10 (Total Marks: 1) **Select correct option:**
Let FA3 be an FA corresponding to FA1FA2, then the initial state of FA3 must correspond to the initial state of

FA1 only (Page 35)
FA2 only
FA1 or FA2
FA1 and FA2

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
(a* + b*)* = (a + b)* this expression is _____
True
False

Question # 3 of 10 (Total Marks: 1) **Select correct option:**
If S = { x }, then S* will be
{x,xx,xxx,xxxx,…}
{^ ,x,xx,xxx,xxxx,…} (Page 10)

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
The states in which there is no way to leave after entry are called
Davey John Lockers
Dead States
Waste Baskets
All of the given options (Page 17)

خوبصورتی علم وادب سے ہوتی ہے لباس و حسن سے نہیں

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Question # 5 of 10 (Total Marks: 1) **Select correct option:**
If S = {ab, bb}, then S* will not contain
Abbbab
Bbba
ababbb
bbbbab

Question # 6 of 10 (Total Marks: 1) **Select correct option:**
According to theory of automata there are _____ types of languages

1
2 (Page 3)
3
4

Question # 7 of 10 (Total Marks: 1) **Select correct option:**
What do automata mean?
Something done manually
Something done automatically (Page 3)

Question # 8 of 10 (Total Marks: 1) **Select correct option:**
What is false about the term alphabet?
It is a finite set of symbols.
It is usually denoted by Greek letter sigma
It can be an empty set. (Page 3)
Strings are made up of its elements

Question # 9 of 10 (Total Marks: 1) **Select correct option:**
Formal is also known as _____
Syntactic language (page 3)
Semantic language
Informal language
Nsone of these

Question # 10 of 10 (Total Marks: 1) **Select correct option:**
Following are types of languages

Formal Languages (Syntactic languages)
Informal Languages (Semantic languages)
Both (Page 3)
None of above

بہترین تجربہ وہ ہے جس سے نصیحت حاصل ہو

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CS402 – Quiz No.4

Question # 1 of 10 (Total Marks: 1) **Select correct option:**
Consider the following production (of a CFG): S->XYZ Here _____ is left most nonterminal in working string. Note: S, X, Y and Z are all nonterminals
S
X
Y
Z

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
A PDA is called nondeterministic PDA if _____

There are more than one outgoing edges at READ or POP states with one label (Page 111)
There are more than one PUSH states
There are mroe than one POP states
All of the given options

Question # 3 of 10 (Total Marks: 1) **Select correct option:**
A PDA consists of the following:

An alphabet (Sigma) of input letters.
An input TAPE with infinite many locations in one direction
One START state with only one out-edge and no in-edge
All of the given options (Page 105)

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
The CFG S --> aSa | bSb | a | b | ^ represents the language

EVEN-EVEN
PALINDROM (Page 91)
EQUAL
ODD-ODD

Question # 5 of 10 (Total Marks: 1) **Select correct option:**
Halt states are

Start and Accept
Accept and Reject (Page 105)
Start and Reject
Read and Reject

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Question # 6 of 10 (Total Marks: 1) **Select correct option:**
Choice of path can be determined by left most derivation of the string belonging to CFL at…… state

Accept (Page 104)
Reject
Push
POP

Question # 7 of 10 (Total Marks: 1) **Select correct option:**
The unit and null productions can be deleted from a CFG

True (Page 99-100)
False

Question # 8 of 10 (Total Marks: 1) **Select correct option:**
Identify the TRUE statement about following CFG:
S -> SB|AB
A -> CC
B -> b
C -> a

The given CFG has 8 Nonterminals
The given CFG has 8 Terminals
The given CFG is in CNF (Page 101)
The given CFG is not in CNF

Question # 9 of 10 (Total Marks: 1) **Select correct option:**
The structure given below is called _____ S -> aA|bB A -> aS|a B -> bS|b

RE
TG
CFG (Page 87)
PDA

Question # 10 of 10 (Total Marks: 1) **Select correct option:**
Which of the following states is not part of PDA

START
ACCEPT
WRITE (Page 107)
REJECT

تم اچھا کرو زمانہ تم کو برا سمجھے یہ اس سے بہتر ہے کہ تم برا کرو اور زمانہ تم کو اچھا سمجھے

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CS402 – Quiz No.4

Question # 1 of 10 (Total Marks: 1) **Select correct option:**
The production of the form: nonterminal --> one nonterminal is called the _____

Unit production (Page 100)
NULL production
Terminal production
Non Terminal production

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
A _____ is the one for which every input string has a unique path through the machine.

Deterministic PDA (Page 111)
nondeterministic PDA
PUSHDOWN store
Input Tape

Question # 3 of 10 (Total Marks: 1) **Select correct option:**
In the null production N --> ^ , N is a

Terminal
Non terminal (Page 99)
Word
None of the given options

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
The major problem in the earliest computers was

To store the contents in the registers
To display mathematical formulae (Page 87)
To load the contents from the registers
To calculate the mathematical formula

Question # 5 of 10 (Total Marks: 1) **Select correct option:**
In polish notation, (o-o-o) is the abbreviation of……?

Operand - Operator – Operand
Operand - Operand- Operator
Operator -Operand – Operand (Page 94)
Operand -Operand – Operand

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Question # 6 of 10 (Total Marks: 1) **Select correct option:**
The CFG is said to be ambiguous if there exist at least one word of its language that can be generated by the …… production trees

One
Two
More than one (Page 95)
At most one

Question # 7 of 10 (Total Marks: 1) **Select correct option:**
The input string is placed, before it runs, in

Stack
Memory
Tape (Page 105)
Ram

Question # 8 of 10 (Total Marks: 1) **Select correct option:**
The production S --> SS | a | b | ^ can be expressed by RE

(a+b)+
(a+b)
(a+b)* (Page 88)
(ab)*

Question # 9 of 10 (Total Marks: 1) **Select correct option:**
The locations into which we put the input letters on "Input Tap" are called _____

words
alphabets
cells (Page 105)
elements

Question # 10 of 10 (Total Marks: 1) **Select correct option:**
"CFG" stands for _____

Context Free Graph
Context Free Grammer (Page 87)
Context Finite Graph
Context Finite Grammer

بدصورت چہرہ بدصورت دماغ سے بہتر ہے

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Question # 1 of 10 (Total Marks: 1) **Select correct option:**
In a CFG the nonterminal that occurs first from the left in the working string, is said to be _____

Least Significant nonterminal
Most Significant nonterminal
Left most nonterminal (Page 103)
Left most derivate

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
The unit production is

Terminal --> Terminal
Terminal --> Non Terminal
Non terminal --> Terminal
Non terminal --> Non Terminal (Page 100)

Question # 3 of 10 (Total Marks: 1) **Select correct option:**
A _____ operator adds a new letter at the top of STACK

PUSH (Page 107)
POP
READ
APPEND

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
PDA stands for _____

Push and Drop Automaton
Pop and Drop Automaton
Push Down Automaton (Page 112)
None of given options

Question # 5 of 10 (Total Marks: 1) **Select correct option:**
The production of the form: Nonterminal-> ^ is said to be _____ production

NULL (Page 99)
UNIT
Chomsky form production
None of the given options

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Question # 6 of 10 (Total Marks: 1) **Select correct option:**
If a CFG has a null production, then it is _____

Posiible to construct another CFG without null production accepting the same language with the exception of the word ^ (Page 99)
Not possible to construct another CFG without null production accepting the same language with the exception of the word ^
Called NULL CFG
Called Chmosky Normal Form (CNF)

Question # 7 of 10 (Total Marks: 1) **Select correct option:**
In a STACK:

The element PUSHed first is POPed first
The element PUSHed first is POPed in the last (Page 107 concept)
The element PUSHed in last is POPed in last
None of given options

Question # 8 of 10 (Total Marks: 1) **Select correct option:**
Kleene star closure can be defined
Over any set of string (Page 7)
Over specific type of string

Question # 9 of 10 (Total Marks: 1) **Select correct option:**
While finding RE corresponding to TG, we connect the new start state to the old start state by the transition labeled by
A
B
null string (Page 26)
None of the given options

انسان کے لئے بری صحبت سے بڑھ کر بری کوئی چیز نہیں

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Some More Quizzes

Question # 1 of 10 (Total Marks: 1) **Select correct option:**
For a given input, it provides the compliment of Boolean AND output.

NAND box (NOT AND) **(Page 63)**
DELAY box
OR box
AND box

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
It delays the transmission of signal along the wire by one step (clock pulse).

NAND box (NOT AND)
DELAY box **(Page 63)**
OR box
AND box

Question # 3 of 10 (Total Marks: 1) **Select correct option:**
For the given input, it provides the Boolean OR output

NAND box (NOT AND)
DELAY box
OR box **(Page 63)**
AND box

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
For the given input, AND box provides the Boolean AND output.
True **(Page 63)**
False

Question # 5 of 10 (Total Marks: 1) **Select correct option:**
The current in the wire is indicated by 1 and 0 indicates the absence of the current.
True **(Page 63)**
False

Question # 6 of 10 (Total Marks: 1) **Select correct option:**
Any language that can not be expressed by a RE is said to be regular language.
True
False **(Page 71)**

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Question # 7 of 10 (Total Marks: 1) **Select correct option:**
If L1 and L2 are regular languages_____ is/are also regular language(s).

L1 + L2
L1L2
L1*
All of above (Page 10)

Question # 8 of 10 (Total Marks: 1) **Select correct option:**
Let L be a language defined over an alphabet Σ, then the language of strings, defined over Σ, not belonging to L, is called Complement of the language L, denoted by Lc or L'.
True (Page 66)
False

Question # 9 of 10 (Total Marks: 1) **Select correct option:**
To describe the complement of a language, it is very important to describe the ---------- of that language over which the language is defined.

Alphabet (Page 66)
Regular Expression
String
Word

Question # 10 of 10 (Total Marks: 1) **Select correct option:**
For a certain language L, the complement of Lc is the given language L *i.e.* (Lc)c = Lc
True
False (Page 66)

Question # 1 of 10 (Total Marks: 1) **Select correct option:**
If L is a regular language then, --------- is also a regular language.
Lm
Ls
Lx
Lc (Page 66)

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
Converting each of the final states of F to non-final states and old non-final states of F to final states, FA thus obtained will reject every string belonging to L and will accept every string, defined over Σ, not belonging to L. is called
Transition Graph of L
Regular expression of L
Complement of L (Page 66)
Finite Automata of L

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Question # 3 of 10 (Total Marks: 1) **Select correct option:**
If L1 and L2 are two regular languages, then L1 U L2 is not a regular.
True
False (Page 65)

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
De-Morgan's law for sets is expressed by,
$(L_1^c \cap L_2^c)^c = L_1^c \cap L_2^c$
$(L_1^c \cap L_2^c)^c = L_1^c \cap L_2^c$
$(L_1^c \cap L_2^c)^c = L_1 \cap L_2$
$(L_1^c \cap L_2^c)^c = L_1 \cup L_2$ **CORRECT (page 68)**

Question # 5 of 10 (Total Marks: 1) **Select correct option:**
If L1 and L2 are regular languages, then these can be expressed by the corresponding FAs.
True (Page 68)
False

Question # 6 of 10 (Total Marks: 1) **Select correct option:**
L= language of words containing even number of a's. Regular Expression is

(a+b)*aa(a+b)*
(b+ab*a)* (Page 68)
a+bb*aab*a
(a+b)*ab(a+b)*

Question # 7 of 10 (Total Marks: 1) **Select correct option:**
The regular expression defining the language $L_1 \cap L_2$ can be obtained, converting and reducing the previous ---------- into a ---------- as after eliminating states.

GTG, TG
FA, GTG (Page 69)
FA, TG
TG, RE

Question # 8 of 10 (Total Marks: 1) **Select correct option:**
The language that can be expressed by any regular expression is called a Non regular language.
True
False (Page 71)

خاموشی غصے کا بہترین علاج ہے

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Question # 9 of 10 (Total Marks: 1) **Select correct option:**
The languages ---------- are the examples of non regular languages.

PALINDROME and PRIME **(Page 71)**
PALINDROME and EVEN-EVEN
EVEN-EVEN and PRIME
FACTORIAL and SQURE

Question # 10 of 10 (Total Marks: 1) **Select correct option:**
Let L be any infinite regular language, defined over an alphabet Σ then there exist three strings x, y and z belonging to Σ* such that all the strings of the form xy^nz for n=1,2,3, … are the words in L. called.

Complement of L
Pumping Lemma **(Page 72)**
Kleene's theorem
None in given

Question # 1 of 10 (Total Marks: 1) **Select correct option:**
Languages are proved to be regular or non regular using pumping lemma.
True **(Page 74)**
False

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
---------- is obviously infinite language.
EQUAL-EQUAL
EVEN-EVEN
PALINDROME **(Page 75)**
FACTORIAL

Question # 3 of 10 (Total Marks: 1) **Select correct option:**
If, two strings x and y, defined over Σ, are run over an FA accepting the language L, then x and y are said to belong to the same class if they end in the same state, no matter that state is final or not.
True **(Page 75)**
False

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
Myhill Nerode theorem is consisting of the followings,

L partitions Σ* into distinct classes.
If L is regular then, L generates finite number of classes.
If L generates finite number of classes then L is regular.
All of above **(Page 75)**

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Question # 5 of 10 (Total Marks: 1) **Select correct option:**
The language Q is said to be quotient of two regular languages P and R, denoted by--- if PQ=R.
R=Q/P
Q=R/P (Page 78)
Q=P/R
P=R/Q

Question # 6 of 10 (Total Marks: 1) **Select correct option:**
If two languages R and Q are given, then the prefixes of Q in R denoted by Pref(Q in R).
True (Page 78)
False

Question # 7 of 10 (Total Marks: 1) **Select correct option:**
Let Q = {aa, abaaabb, bbaaaaa, bbbbbbbbbb} and R = {b, bbbb, bbbaaa, bbbaaaaa} Pref (Q in R) is equal to,

{b,bbba,bbbaaa} (Page 78)
{b,bba,bbaaa}
{ab,bba,bbbaa}
{b,bba,bbba}

Question # 8 of 10 (Total Marks: 1) **Select correct option:**
If R is regular language and Q is any language (regular/ non regular), then Pref (Q in R) is ---------.

Non-regular
Equal
Regular (Page 79)
Infinite

Question # 9 of 10 (Total Marks: 1) **Select correct option:**
_____ states are called the halt states.
ACCEPT and REJECT (Page 105)
ACCEPT and READ
ACCEPT AND START
ACCEPT AND WRITE

Question # 10 of 10 (Total Marks: 1) **Select correct option:**
The part of an FA, where the input string is placed before it is run, is called _____

State
Transition
Input Tape (Page 105)
Output Tape

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Question # 1 of 10 (Total Marks: 1) **Select correct option:**
In new format of an FA (discussed in lecture 37), This state is like dead-end non final state

ACCEPT
REJECT (Page 105)
STATR
READ

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
Between the two consecutive joints on a path

One character can be pushed and one character can be popped
Any no. of characters can be pushed and one character can be popped (Page 122)
One character can be pushed and any no. of characters can be popped
Any no. of characters can be pushed and any no. of characters can be popped

Question # 3 of 10 (Total Marks: 1) **Select correct option:**
The PDA is called non-deterministic PDA when there are more than one out going edges from…… state

START or READ
POP or REJECT
READ or POP (Page 111)
PUSH or POP

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
Identify the TRUE statement:
A PDA is non-deterministic, if there are more than one READ states in PDA
A PDA is never non-deterministic
Like TG, A PDA can also be non-deterministic (Page 111)
A PDA is non-deterministic, if there are more than one REJECT states in PDA

Question # 5 of 10 (Total Marks: 1) **Select correct option:**
There is a problem in deciding whether a state of FA should be marked or not when the language Q is infinite.
True (Page 79)
False

Question # 6 of 10 (Total Marks: 1) **Select correct option:**
If an effectively solvable problem has answered in yes or no, then this solution is called ---------

Decision procedure (Page 80)
Decision method
Decision problem
Decision making

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Question # 7 of 10 (Total Marks: 1) **Select correct option:**
The following problem(s) ---------- is/are called decidable problem(s).

The two regular expressions define the same language
The two FAs are equivalent
Both a and b (Page 80)
None of given

Question # 8 of 10 (Total Marks: 1) **Select correct option:**
To examine whether a certain FA accepts any words, it is required to seek the paths from ------- state.

Final to initial
Final to final
Initial to final (Page 81)
Initial to initial

Question # 9 of 10 (Total Marks: 1) **Select correct option:**
The high level language is converted into assembly language codes by a program called compiler.

TRUE (Page 87)
FALSE

Question # 10 of 10 (Total Marks: 1) **Select correct option:**
Grammatical rules which involve the meaning of words are called ----------
Semantics (Page 87)
Syntactic
Both a and b
None of given

Question # 1 of 10 (Total Marks: 1) **Select correct option:**
Grammatical rules which do not involve the meaning of words are called ----------
Semantics
Syntactic (Page 87)
Both a and b
None of given

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
The symbols that must be replaced by other things are called _____

Productions
Terminals
Non-terminals (Page 87)
None of given

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Question # 3 of 10 (Total Marks: 1) **Select correct option:**
The grammatical rules are often called_____

Productions (Page 87)
Terminals
Non-terminals
None of given

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
The terminals are designated by _____ letters, while the non-terminals are designated by _____ letters.
Capital, bold
Small, capital (Page 87)
Capital, small
Small, bold

Question # 5 of 10 (Total Marks: 1) **Select correct option:**
The language generated by _____ is called Context Free Language (CFL).
FA
TG
CFG (Page 87)
TGT

Question # 6 of 10 (Total Marks: 1) **Select correct option:**
$\Sigma = \{a,b\}$ Productions $S \rightarrow XaaX$
$X \rightarrow aX$
$X \rightarrow bX$
$X \rightarrow \Lambda$
This grammar defines the language expressed by_____

(a+b)*aa(a+b)* (Page 89)
(a+b)*a(a+b)*a
(a+b)*aa(a+b)*aa
(a+b)*aba+b)*

Question # 7 of 10 (Total Marks: 1) **Select correct option:**
$S \rightarrow aXb|bXa$
$X \rightarrow aX|bX|\Lambda$
The given CFG generates the language in English _____

Beginning and ending in different letters (Page 91)
Beginning and ending in same letter
Having even-even language
None of given

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Question # 8 of 10 (Total Marks: 1) **Select correct option:**

The CFG is not said to be ambiguous if there exists atleast one word of its language that can be generated by the different production trees,

TRUE
FALSE (Page 95)

Question # 9 of 10 (Total Marks: 1) **Select correct option:**

The language generated by that CFG is regular if _____

No terminal → semi word
No terminal → word
Both a and b (Page 97)
None of given

Question # 10 of 10 (Total Marks: 1) **Select correct option:**

The production of the form no terminal → Λ is said to be null production.

TRUE (Page 99)
FALSE

Question # 1 of 10 (Total Marks: 1) **Select correct option:**

CNF is stands for

Context Normal Form
Complete Normal Form
Chomsky Normal Form (Page 102)
Compared Null Form

Question # 2 of 10 (Total Marks: 1) **Select correct option:**

Proof(Kleene's Theorem Part II)
If a TG has more than one start states, then

Introduce the new start state (Page 26)
Eliminate the old start state
Replace the old start state with final state
Replace the old final state with new start state

Question # 3 of 10 (Total Marks: 1) **Select correct option:**

Which of the following regular expression represents same language?
a. (a+ab)*
b. (ba+a)*
c. a*(aa*b)*
d. (a*b*)* (a+b)*a(a+b)*b(a+b)*+ (a+b)*b(a+b)*a(a+b)*.

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{ x}*, { x}+, {a+b}*

Select correct option:
a and b (correct)
a and c
c and d

Question # 4 of 10 (Total Marks: 1) Select correct option:
Let FA3 be an FA corresponding to FA1+FA2, then the initial state of FA3 must correspond to the initial state of

FA1 only
FA2 only
FA1 or FA2 (Page 32)
FA1 and FA2

Question # 5 of 10 (Total Marks: 1) Select correct option:
Which of the following statement is NOT true about TG?

There exists exactly one path for certain string (Page 19)
There may exist more than one paths for certain string
There may exist no path for certain string
There may be no final state

Question # 6 of 10 (Total Marks: 1) Select correct option:
Kleene's theorem states

All representations of a regular language are equivalent.
All representations of a context free language are equivalent.
All representations of a recursive language are equivalent
Finite Automata are less powerful than Pushdown Automata. (Page 105)

Question # 7 of 10 (Total Marks: 1) Select correct option:
A language accepted by an FA is also accepted by

TG only
GTG only
RE only
All of the given (Page 25)



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Quiz No. 4

Question # 1of 10 (Total Marks: 1) **Select correct option:**
Consider the Following CFG: (NOTE: ^ means NULL) S->Xa X->aX|bX|^
above given CFG can be represented by RE _____

a*b*
a*b*a
(a+b)*a
a(a+b)*a

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
Identify FALSE statement:

Every Regular Expression be expressed by CFG and every CFG can be expressed by a Regular Expression (Page 97)
Every regular expression can be expressed as CFG but every CFG cannot be expressed as a regular expression.
For a PDA, there exists a CFG, that represents the same language as represented by PDA.
None of the given options

Question # 3 of 10 (Total Marks: 1) **Select correct option:**
Null production is a

Word
String
Terminal
All of the given options

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
In nondeterministic PDA a string is supposed to be accepted, if there exists at least one path traced by the string, leading to _____ state.

ACCEPT (Page 111)
REJECT
START
READ

افضل انسان وہ ہے جو اپنی اصلاح کی کوشش کرتا ہے

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Question # 5 of 10 (Total Marks: 1) **Select correct option:**
The CFG which generates the regular language is called

Regular expression
Finite Automata
Regular grammar (Page 97)
None of the given options

Question # 6 of 10 (Total Marks: 1) **Select correct option:**
If a CFG has a null production, then it is possible to construct another CFG accepting the same language without null production

TRUE (Page 99)
FALSE

CS402 – Quiz No.2 (15 Jun 2013)

Question # 1 of 10 (Total Marks: 1) Select correct option
In large FA with thousands of states and millions of directed edges, without an effective procedure it is _____ to find a path from initial to final state.
Always easy
Impossible (Page 81)
may be good
always impossible

Question # 2 of 10 (Total Marks: 1) Select correct option
If there is no final state of two FAs then their _____ also have no _____ state
initial, union
final, union
union,final (Page 83)
union, initial

Question # 3 of 10 (Total Marks: 1) Select correct option
Set of all palindromes over {a,b} is:
Regular
Regular and finite
Regular and infinite
Non-regular (Page 71)

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Question # 4 of 10 (Total Marks: 1) Select correct option
In the context of Myhill Nerode theorem, for even-even language sigma star can be partitioned into _____ number of classes.

3
4 (Page 77)
5
6

Question # 5 of 10 (Total Marks: 1) Select correct option
The product of two regular languages is _____.

Regular (Page 78)
infinite
non-regular
closure of a regular language

Question # 6 of 10 (Total Marks: 1) Select correct option
If the FA has N states, then test the words of length less than N. If no word is accepted by this FA, then it will _____ word/words.

accept all
accept no (Page 85) rep
accept some
reject no

Question # 7 of 10 (Total Marks: 1) Select correct option
An FA has same initial and _____ state, then it means that it has no _____ state.

initial, final
final, initial
initial, initial
none of the given options

Question # 8 of 10 (Total Marks: 1) Select correct option
A problem that has decision procedure is called _____ problem.

Regular language
un-decidable
Infinite
Decidable (Page 80)

اطمینان قلب چاہتے ہو تو حسد سے دور رہو

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Question # 9 of 10 (Total Marks: 1) Select correct option
For a machine with N number of states, the total number of strings to be tested, defined over an alphabet of m letters, is_____.
Select correct option:

Nm +Nm+1+ N m+2 +… + N2m-1
m^N + m^N+1 + m^N + 2 +… +m2N-1 (Page 86)
Nm
mN

Question # 10 of 10 (Total Marks: 1) Select correct option
If (L1 ∩ L2c) ∪ (L1c ∩ L2) is regular language that accepts the words which are in L1 but not in L2 or else in L2 but not in L1 . The corresponding FA cannot accept any word which is in _____ L1 and L2.
Not both
Both (Page 80)
At least in one
None of the given options

Question # 1 of 10 (Total Marks: 1) Select correct option
While determining regular expression for a given FA, it is _____ to write its regular expression.

Always possible easily
Sometime impossible (Page 80)
always impossible
None of the given options

Question # 2 of 10 (Total Marks: 1) Select correct option
Incase of Myhill Nerode theorem, if a language L partitions sigma star into distinct classes and L is also regular then L generates_____ number of classes.

infinite
specified
finite (Page 75)
odd

ہر چیز کی ایک پہچان ہوتی ہے اور عقلمند کی پہچان غور و فکر کرنا ہے اور غور و فکر کی پہچان خاموشی ہے

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FINALTERM EXAMINATION
Spring 2010
CS402- Theory of Automata (Session - 1)

Question No: 1 (Marks: 1) - Please choose one
If r1 = (aa + bb) and r2 = (a + b) then the language (aa + bb)(a + b) will be generated by

- **(r1)(r2) (Page 10)**
- (r1 + r2)
- (r2)(r1)
- (r1)*

Question No: 2 (Marks: 1) - Please choose one
"One language can be expressed by more than one FA". This statement is _____

- **True (Page 14)**
- False
- Some times true & sometimes false
- None of these

Question No: 3 (Marks: 1) - Please choose one
Who did not invent the Turing machine?

- Alan Turing
- **A. M. Turing (Page 140)**
- Turing
- None of these

Question No: 4 (Marks: 1) - Please choose one
Which statement is true?

- **The tape of turing machine is infinite. (Page 140)**
- The tape of turing machine is finite.
- The tape of turing machine is infinite when the language is regular
- The tape of turing machine is finite when the language is nonregular.

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Question No: 5 (Marks: 1) - Please choose one

A regular language:

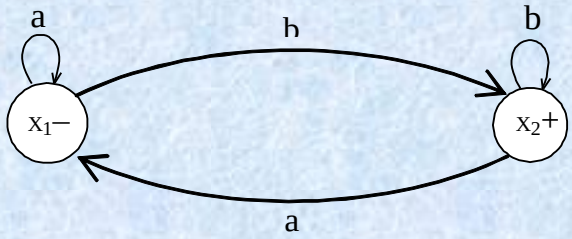
- ► **Must be finite (Page 11)**
- ► Must be infinite
- ► Can be finite or infinite
- ► Must be finite and cannot be infinite

Question No: 6 (Marks: 1) - Please choose one

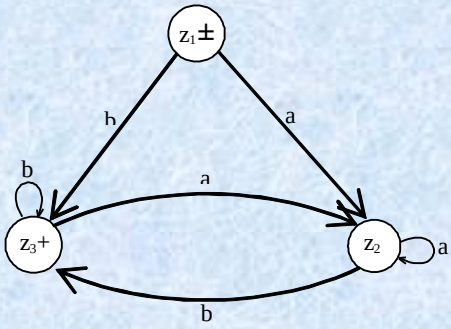
Every regular expression can be expressed as CFG but every CFG cannot be expressed as a regular expression. This statement is:

- ► Depends on the language
- ► None of the given options
- ► **True (Page 97)**
- ► False

Question No: 7 (Marks: 1) - Please choose one



Above given FA corresponds RE r. then FA corresponding to r* will be



This statement is

- ► **True (Page 38)**
- ► False
- ► Depends on language
- ► None of these

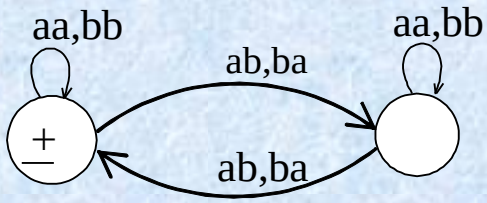
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Question No: 8 (Marks: 1) - Please choose one

Consider the language L of strings, defined over Σ = {a,b}, ending in a

- **There are finite many classes generated by L, so L is regular (Page 76)**
- There are infinite many classes generated by L, so L is regular
- There are finite many classes generated by L, so L is non-regular
- There are infinite many classes generated by L, so L is non-regular

Question No: 9 (Marks: 1) - Please choose one



Above given TG has _____ RE.

- (aa+aa+(ab+ab)(aa+ab)*(ab+ba))*
- **(aa+bb+(ab+ba)(aa+bb)*(ab+ba))* (Page 22)**
- (aa+bb+(ab+ba)(aa+bb)(ab+ba))*
- None of these

Question No: 10 (Marks: 1) - Please choose one

The word 'formal' in formal languages means

- The symbols used have well defined meaning
- They are unnecessary, in reality
- **Only the form of the string of symbols is significant** Click here for detail
- None of these

Question No: 11 (Marks: 1) - Please choose one

Let A = {0, 1}. The number of possible strings of length 'n' that can be formed by the elements of the set A is

- n!
- n^2
- n^m
- **2^n**

Question No: 12 (Marks: 1) - Please choose one

Choose the correct statement.

- A Mealy machine generates no language as such
- A Moore machine generates no language as such
- A Mealy machine has no terminal state
- **All of these** click here for detail

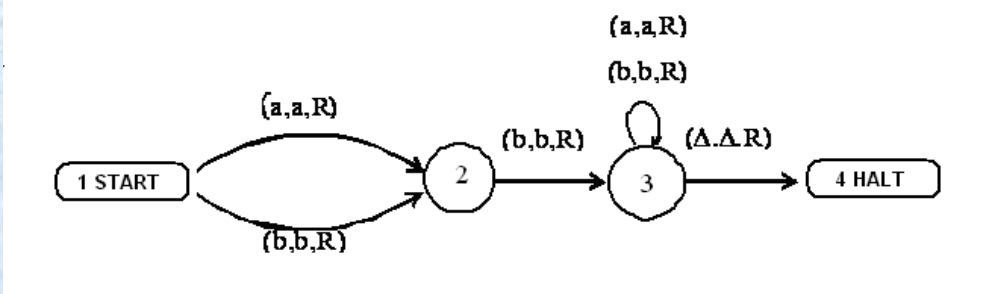
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Question No: 13 (Marks: 1) - Please choose one
TM is more powerful than FSM because
- ► The tape movement is confined to one direction
- ► It has no finite state control
- ► **It has the capability to remember arbitrary long sequences of input symbols** Click here for detail
- ► None of these

Question No: 14 (Marks: 1) - Please choose one
If L1 and L2 are expressed by regular expressions r1 and r2, respectively then the language expressed by r1 + r2 will be _____
- ► **Regular (Page 10)**
- ► Ir-regular
- ► Can't be decided
- ► Another Language which is not listed here

Question No: 15 (Marks: 1) - Please choose one
Like TG, a PDA can also be non-deterministic
- ► **True (Page 111)**
- ► False

Question No: 16 (Marks: 1) - Please choose one



The above machine is a/anTG _____
- ► Finite Automata
- ► **Turing machine (Page 141)**
- ► FA
- ► TG

Question No: 17 (Marks: 1) - Please choose one
The language of all words (made up of a's and b's) with at least two a's can not be described by the regular expression.
- ► a(a+b)*a(a+b)*(a+b)*ab*
- ► (a+b)* ab* a(a+b)*
- ► b*ab* a(a+b)*
- ► **none of these**

a^nb^n {where n>0} is the language will at least one a and b and cannot be described by RE.

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Question No: 18 (Marks: 1) - Please choose one
In FA, if one enters in a specific state but there is no way to leave it, then that specific state is called
- ► Dead State
- ► Waste Basket
- ► Davey John Locker
- ► **All of these (Page 17)**

Question No: 19 (Marks: 1) - Please choose one
If L is a regular language then, L^c is also a _____ language.
- ► **Regular (Page 66)**
- ► Non-regular
- ► Regular but finite
- ► None of the given

Question No: 20 (Marks: 1) - Please choose one
In CFG, the symbols that can't be replaced by anything are called___
- ► **Terminal (Page 87)**
- ► Non-Terminal
- ► Production
- ► All of given

Question No: 21 (Marks: 1) - Please choose one
Which of the following is NOT a regular language?
- ► String of 0's whose length is a perfect squere
- ► Set of all palindromes made up of 0's and 1's
- ► String of 0's whose length is a prime number
- ► **All of the given options** Click here for detail

Question No: 22 (Marks: 1) - Please choose one
Choose the incorrect (FALSE) statement.
- ► A Mealy machine generates no language as such
- ► A Mealy machine has no terminal state
- ► **For a given input string, length of the output string generated by a Moore machine is not more than the length of the output string generated by that of a Mealy machine** click here for detail
- ► All of these

Question No: 23 (Marks: 1) - Please choose one
Pumping lemma is generally used to prove that:
- ► A given language is infinite
- ► **A given language is not regular** Click here for detail
- ► Whether two given regular expressions of a regular language are equivalent or not
- ► None of these

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Question No: 24 (Marks: 1) - Please choose one
Which of the following is a regular language?
- ► **String of odd number of zeroes** Click here for detail
- ► Set of all palindromes made up of 0's and 1's
- ► String of 0's whose length is a prime number
- ► All of these

Question No: 25 (Marks: 1) - Please choose one
Choose the incorrect statement:
- ► (a+b)*aa(a+b)* generates Regular language.
- ► **A language consisting of all strings over ∑={a,b} having equal number of a's and b's is a regular language**
- ► Every language that can be expressed by FA can also be expressed by RE
- ► None of these

Question No: 26 (Marks: 1) - Please choose one
Left hand side of a production in CFG consists of:
- ► One terminal
- ► More than one terminal
- ► **One non-terminal (Page 87)**
- ► Terminals and non-terminals

FINALTERM EXAMINATION
SPRING 2007

Question No: 1 (Marks: 1) - Please choose one
PDA is only used to represent a regular language.
- ► True
- ► **False** Click here for detail

Question No: 2 (Marks: 1) - Please choose one
If L is a regular language then LC is also a regular language.
- ► **True (Page 66)**
- ► False

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Question No: 3 (Marks: 1) - Please choose one
A production of the form non-terminal ⇾ string of two non-terminal is called a live Production.
► **True (Page 127)**
► False

Question No: 4 (Marks: 1) - Please choose one
We can find a CFG corresponding to a DFA.
► **True (Page 97)**
► False

Question No: 5 (Marks: 1) - Please choose one
START, READ, HERE and ACCEPTS are conversions of the machine
► **True (Page 122)**
► False

Question No: 6 (Marks: 1) - Please choose one
A CFG is said to be ambiguous if there exists at least one word of its language that can be generated by different production trees
► **True (Page 95)**
► False

Question No: 7 (Marks: 1) - Please choose one
Syntax tree or Generation tree or Derivation tree are same tree
► **True (Page 92)**
► False

Question No: 8 (Marks: 1) - Please choose one
The symbols that cannot be replaced by anything are called terminals
► **True (Page 87)**
► False

Question No: 9 (Marks: 1) - Please choose one
The production of the form non-terminal ⇾ one non-terminal is called unit production
► **True (Page 100)**
► False

Question No: 10 (Marks: 1) - Please choose one
DFA and PDA are equal in power.
► True
► **False (Page 105)**

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FINALTERM EXAMINATION
Spring 2006
CS402- Theory of Automata

Question No. 1
A production of the form non-terminal ⇗ non-terminal is called a dead Production.
True
False (Page 127)

Question No. 2
Semi-word is a string having some terminals and one non-terminal at the right of string.
True (Page 97)
False

Question No. 3
Two FAs are equivalent if they have same no. of states.
True (Page 15)
False

Question No. 4
There exist exactly two different derivations in an ambiguous CFG for a word.
True (Page 93)
False

Question No. 6
Regular languages are closed under Union, Concatenation and Kleene star.
True (Page 10)
False

Question No. 7
CFG may also represent a regular language.
True (Page 97)
False

Question No. 9 Marks : 1
PDA is stronger than FA.
True (Page 105)
False

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FINALTERM EXAMINATION
Spring 2005
CS402- Theory of Automata

Question No. 1
A Total Language Tree has
All languages over Σ
All strings over Σ (Page 96)
All words of all languages over Σ
All words of one language over Σ

Question No. 2
What Turing Machine does not have?
Stack
Tape
Head
Word
Turing machine has stack but insertion and deletion can be done from both sides. Tape and head to.

Question No. 3
CFG given S → bS|Sb|aa represents language
b*aa
aab*
b*aab*
b*(aa)*b*

Question No. 4
A Language that is finite but not regular
Λ
(a+b)*
Φ (not sure)
All strings of a's in Σ = {a,.b}

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CS402 – Quiz No.3

Question # 1 of 10 (Total Marks: 1) **Select correct option:**
The values of input (say a & b) does not remain same in one cycle due to
NAND gate
Click plus
OR gate
NOT gate

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
Set of all palindromes over {a,b}is regular

True
False **(Page 74)**

Question # 3 of 10 (Total Marks: 1) **Select correct option:**
In CFG, the symbols that cannot be replaced by anything are called

Terminals **(Page 87)**
Non terminals
Productions
None of the given options

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
a^n b^n generates the …… language

regular
non regular
EQUAL and non regular **(Page 71)**
EQUAL and regular

Question # 5 of 10 (Total Marks: 1) **Select correct option:**
The grammatical rules which involves meaning of words are called:

Semantic **(Page 87)**
Sytactics
Alphabets
None of he given options

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Question # 6 of 10 (Total Marks: 1) **Select correct option:**
The reverse of the string sbfsbb over { sb, f, b }

bbsfbs
bsbfsb
sbbfsb
bsfbsb

Question # 7 of 10 (Total Marks: 1) **Select correct option:**
If an FA has N state then it must accept the word of length

N-1
N+1
N+2N

Question # 8 of 10 (Total Marks: 1) **Select correct option:**
Two languages are said to belong to same class if they end in the same state when they run over an FA, that state

Must be final state
May be final state or not (Page 75)
May be start or not
None of the given options

Question # 9 of 10 (Total Marks: 1) **Select correct option:**
In pref(Q in R) Q is …… to (than) R

Equal
Not Equal (Page 79)
Greater
Smaller

Question # 10 of 10 (Total Marks: 1) **Select correct option:**
According to Myhill Nerode theorem, if L generates finite no. of classes then L is.....

Finite
Infinite
Regular (Page 76)
Non Regular

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Question # 1 of 10 (Total Marks: 1) **Select correct option:**
If the intersection of two regular languages is regular then the complement of the intersection of these two languages is also regular

True (Page 68)
False

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
In pumping lemma theorem (x y^n z) the range of n is

n=1,2,3,4..... (Page 74)
n=0,1,2,3,4....
n=-3,-2,-1,0,1,2,3,4.....
n=-3,-2,-1,1,2,3,4.....

Question # 3 of 10 (Total Marks: 1) **Select correct option:**
The complement of a regular language is also a regular

True rep
False

CS402 – Quiz No.3

Question # 1 of 10 (Total Marks: 1) **Select correct option:**
For a non regular language there exist …… FA

One
At least one
At most one
No (Page 71)

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
The strings or words which do not belong to a language is called…… of that language

Intersection
Union
Complement (Page 66)
Quotient

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Question # 3 of 10 (Total Marks: 1) **Select correct option:**
A non regular language can be represented by
RE
FA
TG
None of the given options (Page 71)

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
For language L defined over {a, b},then L partitions {a, b}* into …… classes

Infinite
Finite
Distinct (Page 75)
Non distinct

Question # 5 of 10 (Total Marks: 1) **Select correct option:**
If an FA accept a word then there must exist a path from

Initial to final state (Page 81)
Initial to each state
Initial to each state but not to final state
Initial to final state by traversing each state

Question # 6 of 10 (Total Marks: 1) **Select correct option:**
Does the empty string match the regular expression |y+a|?

Yes
No (Page 3)

Question # 7 of 10 (Total Marks: 1) **Select correct option:**
If an FA already accepts the language expressed by the closure of certain RE, then the given FA is the required FA.

True (Page 37)
False

Question # 8 of 10 (Total Marks: 1) **Select correct option:**
Which of the following statement is true about NFA with Null String?

Infinite states
Infinite set of letters
Infinite set of transitions
Transition of null string is allowed at any stage (Page 71)

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Question # 9 of 10 (Total Marks: 1) **Select correct option:**
If R is a regular language and L is some language, and L U R is a regular language, then L must be a regular language.

True (page 10)
False

Question # 10 of 10 (Total Marks: 1) **Select correct option:**
FA corresponding to an NFA can be built by introducing an empty state for a letter having

no transition at certain state (Page 43)
one transition at certain state
two transition at certain state
more than two transitions at certain state

Question # 1 of 10 (Total Marks: 1) **Select correct option:**
Let FA3 be an FA corresponding to FA1FA2, then the initial state of FA3 must correspond to the initial state of

FA1 only (Page 35)
FA2 only
FA1 or FA2
FA1 and FA2

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
(a* + b*)* = (a + b)* this expression is _____
True
False

Question # 3 of 10 (Total Marks: 1) **Select correct option:**
If S = { x }, then S* will be
{x,xx,xxx,xxxx,…}
{^ ,x,xx,xxx,xxxx,…} (Page 10)

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
The states in which there is no way to leave after entry are called
Davey John Lockers
Dead States
Waste Baskets
All of the given options (Page 17)

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Question # 5 of 10 (Total Marks: 1) **Select correct option:**
If S = {ab, bb}, then S* will not contain
Abbbab
Bbba
ababbb
bbbbab

Question # 6 of 10 (Total Marks: 1) **Select correct option:**
According to theory of automata there are _____ types of languages

1
2 (Page 3)
3
4

Question # 7 of 10 (Total Marks: 1) **Select correct option:**
What do automata mean?
Something done manually
Something done automatically (Page 3)

Question # 8 of 10 (Total Marks: 1) **Select correct option:**
What is false about the term alphabet?
It is a finite set of symbols.
It is usually denoted by Greek letter sigma
It can be an empty set. (Page 3)
Strings are made up of its elements

Question # 9 of 10 (Total Marks: 1) **Select correct option:**
Formal is also known as _____
Syntactic language (page 3)
Semantic language
Informal language
Nsone of these

Question # 10 of 10 (Total Marks: 1) **Select correct option:**
Following are types of languages

Formal Languages (Syntactic languages)
Informal Languages (Semantic languages)
Both (Page 3)
None of above

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CS402 – Quiz No.4

Question # 1 of 10 (Total Marks: 1) **Select correct option:**
Consider the following production (of a CFG): S->XYZ Here _____ is left most nonterminal in working string. Note: S, X, Y and Z are all nonterminals
S
X
Y
Z

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
A PDA is called nondeterministic PDA if _____

There are more than one outgoing edges at READ or POP states with one label (Page 111)
There are more than one PUSH states
There are mroe than one POP states
All of the given options

Question # 3 of 10 (Total Marks: 1) **Select correct option:**
A PDA consists of the following:

An alphabet (Sigma) of input letters.
An input TAPE with infinite many locations in one direction
One START state with only one out-edge and no in-edge
All of the given options (Page 105)

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
The CFG S --> aSa | bSb | a | b | ^ represents the language

EVEN-EVEN
PALINDROM (Page 91)
EQUAL
ODD-ODD

Question # 5 of 10 (Total Marks: 1) **Select correct option:**
Halt states are

Start and Accept
Accept and Reject (Page 105)
Start and Reject
Read and Reject

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Question # 6 of 10 (Total Marks: 1) **Select correct option:**
Choice of path can be determined by left most derivation of the string belonging to CFL at…… state

Accept (Page 104)
Reject
Push
POP

Question # 7 of 10 (Total Marks: 1) **Select correct option:**
The unit and null productions can be deleted from a CFG

True (Page 99-100)
False

Question # 8 of 10 (Total Marks: 1) **Select correct option:**
Identify the TRUE statement about following CFG:
S -> SB|AB
A -> CC
B -> b
C -> a

The given CFG has 8 Nonterminals
The given CFG has 8 Terminals
The given CFG is in CNF (Page 101)
The given CFG is not in CNF

Question # 9 of 10 (Total Marks: 1) **Select correct option:**
The structure given below is called _____ S -> aA|bB A -> aS|a B -> bS|b

RE
TG
CFG (Page 87)
PDA

Question # 10 of 10 (Total Marks: 1) **Select correct option:**
Which of the following states is not part of PDA

START
ACCEPT
WRITE (Page 107)
REJECT

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CS402 – Quiz No.4

Question # 1 of 10 (Total Marks: 1) **Select correct option:**
The production of the form: nonterminal --> one nonterminal is called the _____

Unit production (Page 100)
NULL production
Terminal production
Non Terminal production

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
A _____ is the one for which every input string has a unique path through the machine.

Deterministic PDA (Page 111)
nondeterministic PDA
PUSHDOWN store
Input Tape

Question # 3 of 10 (Total Marks: 1) **Select correct option:**
In the null production N --> ^ , N is a

Terminal
Non terminal (Page 99)
Word
None of the given options

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
The major problem in the earliest computers was

To store the contents in the registers
To display mathematical formulae (Page 87)
To load the contents from the registers
To calculate the mathematical formula

Question # 5 of 10 (Total Marks: 1) **Select correct option:**
In polish notation, (o-o-o) is the abbreviation of……?

Operand - Operator – Operand
Operand - Operand- Operator
Operator -Operand – Operand (Page 94)
Operand -Operand – Operand

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Question # 6 of 10 (Total Marks: 1) **Select correct option:**
The CFG is said to be ambiguous if there exist at least one word of its language that can be generated by the …… production trees

One
Two
More than one (Page 95)
At most one

Question # 7 of 10 (Total Marks: 1) **Select correct option:**
The input string is placed, before it runs, in

Stack
Memory
Tape (Page 105)
Ram

Question # 8 of 10 (Total Marks: 1) **Select correct option:**
The production S --> SS | a | b | ^ can be expressed by RE

(a+b)+
(a+b)
(a+b)* (Page 88)
(ab)*

Question # 9 of 10 (Total Marks: 1) **Select correct option:**
The locations into which we put the input letters on "Input Tap" are called _____

words
alphabets
cells (Page 105)
elements

Question # 10 of 10 (Total Marks: 1) **Select correct option:**
"CFG" stands for _____

Context Free Graph
Context Free Grammer (Page 87)
Context Finite Graph
Context Finite Grammer

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Question # 1 of 10 (Total Marks: 1) **Select correct option:**
In a CFG the nonterminal that occurs first from the left in the working string, is said to be _____

Least Significant nonterminal
Most Significant nonterminal
Left most nonterminal (Page 103)
Left most derivate

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
The unit production is

Terminal --> Terminal
Terminal --> Non Terminal
Non terminal --> Terminal
Non terminal --> Non Terminal (Page 100)

Question # 3 of 10 (Total Marks: 1) **Select correct option:**
A _____ operator adds a new letter at the top of STACK

PUSH (Page 107)
POP
READ
APPEND

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
PDA stands for _____

Push and Drop Automaton
Pop and Drop Automaton
Push Down Automaton (Page 112)
None of given options

Question # 5 of 10 (Total Marks: 1) **Select correct option:**
The production of the form: Nonterminal-> ^ is said to be _____ production

NULL (Page 99)
UNIT
Chomsky form production
None of the given options

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Question # 6 of 10 (Total Marks: 1) **Select correct option:**
If a CFG has a null production, then it is _____

Posiible to construct another CFG without null production accepting the same language with the exception of the word ^ (Page 99)
Not possible to construct another CFG without null production accepting the same language with the exception of the word ^
Called NULL CFG
Called Chmosky Normal Form (CNF)

Question # 7 of 10 (Total Marks: 1) **Select correct option:**
In a STACK:

The element PUSHed first is POPed first
The element PUSHed first is POPed in the last (Page 107 concept)
The element PUSHed in last is POPed in last
None of given options

Question # 8 of 10 (Total Marks: 1) **Select correct option:**
Kleene star closure can be defined
Over any set of string (Page 7)
Over specific type of string

Question # 9 of 10 (Total Marks: 1) **Select correct option:**
While finding RE corresponding to TG, we connect the new start state to the old start state by the transition labeled by
A
B
null string (Page 26)
None of the given options

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Some More Quizzes

Question # 1 of 10 (Total Marks: 1) **Select correct option:**
For a given input, it provides the compliment of Boolean AND output.

NAND box (NOT AND) **(Page 63)**
DELAY box
OR box
AND box

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
It delays the transmission of signal along the wire by one step (clock pulse).

NAND box (NOT AND)
DELAY box **(Page 63)**
OR box
AND box

Question # 3 of 10 (Total Marks: 1) **Select correct option:**
For the given input, it provides the Boolean OR output

NAND box (NOT AND)
DELAY box
OR box **(Page 63)**
AND box

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
For the given input, AND box provides the Boolean AND output.
True **(Page 63)**
False

Question # 5 of 10 (Total Marks: 1) **Select correct option:**
The current in the wire is indicated by 1 and 0 indicates the absence of the current.
True **(Page 63)**
False

Question # 6 of 10 (Total Marks: 1) **Select correct option:**
Any language that can not be expressed by a RE is said to be regular language.
True
False **(Page 71)**

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Question # 7 of 10 (Total Marks: 1) **Select correct option:**
If L1 and L2 are regular languages_____ is/are also regular language(s).

L1 + L2
L1L2
L1*
All of above (Page 10)

Question # 8 of 10 (Total Marks: 1) **Select correct option:**
Let L be a language defined over an alphabet Σ, then the language of strings, defined over Σ, not belonging to L, is called Complement of the language L, denoted by Lc or L'.
True (Page 66)
False

Question # 9 of 10 (Total Marks: 1) **Select correct option:**
To describe the complement of a language, it is very important to describe the ---------- of that language over which the language is defined.

Alphabet (Page 66)
Regular Expression
String
Word

Question # 10 of 10 (Total Marks: 1) **Select correct option:**
For a certain language L, the complement of Lc is the given language L *i.e.* (Lc)c = Lc
True
False (Page 66)

Question # 1 of 10 (Total Marks: 1) **Select correct option:**
If L is a regular language then, --------- is also a regular language.
Lm
Ls
Lx
Lc (Page 66)

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
Converting each of the final states of F to non-final states and old non-final states of F to final states, FA thus obtained will reject every string belonging to L and will accept every string, defined over Σ, not belonging to L. is called
Transition Graph of L
Regular expression of L
Complement of L (Page 66)
Finite Automata of L

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Question # 3 of 10 (Total Marks: 1) **Select correct option:**
If L1 and L2 are two regular languages, then L1 U L2 is not a regular.
True
False (Page 65)

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
De-Morgan's law for sets is expressed by,
$(L_1^c \cap L_2^c)^c = L_1^c \cap L_2^c$
$(L_1^c \cap L_2^c)^c = L_1^c \cap L_2^c$
$(L_1^c \cap L_2^c)^c = L_1 \cap L_2$
$(L_1^c \cap L_2^c)^c = L_1 \cup L_2$ **CORRECT (page 68)**

Question # 5 of 10 (Total Marks: 1) **Select correct option:**
If L1 and L2 are regular languages, then these can be expressed by the corresponding FAs.
True (Page 68)
False

Question # 6 of 10 (Total Marks: 1) **Select correct option:**
L= language of words containing even number of a's. Regular Expression is

(a+b)*aa(a+b)*
(b+ab*a)* (Page 68)
a+bb*aab*a
(a+b)*ab(a+b)*

Question # 7 of 10 (Total Marks: 1) **Select correct option:**
The regular expression defining the language $L_1 \cap L_2$ can be obtained, converting and reducing the previous ---------- into a ---------- as after eliminating states.

GTG, TG
FA, GTG (Page 69)
FA, TG
TG, RE

Question # 8 of 10 (Total Marks: 1) **Select correct option:**
The language that can be expressed by any regular expression is called a Non regular language.
True
False (Page 71)

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Question # 9 of 10 (Total Marks: 1) **Select correct option:**
The languages ---------- are the examples of non regular languages.

PALINDROME and PRIME (Page 71)
PALINDROME and EVEN-EVEN
EVEN-EVEN and PRIME
FACTORIAL and SQURE

Question # 10 of 10 (Total Marks: 1) **Select correct option:**
Let L be any infinite regular language, defined over an alphabet Σ then there exist three strings x, y and z belonging to Σ* such that all the strings of the form xy^nz for n=1,2,3, … are the words in L. called.

Complement of L
Pumping Lemma (Page 72)
Kleene's theorem
None in given

Question # 1 of 10 (Total Marks: 1) **Select correct option:**
Languages are proved to be regular or non regular using pumping lemma.
True (Page 74)
False

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
---------- is obviously infinite language.
EQUAL-EQUAL
EVEN-EVEN
PALINDROME (Page 75)
FACTORIAL

Question # 3 of 10 (Total Marks: 1) **Select correct option:**
If, two strings x and y, defined over Σ, are run over an FA accepting the language L, then x and y are said to belong to the same class if they end in the same state, no matter that state is final or not.
True (Page 75)
False

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
Myhill Nerode theorem is consisting of the followings,

L partitions Σ* into distinct classes.
If L is regular then, L generates finite number of classes.
If L generates finite number of classes then L is regular.
All of above (Page 75)

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Question # 5 of 10 (Total Marks: 1) **Select correct option:**
The language Q is said to be quotient of two regular languages P and R, denoted by--- if PQ=R.
R=Q/P
Q=R/P (Page 78)
Q=P/R
P=R/Q

Question # 6 of 10 (Total Marks: 1) **Select correct option:**
If two languages R and Q are given, then the prefixes of Q in R denoted by Pref(Q in R).
True (Page 78)
False

Question # 7 of 10 (Total Marks: 1) **Select correct option:**
Let Q = {aa, abaaabb, bbaaaaa, bbbbbbbbbb} and R = {b, bbbb, bbbaaa, bbbaaaaa} Pref (Q in R) is equal to,

{b,bbba,bbbaaa} (Page 78)
{b,bba,bbaaa}
{ab,bba,bbbaa}
{b,bba,bbba}

Question # 8 of 10 (Total Marks: 1) **Select correct option:**
If R is regular language and Q is any language (regular/ non regular), then Pref (Q in R) is ---------.

Non-regular
Equal
Regular (Page 79)
Infinite

Question # 9 of 10 (Total Marks: 1) **Select correct option:**
_____ states are called the halt states.
ACCEPT and REJECT (Page 105)
ACCEPT and READ
ACCEPT AND START
ACCEPT AND WRITE

Question # 10 of 10 (Total Marks: 1) **Select correct option:**
The part of an FA, where the input string is placed before it is run, is called _____

State
Transition
Input Tape (Page 105)
Output Tape

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Question # 1 of 10 (Total Marks: 1) **Select correct option:**
In new format of an FA (discussed in lecture 37), This state is like dead-end non final state

ACCEPT
REJECT (Page 105)
STATR
READ

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
Between the two consecutive joints on a path

One character can be pushed and one character can be popped
Any no. of characters can be pushed and one character can be popped (Page 122)
One character can be pushed and any no. of characters can be popped
Any no. of characters can be pushed and any no. of characters can be popped

Question # 3 of 10 (Total Marks: 1) **Select correct option:**
The PDA is called non-deterministic PDA when there are more than one out going edges from…… state

START or READ
POP or REJECT
READ or POP (Page 111)
PUSH or POP

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
Identify the TRUE statement:
A PDA is non-deterministic, if there are more than one READ states in PDA
A PDA is never non-deterministic
Like TG, A PDA can also be non-deterministic (Page 111)
A PDA is non-deterministic, if there are more than one REJECT states in PDA

Question # 5 of 10 (Total Marks: 1) **Select correct option:**
There is a problem in deciding whether a state of FA should be marked or not when the language Q is infinite.
True (Page 79)
False

Question # 6 of 10 (Total Marks: 1) **Select correct option:**
If an effectively solvable problem has answered in yes or no, then this solution is called ---------

Decision procedure (Page 80)
Decision method
Decision problem
Decision making

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Question # 7 of 10 (Total Marks: 1) **Select correct option:**
The following problem(s) ---------- is/are called decidable problem(s).

The two regular expressions define the same language
The two FAs are equivalent
Both a and b (Page 80)
None of given

Question # 8 of 10 (Total Marks: 1) **Select correct option:**
To examine whether a certain FA accepts any words, it is required to seek the paths from ------- state.

Final to initial
Final to final
Initial to final (Page 81)
Initial to initial

Question # 9 of 10 (Total Marks: 1) **Select correct option:**
The high level language is converted into assembly language codes by a program called compiler.

TRUE (Page 87)
FALSE

Question # 10 of 10 (Total Marks: 1) **Select correct option:**
Grammatical rules which involve the meaning of words are called ----------
Semantics (Page 87)
Syntactic
Both a and b
None of given

Question # 1 of 10 (Total Marks: 1) **Select correct option:**
Grammatical rules which do not involve the meaning of words are called ----------
Semantics
Syntactic (Page 87)
Both a and b
None of given

Question # 2 of 10 (Total Marks: 1) **Select correct option:**
The symbols that must be replaced by other things are called _____

Productions
Terminals
Non-terminals (Page 87)
None of given

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Question # 3 of 10 (Total Marks: 1) **Select correct option:**
The grammatical rules are often called_____

Productions (Page 87)
Terminals
Non-terminals
None of given

Question # 4 of 10 (Total Marks: 1) **Select correct option:**
The terminals are designated by _____ letters, while the non-terminals are designated by _____ letters.
Capital, bold
Small, capital (Page 87)
Capital, small
Small, bold

Question # 5 of 10 (Total Marks: 1) **Select correct option:**
The language generated by _____ is called Context Free Language (CFL).
FA
TG
CFG (Page 87)
TGT

Question # 6 of 10 (Total Marks: 1) **Select correct option:**
Σ = {a,b} Productions S→XaaX
X→aX
X→bX
X→Λ
This grammar defines the language expressed by_____

(a+b)*aa(a+b)* (Page 89)
(a+b)*a(a+b)*a
(a+b)*aa(a+b)*aa
(a+b)*aba+b)*

Question # 7 of 10 (Total Marks: 1) **Select correct option:**
S → aXb|b
XaX → aX|bX|Λ
The given CFG generates the language in English _____

Beginning and ending in different letters (Page 91)
Beginning and ending in same letter
Having even-even language
None of given

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Question # 8 of 10 (Total Marks: 1) **Select correct option:**

The CFG is not said to be ambiguous if there exists atleast one word of its language that can be generated by the different production trees,

TRUE
FALSE (Page 95)

Question # 9 of 10 (Total Marks: 1) **Select correct option:**

The language generated by that CFG is regular if _____

No terminal → semi word
No terminal → word
Both a and b (Page 97)
None of given

Question # 10 of 10 (Total Marks: 1) **Select correct option:**

The production of the form no terminal → Λ is said to be null production.

TRUE (Page 99)
FALSE

Question # 1 of 10 (Total Marks: 1) **Select correct option:**

CNF is stands for

Context Normal Form
Complete Normal Form
Chomsky Normal Form (Page 102)
Compared Null Form

Question # 2 of 10 (Total Marks: 1) **Select correct option:**

Proof(Kleene's Theorem Part II)
If a TG has more than one start states, then

Introduce the new start state (Page 26)
Eliminate the old start state
Replace the old start state with final state
Replace the old final state with new start state

Question # 3 of 10 (Total Marks: 1) **Select correct option:**

Which of the following regular expression represents same language?
a. (a+ab)*
b. (ba+a)*
c. a*(aa*b)*

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d. (a*b*)* (a+b)*a(a+b)*b(a+b)*+ (a+b)*b(a+b)*a(a+b)*.

{ x}*, { x}+, {a+b}*

Select correct option:
a and b (correct)
a and c
c and d

Question # 4 of 10 (Total Marks: 1) Select correct option:
Let FA3 be an FA corresponding to FA1+FA2, then the initial state of FA3 must correspond to the initial state of

FA1 only
FA2 only
FA1 or FA2 (Page 32)
FA1 and FA2

Question # 5 of 10 (Total Marks: 1) Select correct option:
Which of the following statement is NOT true about TG?

There exists exactly one path for certain string (Page 19)
There may exist more than one paths for certain string
There may exist no path for certain string
There may be no final state

Question # 6 of 10 (Total Marks: 1) Select correct option:
Kleene's theorem states

All representations of a regular language are equivalent.
All representations of a context free language are equivalent.
All representations of a recursive language are equivalent
Finite Automata are less powerful than Pushdown Automata. (Page 105)

Question # 7 of 10 (Total Marks: 1) Select correct option:
A language accepted by an FA is also accepted by

TG only
GTG only
RE only
All of the given (Page 25)

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Theory of Automata(Cs402)
Final term Papers
Solved final term by Hina

Question: 1
The production of the form nonterminal →Λ is said to be null production.
- Ø ► True Page 104
- Ø ► False

Question: 2
Consider the following GFC :
s→aa|bB,a→aa|B,B→aS|Λ
here s→aaand A→B are null productions ,while B→Λ is null able production
- Ø ►false page 105
- Ø ►True

Question: 3
Which statement is true?
- Ø The tape of turing machine is infinite.
- Ø The tape of turing machine is finite.
- Ø The tape of turing machine is infinite when the language is regular
- Ø The tape of turing machine is finite when the language is nonregular.

Question: 4
The production of the form nonterminal →one nonterminal is called the :
- Ø Null production
- Ø Null able production
- Ø Unit production page105
- Ø None of the given

Question: 5
For a given input, it provides the compliment of Boolean AND output.
- Ø NAND box (NOT AND)
- Ø DELAY box
- Ø OR box
- Ø AND box

Question: 6
(Marks: 1) - Please choose one
Choose the correct statement.

Hina

- Ø A Mealy machine generates no language as such Ø A Moore machine generates no language as such Ø **A Mealy machine has no terminal state**
- Ø All of these

Question: 7

Let Q and R be expressed by ab*a and (ba)* respectively i.e Q={aa ,aba ,abba ……}and R={Λ,ba baba,bababa…….}..aba is the only word in Q which can make a word in R, because the words in R don,t contain the

- Ø **Single letter**
- Ø **Double letter** **page 84**
- Ø String
- Ø Null string

Question: 8

It delays the transmission of signal along the wire by one step (clock pulse).

- Ø OR box
- Ø **DELAY box**
- Ø NAND box (NOT AND)
- Ø AND box

Question: 9

To describe the complement of a language, it is very important to describe the ---------- of that language over which the language is defined.

- Ø String
- Ø Regular Expression
- Ø **Alphabet**
- Ø Word

Question:10

Let L be a language defined over an alphabet ∑,then the language of strings , defined over ∑, not belonging to L denoted by L^C or L. is called :

- Ø Non regular language of L
- Ø **Complement of the language L**
- Ø Non of the given
- Ø All of above

Question:11

For the given input, it provides the Boolean OR output

- Ø DELAY box
- Ø AND box
- Ø NAND box (NOT AND)
- Ø **OR box**

Question: 12

For the given input, AND box provides the Boolean AND output.

- Ø **True**

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- Ø False

Question: 13

The current in the wire is indicated by 1 and 0 indicates the absence of the current.

- Ø **True**
- Ø False

Question: 14

If L is a regular language ,then according to Kleene,theorem , there exists an :

- Ø TG
- Ø GTG
- Ø **FA page77**
- Ø Non of the given

Question: 15

Any language that can not be expressed by a RE is said to be regular language.

- Ø True
- Ø **False**

Question: 16

and r2 = (a + b) then the language (aa + bb)(a + b) will be generated by

- Ø **(r1 + r2) Ø**
- (r2)(r1) Ø
- (r1)*
- Ø (r1)(r2)

Question: 17

If L1 and L2 are regular languages is/are also regular language(s).

- Ø L1 + L2
- Ø L1L2
- Ø L1*
- Ø **All of above Page 70**

Question: 18

Let L be a language defined over an alphabet Σ, then the language of strings, defined over Σ, not belonging to L, is called Complement of the language L, denoted by Lc or L'.

True

False

NO19: For a certain language L, the complement of L^C is the given language L *i.e.* $(L^C)^C = L$

- Ø **True Page 71**
- Ø **False**

Question: 20

If L is a regular language then, L^C is also a _____language.

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- Ø Regular
- Ø Non-regular
- Ø Regular but finite
- Ø None of the given

Question: 21

If an effectively solvable problem has answered in yes or no, then this solution is called ---------

- Ø Decision problem
- Ø Decision method
- Ø Decision procedure
- Ø Decision making

Question: 22

There is an approach in defining the quotient of regular languages ie the language Q is said to be quotient of two regular languages P and R, denoted by Q=R/P if :

- Ø PQ=R Ø

R=PQ Ø

QR=P

- Ø Non of above

Question: 23

consider a language L defined over an alphabet ∑ if two strings x and y defined over ∑ are run over an FA accepting the language L,then x and y are said to belong to the same ……. if they end in the same …….

- Ø Class ,state
- Ø Final ,infinite
- Ø Regular ,nonregular
- Ø All of Above

Question:24

If L is a regular language then, --------- is also a regular language.

- Ø Lm Ø

Ls Ø Lx

- Ø Lc

Question:25

Converting each of the final states of F to non-final states and old non-final states of F to final states, FA thus obtained will reject every string belonging to L and will accept every string, defined over Σ, not belonging to L. is called

- Ø Complement of L
- Ø Finite Automata of L Ø

Transition Graph of L Ø

Regular expression of L

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Question: 26

If L1 and L2 are two regular languages, then L1 U L2 is not a regular.

- Ø **True**
- Ø **False**

Question:27

L= language of words containing even number of a's. Regular Expression is

- Ø **(a+b)*aa(a+b)***
- Ø **(b+ab*a)***
- Ø **a+bb*aab*a**
- Ø **(a+b)*ab(a+b)***

Question:28

The regular expression defining the language L1 U L2 can be obtained, converting and reducing the previous ---------- into a ---------- as after eliminating states.

- Ø **GTG, TG** Ø
- **FA, GTG** Ø **FA, TG**
- Ø **TG, RE**

Question: 29

The language that can be expressed by any regular expression is called a Non regular language.

True

False Page 76

Question:30

Please choose one

Choose the incorrect statement:

- Ø **(a+b)*aa(a+b)* generates Regular language.**
- Ø **A language consisting of all strings over ∑={a,b} having equal number of a's and b's is a regular language**
- Ø **Every language that can be expressed by FA can also be expressed by RE**
- Ø **None of these**

Question: 31

The languages ---------- are the examples of non regular languages

- Ø **EVEN-EVEN and PRIME**
- Ø **PALINDROME and PRIME. Page 76**
- Ø **PALINDROME and EVEN-EVEN**
- Ø **FACTORIAL and SQURE**

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Question: 32

De-Morgan's law for sets is expressed by,

- Ø $(L_1^c \cap L_2^c)^c = L_1^c \cap L_2^c$
- Ø $(L_1^c \cap L_2^c)^c = L_1 \cap L_2$
- Ø $(L_1^c \cap L_2^c)^c = L_1 \cup L_2$
- Ø $(L_1^c \cap L_2^c)^c = L_1^c \cap L_2^c$

Question: 33

Let L be any infinite regular language, defined over an alphabet Σ then there exist three strings x, y and z belonging to Σ* such that all the strings of the form $xy^n z$ for n=1,2,3, … are the words in L. called Complement of L

- Ø **Pumping Lemma** **Page 77**
- Ø **Kleene's theorem**
- Ø **None of the given**
- Ø **1,2 both**

Question: 34

Languages are proved to be regular or non regular using pumping lemma.

- Ø **True**
- Ø **False**

Question:35

---------- is obviously infinite language.

- Ø **EQUAL-EQUAL**
- Ø **EVEN-EVEN**
- Ø **PALINDROME** **Page 80**
- Ø **FACTORIAL**

Question: 36

If L1 and L2 are expressed by regular expressions r1 and r2, respectively then the language expressed by r1 + r2 will be _____

- Ø **Ir-regular**
- Ø **Can't be decided**
- Ø **Regular language** **Page 77**
- Ø **Another Language which is not listed here**

Question: 37

Let L be an infinite language accepted by a language accepted by a finite automaton with N states , then for all words W in L that have length more than N there are strings x,y and Z (y being non null string)and length (x)+length (y)≤Ns.t.W=xyz and all strings of the form $xy^n z$ are in L for n=1,2,3…….

- Ø **True** **Page 80**

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Ø False

Question: 38

If, two strings x and y, defined over Σ, are run over an FA accepting the language L, then x and y are said to belong to the same class if they end in the same state, no matter that state is final or not.

Ø True

Ø False

Question: 39

Myhill Nerode theorem is consisting of the followings.

Ø L partitions Σ* into distinct classes.

Ø If L is regular then, L generates finite number of classes. Ø If L generates finite number of classes then L is regular. Ø All of above

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Question:40

The language Q is said to be quotient of two regular languages P and R, denoted by--- if PQ=R.

Ø R=Q/P

Ø Q=R/P Page 83

Ø Q=P/R

Ø P=R/Q

Question:41

If two languages R and Q are given, then the prefixes of Q in R denoted by Pref(Q in R).

Ø True Page 83

Ø False

Question:42

Let Q = {aa, abaaabb, bbaaaaa, bbbbbbbbbb} and R = {b, bbbb, bbbaaa, bbbaaaaa} Pref (Q in R) is equal to

Ø {b,bbba,bbbaaa}, Page 83

Ø {b,bba,bbaaa} Ø

{ab,bba,bbbaa} Ø

{b,bba,bbba}

Question: 43

If R is regular language and Q is any language (regular/ non regular), then Pref (Q in R) is ---------.

Ø Non-regular

Ø Equal

Ø Regular Page 84

Ø Infinite

Question: 44

The regular expression thus obtained if contains at least one word then the language is not empty

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otherwise the language is :

- Ø **Regular**
- Ø **No regular**
- Ø **Empty** **Page 85**
- Ø **Non of the above**

Question: 45
"CFG" stands for _____:

- Ø **Context Free Graph**
- Ø **Context Free Grammar** **Page 92**
- Ø **Context Finite Graph**
- Ø **Context Finite Grammar**

Question:46
The langue generated by CFG is called Context free language (CFL)

- Ø **False**
- Ø **True**

Question:47

_____states are called the halt states.

- Ø **ACCEPT and REJECT**
- Ø **ACCEPT and READ**
- Ø **ACCEPT AND START**
- Ø **ACCEPT AND WRITE**

Question:48
If a regular expression contains * then it may define an infinite language ,with exception Λ*as Λ*= Λ e.g.

- Ø **(Λ+a Λ*)(Λ*+Λ) * defines finite language. While (Λ+a Λ*)*(Λ*+Λ) *defines an finite language.**
- Ø **True**
- Ø **False** **Page 90**

Question:49
The part of an FA, where the input string is placed before it is run, is called

- Ø State
- Ø Transition
- Ø **Input Tape** **Page 110**
- Ø Output Tape

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Question: 50

TM is more powerful than FSM because

- Ø The tape movement is confined to one direction
- Ø **It has no finite state control**
- Ø It has the capability to remember arbitrary long sequences of input symbols
- Ø None of these

NO51: In new format of an FA This state is like dead-end non final state:

- Ø ACCEPT
- Ø **REJECT Page 110**
- Ø STATR
- Ø READ

NO52: For language L defined over {a, b}, then L partitions {a, b}* into …… classes

- Ø Infinite
- Ø Finite
- Ø **Distinct**
- Ø Non-distinct

NO53 := language of words containing even number of a's. Regular Expression is

- Ø (a+b)*aa(a+b)*
- Ø **(b+ab*a)***
- Ø a+bb*aab*a
- Ø (a+b)*ab(a+b)*

No 54:All NonNull words of the CFL can be generated by the corresponding CFG which is in CNF i.e the grammar in CNF will generate the same language except the :

- Ø string
- Ø regular language
- Ø **null string .**
- Ø non of above

NO55: The …….. is said to be ambiguous if there exist at least one word of its language that can be generated by the different production tree .

- Ø CFL
- Ø CFG Page 98
- Ø GTG
- Ø None of the given

NO56 : Between the two consecutive joints on a path

- Ø One character can be pushed and one character can be popped
- Ø **Any no. of characters can be pushed and one character can be popped**
- Ø One character can be pushed and any no. of characters can be popped
- Ø Any no. of characters can be pushed and any no. of characters can be popped

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NO57: In pumping lemma theorem (x y^n z) the range of n is:

- **n=1, 2, 3, 4…….** **Page 77**
- n=0, 1, 2, 3, 4…….
- n=…….-3,-2,-1, 0, 1, 2, 3, 4……
- n=…….-3,-2,-1, 1, 2, 3, 4……

NO58: TM is more powerful than FSM because Ø

The tape movement is confined to one direction Ø **It has no finite state control**

- It has the capability to remember arbitrary long sequences of input symbols
- None of these

NO59 : If every production in CFG is one of the following forms
Conterminal → semi word
Nonterminal→word
Then the language generated by that GFC is :

- **Regular**
- Nonregular
- Finite
- Infinite

NO 60: Then the language generated by that CFG is:

- Non regular
- Infinite
- **Regular** **Page 102**
- Finite

NO 61:The PDA is called non-deterministic PDA when there are more than one out going edges from…… state :

- START or READ
- POP or REJECT
- **READ or POP** **Page 116**
- PUSH or POP

NO:62 Identify the TRUE statement:

- A PDA is non-deterministic, if there are more than one READ states in PDA
- A PDA is never non-deterministic
- **Like TG, A PDA can also be non-deterministic** **Page 116**
- A PDA is non-deterministic, if there are more than one REJECT states in PDA

NO:63 the language Q is infinite.

- **True** **Page 134**
- **False**

Left hand side of a production in CFG consists of:

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- Ø One terminal
- Ø More than one terminal
- Ø One non-terminal
- Ø Terminals and non-terminals Page 64:

NO65: it is very important to determine which sequences of rows do correspond to possible paths through the:

- Ø CFG
- Ø CFL
- Ø **PDA Page 128**
- Ø TAPE

NO: 66 : The following problem(s) ---------- is/are called decidable problem(s).

- Ø The two regular expressions define the same language
- Ø The two FAs are equivalent
- Ø **Both a and b**
- Ø None of given

NO67: Before the CFG corresponding to the given PDA is determined,the PDA is converted in to the standard form which is called the:

- Ø Standard form
- Ø **Conversion form Page 108**
- Ø Left most derivation
- Ø None of them

NO: 68 The deviation of the word W generated by a CFG, such that at each step ,a production is applied to the left most nonterminal in the working string is said to be

- Ø Left most terminal
- Ø **Left most deviation : Page 108**
- Ø None of these
- Ø A ,B both

NO 69: To examine whether a certain FA accepts any words, it is required to seek the paths from ----- -- state.

- Ø Final to initial
- Ø Final to final
- Ø **Initial to final**
- Ø Initial to initial

NO 70: The high level language is converted into assembly language codes by a program called compiler.

- Ø **TRUE**
- Ø FALSE

NO 71: Grammatical rules which involve the meaning of words are called ----------

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Ø **Semantics** **Page 92**

Ø Syntactic Both
Ø a and b None
Ø of given

NO72: Choose the correct statement.

A Mealy machine generates no language as such
A Moore machine generates no language as such
A Mealy machine has no terminal state
All of these

NO: 73 Grammatical rules which do not involve the meaning of words are called ----------

Ø Semantics
Ø **Syntactic** **Page 92**

Ø **Both a and b**
Ø **None of given**

NO74: - Please choose one
The word 'formal' in formal languages means

Ø They are unnecessary, in reality
Ø Only the form of the string of symbols is significant
Ø **The symbols used have well defined meaning**
Ø None of these

NO: 75 ..... is a place where the input letters can be placed until these letters are referred again. It can store as many letters as one can in a long column .

Ø STACK
Ø POP AND STACK
Ø **PUSHDOWN STACK** **Page 112**
Ø **None of above**

NO 76: Consider the language L of strings, defined over Σ = {a,b}, ending in a

► There are finite many classes generated by L, so L is regular
► **There are infinite many classes generated by L, so L is regular**
► There are finite many classes generated by L, so L is non-regular
► There are infinite many classes generated by L, so L is non-regular

NO77: The symbols that can't be replaced by anything are called ----------

Ø Productions
Ø **Terminals Page 92**
Ø Non-terminals
Ø All of above

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NO78: "One language can be expressed by more than one FA". This statement is _____

- Ø **True**
- Ø False
- Ø Some times true & sometimes false
- Ø None of these

NO: 79 The symbols that must be replaced by other things are called _____

- Ø Productions
- Ø Terminals
- Ø **Non-terminals** **Page 92**
- Ø None of given

NO 80: Which of the following statement is NOT true:

- Ø FA can be considered to be an NFA
- Ø FA can be considered to be an NFA with null string
- Ø NFA can be considered to be an TG
- Ø **TG can be considered to be an NFA**

NO 81: Let FA 3 be an FA accepting L1∩L2 then the initial stat of FA3 must be correspond to the initial state of……. and initial state of …… p 74

- Ø FA3, FA2
- Ø **FA1 , FA2**
- Ø FA1,FA3
- Ø None of the given

NO82: If r1 = (aa + bb) and r2 = (a + b) then the language (aa + bb)(a + b) will be generated by

- Ø (r1)(r2)
- Ø **(r1 + r2)**
- Ø (r2)(r1) Ø
  (r1)*

NO83: The grammatical rules are often called_____

- Ø **Productions** **Page 92**
- Ø Terminals
- Ø Non-terminals
- Ø None of given

NO 84: Does the empty string match the regular expression |y+a|?

- Ø Yes
- Ø **No**

NO 85
The terminals are designated by _____letters, while the non-terminals are designated by _____letters.

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- Ø Capital, bold
- Ø **Small, capital** **Page 92**
- Ø Capital, small
- Ø Small, bold

NO86: FA corresponding to an NFA can be built by introducing a state corresponding to the combination of states, for a letter having
Choices:

- Ø **no transition at certain state**
- Ø **one transition at certain state**
- Ø **more than one transitions at certain state**
- Ø **none of the given options**

NO:87 Σ = {a,b} Productions S→XaaX X→aXX→bX X→Λ This grammar defines the language expressed by_____

- Ø **(a+b)*aa(a+b)*** **Page 94**
- Ø (a+b)*a(a+b)*a
- Ø (a+b)*aa(a+b)*aa
- Ø (a+b)*aba+b)*

NO 88: Which statement is true:

- Ø ► **The tape of turing machine is infinite.**
- Ø ► The tape of turing machine is finite.
- Ø ► The tape of turing machine is infinite when the language is regular
- Ø ► The tape of turing machine is finite when the language is nonregular.

NO89 : The language generated by _____ is called Context Free Language (CFL).

- Ø FA
- Ø TG
- Ø **CFG** **Page 93**
- Ø TGT

NO 90: Let A = {0, 1}. The number of possible strings of length 'n' that can be formed by the elements of the set A is:

- Ø n!
- Ø n^2
- Ø n^m
- Ø 2^n

NO : 91 S → aXb|bXa X → aX|bX|Λ The given CFG generates the language of strings in English _____

- Ø **Beginning and ending in different letters** **Page 96**
- Ø Beginning and ending in same letter

- Ø Having even-even language
- Ø None of given

NO92: Every regular expression can be expressed as CFG but every CFG cannot be expressed as a regular expression. This statement is:

- Ø Depends on the language
- Ø None of the given options
- Ø **True**
- Ø False

NO 93: The CFG is said to be ambiguous if there exists atleast one word of its language that can be generated by the different production trees,

- Ø **TRUE Page 100**
- Ø FALSE

NO 94: The language generated by that CFG is regular if _____

- Ø No terminal → semi word
- Ø No terminal → word
- Ø **Both a and b Page 102**
- Ø None of given

NO95: A regular language:

- Ø **Must be finite**
- Ø Must be infinite
- Ø Can be finite or infinite
- Ø Must be finite and cannot be infinite

NO96: The production of the form non terminal → Λ is said to be null production .

- Ø **TRUE Page 104**
- Ø **FALSE**

NO 97: Who did not invent the Turing machine?

- Ø Alan Turing
- Ø **A. M. Turing**
- Ø Turing
- Ø None of these

NO: 98 A production is called null able production if it is of the form N → Λ

- Ø **TRUE Page 105**
- Ø FALSE

NO99: A DFA with n states must accept at least one string of length greater than n.

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Choices:

- Ø **True**
- Ø False

NO100: For every three regular expressions R, S, and T, the languages denoted by R(S U T) and (RS) U (RT) are the same.

Choices:

- Ø **True**
- Ø False

NO101: Choose the right option: (2)

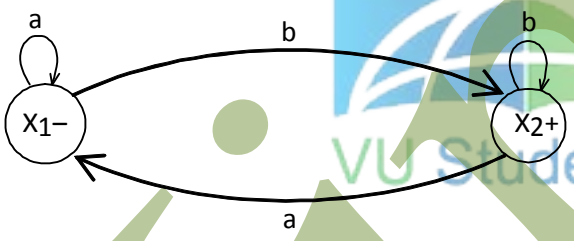
In a Mealy machine, the set of letters and the set of output characters must be same

In a Mealy machine, the set of letters and the set of output characters may not be same

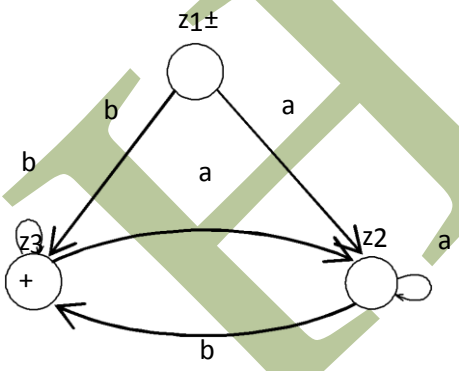
B only

A only

No102 : - Please choose one



Above given FA corresponds RE r. then FA corresponding to r* will be



This statement is

True **Page 42**

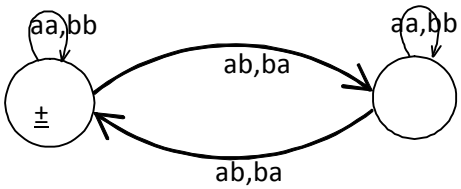
False

Depends on language

None of these

NO103 : - Please choose one

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Above given TG has _____RE.

(aa+aa+(ab+ab)(aa+ab)*(ab+ba))*

(aa+bb+(ab+ba)(aa+bb)*(ab+ba))* Page 26

(aa+bb+(ab+ba)(aa+bb)(ab+ba))*

None of these

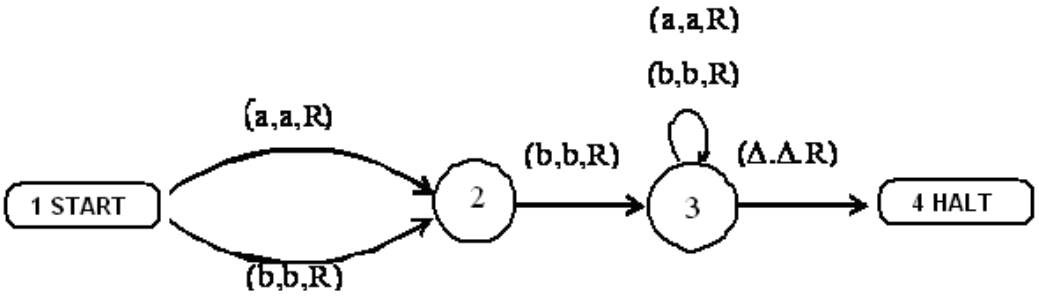
NO104: - Please choose one

Like TG, a PDA can also be non-deterministic

True

False

NO105 :- Please choose one :



The above machine is a/anTG _____http://vustudents.ning.com

Finite Automata

Turing machine Page 148

FA

TG

NO106: In FA, if one enters in a specific state but there is no way to leave it, then that specific state is called :

Dead State Waste

Basket Davey John

Locker All of these

NO107: - Please choose one

In CFG, the symbols that can't be replaced by anything are called_____

Ø Terminal

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- Ø Non-Terminal
- Ø **Production**
- Ø All of given

NO108: - Please choose one
Which of the following is NOT a regular language?

- Ø String of 0's whose length is a perfect squere
- Ø **Set of all palindromes made up of 0's and 1's**
- Ø String of 0's whose length is a prime number
- Ø All of the given options

NO109: - Please choose one
Choose the incorrect (FALSE) statement

- Ø A Mealy machine generates no language as such
- Ø A Mealy machine has no terminal state
- Ø **For a given input string, length of the output string generated by a Moore machine is not more than the length of the output string generated by that of a Mealy machine . Page 62**
- Ø All of these

NO110: - Please choose one
Pumping lemma is generally used to prove that

- ► A given language is infinite
- ► **A given language is not regular : Page 77**
- ► Whether two given regular expressions of a regular language are equivalent or not
- ► None of these

NO111:- Please choose one
Which of the following is a regular language?

- Ø String of odd number of zeroes
- Ø Set of all palindromes made up of 0's and 1's
- Ø **String of 0's whose length is a prime number**
- Ø All of these

NO112 : lemma is generally used to prove that

- Ø A given language is infinite
- Ø **A given language is not regular Page 78**
- Ø Whether two given regular expressions of a regular language are equivalent or not
- Ø None of these

NO113: language can be expressed by more than one FA". This statement is _____

- Ø **True**
- Ø False
- Ø Some times true & sometimes false
- Ø None of these

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NO114: language:

- Must be finite
- **Must be infinite**
- Can be finite or infinite
- Must be finite and cannot be infinite

NO115 : enters in a specific state but there is no way to leave it, then that specific state is called

- Dead State
- Waste Basket
- Davey John Locker
- **All of these**

NO116: symbols that can't be replaced by anything are called_____

- **Terminal** **Page 92**
- Non-Terminal
- Production
- All of given

NO117: following is NOT a regular language?

- String of 0's whose length is a perfect squere
- Set of all palindromes made up of 0's and 1's
- String of 0's whose length is a prime number
- **All of the given options**

NO118: Left hand side of a production in CFG consists of

- One terminal
- More than one terminal
- One non-terminal
- **Terminals and non-terminals** **Page 92**

NO119: One language can be expressed by more than one FA". This statement is _____

- **True**
- False
- Some times true & sometimes false
- None of these
-

NO120: invent the Turing machine?

- Alan Turing
- **A. M. Turing**
- Turing
- None of these

'NO121: formal' in formal languages means

- **The symbols used have well defined meaning**
- They are unnecessary, in reality
- Only the form of the string of symbols is significant

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- Ø None of these

NO122: TM is more powerful than FSM because

- Ø The tape movement is confined to one direction
- Ø **It has no finite state control**
- Ø It has the capability to remember arbitrary long sequences of input symbols
- Ø None of these

NO123: A program which is the set of rules which show that which state is to be entered when a letter is read form the :

- Ø **TAPE** **Page 147**
- Ø HALT
- Ø TM
- Ø None of above

NO124: The process of finding the derivation of word generated by particular grammar is called :

- Ø PLUS TIMING
- Ø **Parsing** **Page 142**
- Ø HALT
- Ø All of above

NO125: For a non regular language there exist …… FA:

- Ø **NO**
- Ø Yes

NO126: Bottem up parsing can be determined similar to that of TOP Down parsing with the change that in this case ,the process is started with the given string and the tree is extended till "S "is Regular

- Ø Non regular
- Ø **Obtain** **Page 146**
- Ø Finite

NO127: A production in CFG consists of:

- Ø One terminal
- Ø More than one terminal
- Ø One non-terminal
- Ø **Terminals and non-terminals**

NO128: If L1 and L2 are regular languages is/are also regular language(s).

- o L1 + L2
- o L1L2
- o L1*
- o **All of above**

NO129: Between the two consecutive joints on a path

- Ø One character can be pushed and one character can be popped

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- Ø **Any no. of characters can be pushed and one character can be popped**
- Ø One character can be pushed and any no. of characters can be popped
- Ø Any no. of characters can be pushed and any no. of characters can be popped

NO131: Language which are context –free are called Non –CFL:

- Ø True
- Ø **False** **Page 132**

NO132: The following problem(s) ---------- is/are called decidable problem(s).

The two regular expressions define the:

- Ø same language
- Ø The two FAs are equivalent
- Ø **Both a and b**
- Ø None of given

NO133: If F accept an ..... language then there are some words w.s.t N≤ length (w) <2n :

- Ø Regular
- Ø Finite
- Ø **Infinite** **Page 91**
- Ø None of given

NO134:If an FA has N state then it must accept the word of length:

- Ø N^2
- Ø N-1
- Ø **n+1**
- Ø all of above

NO135: The values of input (say a & b) does not remain same in one cycle due to

- Ø tape
- Ø halt
- Ø **clock pulse**
- Ø start

NO136: Consider the following CFG
s→aS|bS|aaS|Λ
can be observed that the word aaa can be derived from more than:

- Ø **one production tree** **Page 101**
- Ø two producton tree
- Ø Total language tree
- Ø All of above

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NO137: One language can have …… CFG(s)

- Ø **At least one** Ø
- At least two Ø At least three
- Ø None of them

NO138: The reverse of the string sbfsbb over { sb, f, b}

- Ø **(bsbfsb)**
- Ø bfsbs
- Ø sbbfsb
- Ø bbfsb

NO139: CFG is said to be a regular grammar if it generates the regular language i.e.a CFG is said to be a regular grammar in which each production is one of the:

- Ø Three forms
- Ø One form
- Ø Four forms
- Ø **Two forms Page 102**

NO140: If L1 and L2 are regular languages then which statement is NOT true?

- Ø **(L1/L2 is always regular)** Ø
- L1+L2 are always regular Ø
- L1*l2 are always regular
- Ø None of them

NO141: If the intersection of two regular languages is regular then the complement of the intersection of these two languages is also regular:

- Ø False
- Ø **True**

NO142: the moment a final state of ……. FA is entered ,the possibility of the initial state of ……. FA will be included as well:

- Ø first ,third
- Ø **first ,second Page 39**
- Ø second ,third
- Ø all of above
- Ø

NO143: Any word generated by given CFG cannot also be expressed by Syntax tree or Generation tree or Derivation tree as well

- Ø true
- Ø **false**

NO144: According to Mayhill Nerode theorem, if L generates finite no. of classes then L is…..

- Ø **Regular**

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- Ø Nonregular
- Ø Infinite
- Ø Finite

NO145: L is a regular language so by kleene,s theorem ,there exists an:

- Ø **FA Page 71**

- Ø GTG
- Ø TG
- Ø CNF

NO146: The language generated by the CFG is called the language ……by the CFG

- Ø **Produced**
- Ø Null string
- Ø Pumping lemma
- Ø Non of then

NO147: In CFG, the symbols that cannot be replaced by anything are called:

- Ø None terminals
- Ø Infinite
- Ø Finite
- Ø **Terminals**

NO148: The production S --> SS | a | b | ^ can be expressed by RE:

- Ø **(a+b)+**
- Ø a-b
- Ø (a-b)+
- Ø None of them

NO149: Set of all palindromes over {a,b}is regular

- Ø **(false)**
- Ø (true)

NO150: An FA has same initial and final state, then it means that it has no final state.

- Ø **(false)**
- Ø (true)

NO151: The same non terminals can be written in single line if they have more than one.....

- Ø **(Productions)**
- Ø Regular production
- Ø None regular production

NO152: If L1 and L2 are two regular languages then L1∩L2 is also :

- Ø **Regular Page 73**

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- Ø None regular
- Ø Finite
- Ø None infinite

NO154: For language L defined over {a, b},then L partitions {a, b}* into …… classes:

- Ø **(Distinct)**
- Ø Accept
- Ø Unit production
- Ø None of the above

NO155: The two FAs are

- Ø Same
- Ø **Equivalent** **Page 85**
- Ø Different
- Ø None of them

NO156:There is at least one production that has one……..on its left side:

- Ø Terminal
- Ø Infinite
- Ø **None Terminal**
- Ø All of above

NO157:The complement of a regular language is also a regular

- Ø **(True)**
- Ø False

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- Ø **NO159: If an effectively solvable problem has answer in yes or no ,then this solution is called : Decision procedure** **Page 85**
- Ø Decidable problem
- Ø Solved able problem
- Ø All of above

NO160: In pref(Q in R) Q is …… to (than) R

- Ø **Q is not equal to R**
- Ø Q is equal to R
- Ø Q is infinite
- Ø None of them

NO61: For FA corresponding
To $(L1 \cap L2^{C}) U (L1^{C} \cap L2)$ the regular expression ca be determined that defines the language accepted by this :

- Ø TG
- Ø GFC

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Ø **FA** **Page 85**
Ø GTG

NO162: a^n b^n generates the …… language:
Ø **Non regular languages**
Ø **Regular language** Ø
Infinite language Ø
Finite language

NO: 163 (a+b)*a(a+b)*b(a+b)* is the RE of language defined over ={a,b} having at least one a and one b

Ø **True** **Page 11**
Ø False
Such a language does not exist
None of these

Question No: 164: (Marks: 1) - Please choose one
NO164: If r1 = (aa + bb) and r2 = (a + b) then the language (a + b)* (aa + bb)* will be generated by :

Ø (r2)(r1)
Ø (r1 + r2)*
Ø (r2)*(r1)*
Ø **(r1)*** **Page 12**

Question No 165: (Marks: 1) - Please choose one
NO165: In FA starting state is represented by a _____sign.
Ø **+**
Ø **-**
Ø *****
Ø **S**

NO166: If w is large enough word in a CF then w can be decomposed into w =uvwxyz such that all words of the form uvn xynz belong to :
Ø CNF
Ø **L**
Ø CFL
Ø CFG
NO167: Can a turing machine's head ever be in the same location in two successive steps?
Ø Yes
Ø Yes but only in finite languages
Ø **No** **Page 150**
Ø Yes but only in infinite langauges

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NO168: Examin the following CFG and select the correct choice:
S→ AB, A →BSB, B→ CC
C
→

S
S
A
→

a
|
b
C
→

b
|
b
b

- **Ø abb is a word in the corresponding CFL. Page 139**
- Ø abb is not the word of corresponding CFL.
- Ø any word can be accept from the corresponding CFL.
- Ø Non of these

NO169: The production of the form nonterminal →string of two nonterminals is called a:

- **Ø live production Page 132**
- Ø dead production
- Ø type of production
- Ø none of them

Question No: 10 (Marks: 1) - Please choose one
NO170: Converting the given CFG in CNF is the first rule of _____

- **Ø CYK algorithm Page 140**
- Ø CKY algorithm
- Ø KYC algorithm
- Ø CNK algorithm

Question No: 11 (Marks: 1) - Please choose one
NO171: Which statement is true?

Ø The PDA must have one accept state and one reject state Ø The PDA must have one accept state and two reject state Ø The PDA must have two accept state and two reject state Ø **There is no reject state in the PDA.Page 124**

NO172: Question No: 12 (Marks: 1) - Please choose one

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If a language can be expressed by a regular expression, then its complement cannot be expressed by a regular expression. This statement is:

Ø true
Ø **False**
Ø Depends on language
Ø None of the given optios

NO173: Left hand side of CFG may consist of:

Ø One terminal
Ø More than one terminal
Ø **One non-terminal**
Ø Terminals and non-terminals

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