CS502-Fundemental Of Algorithm

FINAL TERM MCQS

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ALL answers are verified if found any mistake then Correct ACCORDINGLY

1. **Which method is preferable for dealing with chain matrix multiplication?**
- Divide and conquer strategy
- **Dynamic programming formulation**
- Graph theory
- Greedy Approach
2. **Huffman algorithm produces the…….prefix code tree.**
- Better
- **Optimal**
- Worst
- Best
3. **A….w is adjacent to vertex v if there is an edge from v to w.**
   - Acyclic
   - **Vertex**
   - Loop
   - Cycle
4. **Using ASCII standard the string "greedy" will be encoded with**

i. 44 bits
ii. 120 bits
iii. 40 bits
iv. 48 bits

5. **Find the maximum value of the items which can carry using knapsack weight capacity =50**

Item weight	**Value**
10	**70**
20	**20**
30	**80**
70	**200**

i. 90
ii. 280
iii. 200
iv. 100

6. **In activity scheduling algorithm, each activity is represented by a**

i. Rectangle
ii. Square

iii. Circle
iv. Triangle

7. Those problems in which greedy finds good, but not always best is called a greedy…..

i. Heuristic
ii. Solution
iii. Result
iv. Algorithm

8. The knapsack problem belongs to the domain of…..Problems

i. Searching
ii. Sorting
iii. Linear solution
iv. Optimization

9. The general coin change problem can be solved using

i. Recursion
ii. Greedy algorithm
iii. Dynamic programming
iv. Divide and conquer

10. Huffman algorithm produces the…………prefix code tree

i. Optimal
ii. Better
iii. Best
iv. Worst

11. Huffman algorithm generates an optimum …..code

i. Postfix
ii. Infix
iii. None of the given options
iv. Prefix

12. …..ways of representing graphics

i. 1
ii. 2
iii. 3
iv. 4

13. Knapsack word originates from ……language

i. German
ii. English
iii. French
iv. Norwegian

14. Graphs are important…….model for many application problems

i. Mathematical
ii. Unpredictable
iii. Haphazard
iv. Unsystematic

15. Which type of algorithm is harder to prove the correctness?

i. Dynamic

ii. Greedy
iii. Divide and conquer
iv. Brute force

16. …..Items are not allowed in 0/1 knapsack problem

i. Fractional
ii. 0
iii. 1
iv. 0/1

17. Matrix multiplication is a(n)……..operation

i. Nether commutative nor associative
ii. Transitive
iii. Commutative
iv. Associative

18. For a Diagraph G= (V.E), Sum of in-degree (v) -----------------.

- Not equal to sum of out-degree(v)
- = sum of out-degree(v) pg#115
- < sum of out-degree(v)
- > sum of out-degree(v)

19. DFS or BFS yields a-------------of the graph.

- Traversed tree
- Spanning tree pg#125
- Simple tree
- Free tree

20. Using ASCII code, each character is represented by a fixed-length code of-------------bits per character.

- 4
- 6
- 10
- 8 pg#100

21. In Knapsack Problem, the goal is to put items in the Knapsack such that the value of the items is---------

-------subject to weight limit of the Knapsack.

- Minimized
- Decreased
- Maximized pg#109
- None of the above given

22. Consider the string"abcdaacac",if the string is coded with ASCII codes, the message length would be---

- 70 bits
- 60 bits
- 90 bits
- 72 bits

23. A graph is said to be acyclic if it contains---------.

- At least one cycle
- Exactly one cycle
- Always more than one cycle
- No cycles pg#116

24. The number of edges that come out of a vertex is called the-------------of that vertex in the digraph.

- Post-degree
- in-degree
- out-degree pg#114
- pre-degree

25. If Matrix-A has dimensions "3x2" and Matrix-B has dimensions "2x3", then multiplication of Matrix-A and Matrix-B will result a new Matrix-C having dimensions.

- 3x2
- 2x3
- 2x2
- 3x3pg#87

26. A/an----------is one in which you want to find, not just a solution, but the best solution.

- Optimization problem
- Divide and Conquer
- NP complete problem
- Best problem

27. Fractional Knapsack is founded on-----------method.

- Greedy page no109
- Recursive
- Divide and Conquer
- Dynamic programming

28. If the graph is represented using an adjacency matrix, then Breadth-first search takes-----------time.

- O(E+1)
- O(V^2)
- O(V)
- O(E)

29. In inductive approach of Knapsack problem, we consider 2 cases, ------------or--------------.

- Median, Mode
- Recursive, Iterative
- Leave object, Take object pg#93
- Sequentially, Parallel

30. A Greedy algorithm can NOT be used to solve all the-------------problems.

- Dynamic programming (Google)
- Memorization programming
- Edit-distance programming
- Storing value programming

31. In Huffman encoding, the---------is the number of occurrences of a character divided by the total characters in the message.

- Counting
- Parsing
- Relative Probability pg#100
- Weight

32. The Binary Tree constructed by a Huffman Encoding is a:

- Full Binary Tree pg#102
- Partial Binary Tree
- Incomplete Binary Tree
- None of the given option

33. Following is not the application of Edit Distance Problem.

- Speech recognition pg#76
- Spelling correction
- Ascending order
- Computational Molecular Biology

34. Consider three Matrices X, Y, Z of dimensions 1x2, 2x3, 3x4 respectively. The number of multiplication of(XYZ) is:

- 18
- 32
- 24
- 30

35. In ------------- Knapsack Problem, limitation is that an item can either be put in the bag or not. Fractional items are not allowed.

   a. 0
   b. 1
   c. 0/1 pg#91
   d. Fractional

36. An in-place sorting algorithm is one that----------uses additional array for storage.

- Always
- Permanently
- Does not pg#54
- Sometime

37. If Matrix-A has dimensions “pxq” and Matrix-B has dimensions “qxr”, then multiplication of Matrix-A and Matrix-B will result a new Matrix-C having dimensions.

- P x q
- P x r page#84
- q x r
- q x p

38. Counting sort is suitable to sort the elements in range 1 to K.

- K is large
- K is small pg#71
- K may be large or small
- None

39. When matrix A of 5x 3 is multiply with matrix B of 3x 4 then the multiplication required is:

- 15
- 12
- 36
- 60

40. -------------is a linear time sorting algorithm.

- Merge sort
- Quick sort

- Bubble sort
- Radix sort

41. In Dynamic Programming approach, we do not store the solution to each sub problem in case if it reappears.

- True
- False page#75

42. Dynamic Programming approach is usually useful in solving optimization problem.

- True page#97
- False

43. Which of the following algorithm provides an optimal solution for the activity selection problem?

- Divide and Conquer
- Brute force
- Greedy pg#105
- Recursive

44. A graph is---------- if every vertex can reach every other vertex.

- Connected pg#116
- Cycle
- Acyclic
- Loop

45. In a Huffman encoding when a new node is created by combining two nodes, the new node is placed in the ________.

- Priority queue pg#100
- Linked list
- Min heap tree
- Graph traversal

46. Huffman algorithm produces the _________ prefix code

- Optimal pg#105

- Best
- Worst
- Better

47. In ________ algorithm, you hope that by choosing a local optimum at each step, you will end up a global

optimum.

- Simple
- Divide and conquer
- Greedy pg#97
- Brute Force

48. The string "Imncde" is coded with ASCII code, the message length would be ____ bits.

  - 24
  - 36
  - 48
  - 60

49. For graph traversal, breadth-first search strategy _________

  - Is always recursive
  - Cannot br recursive
  - Cannot be non-recursive
  - Can be both recursive and non-recursive page 119

50. In activity scheduling algorithm , the width of a rectangle __________

- Is always ignored
- Directs towards recursion
- Should be maximized
- Indicates the duration of an activity pg#106

51. If the graph is represented using an adjacency list, then Breadth-first search takes--------- time

- O(V^2)

- O(V)
- O(V+E) pg#138
- O(E+1)

52. Suppose you are given infinite coins of 1,2 ,3, and 4.Select the ways of the minimum number of coins that required to achieve a sum of 6:

- 1
- 2 Conceptual
- 3
- 4

53. sing ASCII standard the string "greedy" will be encoded with

- 48 bits Conceptual
- 120 bits
- 44 bits
- 40 bits

54. The Huffman codes provide a method of -------data efficiency.

- Reading/Writing
- Encoding/Decoding pg#99
- Divide/Conquer
- Inserting/Deleting

55. In the context of activity selection algorithm, time s dominated by sorting of the activities by------

- Start Times
- Finish Times pg#106
- Average Times

- CPU Burst Times

56. Time complexity of the “0-1” knapsack algorithm depends on----

- Number of items
- Capacity of the knapsack
- Size of the Table
- Number of items and capacity of knapsack (confirm)

57. The greedy approach gives us an optimal solution when the coins are all powers of a -------- denomination

- Fixed pg#98
- Variable
- Constant
- Static

58. In Activity Selection, we say that two activities are non-interfering if their start-finish interval-------overlap

- Do
- Do not pg#105
- Sometimes
- Once

59. How many steps are involved to design the dynamic programming strategy?

- 2
- 3
- 1
- 4 pg#92

60. Bag is a------------------

- type of algorithm pg#119
- data structure

- program
- compiler

61. If a problem is in NP-complete, it must also be in NP.

► True page#170

► False

62. The Huffman algorithm finds a optimal solution.

► True pg#105

► False

63. The Huffman algorithm finds an exponential solution

► True

► False pg#105

64. The Huffman algorithm finds a polynomial solution

► True google

► **False**

65. The greedy part of the Huffman encoding algorithm is to first find two nodes with **smallest** frequency.

► True pg#100

► **False**

66. The code word assigned to characters by the Huffman algorithm have the property that no code word is the prefix of any other.

► True pg#101

► **False**

67. Huffman algorithm uses a greedy approach to generate a postfix code T that minimizes the expected length B (T) of the encoded string.

► True

► **False pg#102**

68. Dijkestra's single source shortest path algorithm works if all edges weights are non-negative and there are negative cost cycles.

► True

► **False pg#154**

69. The term “coloring” came form the original application which was in architectural design.

► True

► **False pg#176**

70. In the clique cover problem, for two vertices to be in the same group, they must be adjacent to each other.

► True pg#176

► **False**

71. Dijkstra’s algorithm is operates by maintaining a subset of vertices

► True pg#155

► **False**

72. We do sorting to,

► keep elements in random positions

► keep the algorithm run in linear order

► keep the algorithm run in (log n) order

► **keep elements in increasing or decreasing order pg#40**

73. After partitioning array in Quick sort, pivot is placed in a position such that

► **Values smaller than pivot are on left and larger than pivot are on right pg#48**

► Values larger than pivot are on left and smaller than pivot are on right

➢ Pivot is the first element of array

► Pivot is the last element of array

74. Merge sort is stable sort, but not an in-place algorithm

► True pg#54

► **False**

75. A p × q matrix A can be multiplied with a q × r matrix B. The result will be a p × r matrix C. There are (p . r) total entries in C and each takes _________ to compute.

► O (q) pg#84

► O (1)

► O (n^2)

► O (n^3)

76. One of the clever aspects of heaps is that they can be stored in arrays without using any

_______________.

- Pointers pg#40

- constants
- variables
- functions

77. Merge sort requires extra array storage,

- True pg#54
- False

78. The Huffman codes provide a method of encoding data **inefficiently** when coded using ASCII standard.

- True
- False pg#99

79. Using ASCII standard the string abacdaacac will be encoded with __________ bits.

- 80 pg#99
- 160
- 320
- 100

80. Using ASCII standard the string abacdaacac will be encoded with 160 bits.

- True
- False pg#99

81. Using ASCII standard the string abacdaacac will be encoded with 10 bytes.

- ❖ True
- ❖ False pg#99

82. The greedy part of the Huffman encoding algorithm is to first find two nodes with **character** frequency

- ❖ True
- ❖ False

83. Huffman algorithm uses a greedy approach to generate an prefix code T that minimizes the expected length B (T) of the encoded string.

- ❖ True pg#100
- ❖ False

84. An optimization problem is one in which you want to find,
    - ► Not a solution
    - ► An algorithm
    - ► Good solution
    - ► The best solution pg#97

85. Although it requires more complicated data structures, Prim's algorithm for a minimum spanning tree is better than Kruskal's when the graph has a large number of vert
    - **► True** **pg#149**
    - ► False

86. If a problem is in NP, it must also be in P.

► True

► False

► unknown pg#173

87. What is generally true of Adjacency List and Adjacency Matrix representations of graphs?

► Lists require less space than matrices but take longer to find the weight of an edge (v1,v2) pg#116

► *Lists* require less space than *matrices* and they are faster to find the weight of an edge (v1,v2)

► *Lists* require more space than *matrices* and they take longer to find the weight of an edge (v1,v2)

► *Lists* require more space than *matrices* but are faster to find the weight of an edge (v1,

88. If a graph has v vertices and e edges then to obtain a spanning tree we have to delete

► v edges.

► v – e + 5 edges

► v + e edges.

► None of these

89. Maximum number of vertices in a Directed Graph may be $|V^2|$

► True

► False pg#115

90. The Huffman algorithm finds a (n) _____________ solution.

► Optimal pg#105

► Non-optimal

► Exponential

► Polynomial

91. The Huffman algorithm finds an exponential solution

► True

► False pg#115

92. Edge (u, v) is a forward edge if

► u is a proper descendant of v in the tree

► v is a proper descendant of u in the tree pg#129

► None of these

93. After partitioning array in Quick sort, pivot is placed in a position such that

► **Values smaller than pivot are on left and larger than pivot are on right (Page 48)**

► Values larger than pivot are on left and smaller than pivot are on right

► Pivot is the first element of array

► Pivot is the last element of array

94. Merge sort is stable sort, but not an in-place algorithm

► **True Page #54**

► False

95. In counting sort, once we know the ranks, we simply _________ numbers to their final positions in an output array.

► Delete

-
► **copy Page# 57**

► Mark

► arrange

96. . Dynamic programming algorithms need to store the results of intermediate sub-problems.

► **True pg#75**

► False

97. . A p × q matrix A can be multiplied with a q × r matrix B. The result will be a p × r matrix C. There are (p . r) total entries in C and each takes _________ to compute.

► **O (q) pg#48**

► O (1)

► O (n^2)

► O (n^3)

98. ._______________ is a graphical representation of an algorithm

► Σ notation

► Θ notation

► **Flowchart**

► Asymptotic notation

99. .Which of the following is calculated with **big o notation**?

- ►Lower bounds
- **►Upper bounds pg#25**
- ►Both upper and lower bound
- ►Medium bounds

100. Merge sort makes two recursive calls. Which statement is true after these recursive calls finish, but before the merge step?

- ►The array elements form a heap
- **►Elements in each half of the array are sorted amongst themselves**
- ►Elements in the first half of the array are less than or equal to elements in the second half of the array
- ►None of the above

101. What is the solution to the recurrence T(n) = T(n/2)+n, T(1) = 1

- ►O(logn)
- **►O(n)** **pg#37**
- ►O(nlogn)
- ►O(2n)

102. Consider the following Huffman Tree

The binary code for the string **TEA** is

- **►10 00 010**
- ►011 00 010
- ►10 00 110
- ►11 10 110

103. .A greedy algorithm does not work in phases.

►True

►False pg#97

104. Can an adjacency matrix for a directed graph ever not be square in shape?

►Yes
►No pg#116

105. 44.One of the clever aspects of heaps is that they can be stored in arrays without using any_____________.

►Pointers pg#40
►constants
►variables
►functions

106. .Merge sort requires extra array storage,

- ►**True Page 54**
- ►False

107. .Non-optimal or greedy algorithm for money change takes____________

- ►**O(k) Pg #99**
- ►O(kN)
- ►O(2k)
- ►O(N)

108. The Huffman codes provide a method of encoding data **inefficiently** when coded using ASCII standard.

- ►True
- ►**False Pg# 99**

109. Using ASCII standard the string abacdaacac will be encoded with __________ bits.

- ►**80 pg# 99**
- ►160
- ►320
- ►100

110. Using ASCII standard the string abacdaacac will be encoded with 160 bits.

- ►True
- ►**False (Pg# 99)**

111. Using ASCII standard the string abacdaacac will be encoded with 320 bits.

- ►True
- ►**False (Pg# 99)**

112. **.**Using ASCII standard the string abacdaacac will be encoded with 100 bits.

- ►True
- ►**False (Pg# 99)**

113. Using ASCII standard the string abacdaacac will be encoded with 32 bytes

- ►True
- ►**False (Pg# 99)** **8bytes**

114. The greedy part of the Huffman encoding algorithm is to first find two nodes with **smallest** frequency.

- ►**True (Pg# 100)**
- ►False

115. The greedy part of the Huffman encoding algorithm is to first find two nodes with **character** frequency

- ►True
- ►**False (Pg# 100)**

116. .Huffman algorithm uses a greedy approach to generate an **antefix** code T that minimizes the expected length B (T) of the encoded string.

- ► True
- ► **False (Pg# 102)**

117. Depth first search is shortest path algorithm that works on un-weighted graphs.

► True

► **False (Pg# 159)**

118. Floyd-Warshall algorithm is a dynamic programming algorithm; the genius of the algorithm is in the clever recursive formulation of the shortest path problem.

► **True (Pg# 162)**

► Flase

119. .Floyd-Warshall algorithm, as in the case with DP algorithms, we avoid recursive evaluation by generating a table for

- ► k
- ► d_{ij}^{k} **(Pg# 164)**
- ► True
- ► Flase

120. .The term coloring came from the original application which was in map drawing.

- ► **True (Pg# 176)**
- ► False

121. In the clique cover problem, for two vertices to be in the same group, they must be________________each other.

- ► Apart from
- ► Far from
- ► Near to
- ► **Adjacent to (Pg# 176)**

122. . Fixed-length codes may not be efficient from the perspective of _______the total quantity of data.

Select correct option:

► **Minimizing Pg# 99**

► Averaging

► Maximizing

► Summing

123. In greedy algorithm, at each phase, you take the________ you can get right now, without regard for future consequences.

►Worst

►Minimum

►Good

►**Best Page #97**

124. The difference between Prim s algorithm and Dijkstra s algorithm is that Dijkstra s algorithm uses a same key.

►True

►**False Page# 156**

125. If a problem is in NP-complete, it must also be in NP.

► **True Page# 178**

► False

126. If there are n items, there are _______ possible combinations of the items.

►2

►n

►**2^n Page# 92**

►3^n

127. .Using ASCII code, each character is represented by a fixed-length code word of ________ bits per character.

►4

►6

►**8 pg # 99**

►10

128. .In Knapsack Problem, the thief's goal is to put items in the bag such that the ______ of the items does not exceed the limit of the bag.

►**Value Page #91**

►Weight

►Length

►Balance

129. The knapsack problem does not belong to the domain of optimization problems.

► True

► **False Page# 91**

130. .In Huffman encoding, for a given message string, the frequency of occurrence (relative probability) of each character in the message is determined last.

► True

► **False Page 100**

131. Fixed-length codes are known for easy break up of a string into its individual characters.

► **True Page# 99**

► False

132. In ______ Knapsack Problem, limitation is that an item can either be put in the bag or not-fractional items are not allowed.

► 0

► 1

► **0/1 Page# 91**

► Fractional

133. In Knapsack Problem, value and weight both are to be under consideration.

► **True page #91**

► False

134. Time complexity of DP based algorithm for computing the minimum cost of chain matrix Multiplication is ________ .

► log n

► n

► n2

► **n3 Page #90**

135. In DP based solution of knapsack problem, to compute entries of V we will imply a/an _______ approach.

► Subjective

► **Inductive Page #93**

► Brute force

► Combination

136. A greedy algorithm sometimes works well for optimization problems.

► **True Page# 97**

► False

137. In Huffman encoding, frequency of each character can be determined by parsing the message and __________ how many times each character (or symbol) appears.

► Printing

► Incrementing

► **Counting (Page 100)**

► Deleting

138. Greedy algorithm can do very poorly for some problems.

► **True Page# 97**

► False

139. The Huffman codes provide a method of _________ data efficiently.

► Reading

► **Encoding Page# 99**

► Decoding

► Printing

140. In _______ based solution of knapsack problem, we consider 2 cases, Leave object Or Take object.

► Brute force

► **Dynamic programming Page #93**

141. Those problems in which Greedy finds good, but not always best is called a greedy________.

► Algorithm

► Solution

► **Heuristic Page# 97**

► Result

142. In brute force based solution of knapsack problem, we consider 2 cases, Leave object Or Take object.

► TRUE

► **FALSE** **Page# 97**

143. .________ problem, we want to find the best solution.

► Minimization

► Averaging

► **Optimization** **Page# 97**

► Maximization

144. Using ASCII standard the string abacdaacac will be encoded with 10 bytes.

► **True** **Page #101**

► False

145. In _______ algorithm, you hope that by choosing a local optimum at each step, you will end up at a global optimum.

► Simple

► Non Greedy

► **Greedy** **Page# 97**

► Brute force

146. Huffman algorithm uses a greedy approach to generate an prefix code T that minimizes the expected length B (T) of the encoded string.

► **True** **Page# 102**

► False

147. Counting Money problem is an example which cannot be optimally solved by greedy algorithm.

► **True** **Page# 97**

► False

148. Huffman algorithm generates an optimum prefix code.

► **True** **Page# 102**

► False

149. If the string "lmncde" is coded with ASCII code, the message length would be _______ bits.

► 24

► 36

► **48 6*8=48** **page #99**

► 60

150. There are _________ nested loops in DP based algorithm for computing the minimum cost of chain matrix multiplication.

► 2

► **3 Page# 90**

► 4

151. .A number of lectures are to be given in a single lecture hall. Optimum scheduling for this is an example of Activity selection.

► **True Page# 105**

► False

152. The activity scheduling is a simple scheduling problem for which the greedy algorithm approach provides a/an ________solution.

► Simple

► Sub optimal

► **Optimal Page# 105**

► Non optimal

153. The string |xyz|, if coded with ASCII code, the message length would be 24 bits.

► **True (3*8=24) page#99**

► False

154. An application problem is one in which you want to find, not just a solution, but the ____ solution.

► Simple

► **Good Page #113**

► Best

155. Suppose that a graph G = (V,E) is implemented using adjacency lists. What is the complexity of a breadth-first traversal of G?

► O(|V |^2)

► O(|V | |E|)

► O(|V |^2|E|)

► O(|V | + |E|) pg #116

156. Which is true statement?

► Breadth first search is shortest path algorithm that works on un-weighted graphs Page #153

► Depth first search is shortest path algorithm that works on un-weighted graphs.

► Both of above are true.

► None of above are true.

157. .Forward edge is:

► (u, v) where u is a proper descendent of v in the tree.

► (u, v) where v is a proper descendent of u in the tree. Page #129

► (u, v) where v is a proper ancestor of u in the tree.

► (u, v) where u is a proper ancesstor of v in the tree.

158. If you find yourself in maze the better traversal approach will be :

► BFS google

► BFS and DFS both are valid

► Level order

► DFS

159. .In digraph G=(V,E) ;G has cycle if and only if

► The DFS forest has forward edge.

► The DFS forest has back edge Page#131

► The DFS forest has both back and forward edge

► BFS forest has forward edge

160. .Back edge is:

► (u, v) where v is an ancestor of u in the tree. Page# 128

► (u,v) where u is an ancesstor of v in the tree.

► (u, v) where v is an predcessor of u in the tree.

►None of above

161. Cross edge is :

► (u, v) where u and v are not ancestor of one another

► (u, v) where u is ancesstor of v and v is not descendent of u.

► **(u, v) where u and v are not ancestor or descendent of one another Page# 129**

► (u, v) where u and v are either ancestor or descendent of one another.

162. Kruskal's algorithm (choose best non-cycle edge) is better than Prim's (choose best tree edge) when the graph has relatively few edges.

► **True google**

► False

163. What algorithm technique is used in the implementation of Kruskal solution for the MST?

► **Greedy Technique Page# 142**

► Divide-and-Conquer Technique

► Dynamic Programming Technique

► The algorithm combines more than one of the above techniques

164. What is the time complexity to extract a vertex from the priority queue in Prim's algorithm?

► O (log E)

► (V)

► (V+E)

► **O (log V) Page #152**

165. The relationship between number of back edges and number of cycles in DFS is,

► Both are equal

► Back edges are half of cycles

► Back edges are one quarter of cycles

► **There is no relationship between no. of edges and cycles Page# 131**

166. You have an adjacency list for G, what is the time complexity to compute Graph transpose G^T.?

► **(V + E) Page# 138**

► (V E)

► (V)

► (V^2)

167. There is relationship between number of back edges and number of cycles in DFS

► Both are equal.

► Cycles are half of back edges.

► Cycles are one fourth of back edges.

► **There is no relationship between back edges and number of cycles. Page# 131**

168. A digraph is strongly connected under what condition?

► A digraph is strongly connected if for every pair of vertices u, v e V, u can reach v .

► **A digraph is strongly connected if for every pair of vertices u, v e V, u can reach v and vice versa. Page# 135**

► A digraph is strongly connected if for at least one pair of vertex u, v e V, u can reach v and vice versa.

► A digraph is strongly connected if at least one third pair of vertices u, v e V, u can reach v and vice versa.

169. In in-place sorting algorithm is one that uses arrays for storage :

► An additional array

► **No additional array Page#54**

► Both of above may be true according to algorithm

► More than 3 arrays of one dimension.

170. In stable sorting algorithm

► One array is used

► In which duplicating elements are not handled.

► More than one arrays are required.

► **Duplicating elements remain in same relative position after sorting. Page# 54**

171. Which sorting algorithm is faster :

► O(n^2)

► **O(nlogn) Page# 46**

► O(n+k)

►O(n^3)

172. In Quick sort algorithm, constants hidden in T(n lg n) are

►Large

►Medium

►Not known

►Small

173. Quick sort is based on divide and conquer paradigm; we divide the problem on base of pivot element and:

►There is explicit combine process as well to conquer the solution.
►No work is needed to combine the sub-arrays, the array is already sorted
►Merging the sub arrays
►None of above. Page# 51

174. . Dijkstra's algorithm :

►Has greedy approach to find all shortest paths
►Has both greedy and Dynamic approach to find all shortest paths
►Has greedy approach to compute single source shortest paths to all other vertices Page# 154

► Has both greedy and dynamic approach to compute single source shortest paths to all other vertices.

175. Which may be stable sort:

►Bubble sort
►Insertion sort
►Both of above page# 54
►Selection sort

176. In the analysis of Selection algorithm, we eliminate a constant fraction of the array with each phase; we get the convergent _______________ series in the analysis,

►linear
►arithmetic
►geometric page #37
►exponent

177. How much time merge sort takes for an array of numbers?
►T(n^2)
►T(n) Page# 40
►T(log n)
►T(n log n)

178. Dijkstra's algorithm is operates by maintaining a subset of vertices

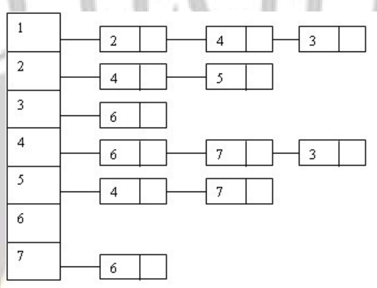
- **True** **Page# 155**
- False

179. The difference between Prim's algorithm and Dijkstra's algorithm is that Dijkstra's algorithm uses a different key.

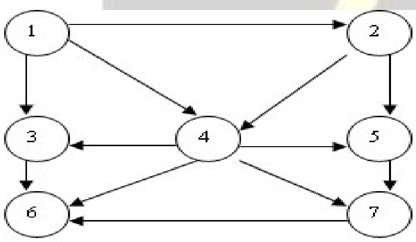
►True Page# 156

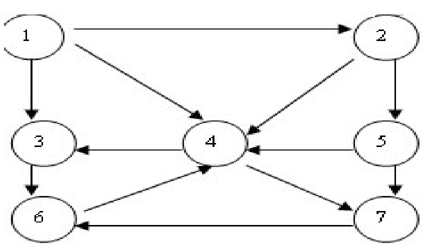
► False

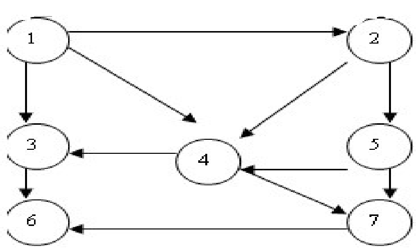
180. Consider the following adjacency list:

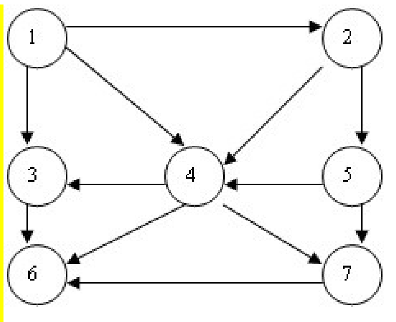


Which of the following graph(s) describe(s) the above adjacency list?







► 

Correct Option pg#116

181. We do sorting to,

► keep elements in random positions

► keep the algorithm run in linear order

- ► keep the algorithm run in (log n) order
- **► keep elements in increasing or decreasing order Page# 40**

182. . After partitioning array in Quick sort, pivot is placed in a position such that

- **► Values smaller than pivot are on left and larger than pivot are on right Page# 48**
- ► Values larger than pivot are on left and smaller than pivot are on right
- ► Pivot is the first element of array
- ► Pivot is the last element of array

183. . Merge sort is stable sort, but not an in-place algorithm

- **► True (Page# 54)**
- ► False

184. In counting sort, once we know the ranks, we simply _________ numbers to their final positions in an output array.

- ► Delete
- **► copy (Page# 57)**
- ► Mark
- ► arrange

185. Dynamic programming algorithms need to store the results of intermediate sub-problems.

- **► True (Page# 75)**
- ► False

186. A p × q matrix A can be multiplied with a q × r matrix B. The result will be a p × r matrix C. There are (p . r) total entries in C and each takes _________ to compute.

- ❖ ► **O (q) (Page# 84)**
- ❖ ► O (1)
- ❖ ► O (n^2)
- ❖ ► O (n^3)

187. _______________ is a graphical representation of an algorithm

- ❖ ► Σ notation
- ❖ ► Θ notation
- ❖ ► **Flowchart**
- ❖ ► Asymptotic notation

188. Which of the following is calculated with **big o notation**?

- ❖ ► Lower bounds
- ❖ ► **Upper bounds (Page# 25)**
- ❖ ► Both upper and lower bound
- ❖ ► Medium bounds

189. Merge sort makes two recursive calls. Which statement is true after these recursive calls finish, but before the merge step?

- ❖ ► The array elements form a heap
- ❖ ► **Elements in each half of the array are sorted amongst themselves**
- ❖ ► Elements in the first half of the array are less than or equal to elements in the second half of the array
- ❖ ► None of the above

190. Non-optimal or greedy algorithm for money change takes_____________

- ❖ ► **O(k) (Page #99)**
- ❖ ► O(kN)
- ❖ ► O(2k)
- ❖ ► O(N)

191. The Huffman codes provide a method of encoding data **inefficiently** when coded using ASCII standard.

- ❖ ► True
- ❖ ► **False (Page# 99)**

192. Using ASCII standard the string abacdaacac will be encoded with __________ bits.

- ❖ ► **80 (Page #99)**
- ❖ ► 160

- ► 320
- ► 100

193. Using ASCII standard the string abacdaacac will be encoded with 160 bits.

- ► True
- ► **False** **(Page #99)**

194. **u**sing ASCII standard the string abacdaacac will be encoded with 32 bytes

► True
► **False** **(Page #99)**

195. The greedy part of the Huffman encoding algorithm is to first find two nodes with **smallest** frequency.

► **True** **(Page #100)**
► False

196. The greedy part of the Huffman encoding algorithm is to first find two nodes with **character** frequency

► True
► **False** **(Page# 100)**

197. Huffman algorithm uses a greedy approach to generate an **antefix** code T that minimizes the expected length B (T) of the encoded string.

► True
► **False** **(Page #102)**

198. Depth first search is shortest path algorithm that works on un-weighted graphs.

► True
► **False** **(Page# 153)**

199. 12Dijkstras single source shortest path algorithm works if all edges weights are non negative and there are no negative cost cycles.

► **True** **(Page#159)**
► False

200. Dijkestra s single source shortest path algorithm works if all edges weights are negative and there are no negative cost cycles.

► True
► **False** **(Page #159)**

201. Floyd-Warshall algorithm is a dynamic programming algorithm; the genius of the algorithm is in the clever recursive formulation of the shortest path problem.

► **True (Page #162)**

►False

202. Floyd-Warshall algorithm, as in the case with DP algorithms, we avoid recursive evaluation by generating a table for

►k

► d_{ij}^{k} **(Page# 164)**

►True

►False

203. the term coloring came from the original application which was in map drawing.

►**True** **(Page #176)**

►False

204. In the clique cover problem, for two vertices to be in the same group, they must be_______________each other.

►Apart from

►Far from

►Near to

►**Adjacent to** **(Page# 176)**

205. Fixed-length codes may not be efficient from the perspective of _______the total quantity of data.

Select correct option:

►**Minimizing** **(Page #99)**

►Averaging

►Maximizing

►Summing

206. In greedy algorithm, at each phase, you take the________ you can get right now, without regard for future consequences.

►Worst

►Minimum

►Good

►**Best** **(Page #97)**

207. The difference between Prim s algorithm and Dijkstra s algorithm is that Dijkstra s algorithm uses a same key.

►True

►**False** **(Page# 156)**

208. If a problem is in NP-complete, it must also be in NP.

► **True** **(Page #178)**

► False

209. If there are n items, there are _______ possible combinations of the items.

- ►2
- ►n
- **►2^n** **(Page# 92)**
- ►3^n

210. Using ASCII code, each character is represented by a fixed-length code word of ________ bits per character.

- ►4
- ►6
- **►8** **(Page #99)**
- ►10

211. In Knapsack Problem, the thief's goal is to put items in the bag such that the ______ of the items does not exceed the limit of the bag.

- **►Value** **(Page# 91)**
- ►Weight
- ►Length
- ►Balance

212. The knapsack problem does not belong to the domain of optimization problems.

- ►True
- **►False** **(Page# 91)**

213. In Huffman encoding, for a given message string, the frequency of occurrence (relative probability) of each character in the message is determined last.

- ►True
- **►False** **(Page #100)**

214. Fixed-length codes are known for easy break up of a string into its individual characters.

►**True** **(Page# 99)**

►False

215. In ______ Knapsack Problem, limitation is that an item can either be put in the bag or not-fractional items are not allowed.

- ►0
- ►1
- **►0/1** **(Page# 91)**
- ►Fractional

216. The term "coloring" came from the original application which was in architectural design.

- ► True
- **► False** **(Page# 173)**

217. In Knapsack Problem, value and weight both are to be under consideration.

- **►True** **(page# 91)**

- ►False

218. Time complexity of DP based algorithm for computing the minimum cost of chain matrix Multiplication is ________ .

- ►log n
- ►n
- ►n2
- **►n3 (Page# 90)**

219. In DP based solution of knapsack problem, to compute entries of V we will imply a/an _______ approach.

- ►Subjective
- **►Inductive (Page# 93)**
- ►Brute force
- ►Combination

220. A greedy algorithm sometimes works well for optimization problems.

►True (Page# 97)

►False

221. In Huffman encoding, frequency of each character can be determined by parsing the message and __________ how many times each character (or symbol) appears.

- ►Printing
- ►Incrementing
- **►Counting (Page# 100)**
- ►Deleting

222. .Greedy algorithm can do very poorly for some problems.

- **►True (Page# 97)**
- ►False

223. The Huffman codes provide a method of _________ data efficiently.

- ►Reading
- **►Encoding (Page# 99)**
- ►Decoding
- ►Printing

224. In _______ based solution of knapsack problem, we consider 2 cases, Leave object Or Take object.

- ►Brute force
- **►Dynamic programming (Page #93)**

225. Those problems in which Greedy finds good, but not always best is called a greedy________.

- ►Algorithm
- ►Solution
- **►Heuristic (Page# 97)**
- ►Result

226. In brute force based solution of knapsack problem, we consider 2 cases, Leave object Or Take object.

❖ ►TRUE
❖ ►**FALSE (Page# 97)**

227. ________ problem, we want to find the best solution.

❖ ►Minimization
❖ ►Averaging
❖ ►**Optimization (Page#97)**
❖ ►Maximization

228. Using ASCII standard the string abacdaacac will be encoded with 10 bytes.

❖ ►**True (Page# 101)**
❖ ►False

229. In _______ algorithm, you hope that by choosing a local optimum at each step, you will end up at a global optimum.

❖ ►Simple
❖ ►Non Greedy
❖ ►**Greedy (Page# 97)**
❖ ►Brute force

230. Huffman algorithm uses a greedy approach to generate an prefix code T that minimizes the expected length B (T) of the encoded string.

❖ ►**True (Page #102)**
❖ ►False

231. How many elements do we eliminate in each time for the Analysis of Selection algorithm?

►**n / 2 elements (Page #37)**
► (n / 2) + n elements
►n / 4 elements
►2 n elements

232. Slow sorting algorithms run in,

►**T(n^2) (Page #39)**
►T(n)
►T(log n)
►T(n log n)

233. Counting sort is suitable to sort the elements in range 1 to k:

►K is large
►**K is small (Page# 57)**
►K may be large or small
►None

234. Heaps can be stored in arrays without using any pointers; this is due to the ____________ nature of the binary tree,

►**left-complete (Page# 40)**
►right-complete
►tree nodes
►tree leaves

235. Sieve Technique can be applied to selection problem?

►**True (Page#35)**
►False

236. A heap is a left-complete binary tree that conforms to the ___________

► increasing order only
► decreasing order only
► **heap order (Page# 40)**
► (log n) order

237. Divide-and-conquer as breaking the problem into a small number of
► pivot
► Sieve
► **smaller sub problems (Page #34)**
► Selection

238. In Sieve Technique we do not know which item is of interest
► **True (Page# 34)**
► False

239. The recurrence relation of Tower of Hanoi is given below T(n)={1 if n=1 and 2T(n-1) if n >1 In order to move a tower of 5 rings from one peg to another, how many ring moves are required?

► 16
► 10
► 32
► **31**

240. For the heap sort, access to nodes involves simple _______________ operations.

► **arithmetic (Page# 41)**
► binary
► algebraic
► logarithmic

241. For the sieve technique we solve the problem,
► **recursively (Page# 34)**
► mathematically
► precisely
► accurately

❖ 242. The sieve technique works in ___________ as follows

► **phases (Page #34)**
► numbers
► integers
► routines

243. A (an) _________ is a left-complete binary tree that conforms to the heap order
► **heap (Page# 40)**
► binary tree
► binary search tree
► array

244. The sieve technique is a special case, where the number of sub problems is just
► 5
► many

►1 (Page #34)

►few

245. Analysis of Selection algorithm ends up with,

►T(n)

►T(1 / 1 + n)

►T(n / 2)

►T((n / 2) + n) (Page #37)

246. For the heap sort we store the tree nodes in

►level-order traversal (Page #40)

►in-order traversal

►pre-order traversal

►post-order traversal

247. The reason for introducing Sieve Technique algorithm is that it illustrates a very important special case of,

►divide-and-conquer (Page# 34)

►decrease and conquer

►greedy nature

►2-dimension Maxima

248. Theta asymptotic notation for T (n) :

►Set of functions described by: c1g(n)Set of functions described by c1g(n)>=f(n) for c1 s

►Theta for T(n)is actually upper and worst case comp

►Set of functions described by:

►c1g(n

249. Sieve Technique applies to problems where we are interested in finding a single item from a larger set of _____________

►n items (Page# 34)

►phases

►pointers

►constant

250. Memorization is?

►To store previous results for future use

►To avoid this unnecessary repetitions by writing down the results of recursive calls and looking them up again if we need them later (Page# 47)

►To make the process accurate

►None of the above

251. Quick sort is

►Stable & in place

►Not stable but in place (Page#57)

►Stable but not in place

►Some time stable & some times in place

252. One example of in place but not stable algorithm is

►Merger Sort
►Quick Sort (Page# 54)
►Continuation Sort
►Bubble Sort

253. . Continuation sort is suitable to sort the elements in range 1 to k

►K is Large
►K is not known
►K may be small or large
►K is small (Page# 57)

254. Which may be a stable sort?

►Merger
►Insertion
► Both above (Page #54)
►None of the above

255. . An in place sorting algorithm is one that uses ___ arrays for storage

►Two dimensional arrays
►More than one array
►No Additional Array (Page #54)
►None of the above

256. Continuing sort has time complexity of ?

►O(n
►O(n+k)
►O(nlogn)
►O(k)

257. single item from a larger set of ____________

►n items (Page# 34)
►phases

►pointers
►v constant

258. For the Sieve Technique we take time

►T(nk) (Page# 34)
►T(n / 3)
►n^2
►n/3

259. One Example of in place but not stable sort is

►Quick (Page# 54)
►Heap
►Merge
►Bubble

260. Consider the following Algorithm:

```
Factorial (n){

  if (n=1)

    return 1
```

else

return (n * Factorial(n-1))

Recurrence for the following algorithm is:

- ❖ ► T(n) = T(n-1) +1
- ❖ ► T(n) = nT(n-1) +1
- ❖ ► T(n)= T(n-1) +n
- ❖ ► **T(n)=T(n(n-1)) +1**

261. Due to left complete nature of binary tree, the heap can be stored in

- ❖ ► **Arrays (Page #40)**
- ❖ ► Structures
- ❖ ► Link List
- ❖ ►Stack

262. What type of instructions Random Access Machine (RAM) can execute?

- ❖ ►Algebraic and logic
- ❖ ►Geometric and arithmetic
- ❖ ►**Arithmetic and logic (Page# 10)**
- ❖ ►Parallel and recursive

263. What is the total time to heapify?

- ❖ ► **O(log n) (Page 43)**
- ❖ ► O(n log n)
- ❖ ► O(n^2 log n)
- ❖ ► O($\log^2$ n)

264. word Algorithm comes from the name of the muslim author ____________

- ❖ ►**Abu Ja'far Mohammad ibn Musa al-Khowarizmi**.

265. Al-Khwarizmi's work was written in a book titled _______________

- ❖ ►**al Kitab al-mukhatasar fi hisab al-jabr wa'l-muqabalah**

266. Random access machine or RAM is a/an

- ❖ ► Machine build by Al-Khwarizmi
- ❖ ► Mechanical machine
- ❖ ► Electronics machine
- ❖ ► **Mathematical model (Page# 10)**

267. A RAM is an idealized machine with _____________ random-access memory.

- ❖ ► 256MB
- ❖ ► 512MB
- ❖ ► **an infinitely large (Page #10)**
- ❖ ► 100GB

268. What will be the total number of max comparisons if we run brute-force maxima algorithm with n elements?

- ❖ ► n^2
- ❖ ► $n^{\frac{n}{2}}$
- ❖ ► **n (Page# 14)**

- ► n^8

269. Consider the following code:

```
For(j=1; j<n;j++)
        For(k=1; k<15;k++)
                For(l=5; l<n; l++)
                {
                        Do_something_constant();
                }
```

What is the order of execution for this code.

- ► **O(n)**
- ► O(n^3)
- ► O(n^2 log n)
- ► O(n^2)

270. Is it possible to sort without making comparisons?

- ► **Yes (Page# 57)**
- ► No

271. When we call heapify then at each level the comparison performed takes time

- ► **It will take Θ (1) (Page# 43)**
- ► Time will vary according to the nature of input data
- ► It can not be predicted
- ► It will take Θ (log n)

272. In Quick sort, we don't have the control over the sizes of recursive calls

- ► **True (Page# 40)**
- ► False
- ► Less information to decide
- ► Either true or false

273. For Chain Matrix Multiplication we cannot use divide and conquer approach because,

- ► **We do not know the optimum k (Page# 86)**
- ► We use divide and conquer for sorting only
- ► We can easily perform it in linear time
- ► Size of data is not given

274. The Knapsack problem belongs to the domain of _______________ problems.

- ► **Optimization (Page# 91)**
- ► NP Complete
- ► Linear Solution
- ► Sorting

275. Suppose we have three items as shown in the following table, and suppose the capacity of the knapsack is 50 i.e. W = 50.

Item	Value	Weight
1	60	10
2	100	20
3	120	30

The optimal solution is to pick

- ❖ ► Items 1 and 2
- ❖ ► Items 1 and 3
- ❖ ► **Items 2 and 3**
- ❖ ► None of these

276. who invented the quick sort

- ❖ ► **C.A.R. Hoare**

277. main elements to a divide-and-conquer

- ❖ ► **Divide, conquer, combine (Page# 27)**

278. Mergesort is a stable algorithm but not an in-place algorithm.

- ❖ ► **True (Page# 54)**
- ❖ ► false

279. Counting sort the numbers to be sorted are in the range 1 to k where k is small.

- ❖ ► **True (Page# 57)**
- ❖ ► False

280. In selection algorithm, because we eliminate a constant fraction of the array with each phase, we get the

- ❖ ► **Convergent geometric series (Page 37)**
- ❖ ► Divergent geometric series
- ❖ ► None of these

281. .In RAM model instructions are executed

- ❖ ► **One after another (Page# 10)**
- ❖ ► Parallel

- ►Concurrent
- ►Random

282. Due to left-complete nature of binary tree, heaps can be stored in

- ►Link list
- ►Structure
- **►Array (Page# 40)**
- ►None of above

283. The time assumed for each basic operation to execute on RAM model of computation is-----

- ►Infinite
- ►Continuous
- **►Constant (Page# 10)**
- ►Variable

284. If the indices passed to merge sort algorithm are not equal, the algorithm may return immediately.

- ►True
- **►False (Page# 28)**

285. Brute-force algorithm uses no intelligence in pruning out decisions.

- **►True (Page #18)**
- ►False

286. In analysis, the Upper Bound means the function grows asymptotically no faster than its largest term.

- **►True (Page #24)**
- ►False

287. For small values of n, any algorithm is fast enough. Running time does become an issue when n gets large.

- ***►True (Page #14)***
- *►False*

288. In simple brute-force algorithm, we give no thought to efficiency.

- **►True (Page# 11)**
- ►False

289. The ancient Roman politicians understood an important principle of good algorithm design that is plan-sweep algorithm.

- ►True
- **►False (Page# 27)**

290. In 2d-space a point is said to be ________if it is not dominated by any other point in that space.

- ►Member
- ►Minimal
- **►Maximal (Page# 11)**
- ►Joint

291. An algorithm is a mathematical entity that is dependent on a specific programming language.

- ► True
- **►False (Page# 7)**

292. The running time of an algorithm would not depend upon the optimization by the compiler but that of an implementation of the algorithm would depend on it.

- ► **True** **(Page# 13)**
- ► False

293. F (n) and g (n) are asymptotically equivalent. This means that they have essentially the same __________ for large n.

- ► Results
- ► Variables
- ► Size
- ► **Growth rates** **(Page#23)**

294. 8n2 + 2n - 3 will eventually exceed c2*(n) no matter how large we make c2.

- ► **True** **(Page# 25)**
- ► False

295. If we associate (x, y) integers pair to cars where x is the speed of the car and y is the negation of the price. High y value for a car means a ________ car.

- ► Fast
- ► Slow
- ► Expensive
- ► **Cheap** **(Page# 11)**

296. The function f(n)= n(logn+1)/2 is asymptotically equivalent to n log n. Here Upper Bound means the function f(n) grows asymptotically ____________ faster than n log n.

► More
► Quiet
► **Not** **(Page# 24)**
► At least

297. Counting Money problem is an example which cannot be optimally solved by greedy algorithm.

- ► **True** **(Page# 97)**
- ► False

298. Huffman algorithm generates an optimum prefix code.

- ► **True** **(Page #102)**
- ► False

299. If the string "lmncde" is coded with ASCII code, the message length would be _______ bits.

- ► 24
- ► 36
- ► **48** **(6*8=48)**
- ► 60

300. There are _________ nested loops in DP based algorithm for computing the minimum cost of chain matrix multiplication.

- ► 2
- ► **3** **(Page# 90)**

- ►4
- ►5

301. Inductive approach to compute entries of V is implied in _____ based solution of knapsack problem.

- ►Brute force
- **►Dynamic programming (Page #93)**

302. A number of lectures are to be given in a single lecture hall. Optimum scheduling for this is an example of Activity selection.

- **►True (Page# 105)**
- ►False

303. The activity scheduling is a simple scheduling problem for which the greedy algorithm approach provides a/an ________solution.

- ►Simple
- ►Sub optimal
- **►Optimal (Page# 105)**
- ►Non optimal

304. The string |xyz|, if coded with ASCII code, the message length would be 24 bits.

- **►True (3*8=24)**
- ►False

305. An application problem is one in which you want to find, not just a solution, but the ____ solution.

- ►Simple
- **►Good (Page# 113)**
- ►Best
- ►Worst

306. A free tree with n vertices has exactly _______edges.

a. n

b. n+1

c. n-1 page 142

1

307. Kruskal`s algorithm works by adding ______ in increasing order of weight (lightest edge first)

a. Verticals

b. Edges page 147

- Trees
- Weights

308. Computing the strongly connected components of a digraphs is a/an _____ of the problem to determine whether a diagraph is strongly connected or not

a. Size

b. Generalization page 135

- Optimization
- Connection

309. The process of updating estimates in Dijkstra`s algorithm is called ______

a. Updating

b. Amendment

c. Relaxation page 154

- Insertion

310. An un-weighted graph can be considered as a graph in which every edge has weight_______ Unit.

a. 7
b. 5
c. 3

d. 1 page 153

311. The breadth-first-search algorithm is a shortest-path algorithm that works on______graphs.

a. Weighted

b. Directed

c. Un-weighted page 153

d. Un-directed

312. Which activity creates a unique cycle in a free tree:

a. adding any vertex
b. adding any sub tree
c. adding root

d. adding any edge page 142

313. The relationship between number of back edges and Number of cycles in DFS is,

a. Both are equal

b. Back edges are half of cycles

c. Back edges are one quarter of cycles

d. There is no relationship between no. of edges and cycles google

314. From given algorithms which one considered as best for finding the shortest-path:

- DFS
- Bellman-Ford algorithm
- **Dijkstra's algorithm page 154 / google**
- BFS

315. Overall time for Kruskal algorithm is

a. Θ(log E)

b. Θ(E log V) page 149 / google

c. Θ(E log E)

d. Θ(V log E)

316. Dijkstra's Algorithm is used to solve_______ problems.

a. All-pair shortest path

b. Single-source shortest path page 154

- Multi-source shortest path
- Sorting & searching

317. A digraph is strongly connected under what condition?

- A digraph is strongly connected if for every pair of vertices u, v e V, u cancreach v.
- **A digraph is strongly connected if for every pair of vertices u, v e V, u can reach v and vice versa. Page 135**
- A digraph is strongly connected if for at least one pair of vertex u, v e V, u can reach v and vice versa.
- A digraph is strongly connected if at least one third pair of vertices u, v e V, u can reach v and vice versa.

318. Floyd-Warshall Algorithm is based on _____________

a. Dynamic Programming page 161

- Greedy Approach
- Divide and Conquer
- Complexity theory

319. . In strong components algorithm, vertices are sorted in __________order of finish times.

a. Any

b. Increasing

c. Decreasing page 141 / google

d. Strong

320. . ________ is commonly the running time of Dijkstra's Algorithm using the binary heap method.

a. Θ (E log V) page 156

- Θ (V log)
- Θ (log E)
- Θ (Blog V)

321. Which technique is used in the implementation of Kruskal solution for the MST?

a. Greedy Technique page 142 / google

b. Divide-and-Conquer Technique

c. Dynamic Programming Technique

d. The algorithm combines more than one of the above techniques i.e. Divide-and-Conquer and Dynamic Programming

322. A fully connected undirected graph of 5 nodes will have _______ edges.

- 4

- 5

10 n(n-1)/2

d. 15

323. Prim's algorithm is based on_________ strategy.

a. Greedy page 150 / google

b. Dynamic programming

c. Divide and Conquer

d. Exponential

324. We say that two vertices u and v are mutually ______if u can reach v and vice versa.

a. Crossed

b. Forward

c. Reachable page 135

d. Not Reachable

325. In Dijkstra's algorithm, initially the estimated value from source vertex to any vertex v is:

a. Zero (0)

b. One (1)

c. Minus one (-1)

d. Infinity (∞) page 154

326. A strongly connected component only apply to:

a. Directed Graph page 135 / google

- Undirected Graph
- Minimum Spanning Tree
- Breadth First Search

327. A graph may contain_______

- Exactly one MST
- No MST
- One or zero MST
- **More than one MST google**

328. In ______ algorithm(s), at any time, the subset of edges A forms a single tree.

a. Kruskals

b. Prim's page 149

c. kruskal's and Prim's

d. BFS

329. The _______given by DFS allow us to determine a number of things about a graph or

Digraph

a. color stamps

b. time stamps page 130

c. line stamps

d. node stamps

330. . In Kruskal's algorithm, the vertices will be stored in________.

a. Links

b. Sets page 147

- nodes
- Loops

331. Keeping in mind the shortest path, if given scenarios occur in computer networks like the internet where data packets have to be routed. The vertices are _______. Edges are

______which may be wired or wireless.

a. Routers, communication links page 153

- Internet, routers
- Communication links, routers
- Routers, internet

332. In computing the strongly connected components of a digraph. vertices of the digraph

are ________into subsets

a. Joined

b. Partitioned page 135

c. Deleted

d. Created

333. In undirected graph, by convention all the edges are called _______edges.

a. Forward

b. Back page 130

c. Cross

d. Both forward and back

334. In Timestamped DFS, No back edges means_______

a. 1 cycle

b. no cycles page 131

c. DFS

d. BFS

335. . In Prim's algorithm, we start with the ______vertex r, it can be any vertex.

- Pivot
- Leaf
- negative

d. Root page 149

336. . The ancestor and descendent relation can be nicely inferred by the______ lemma.

a. addition

b. division

c. parenthesis page 129

d. Node

337. Which of the following statement is true?

- Kruskal algorithm is multiple source technique for finding MST.
- Kruskal's algorithm is used to find minimum spanning tree of a graph, time complexity of this algorithm is 0(EV)
- Both I and II
- **Kruskal's algorithm (choose best non-cycle edge) is better than Prim's (choose best Tree edge) when the graph has relatively few edges.**

See option B of Sr 46

338. . The time complexity to compute Graph transposes G^T is (V+E), if you have __ for G.

a. an adjacency list page 138

- Array list
- complete list
- stack

339. . In Prim's algorithm, If there is no edge from u to a vertex in S. we set the key value to_____

- 0
- 1
- -1

d. ∞ page 151

340. . What is the time complexity to extract a vertex from the priority queue in Prim's algorithm?

- O(log E)
- O(V)
- O(V+E)

d. O(logV) page 152

341. . Edge weights can be interpreted as distance _____

- in breadth-First Search
- in Queue's

c. in the shortest-paths page 153

d. in depth-First Search

342. The ________ given by DFS allow us to determine whether the graph contains any

cycles.

a. Order

b. Time stamps page 130

c. BFS traversing

d. Topological sort

343. . Dijkstra's algorithm works on a weighted directed graph G(V, E) in which all weights

______ are non-negative.

a. Vertices

b. Edges page 154

- nodes
- links

344. . By breaking any edge on a cycle created in free tree, the free_____ is restored.

a. Edge

b. Tree page 142

c. Cycle

d. Vertex

345. . Bellman-Ford algorithm is used to solve ______ problems.

a. All pair shortest path

b. Single source shortest path google

c. Flow of networking

d. Double source shortest path

346. . From the given options which one is correct regarding the time complexity of Dijkstra's algorithm

- O(N)
- O(N^3)
- O(N^2)

d. O(log N) google

347. . In which algorithm, information of shortest path is propagated sequentially along each

shortest path in the graph.

a. Bellman-Ford page 16

52) Brute-force technique

53) Dijkstra's

54) Prim's

348. In Timestamped DFS-cycles lemma, if edge (u, v) is a tree, forward or cross edge, then a. f[u] < f[v]

b. f[u] > f[v] page 130

52) f[u] ≤ f[v]

53) f[u] ≥ f[v]

349. Bellman-Ford Algorithm does not allow G(graph) to have _____________

a. positive cost cycles

b. negative cost cycles page 159

c. negative weights edges

d. positive weights edges

350. Kruskal algorithm (choose best non cycle edge) is better than Prims (choose best tree edge) when the _______has relatively few______

a. tree, edges

b. graph edges **see option D of Sr 23**

- tree, branches
- graph, branches

351. Finding the faster result of the shortest path from u to v for every pair of vertices and we use ____

a. Single-pair shortest-paths problem

b. Two pair shortest the problem

c. All pair shortest paths problem **page 153**

d. both I and II

352. There are no________ edges in undirected graph.

a. Forward

b. Back

c. Cross **page 130**

d. Both forward and back

353. Networks are ______ in the sense that it is possible from any location in the network to

reach any other location in the digraph

a. Complete page 135

b. Incomplete

c. Not graphs

d. Transportation

354. . Dijkstra's algorithm:

a. Has greedy approach to find all shortest paths

b. Has both greedy and Dynamic approach to find all shortest paths

c. Has greedy approach to compute single source shortest paths to all other vertices page 154

e. Has both greedy and dynamic approach to compute single source shortest paths to all other vertices

355. Bellman-Ford algorithm is slower than

a. Brute-force technique

b. Dijkstra's page 159

58) Prim's

59) Graph Algorithm

356. Dijkstra's Algorithm cannot be applied on

a. directed and weighted graphs

b. graphs having negative weight function google

- unweighted graphs

- undirected and unweighted graphs

357. . Which of the following is used in the data structure for implementing Dijkstra's Algorithm?

a. Max heap

b. Stack's

c. Circular queue

d. Priority queue Google

358. . In Generic approach determining of Greedy MST, we maintain a subset A of ____

a. Edges page 143

- Vertices
- Cycles
- Paths

359. In Dijkstra's algorithm the estimated value of source vertex d[s] is

a. Equal to 0 page 154

- Equal to 1
- Greater than 0
- Greater than 1

360. Dijkstra's algorithm is a simple________ algorithm for computing the single-source

shortest-paths to all other vertices.

a. Greedy page 154

c. Bellman-Ford

d. Divide and conquer

e. Brute-Force

361. In Timestamped DFS. If there is a back edge (u, v) then v is an ancestor of u and by following tree edge from v to u, we get ____________.

a. Nothing

b. a cycle page 131

c. a line

d. a graph

362. There exists a unique path between any _______ vertices of a free tree.

a. One

b. Two page 142

- Three
- Four

363. ______________ technique is look like propagating wave-front outward.

a. Generic traversal

b. Breadth first traversal page 117

c. Depth first traversal

d. Time stamp traversal

364. You have an adjacency list for G, what is the time complexity to compute Graph transpose G^T?

a. (V+E) page 138

- V.E
- V
- E

365. In the shortest-paths problem, we are given a weighted of ______G =(V, E).

a. Directed graph page 153

65) Line graph

66) Un-directed graph

67) Weighted graph

366. Equivalence relation partitions the vertices into _______ classes of mutually reachable

vertices and these are the strong components

a. Variance

b. Equivalence page 136

c. Non equivalence

d. Non classes

367. Overall Running time of Prim's algorithm is _________.

a. Θ(ElogE)

b. Θ(ElogV)

c. Θ((V+E)logV) page 152

d. Θ((V+E)logE)

368. For ________ graphs, there is no distinction between forward and back edges.

a. large

b. directed

c. undirected page 130

d. Medium

369. For ________ graphs, there is no distinction between forward and back edges.

a. Undirected page 130

- directed
- small
- large

370. As the Kruskal's algorithm runs, the edges in viable set A induce a ________ on the vertices.

a. Set

b. Graph

c. Tree

d. Forest page 147

371. In strong components algorithm, the form of graph is used in which all the _______ of original graph G have been reversed in direction.

a. Vertices

b. Edges page 138

c. Both edges & vertices

d. Trees

372. In computing the ________ components of a digraph, vertices of the digraph are partitioned into subsets.

a. weakly connected

b. strongly connected page 135

c. Best

d. Worst

373. Timestamp structure of ________ is used in determining the strong components of a digraph.

a. DFS google

b. BFS

c. Both DFS & BFS

d. MST

374. In Prim's algorithm, if the color of a vertex is _______ then it is in S otherwise not.

a. White

b. Gray

c. Black page 151

d. Blue

375. Digraphs _________ in communication and transportation networks.

a. are not used

b. are used page 135

c. parts are used

d. final value is used

376. Once you enter a strong component, every vertex in the component is ________.

a. not reachable

b. reachable page 137

c. reachable some times

d. removed

377. In Kruskal's algorithm, the next edge is added to viable set A, if its adding does not induce a/an __________.

a. Vertex

b. Edge

c. Cycle page 147

d. Tree

378. Problems such as the shortest route between cities can be solved efficiently by modelling the road map as a _________.

a. Tree

b. Graph page 153

c. Linked list

d. Stack

379. In Bellman-Ford Algorithm, relaxation applies to every edge of the graph and repeat this ______ time.

a. E – 1

b. E + 1

c. V + 1

d. V – 1 page 159

380. A topological sort of a DAG is a ________ ordering of the vertices of the DAG such

that for each edge (u, v), u appears before v in the ordering.

a. Linear page 134

b. Parallel

c. Sequence

d. Non-linear

381. Adding any edge to a free tree creates a unique ______

a. Vertex

b. Edge

c. Cycle page 142

d. Strong component

382. Back edge is:

a. (u, v) where v is an ancestor of u in the tree. Page 128

b. (u, v) where u is an ancestor of v in the tree.

c. (u, v) where v is a predecessor of u in the tree.

d. (u, v) where u is a mid of v in the tree.

383. In Kruskal's algorithm, the next _______is not added to viable set A, if its adding induce a/an cycle.

a. Vertex

b. Edge page 147

c. Cycle

d. Tree

384. Which of the following statement is false about Dijkstra'sAlgorithm?

a. It can be applied on graphs having a negative weight function google

b. It is used to solve Single-source shortest path

c. It works on a weighted directed graph

d. Its implementation in data structure is possible through the priority queue

385. . In strong components algorithm, first of all DFS is run for getting _______ times of vertices.

a. **Start** **page 138**

b. Finish

c. Both start & finish

d. Middle

386. . The tricky part of _______ algorithm(s) is/are, how to detect whether the addition of an

edge will create a cycle in viable set A.

a. Kruskal's **page 149**

b. Prim's

c. Both Kruskal's and Prim's

d. DFS

387. . _________ components are not affected by reversal of all edges in terms of vertices

reachability.

a. Strongly connected **page 139**

b. Weakly connected

c. First two

d. Last two

388. In Prim's algorithm, we will make use of _________.

a. Stack

b. Priority Queue page 150

c. Array

d. List

389. The component digraph is necessarily ________.

a. straight

b. cyclic

c. Acyclic page 136

d. Strong

390. A free tree with n _________ have exactly n - 1 ________.

a. vertices, nodes

b. edges, vertices

c. nodes, vertices

d. vertices, edges page 142

391. If you find yourself in maze the better traversal approach will be:

a. BFS google (always return with short part)

c. Level order

d. DFS

392. Forward edge is :

a. (u, v) where u is proper descendent of v in the tree

b. (u, v) where v is proper descendent of u in the tree page 129

c. (u, v) where v is proper ancestor of u in the tree

d. (u, v) where u is proper ancestor of v in the tree

393. . cross edge is :

a. (u, v) where u and v are not ancestor of one another

b. (u, v) where u is ancestor of v and v is not descendent of u

c. (u, v) where u and v are not ancestor or descendent of one another page 129

d. (u, v) where u and v are either ancestor of descendent of one another

394. . The running time of Bellman-Ford algorithm is ________.

a. Θ(V + E)

b. Θ(E + E)

c. Θ(VE) page 159

d. Θ(V + V)

395. In Bellman-Ford Algorithm, relaxation applies to ________ of the graph.

a. Every edge page 159

b. Every Vertices

c. Only First Vertices

d. Only First edge

396. If a subset of edges A is visible for building MST, it cannot contain a/an____

a. Vertex

b. Edge

c. Cycle page 143

d. Graph

397. . In Timestamped DFS-cycles lemma, if edge (u, v) is a back edge, then _________.

a. f[u] <f[v]

b. f[u] > f[v]

c. f[u] ≤ f[v] page 130

d. f[u] ≥ f[v]

398. In digraph G=(V,E) ;G has cycle if and only if

a. The DFS forest has forward edge.

b. The DFS forest has back edge page 131

c. The DFS forest has both back and forward edge

d. BFS forest has forward edge

399. . The key[u] is the weight of the ________ going from u to any vertex in S.

a. lightest edge page 151

b. edge

c. lighter edge

d. heavier edge

400. In Bellman-Ford Algorithm, path consists of at most _______ edges.

a. V + 1

b. V-1 page 160

c. E + 1

d. E-1

401. According to parenthesis lemma, vertex u is a descendent of v vertex it and only if;

a. [d[u], f[u]] ⊆ [d[v], f[v]] page 129

b. [d[u], f[u]] ⊇ [d[v], f[v]]

c. Unrelated

d. Disjoint

402. Edge weights can be interpreted as distance ________.

a. in breadth-First Search

b. in Queue's

c. in the shortest-paths page 153

d. in depth-First Search

403. __________ algorithm allows negative weights edges and no negative cost cycles.

a. Brute-force technique

b. Bellman-Ford page 159

c. Dijkstra’s

d. Print

404. In Huffman encoding, the characters with smallest probabilities are placed at the------------depth of the tree.

a. Minimum

b. Average

- Maximum page 102
- Root

405. There are -------------- ways to representing graphs.

- 3
- 1
- 2 page 116

a. 4

406. Each time we traverse graph by Breadth-first search algorithm, we count the distance from----------.

a. Starting node

- Neighbours of the starting node page 117
- Right most node
- Left most node

407. In Activity Selection problem, intuitively--------------.

- There are always short activities as input
- Short activities are not attractive
- Duration of the activities does not matter
- We do not like long activities page105

408. The activity scheduling is a simple scheduling problem for which the greedy algorithm approach provides a/an------------solution.

a. Simple

b. Sub-optimal

- Optimal page 105

c. Non optimal

409. The ------------- is a problem for which the greedy algorithm approach provides an optimal solution.

- Activity selection page 105
- Dynamic programming
- Knapsack problem
- NP complete problem

410. Which of the following ways can be used to represent a graph?

a. Adjacency list

b. Incidence matrix

- Adjacency list , Adjacency Matrix page 116

- No way to represent

411.

Queue Data Structure work on ------------- principles.

4

- FIFO(first in first out) cs301

- LIFO(last in first out)
- JLO(just in last out)
- LOFI(last out first in)

412. Graphs can be represented by an--------------- and -----------------.

- queue , stack
- adjacency list , adjacency matrix page 116

a. adjacency right , adjacency left

b. Binary , linear

413. Identify a TRUE statement about Knapsack.

a. The Knapsack Problem does not belongs to the domain of optimization problems

- The Knapsack Problem belongs to the domain of optimization problems page 91

i. The Knapsack Problem cannot be solved by using Dynamic programming

- The Knapsack Problem is optimally solved by using Brute force algorithm

414. Which of the following is true about graph?

a. A graph may contain no edges and many vertices

- A graph may contain many edges and no vertices

415. Which type of algorithm is harder to prove the correctness?

- Greedygoogle
- Brute force
- Dynamic programming
- Divide and Conquer

416. The running time of brute-force algorithm to solve Knapsack problem is------

- O(h1)
- O(n3)
- O (n!)
- O(2^n) pg#92

417. If a matrix has three rows and two columns, the dimension of matrix will be:

- 3x2 Conceptual
- 2x3
- 3x3
- 2x2

418. The Probability in Huffman encoding is the number of occurrences of a character divided by the total-

-------------in the message.

c. Numbers

d. Frequencies

e. Strings

f. Characters pg#100

419. In recursive formulation of Knapsack Problem: V [0, j] = ------------- for j>=0

- -1
- 0 pg#93
- 1
- 2

420. The Knapsack Problem belongs to the domain of-----------problem.

g. Optimization pg#91

h. Sorting
i. Linear solution

j. Searching

421. An optimization problem is one in which you want to find the-----------solution.

k. Simple

l. Good

m. Best pg#97

- Worst

422. Huffman algorithm generates an optimum----------- code.

- Prefix page 102
- Postfix
- Infix
- None of the above

423. Which of the following algorithms solves the Fractional Knapsack Problem more effectively?

- Divide and Conquer
- Greedy algorithm page 109
- Dynamic programming
- Backtracking

424. One of the limitation in 0/1 Knapsack is that an item can either be----------in the bag or not.

- Use
- Put page 91
- Move
- Store

425. In Dynamic Programming based solution of Knapsack Problem, if we decide to take an object'i' then we gain-------------.

a. W(Total weight of Knapsack)

b. V(Total value of all items)

- vi(value of object i) page 93
- None of the given option

426. An activity scheduling algorithm, the width of a rectangle--------------.

n. Is always ignored

o. Direct toward recursion

p. Should be maximized

- Indicates the duration of an activity page 106

427. The prefix code generated by Huffman algorithm------------- the expected length of the encoded string.

- Minimizes page 102

- Balances
- Maximizes
- Keeps constant

428. An optimization problem is one in which you want to find,
► Not a solution
► An algorithm
► Good solution
► The best solution (Page 97)

429. Although it requires more complicated data structures, Prim's algorithm for a minimum spanning tree is better than Kruskal's when the graph has a large number of vertices.
► True
► False

430. If a problem is in NP, it must also be in P.
► True
► False

► unknown (Page 173)

431. What is generally true of Adjacency List and Adjacency Matrix representations of graphs?

► Lists require less space than matrices but take longer to find the weight of an edge (v1,v2)

► Lists require less space than matrices and they are faster to find the weight of an edge (v1,v2)

► Lists require more space than matrices and they take longer to find the weight of an edge (v1,v2)

► Lists require more space than matrices but are faster to find the weight of an edge (v1,v2)

432. If a graph has v vertices and e edges then to obtain a spanning tree we have to delete

► v edges.

► v – e + 5 edges

► v + e edges.

► None of these

433. Maximum number of vertices in a Directed Graph may be |V2 |

► True

► False

434. The Huffman algorithm finds a (n) _____________ solution.

► Optimal

► Non-optimal

► Exponential

► Polynomial

435. The Huffman algorithm finds an exponential solution

► True

► False

436. The greedy part of the Huffman encoding algorithm is to first find two nodes with larger frequency.

► True

► False (Page 100)

437. one The codeword assigned to characters by the Huffman algorithm have the property that no codeword is the postfix of any other.

► True (Page 101)

► False

438. Huffman algorithm uses a greedy approach to generate a postfix code T that minimizes the expected length B (T) of the encoded string.

► True

► False (Page 102)

439. Shortest path problems can be solved efficiently by modeling the road map as a graph.
► True (Page 153)
► False

440. Dijkestra's single source shortest path algorithm works if all edges weights are non-negative and there are negative cost cycles.
► True
► False (Page 159)

441. Bellman-Ford allows negative weights edges and negative cost cycles.
► True
► False (Page 159)

442. The term "coloring" came form the original application which was in architectural design.
► True
► False (Page 176)

443. In the clique cover problem, for two vertices to be in the same group, they must be adjacent to each other.
► True (Page 176)
► False

444. Dijkstra's algorithm is operates by maintaining a subset of vertices
► True (Page 155)
► False

445. The difference between Prim's algorithm and Dijkstra's algorithm is that Dijkstra's algorithm uses a different key.
►True (Page 156)
► False

446. We do sorting to,
► keep elements in random positions
► keep the algorithm run in linear order
► keep the algorithm run in (log n) order
► keep elements in increasing or decreasing order (Page 40)

447. After partitioning array in Quick sort, pivot is placed in a position such that
► Values smaller than pivot are on left and larger than pivot are on right (Page 48) ► Values larger than pivot are on left and smaller than pivot are on right
► Pivot is the first element of array
► Pivot is the last element of array

448. Merge sort is stable sort, but not an in-place algorithm
► True (Page 54)
► False

449. In counting sort, once we know the ranks, we simply _________ numbers to their final positions in an output array.

► Delete

► copy (Page 57)

► Mark

► arrange

450. one Dynamic programming algorithms need to store the results of intermediate sub-problems.

► True (Page 75)

► False

451. A p × q matrix A can be multiplied with a q × r matrix B. The result will be a p × r matrix C. There are (p . r) total entries in C and each takes _________ to compute.

► O (q) (Page 84)

► O (1)

► O (n 2)

► O (n3) –

452. _______________ is a graphical representation of an algorithm

► Σ notation

► Θ notation

► Flowchart

► Asymptotic notation

453. one Which of the following is calculated with big o notation?

- ►Lower bounds
- ►Upper bounds (Page 25)
- ►Both upper and lower bound
- ►Medium bounds

454. Merge sort makes two recursive calls. Which statement is true after these recursive calls finish, but before the merge step?

- ►The array elements form a heap
- ►Elements in each half of the array are sorted amongst themselves
- ►Elements in the first half of the array are less than or equal to elements in the second half of the array
- ►None of the above 7

455. Who invented Quick sort procedure?

- ►Hoare
- ►Sedgewick
- ►Mellroy
- ►Coreman

456. What is the solution to the recurrence T(n) = T(n/2)+n, T(1) = 1

- ►O(logn)
- ►O(n) (Page 37)
- ►O(nlogn)
- ►O(2n)

457. one Consider the following Huffman Tree The binary code for the string TEA is
   - ►10 00 010
   - ►011 00 010
   - ►10 00 110
   - ►11 10 110
458. A greedy algorithm does not work in phases.
   ►True
   ►False (Page 97)
459. Can an adjacency matrix for a directed graph ever not be square in shape?
   - ►Yes
   - ►No
460. One of the clever aspects of heaps is that they can be stored in arrays without using any____________.
   - ►Pointers (Page 40)
   ►constants
   - ►variables
   - ►functions
461. Merge sort requires extra array storage, •
   ►True (Page 54) •
   ►False
462. Non-optimal or greedy algorithm for money change takes____________
   - ►O(k) (Page 99)
   - ►O(kN)
   - ►O(2k)
   - ►O(N)
463. The Huffman codes provide a method of encoding data inefficiently when coded using ASCII standard.
   - ►True
   - ►False (Page 99)
464. Using ASCII standard the string abacdaacac will be encoded with __________ bits.
   - ►80 (Page 99)
   - ►160
   - ►320

- ►100

465. Using ASCII standard the string abacdaacac will be encoded with 160 bits.
    - ►True
    - ►False (Page 99)
466. one Using ASCII standard the string abacdaacac will be encoded with 320 bits.
    - ►True
    - ►False (Page 99)
467. Using ASCII standard the string abacdaacac will be encoded with 100 bits.
    - ►True
    - ►False (Page 99)
468. Using ASCII standard the string abacdaacac will be encoded with 32 bytes
    - ►True
    - ►False (Page 99)
469. The greedy part of the Huffman encoding algorithm is to first find two nodes with smallest frequency.
    - ►True (Page 100)
    - ►False
470. The greedy part of the Huffman encoding algorithm is to first find two nodes with character frequency
    - ►True
    - ►False (Page 100)
471. Huffman algorithm uses a greedy approach to generate an antefix code T that minimizes the expected length B (T) of the encoded string.
    - ►True
    - ►False (Page 102)
472. Depth first search is shortest path algorithm that works on un-weighted graphs.
    - ►True
    - ►False (Page 153)
473. one Dijkestra s single source shortest path algorithm works if all edges weights are non negative and there are no negative cost cycles.
    - ►True (Page 159)
    - ►False
474. Dijkestra s single source shortest path algorithm works if all edges weights are negative and there are no negative cost cycles.
    - ►True •
    - ►False (Page 159
475. Floyd-Warshall algorithm is a dynamic programming algorithm; the genius of the algorithm is in the clever recursive formulation of the shortest path problem.

- ►True (Page 162) • ►Flase

476. Floyd-Warshall algorithm, as in the case with DP algorithms, we avoid recursive evaluation by generating a table for
- ►k
- ► k ij d (Page 164)
- ►True
- ►Flase

477. The term coloring came from the original application which was in map drawing.
- ►True (Page 176)
- ►False

478. In the clique cover problem, for two vertices to be in the same group, they must be_______________each other.
- ►Apart from
- ►Far from
- ►Near to
- ►Adjacent to (Page 176)

479. Fixed-length codes may not be efficient from the perspective of _______the total quantity of data. Select correct option:

►Minimizing (Page 99)
►Averaging
►Maximizing
►Summing

480. In greedy algorithm, at each phase, you take the________ you can get right now, without regard for future consequences.

►Worst
►Minimum
►Good
►Best (Page 97)

481. one The difference between Prim s algorithm and Dijkstra s algorithm is that Dijkstra s algorithm uses a same key.
- ►True
- ►False (Page 156)

482. If a problem is in NP-complete, it must also be in NP.

► True (Page 178)
► False

483. If there are n items, there are _______ possible combinations of the items.

►2
►n
►2^n (Page 92)

► 3^n

484. Using ASCII code, each character is represented by a fixed-length code word of ________ bits per character.
► 4
► 6
► 8 (P)age 99)
► 10

485. In Knapsack Problem, the thief's goal is to put items in the bag such that the ______ of the items does not exceed the limit of the bag.
► Value (Page 91)
► Weight
► Length
► Balance

486. one The knapsack problem does not belong to the domain of optimization problems. ► True
► False (Page 91)

487. In Huffman encoding, for a given message string, the frequency of occurrence (relative probability) of each character in the message is determined last.
► True
► False (Page 100)

488. Fixed-length codes are known for easy break up of a string into its individual characters.
► True (Page 99)
► False

489. Question No: 8 (Marks: 1) - Please choose one In ______ Knapsack Problem, limitation is that an item can either be put in the bag or not-fractional items are not allowed.
► 0
► 1
► 0/1 (Page 91)
► Fractional

490. one The term "coloring" came from the original application which was in architectural design.
► True
► False (Page173)

491. In Knapsack Problem, value and weight both are to be under consideration.
► True (page 91)
► False

492. Time complexity of DP based algorithm for computing the minimum cost of chain matrix Multiplication is ________ .

► log n
► n
► n2
► n3 (Page 90)

493. Qestion No: 12 (Marks: 1) - Please choose one In DP based solution of knapsack problem, to compute entries of V we will imply a/an _______ approach.
► Subjective
► Inductive (Page 93)
► Brute force
► Combination

494. A greedy algorithm sometimes works well for optimization problems.
► True (Page 97)
► False

495. In Huffman encoding, frequency of each character can be determined by parsing the message and __________ how many times each character (or symbol) appears. ► Printing
► Incrementing
► Counting (Page 100)
► Deleting

496. Greedy algorithm can do very poorly for some problems.
► True (Page 97)
► False 14

497. one The Huffman codes provide a method of _________ data efficiently.
► Reading
► Encoding (Page 99)
► Decoding
► Printing

498. In _______ based solution of knapsack problem, we consider 2 cases, Leave object Or Take object.
► Brute force
► Dynamic programming (Page 93)

499. Those problems in which Greedy finds good, but not always best is called a greedy________.
► Algorithm
► Solution
► Heuristic (Page 97)
► Result

500. one In brute force based solution of knapsack problem, we consider 2 cases, Leave object Or Take object.

►TRUE

►FALSE (Page 97)

501. ________ problem, we want to find the best solution.

►Minimization

►Averaging

►Optimization (Page 97)

►Maximization

502. Using ASCII standard the string abacdaacac will be encoded with 10 bytes.

- ►True (Page 101)
- ►False

503. In _______ algorithm, you hope that by choosing a local optimum at each step, you will end up at a global optimum.

►Simple

►Non Greedy

►Greedy (Page 97)

►Brute force

504. one Huffman algorithm uses a greedy approach to generate an prefix code T that minimizes the expected length B (T) of the encoded string.

- ►True (Page 102)
- ►False

505. Counting Money problem is an example which cannot be optimally solved by greedy algorithm.

►True (Page 97)

►False

506. Huffman algorithm generates an optimum prefix code.

►True (Page 102)

►False

507. If the string "lmncde" is coded with ASCII code, the message length would be _______ bits.

►24

►36

►48 (6*8=48)

►60

508. There are _________ nested loops in DP based algorithm for computing the minimum cost of chain matrix multiplication.

►2

►3 (Page 90)

►4

►5

509. Inductive approach to compute entries of V is implied in _____ based solution of knapsack problem.
► Brute force
► Dynamic programming (Page 93)

510. A number of lectures are to be given in a single lecture hall. Optimum scheduling for this is an example of Activity selection.
► True (Page 105)
► False

511. The activity scheduling is a simple scheduling problem for which the greedy algorithm approach provides a/an ________solution.
► Simple
► Sub optimal
► Optimal (Page 105)
► Non optimal

512. Question # 1 of 10 (Marks: 1) Please choose one The string |xyz|, if coded with ASCII code, the message length would be 24 bits.
► True
► False

513. An application problem is one in which you want to find, not just a solution, but the ____ solution.
► Simple
► Good (Page 113)
► Best
► Worst

514. A dense undirected graph is:
► A graph in which E = O(V^2) click here 4 detail
► A graph in which E = O(V)
► A graph in which E = O(log V)
► All items above may be used to characterize a dense undirected graph

515. Suppose that a graph G = (V,E) is implemented using adjacency lists. What is the complexity of a breadth-first traversal of G?
► O(|V |^2)
► O(|V | |E|)
► O(|V |^2|E|)
► O(|V | + |E|) pg 116

516. Which is true statement?
► Breadth first search is shortest path algorithm that works on un-weighted graphs (Page 153)
► Depth first search is shortest path algorithm that works on un-weighted graphs. ► Both of above are true.

►None of above are true.

517. one Forward edge is:

► (u, v) where u is a proper descendent of v in the tree.

► (u, v) where v is a proper descendent of u in the tree. (Page 129)

► (u, v) where v is a proper ancesstor of u in the tree.

► (u, v) where u is a proper ancesstor of v in the tree.

518. What general property of the list indicates that the graph has an isolated vertex? ►There is Null pointer at the end of list.

►The Isolated vertex is not handled in list.

► Only one value is entered in the list.

►There is at least one null list.

519. one If you find yourself in maze the better traversal approach will be :

►BFS

►BFS and DFS both are valid

►Level order

►DFS

520. In digraph G=(V,E) ;G has cycle if and only if

►The DFS forest has forward edge.

►The DFS forest has back edge (Page 131)

►The DFS forest has both back and forward edge

►BFS forest has forward edge

521. Back edge is:

► (u, v) where v is an ancestor of u in the tree. (Page 128)

► (u,v) where u is an ancesstor of v in the tree.

► (u, v) where v is an predcessor of u in the tree.

►None of above

522. Which statement is true?

►If a dynamic-programming problem satisfies the optimal-substructure property, then a locally optimal solution is globally optimal.

►If a greedy choice property satisfies the optimal-substructure property, then a locally optimal solution is globally optimal.

► Both of above

►None of above

523. Cross edge is :

► (u, v) where u and v are not ancestor of one another

► (u, v) where u is ancesstor of v and v is not descendent of u.

► (u, v) where u and v are not ancestor or descendent of one another (Page 129)

► (u, v) where u and v are either ancestor or descendent of one another.

524. Kruskal's algorithm (choose best non-cycle edge) is better than Prim's (choose best tree edge) when the graph has relatively few edges.
►True click here 4 detail
►False

525. Which is true statement in the following?
►Kruskal algorithm is multiple source technique for finding MST. click here for detail ►Kruskal's algorithm is used to find minimum spanning tree of a graph, time complexity of this algorithm is O(EV)
►Both of above
►Kruskal's algorithm (choose best non-cycle edge) is better than Prim's (choose best Tree edge) when the graph has relatively few edges. click here 4 detail

526. Kruskal's algorithm (choose best non-cycle edge) is better than Prim's (choose best tree edge) when the graph has relatively few edges.
►True click here 4 detail
►False

527. What algorithm technique is used in the implementation of Kruskal solution for the MST?
►Greedy Technique (Page 142)
►Divide-and-Conquer Technique
►Dynamic Programming Technique
►The algorithm combines more than one of the above techniques

528. What is the time complexity to extract a vertex from the priority queue in Prim's algorithm?
►O (log E)
► (V)
► (V+E)
►O (log V) (Page 152)

529. The relationship between number of back edges and number of cycles in DFS is, ►Both are equal
►Back edges are half of cycles
►Back edges are one quarter of cycles
►There is no relationship between no. of edges and cycles (Page 131)

530. You have an adjacency list for G, what is the time complexity to compute Graph transpose G^T.?
► (V + E) (Page 138)
► (V E)
► (V)

531. A digraph is strongly connected under what condition?

►A digraph is strongly connected if for every pair of vertices u, v e V, u can reach v . ►A digraph is strongly connected if for every pair of vertices u, v e V, u can reach v and vice versa. (Page 135)

►A digraph is strongly connected if for at least one pair of vertex u, v e V, u can reach v and vice versa.

►A digraph is strongly connected if at least one third pair of vertices u, v e V, u can reach v and vice versa.

532. In in-place sorting algorithm is one that uses arrays for storage :

►An additional array

►No additional array (Page 54)

►Both of above may be true according to algorithm

►More than 3 arrays of one dimension.

533. In stable sorting algorithm

►One array is uses

►In which duplicating elements are not handled.

►More then one arrays are required.

►Duplicating elements remain in same relative position after sorting. (Page 54)

534. Which sorting algorithm is faster :

►O(n^2)

►O(nlogn) (Page 46)

►O(n+k)

►O(n^3)

535. In Quick sort algorithm, constants hidden in T(n lg n) are

►Large

►Medium

►Not known

►Small

536. Quick sort is based on divide and conquer paradigm; we divide the problem on base of pivot element and:

►There is explicit combine process as well to conquer the solution.

►No work is needed to combine the sub-arrays, the array is already sorted

►Merging the sub arrays

►None of above. (Page 51

537. Dijkstra's algorithm :

►Has greedy approach to find all shortest paths

►Has both greedy and Dynamic approach to find all shortest paths

►Has greedy approach to compute single source shortest paths to all other vertices (Page 154)

►Has both greedy and dynamic approach to compute single source shortest paths to all other vertices.

538. Which may be stable sort:
►Bubble sort
►Insertion sort
►Both of above (page 54)
►Selection sort

539. Question # 1 of 10 (Marks: 1) Please choose one In the analysis of Selection algorithm, we eliminate a constant fraction of the array with each phase; we get the convergent _______________ series in the analysis,
►linear
►arithmetic
►geometric (page 37)
►exponent

540. How much time merge sort takes for an array of numbers?
►T(n^2)
►T(n) (Page 40)
►T(log n)
►T(n log n)

541. Counting sort has time complexity:
►O(n) ►O(n+k)
►O(k)
►O(nlogn)

542. The analysis of Selection algorithm shows the total running time is indeed ________in no
►arithmetic
►geometric
►linear (Page 37)
►orthogonal

543. Sorting is one of the few problems where provable ________ bonds exits on how fast we can sort,
►upper
►lower (Page 39)
►average
►log n

544. In the analysis of Selection algorithm, we make a number of passes, in fact it could be as many as
►T(n)
►T(n / 2)
►log n (Page 37)

►n / 2 + n / 4

545. number of nodes in a complete binary tree of height h is

►2^(h+1) – 1 (Page 40)

►2 * (h+1) – 1

►2 * (h+1)

► ((h+1) ^ 2) – 1 25

546. How many elements do we eliminate in each time for the Analysis of Selection algorithm?

►n / 2 elements (Page 37)

► (n / 2) + n elements

►n / 4 elements

►2 n elements

547. Slow sorting algorithms run in,

►T(n^2) (Page 39)

►T(n)

►T(log n)

►T(n log n)

548. Counting sort is suitable to sort the elements in range 1 to k:

►K is large

►K is small (Page 57)

►K may be large or small

►None

549. Heaps can be stored in arrays without using any pointers; this is due to the ____________ nature of the binary tree,

►left-complete (Page 40)

►right-complete

►tree nodes

►tree leaves

550. Sieve Technique can be applied to selection problem?

►True (Page 35)

►False

551. A heap is a left-complete binary tree that conforms to the ___________

►increasing order only

►decreasing order only

►heap order (Page 40)

► (log n) order

552. Divide-and-conquer as breaking the problem into a small number of

►pivot

►Sieve

►smaller sub problems (Page 34)

►Selection

553. In Sieve Technique we do not know which item is of interest
►True (Page 34)
►False

554. The recurrence relation of Tower of Hanoi is given below T(n)={1 if n=1 and 2T(n-1) if n >1 In order to move a tower of 5 rings from one peg to another, how many ring moves are required?
►16
►10
►32
►31 Click here 4 detail

555. one For the heap sort, access to nodes involves simple _______________ operations.
►arithmetic (Page 41)
►binary
►algebraic
►logarithmic

556. For the sieve technique we solve the problem,
►recursively (Page 34)
►mathematically
►precisely
►accurately

557. The sieve technique works in ___________ as follows
►phases (Page 34)
►numbers
►integers
►routines

558. A (an) _________ is a left-complete binary tree that conforms to the heap order
►heap (Page 40)
►binary tree
►binary search tree
►array

559. The sieve technique is a special case, where the number of sub problems is just
►5
►many
►1 (Page 34)
►few

560. Analysis of Selection algorithm ends up with,
►T(n)
►T(1 / 1 + n)

►T(n / 2)

►T((n / 2) + n) (Page 37)

561. For the heap sort we store the tree nodes in

►level-order traversal (Page 40)

►in-order traversal

►pre-order traversal

►post-order traversal

562. The reason for introducing Sieve Technique algorithm is that it illustrates a very important special case of,

►divide-and-conquer (Page 34)

►decrease and conquer

►greedy nature

►2-dimension Maxima

563. Theta asymptotic notation for T (n) :

►Set of functions described by: c1g(n)Set of functions described by c1g(n)>=f(n) for c1 s

►Theta for T(n)is actually upper and worst case comp

►Set of functions described by:

►c1g(n)

564. Sieve Technique applies to problems where we are interested in finding a single item from a larger set of _____________

►n items (Page 34)

►phases

►pointers

►constant

565. Memorization is?

►To store previous results for future use

►To avoid this unnecessary repetitions by writing down the results of recursive calls and looking them up again if we need them later (Page 47)

►To make the process accurate

►None of the above

566. Quick sort is

►Stable & in place

►Not stable but in place (Page 57)

►Stable but not in place

►Some time stable & some times in place

567. One example of in place but not stable algorithm is

►Merger Sort

►Quick Sort (Page 54)

►Continuation Sort

► Bubble Sort

568. Continuation sort is suitable to sort the elements in range 1 to k
► K is Large
► K is not known
► K may be small or large
► K is small (Page 57)

569. Which may be a stable sort?
► Merger
► Insertion
► Both above (Page 54)
► None of the above

570. An in place sorting algorithm is one that uses ___ arrays for storage
► Two dimensional arrays
► More than one array
► No Additional Array (Page 54)
► None of the above

571. Continuing sort has time complexity of ?
► O(n)
► O(n+k)
► O(nlogn)
► O(k)

572. single item from a larger set of _____________
► n items (Page 34)
► phases
► pointers
► vconstant

573. For the Sieve Technique we take time
► T(nk) (Page 34)
► T(n / 3)
► n^2
► n/3

574. One Example of in place but not stable sort is
► Quick (Page 54)
► Heap
► Merge
► Bubble

575. Consider the following Algorithm: Factorial (n){ if (n=1) return 1 else return (n * Factorial(n-1)) } Recurrence for the following algorithm is:
► T(n) = T(n-1) +1
► T(n) = nT(n-1) +1

► T(n)= T(n-1) +n
► T(n)=T(n(n-1)) +1

576. Due to left complete nature of binary tree, the heap can be stored in
► Arrays (Page 40)
► Structures
► Link Lis
►Stack

577. What type of instructions Random Access Machine (RAM) can execute?
►Algebraic and logic
►Geometric and arithmetic
►Arithmetic and logic (Page 10)
►Parallel and recursive

578. What is the total time to heapify?
► O(log n) (Page 43)
► O(n log n)
► O(n2 log n)
► O(log2 n)

579. word Algorithm comes from the name of the muslim author ____________
►Abu Ja'far Mohammad ibn Musa al-Khowarizmi.

580. al-Khwarizmi's work was written in a book titled _______________
►al Kitab al-mukhatasar fi hisab al-jabr wa'l-muqabalah

581. Random access machine or RAM is a/an
► Machine build by Al-Khwarizmi
► Mechanical machine
► Electronics machine
► Mathematical model (Page 10)

582. A RAM is an idealized machine with ______________ random-access memory.
► 256MB
► 512MB
► an infinitely large (Page 10)
► 100GB

583. What will be the total number of max comparisons if we run brute-force maxima algorithm with n elements?
► 2 n
► 2 n n
► n (Page 14)
► 8 n

584. Due to left complete nature of binary tree, the heap can be stored in
► Arrays (Page 40)

► Structures
► Link Lis
►Stack

585. one What type of instructions Random Access Machine (RAM) can execute?
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► 512MB
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► 100GB

589. What will be the total number of max comparisons if we run brute-force maxima algorithm with n elements?
► 2 n
► 2 n n
► n (Page 14)
► 8 n

590. The sieve technique works where we have to find _________ item(s) from a large input.
►Single (Page 34)
►Two
►Three
►Similar

591. In which order we can sort?
►increasing order only
►decreasing order only
►increasing order or decreasing order (Page 39)

►both at the same time

592. For the heap sort we store the tree nodes in
►level-order traversal (Page 40)
►in-order traversal
►pre-order traversal
►post-order traversal

593. In the analysis of Selection algorithm, we eliminate a constant fraction of the array with each phase; we get the convergent _______________ series in the analysis, ►linear
►arithmetic
►geometric (Page 37)
►exponent

594. How much time merge sort takes for an array of numbers?
►T(n^2)
►T(n)
►T(log n)
►T(n log n) (Page 40)

595. Memoization is?
►To store previous results for future use
►To avoid this unnecessary repetitions by writing down the results of recursive calls and looking them up again if we need them later (page 74)
►To make the process accurate
►None of the above

596. Cont sort is suitable to sort the elements in range 1 to k
►K is Large
►K is not known
►K may be small or large
►K is small (Page 57)

597. In place stable sorting algorithm.
►If duplicate elements remain in the same relative position after sorting (Page 54) ►One array is used
►More than one arrays are required
►Duplicating elements not handled

598. Sorting is one of the few problems where provable ________ bonds exits on how fast we can sort, ►upper ►lower (Page 39) ►average ►log n

599. Question No: 65 (Marks: 1) - Please choose one Counting sort has time complexity: ►O(n) (Page 58)
►O(n+k)
►O(k)
►O(nlogn)

600. The running time of quick sort depends heavily on the selection of
►No of inputs
►Arrangement of elements in array
►Size o elements
►Pivot elements (Page 49)

601. Which may be stable sort:
►Bubble sort
►Insertion sort
►Both of above (Page 54)

602. In Quick Sort Constants hidden in T(n log n) are
►Large
►Medium
►Small
►Not Known

603. Quick sort is based on divide and conquer paradigm; we divide the problem on base of pivot element and:
►There is explicit combine process as well to conquer the solution.
►No work is needed to combine the sub-arrays, the array is already sorted
►Merging the sub arrays
►None of above. (Page 51)

604. A point p in 2-dimensional space is usually given by its integer coordinate(s)____________
► p.x only
► p.y only
► p.x & p.z
► p.x & p.y (Page 10)

605. In ____________ we have to find rank of an element from given input.
►Merge sort algorithm
►Selection problem (Page 34)
►Brute force technique
►Plane Sweep algorithm

606. In Heap Sort algorithm, if heap property is violated _________
►We call Build heap procedure
►We call Heapify procedure
►We ignore
►Heap property can never be violated

607. Upper bound requires that there exist positive constants c2 and n0 such that f(n) ____ c2n for all n <= n0(ye question ghalat lag raha hai mujhae
►Less than
►Equal to or Less than (Page 25)

► Equal or Greater than
► Greater than

608. A RAM is an idealized algorithm with takes an infinitely large random-access memory. ► True
► False (Page 10)

609. _________ is one of the few problems, where provable lower bounds exist on how fast we can sort.
► Searching
► Sorting
► Both Searching & Sorting
► Graphing

610. Floor and ceiling are ____________ to calculate while analyzing algorithms.
► Very easy
► Usually considered difficult (Page 31)

611. In Heap Sort algorithm, the maximum levels an element can move upward is _________
► Theta (log n) (Page 43)
► Order (log n)
► Omega (log n)
► O (1) i.e. Constant time

612. A point p in 2-dimensional space is usually given by its integer coordinate(s)____________
► p.x only p.y
► only p.x & p.z
► p.x & p.y (Page 17)

613. In Heap Sort algorithm, the total running time for Heapify procedure is ____________
► Theta (log n) (Page 43)
► Order (log n)
► Omega (log n)
► O (1) i.e. Constant time

614. Algorithm is a mathematical entity, which is independent of a specific machine and operating system.
► True
► False (Page 7)

615. While Sorting, the ordered domain means for any two input elements x and y _________ satisfies only.
► x < y
► x > y
► x = y

►All of the above (Page 39)

616. Quick sort is best from the perspective of Locality of reference.

►True (Page 9)

►False

617. In Heap Sort algorithm, we build _______ for ascending sort.

►Max heap (Page 41)

►Min heap

618. In Sieve Technique, we know the item of interest.

►True

►False (Page 34)

619. While solving Selection problem, in Sieve technique we partition input data __________

►In increasing order

►In decreasing order

►According to Pivot (Page 35)

►Randomly

620. In pseudo code, the level of details depends on intended audience of the algorithm.

►True (Page 12)

►False

621. If the indices passed to merge sort algorithm are ________,then this means that there is only one element to sort. ►Small

►Large

►Equal (Page 28)

►Not Equal