

VIRTUAL UNIVERSITY OF PAKISTAN

A Good Education is a Foundation For a Better Future

CORRECT ANSWER SOLVED BY HADI
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(Final Term Past Paper)

MADE AND SOLVED BY TEAM HADI

WARNING: Team HADI is not responsible for any mistake or wrong answer. All students reading and using this document may check and confirm the answers at their own.



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Best of luck!



PAST PAPER

Question No : 1 of 52

Marks: 1 (Budgeted Time 1 Min)

Each operator in a postfix expression refers to the previous _____ operand(s).

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Answer (Please select your correct option)

One

Two



Three

Four

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Question No : 2 of 52

Marks: 1 (Budgeted Time 1 Min)

In the linked list implementation of the queue class, where does the insert member function place the new entry on the linked list?

Answer (Please select your correct option)

At the head

At the tail

correct

After all other entries that are greater than the new entry.

After all other entries that are smaller than the new entry.

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Question No : 3 of 52

Marks: 1 (Budgeted Time 1 Min)

If a complete binary tree has n number of nodes then its height will be,

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Answer (Please select your correct option)

$\log_2 (n+1) - 1$ **correct**

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2^n

$\log_2 (n) - 1$

$2^n - 1$

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Question No : 4 of 52

Marks: 1 (Budgeted Time 1 Min)

Binary Search is an algorithm of searching, used with the _____ data.

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Answer (Please select your correct option)

Sorted **correct**

Unsorted

Heterogeneous

Random

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Question No : 5 of 52

Marks: 1 (Budgeted Time 1 Min)

Consider the following array

23 15 5 12 40 10 7

After the first pass of a particular algorithm, the array looks like

15 5 12 23 10 7 40

Name the algorithm used

Answer (Please select your correct option)

Heap sort

Selection sort

Insertion sort

Bubble sort

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Question No : 6 of 52

Marks: 1 (Budgeted Time 1 Min)

Consider a min heap, represented by the following array:

10,30,20,70,40,50,80,60

After inserting a node with value 31. Which of the following is the updated min heap?

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Answer (Please select your correct option)

10,30,20,31,40,50,80,60,70

correct

10,30,20,70,40,50,80,60,31

10,31,20,30,40,50,80,60,31

31,10,30,20,70,40,50,80,60

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Question No : 7 of 52

Marks: 1 (Budgeted Time 1 Min)

We can build a heap in _____ time.

Answer (Please select your correct option)

Linear **correct**

Exponential

Polynomial

None of the given options

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Question No : 8 of 52

Marks: 1 (Budgeted Time 1 Min)

Suppose we had a hash table whose hash function is " $n \% 12$ ", if the number 35 is already in the hash table, which of the following numbers would cause a collision?

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Answer (Please select your correct option)

144

145 **correct**

143

148

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Question No : 9 of 52

Marks: 1 (Budgeted Time 1 Min)

Which of the following stack operations could result in stack underflow ?

Answer (Please select your correct option)

is_empty

pop

correct

push

is_full

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Question No : 10 of 52

Marks: 1 (Budgeted Time 1 Min)

It will be efficient to place stack elements at the start of the list because insertion and removal take _____ time.

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Answer (Please select your correct option)

Variable

Constant

correct

Inconsistent

Non-linear

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Question No : 11 of 52

Marks: 1 (Budgeted Time 1 Min)

The worst case of deletion in AVL tree requires _____.

Answer (Please select your correct option)

- Only one rotation
- Rotation at each non-leaf node
- Rotation at each leaf node
- Rotations equal to $\log_2 N$ **correct**

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Question No : 12 of 52

Marks: 1 (Budgeted Time 1 Min)

In Threaded Binary Tree, every node that does not have a left-child has a thread to its

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Answer (Please select your correct option)

in-order successor

pre-order successor

in-order predecessor **correct**

pre-order predecessor

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Question No : 13 of 52

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To create a _____, we link the last node with the first node in the list.

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Answer (Please select your correct option)

Doubly linked list

Circularly linked list

correct

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Linked list

Triply linked list

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Marks: 1 (Budgeted Time 1 Min)

By using _____, we avoid the recursive method of traversing a Tree.

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Answer (Please select your correct option)

Binary tree only

Threaded binary tree **correct**

Heap data structure

Huffman encoding

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Question No : 15 of 52

Marks: 1 (Budgeted Time 1 Min)

Which of the following is TRUE about arrays ?

Answer (Please select your correct option)

We can increase the size of arrays after their creation.

correct

We can decrease the size of arrays after their creation.

We can increase but can't decrease the size of arrays after their creation.

We can neither increase nor decrease the array size after their creation.

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Question No : 16 of 52

Marks: 1 (Budgeted Time 1 Min)

Here is an array of ten integers:

5 3 8 9 1 7 0 2 6 4

Array after the FIRST iteration of the main loop in **selection sort** algorithm will be (sorting from smallest to largest) :

Answer (Please select your correct option)

0 3 8 9 1 7 5 2 6 4

correct

2 6 4 0 3 8 9 1 7 5

2 6 4 9 1 7 0 3 8 5

0 3 8 2 6 4 9 1 7 5

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Question No : 17 of 52

Marks: 1 (Budgeted Time 1 Min)

When unions are done by weight (size), the depth of any element is never greater than

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Answer (Please select your correct option)

$\log_2 n$ **correct**

$n \log_2 n$

$n \log_2 n + 1$

$\log_2 n - 1$

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Question No : 18 of 52

Marks: 1 (Budgeted Time 1 Min)

What is the best definition of *collision* in a hash table?

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Answer (Please select your correct option)

- Two entries are identical except for their keys.
- Two entries with different data have different keys.
- Two entries with different keys have the same hash value.
- Two entries with the same key have different hash values.

correct

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Question No : 19 of 52

Marks: 1 (Budgeted Time 1 Min)

Which of the following is NOT true regarding the maze generation?

Answer (Please select your correct option)

- Randomly remove walls until the entrance and exit cells are in the same set.
- Removing a wall is the same as doing a union operation.
- Remove a randomly chosen wall if the cells it separates are already in the same set.
- Do not remove a randomly chosen wall if the cells it separates are already in the same set.

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Question No : 20 of 52

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"++" is a ----- operator.

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Answer (Please select your correct option)

- Unary
- Binary **correct**
- Ternary
- Binary and Ternary

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Question No : 21 of 52

Marks: 1 (Budgeted Time 1 Min)

In the call by methodology, a copy of the object is passed to the called function.

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Answer (Please select your correct option)

- Reference
- Value **correct**
- Reference & Value
- Copy of the object can not be passed

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Question No : 22 of 52

Marks: 1 (Budgeted Time 1 Min)

In a skip list of 'n' elements, which level includes all the elements?

Answer (Please select your correct option)

0

correct

1

2

3

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Question No : 23 of 52

Marks: 1 (Budgeted Time 1 Min)

In a skip list, list S_0 holds the keys of S in which of the following order?

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Answer (Please select your correct option)

Decreasing

Non-decreasing

correct

Non-increasing

Random

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Question No : 24 of 52

Marks: 1 (Budgeted Time 1 Min)

The balance factor of an empty AVL tree is:

.

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Answer (Please select your correct option)

1

-1

2

0

correct

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Question No : 25 of 52

Marks: 1 (Budgeted Time 1 Min)

Hash function can reduce searching operation to in its best and average cases.

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Answer (Please select your correct option)

Constant time

Linear time

Algorithmic time

correct

Quadratic time

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Question No : 26 of 52

Marks: 1 (Budgeted Time 1 Min)

Best case running time of selection sort algorithm is:

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Answer (Please select your correct option)

(n)

(n^2)

(logn)

(nlogn)

correct

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Question No : 27 of 52

Marks: 1 (Budgeted Time 1 Min)

If a list contains 32 elements, how many times the list must split during merge sort?

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Answer (Please select your correct option)

Log (32) times

32 times

16 times

Log (32/2) times

correct

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Question No : 28 of 52

Marks: 1 (Budgeted Time 1 Min)

.....in equivalence relations is as, if x leads to y and y to z then x leads to z.

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Answer (Please select your correct option)

Equality

Symmetry

Non-Symmetry

Transitivity

correct

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Question No : 29 of 52

Marks: 1 (Budgeted Time 1 Min)

Return value of getMin() method is always of MinHeap.

Answer (Please select your correct option)

Root

Right

Left

Leaf

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Question No : 30 of 52

Marks: 1 (Budgeted Time 1 Min)

Which formula is the best approximation for the depth of a heap with n nodes?

Answer (Please select your correct option)

log (base 2) of n

The number of digits in n (base 10), e.g., 145 has three digits

The square root of n

n

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Question No : 31 of 52

Marks: 1 (Budgeted Time 1 Min)

A complete binary tree of height ____ has nodes between 16 to 31 .

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Answer (Please select your correct option)

2

3

4

5

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Question No : 32 of 52

Marks: 1 (Budgeted Time 1 Min)

get () method of *list* is:

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Answer (Please select your correct option)

zero step method

one step method **correct**

two step method

three step method

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Question No : 33 of 52

Marks: 1 (Budgeted Time 1 Min)

Using Huffman Encoding for data to be sent on network enables us to send it with....

Answer (Please select your correct option)

- Large data size and More transmission time
- Small data size and More transmission time
- Small data size and Less transmission time
- Large data size and Less transmission time

correct

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Question No : 34 of 52

Marks: 1 (Budgeted Time 1 Min)

Which of the following is the most significant part of compilers?

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Answer (Please select your correct option)

AVL tree

Expression tree

correct

*correct answer
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Array

Binary tree

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Question No : 35 of 52

Marks: 1 (Budgeted Time 1 Min)

Which of the following is NOT a factor in *Union by Size*?

Answer (Please select your correct option)

- Maintains sizes (number of nodes) of all trees
- Makes smaller tree, the subtree of the larger one
- Makes the larger tree, the subtree of the smaller one
- Maintains sizes (number of nodes) while performing union operation

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Question No : 36 of 52

Marks: 1 (Budgeted Time 1 Min)

A binary tree with 24 internal nodes has _____ external nodes.

Answer (Please select your correct option)

22

23

48

25

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If there are N external nodes in a Binary tree, then number of internal nodes will be:

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Answer (Please select your correct option)

N - 1

N+1

correct

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N+2

N

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Marks: 1 (Budgeted Time 1 Min)

If there are 56 internal nodes in a binary tree then how many external nodes this binary tree will have?

Answer (Please select your correct option)

54

55

56

57 correct

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In disjoint sets, union is a _____ time operation.

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Answer (Please select your correct option)

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Constant

correct

Variable

Exponential

Quadratic

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Question No : 40 of 52

Marks: 1 (Budgeted Time 1 Min)

Which of the following is NOT an example of equivalence relation?

Answer (Please select your correct option)

Electrical connectivity

Set of people

\leq relation

correct

Set of pixels

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Question No : 41 of 52

Marks: 2 (Budgeted Time 4 Min)

In array representation of a Heap, if parent node is present at index i then at what indexes child nodes are present ?

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Answer (Please [click here](#) to Add Answer)



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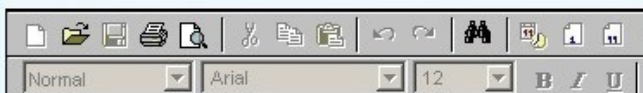
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Question No : 42 of 52

Marks: 2 (Budgeted Time 4 Min)

Give any two important characteristics of skip list.

Answer (Please [click here](#) to Add Answer)



Empty text area for the answer.

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Question No : 43 of 52

Marks: 2 (Budgeted Time 4 Min)

How we can use Disjoint sets for Image Segmentation ?

Answer (Please [click here](#) to Add Answer)

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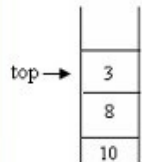
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Question No : 44 of 52

Marks: 2 (Budgeted Time 4 Min)

Give array representation of the following stack.



Answer (Please [click here](#) to Add Answer)

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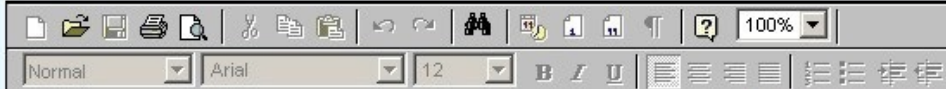
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Question No : 45 of 52

Marks: 3 (Budgeted Time 6 Min)

Write down the code for isEmpty() and isFull() functions of the Stack data structure implemented through Arrays.

Answer (Please [click here](#) to Add Answer)



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Question No : 46 of 52

Marks: 3 (Budgeted Time 6 Min)

Consider the min-heap represented in the following array:

| | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 13 | 15 | 19 | 16 | 18 | 40 | 20 | 24 | 36 | 21 | |

Show the updated min-heap in the array after inserting 14.

Answer (Please [click here](#) to Add Answer)

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Question No : 47 of 52

Marks: 3 (Budgeted Time 6 Min)

Here is an array of ten integers:

5 3 8 9 1 7 0 2 6 4

Draw this array after the FIRST iteration of main loop of insertion sort (sorting from smallest to largest). This iteration has shifted at least one item in the array!

Answer (Please [click here](#) to Add Answer)

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Question No : 48 of 52

Marks: 3 (Budgeted Time 6 Min)

What is an Equivalence relation? Give any two examples.

Answer (Please [click here](#) to Add Answer)



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Question No : 49 of 52

Marks: 5 (Budgeted Time 10 Min)

Perform the Preorder and Inorder traversal on the tree given below and show the result in both cases (you have to perform the traversal manually not using any programming language)



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Answer (Please [click here](#) to Add Answer)



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Question No : 50 of 52

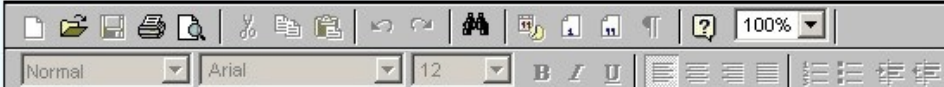
Marks: 5 (Budgeted Time 10 Min)

Following function searches an element from a sorted array. But there are some mistakes in it, you are required to find and correct those mistakes.

```
int isPresent(int *arr, int val, int N)
{
    int low = 0;
    int high = N - 1;
```

Answer (Please [click here](#) to Add Answer)

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Question No : 51 of 52

Marks: 5 (Budgeted Time 10 Min)

Consider the following keys,

57 , 45 , 60 , 75 , 95

Draw an array of size 13 and apply the hash function $f(h) = \text{key} \% 13$ to find the hash values and store these keys in this array.

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Question No : 52 of 52

Marks: 5 (Budgeted Time 10 Min)

We can use a heap to implement a priority queue.

The **Remove()** function returns the highest priority item that will be the maximum heap element .

Write C++ code for **Remove()** function of priority queue . You must have to use heap in the implementation of these functions.

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