



CS301 Data Structures Update MCQS For Quiz-3 File Solve By Vu Topper RM



80 To 100% Marks



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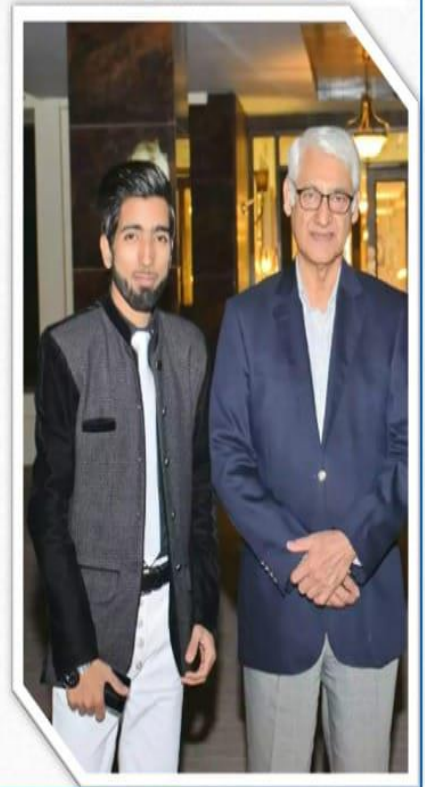
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If the bottom level of a binary tree is not completely filled, depicts that the tree is not a _____.

- A. Expression tree
- B. Threaded binary tree
- C. Complete Binary tree**
- D. Perfectly complete Binary tree

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There are four cases of rotation in an _____ tree.

- A. AVL**
- B. Tree
- C. Binary
- D. Heap

Which type of rotation can balance the following AVL tree?

- A. Single left
- B. Single right
- C. Double right-left
- D. Double left-right**

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Finding the minimum is easy; it is _____ of the min heap.

- A. Top**
- B. Left most child.
- C. Right most child
- D. None of the given options.

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When a complete binary tree, represented by an array then for any array element at position i , the parent is at position _____.

- A. $2i$
- B. $2i-1$
- C. $(2i+1)$
- D. $\text{Floor}(i/2)$**

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

- A. 55
- B. 56
- C. 57**
- D. 58

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In an expression tree, a unary operator will have only _____ subtree.

- A. One**
- B. Two
- C. Three
- D. None

Google

Consider a min heap, represented by the following array:

3,4,6,7,5,10

After inserting a node with value 1. Which of the following is the updated min heap?

- A. 3,4,6,7,5,1,10
- B. 1,4,3,7,5,10,6**
- C. 1,4,6,7,5,10,3
- D. 3,4,6,7,5,10,1

Google

For the inorder traversal of threaded binary tree, we introduced a dummy node. The left pointer of the dummy node is pointing to the _____ node of the tree.

- A. Root
- B. Left must**
- C. Right must
- D. any of the given node

If both pointers of the node in a binary tree are NULL then it will be a/an

- A. Leaf node**
- B. Root node

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- C. Inner node
- D. None of the given options

In complete binary tree the bottom level is filled from _____

- A. Left to right**
- B. Right to left
- C. Not filled at all
- D. None of the given options

Consider a max heap, represented by the following array:

40,30,20,10,15,16,17,8,4

After inserting a node with value 35.

Which of the following is the updated max heap?

- A. 40,30,20,10,15,16,17,8,4,35**
- B. 40,35,20,10,30,16,17,8,4,15
- C. 40,30,20,10,35,16,17,8,4,15
- D. 40,35,20,10,15,16,17,18,4,30

A complete binary tree of height 3 has between _____ nodes.

- A. 8 to 17
- B. 8 to 14
- C. 8 to 15**
- D. 8 to 17

To develop a character encoding scheme in Huffman tree, _____ will be assigned to left branch.

- A. 1
- B. 2
- C. 3**
- D. 4

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If there are 23 external nodes in a binary tree then what will be the no. of internal nodes in this binary tree?

- A. 20

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B. 21

C. 22

D. 23

Which of the following is a correct statement?

A. An AVL tree is not identical to a BST, its altogether kind of tree.

B. An AVL tree is identical to a BST except height of the left and right subtrees can differ by at least 1.

C. An AVL tree is identical to a BST except height of the left and right subtrees can differ by at most 1. Page 220

D. An AVL tree is identical to a BST except height of the left and right subtrees must differ by at least 1.

Which of the following statement is true about dummy node of threaded binary tree?

A. The right pointer of dummy node points to the itself while the left pointer is always NULL.

B. The left pointer of dummy node points to the root node of the tree while the right pointer is always NULL.

C. The left pointer of dummy node points to the itself while the right pointer points to the root of tree.

D. The left pointer of dummy node points to the root node of the tree while the right pointer points itself i.e. to dummy node

Which one of the following is TRUE about iteration?

A. Iteration extensively uses stack memory

B. Recursion is more efficient than iteration

C. Iterative function calls consumes a lot of memory

D. Threaded Binary Trees use the concept of iteration

Traversing a binary tree can only be done using _____

A. Recursion

B. Iteration

C. None of the given options

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D. Both Iteration and Recursion

In the SingleRightRotation function, the height routine will return _____ if the argument passed to it is NULL.

A. 0

B. -1 **Page 259**

C. 1

D. Invalid

The worst case of building a heap of N keys is _____.

A. N

B. N-1

C. N²

D. NlogN

By using _____ we avoid the recursive method of traversing a Tree, which makes use of stacks and consumes a lot of memory and time.

A. Binary tree only

B. Huffman encoding

C. Heap data structure

D. Threaded binary tree **Page 306**

We implement the heap by _____.

A. AVL tree

B. Threaded Tree

C. Expression tree

D. Complete binary tree **Page 336**

In threaded binary tree, the NULL pointers are replaced by the

A. NULL pointers are not replaced.

B. preorder successor or predecessor

C. inorder successor or predecessor

D. postorder successor or predecessor

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Which one of the following is best for traversals,

- A. Heap
- B. AVL tree
- C. Binary Search Tree
- D. Threaded Binary Tree**

If min heap is implemented through array, then the first element of heap will be stored _____.

- A. 0**
- B. 1
- C. 2
- D. 3

In which of the following tree, parent node has key greater than or equal to its both children?

- A. Max heap**
- B. Binary search tree
- C. Threaded Binary tree
- D. Complete Binary tree

If the bottom level of a binary tree is NOT completely filled, depicts that the tree is NOT a -----

- A. Expression tree
- B. Threaded binary tree
- C. Complete Binary tree**
- D. Perfectly complete Binary tree

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An expression tree will always be a/an,

- A. Heap
- B. AVL tree
- C. Strictly binary tree
- D. Binary search tree**

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To search an element in ALV tree, it takes maximum $1.88 \log_2 n$ time.

A. False

B. True

C. In some cases

D. Searching cannot be performed in AVL tree

See the below code and fill the appropriate answer for ? sign.

```
void fastInorder(TreeNode* p)
{
while((p=nexInorder(p)) != ? )
cout << p->getInfo();}
```

A. RTH

B. LTH

C. Dummy

D. RootNode

A Threaded Binary Tree is a binary tree in which every node that does not have a right child has a THREAD (in actual sense, a link) to its _____ successor.

A. Inorder

B. Preorder

C. Postorder

D. Levelorder

While building Huffman encoding tree the parent node is _____ of left and right child nodes.

A. Addition

B. Division

C. Subtraction

D. Multiplication

Which of the following statement is correct?

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- A. A Threaded Binary Tree is a binary tree in which every node that does not have a left child has a THREAD (in actual sense, a link) to its INORDER successor.
- B. A Threaded Binary Tree is a binary tree in which every node that does not have a right child has a THREAD (in actual sense, a link) to its PREORDER successor.
- C. A Threaded Binary Tree is a binary tree in which every node that does not have a right child has a THREAD (in actual sense, a link) to its INORDER successor.**
- D. A Threaded Binary Tree is a binary tree in which every node that does not have a right child has a THREAD (in actual sense, a link) to its POSTORDER successor.

In a threaded binary tree which nodes have NULL child pointers,

- A. Root Node
- B. All leaf nodes**
- C. None of the nodes
- D. Nodes other than leaf nodes

Consider a binary tree, represented by the following array:

10,7,9,5,2,1,6,3,4

This is a _____.

- A. Min heap
- B. Max heap
- C. Binary Search tree**
- D. Threaded binary tree

If there are N internal nodes in a binary tree then what will be the no. of external nodes in this binary tree?

- A. N
- B. N-1
- C. N+1**
- D. N+2

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Which of the following statement is true about dummy node of threaded binary tree?

A. This dummy node never has a value

B. This dummy node has always some integer value.

C. This dummy node has always some dummy value

D. This dummy node has either no value or some dummy value.

If there are N external nodes in a binary tree then what will be the no. of internal nodes in this binary tree?

A. N

B. N-1

C. N+1

D. N+2

In AVL tree during insertion, a single rotation can fix the balance in cases _____ and 4.

A. 1 **Page 239**

B. 2

C. 3

D. 4

In Huffman tree, the process of combining the two nodes of lowest frequency will be carried out until _____ node/nodes left.

A. One **Page 293**

B. Two

C. Six

D. None

We are given N items to build a heap of items , this can be done with _____ successive inserts.

A. N

B. N-1

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- C. $N+1$
- D. $N*2$

There are _____ cases of deletion of a node from an AVL tree.

- A. One
- B. Two
- C. Five**
- D. Three

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While building Huffman encoding tree the new node that is the result of joining two nodes has the frequency.

- A. Equal to the small frequency
- B. Equal to the greater frequency
- C. Equal to the sum of the two frequencies**
- D. Equal to the difference of the two frequencies

When a complete binary tree represented by an array then if right child is at position 5 then left child will be at position _____

- A. 2
- B. 4**
- C. 6
- D. 8

If there are _____ nodes in an AVL tree, its levels will be roughly as $\log_2(10 \text{ million})$.

- A. 2 million
- B. 5 million
- C. 10 million**
- D. 100 million

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We can build a heap in _____ time.

- A. Linear**
- Page 353**
- B. Exponential
- C. Polynomial

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D. None of the given options

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

_____ only removes items in reverse order as they were entered.

► Stack

- Queue
- Both of these
- None of these

Question No: 2 (Marks: 1) - Please choose one

Here is a small function definition:

```
void f(int i, int &k)
{
    i = 1;
    k = 2;
}
```

Suppose that a main program has two integer variables x and y, which are given the value 0. Then the main program calls f(x,y); What are the values of x and y after the function f finishes?

- Both x and y are still 0.
- x is now 1, but y is still 0.
- x is still 0, but y is now 2.
- x is now 1, and y is now 2.

Question No: 3 (Marks: 1) - Please choose one

Select the one FALSE statement about binary trees:

- Every binary tree has at least one node.
- Every non-empty tree has exactly one root node.

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- ▶ Every node has at most two children.
- ▶ Every non-root node has exactly one parent.

Question No: 4 (Marks: 1) - Please choose one

Every AVL is _____

- ▶ Binary Tree
- ▶ Complete Binary Tree
- ▶ None of these

▶ Binary Search Tree

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

Searching an element in an AVL tree take maximum _____ time (where n is no. of nodes in AVL tree),

- ▶ $\log_2(n+1)$
- ▶ $\log_2(n+1) - 1$

▶ $1.44 \log_2 n$

▶ $1.66 \log_2 n$

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

Suppose that we have implemented a *priority queue* by storing the items in a heap. We are now executing a reheapification downward and the out-of-place node has priority of 42. The node's parent has a priority of 72, the left child has priority 52 and the node's right child has priority 62. Which statement best describes the status of the reheapification.

- ▶ The reheapification is done.
- ▶ The next step will interchange the two children of the out-of-place node.
- ▶ The next step will swap the out-of-place node with its parent.
- ▶ The next step will swap the out-of-place node with its left child.

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

Suppose you implement a heap (with the largest element on top) in an array. Consider the different arrays below, determine the one that *cannot* possibly be a heap:

- ▶ 7 6 5 4 3 2 1
- ▶ 7 3 6 2 1 4 5
- ▶ 7 6 4 3 5 2 1
- ▶ 7 3 6 4 2 5 1

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

Which one of the following is NOT the property of equivalence relation:

- ▶ Reflexive
- ▶ Symmetric
- ▶ Transitive
- ▶ Associative

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

The definition of Transitivity property is

- ▶ For all element x member of S , $x R x$
- ▶ For all elements x and y , $x R y$ if and only if $y R x$
- ▶ For all elements x, y and z , if $x R y$ and $y R z$ then $x R z$
- ▶ For all elements w, x, y and z , if $x R y$ and $w R z$ then $x R z$

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

Union is a _____ time operation.

- ▶ Constant
- ▶ Polynomial
- ▶ Exponential
- ▶ None of the given options

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Question No: 13 (Marks: 1) - Please choose one

Which of the following is NOT a correct statement about Table ADT.

- ▶ In a table, the type of information in columns may be different.
- ▶ A table consists of several columns, known as entities.
- ▶ The row of a table is called a record.
- ▶ A major use of table is in databases where we build and use tables for keeping information.

Question No: 14 (Marks: 1) - Please choose one

In the worst case of deletion in AVL tree requires _____.

- ▶ Only one rotation
- ▶ Rotation at each non-leaf node
- ▶ Rotation at each leaf node

▶ Rotations equal to $\log_2 N$

Question No: 15 (Marks: 1) - Please choose one

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

▶ Sorted

▶ Unsorted

▶ Heterogeneous

▶ Random

Question No: 18 (Marks: 1) - Please choose one

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Which of the following statement is NOT true about threaded binary tree?

- ▶ Right thread of the right-most node points to the *dummy* node.
- ▶ Left thread of the left-most node points to the *dummy* node.
- ▶ The left pointer of dummy node points to the root node of the tree.
- ▶ Left thread of the right-most node points to the *dummy* node.

Question No: 19 (Marks: 1) - Please choose one

Consider a min heap, represented by the following array:

11,22,33,44,55

After inserting a node with value 66.Which of the following is the updated min heap?

- ▶ 11,22,33,44,55,66
- ▶ 11,22,33,44,66,55
- ▶ 11,22,33,66,44,55
- ▶ 11,22,66,33,44,55

Question No: 20 (Marks: 1) - Please choose one

Consider a min heap, represented by the following array:

3,4,6,7,5

After calling the function deleteMin().Which of the following is the updated min heap?

- ▶ 4,6,7,5
- ▶ 6,7,5,4
- ▶ 4,5,6,7
- ▶ 4,6,5,7

Question No: 22 (Marks: 1) - Please choose one

Suppose we are sorting an array of eight integers using quick sort, and we have just finished the first partitioning with the array looking like this:

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2 5 1 7 9 12 11 10

Which statement is correct?

- ▶ The pivot could be either the 7 or the 9.
- ▶ The pivot could be the 7, but it is not the 9.
- ▶ The pivot is not the 7, but it could be the 9.
- ▶ Neither the 7 nor the 9 is the pivot.

Question No: 23 (Marks: 1) - Please choose one

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

- ▶ $\log_2 n$
- ▶ The number of digits in n (base 10), e.g., 145 has three digits
- ▶ The square root of n
- ▶ n

Question No: 24 (Marks: 1) - Please choose one

Suppose you implement a Min heap (with the smallest element on top) in an array. Consider the different arrays below; determine the one that *cannot* possibly be a heap:

- ▶ 16, 18, 20, 22, 24, 28, 30
- ▶ 16, 20, 18, 24, 22, 30, 28
- ▶ 16, 24, 18, 28, 30, 20, 22
- ▶ 16, 24, 20, 30, 28, 18, 22

Question No: 25 (Marks: 1) - Please choose one

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While joining nodes in the building of Huffman encoding tree if there are more nodes with same frequency, we choose the nodes _____.

► Randomly

- That occur first in the text message
- That are lexically smaller among others.
- That are lexically greater among others

Question No: 26 (Marks: 1) - Please choose one

Consider the following paragraph with blanks.

A is a linear list where and take place at the same end . This end is called the

What would be the correct filling the above blank positions?

- (i) queue (ii) insertion (iii) removals (iv) top
- (i) stack (ii) insertion (iii) removals (iv) bottom
- (i) stack (ii) insertion (iii) removals (iv) top
- (i) tree (ii) insertion (iii) removals (iv) top

Question No: 27 (Marks: 1) - Please choose one

A binary tree with 33 internal nodes has _____ links to internal nodes.

- 31
- 32
- 33
- 66

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Question No: 28 (Marks: 1) - Please choose one

Which traversal gives a decreasing order of elements in a heap where the max element is stored at the top?

- ▶ post-order
- ▶ level-order
- ▶ inorder
- ▶ None of the given options

Question No: 29 (Marks: 1) - Please choose one

What requirement is placed on an array, so that *binary search* may be used to locate an entry?

- ▶ The array elements must form a heap.
- ▶ The array must have at least 2 entries.
- ▶ The array must be sorted.
- ▶ The array's size must be a power of two.

Question No: 30 (Marks: 1) - Please choose one

Which of the following is a non linear data structure?

- ▶ Linked List
- ▶ Stack
- ▶ Queue
- ▶ Tree

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

The data of the problem is of 2GB and the hard disk is of 1GB capacity, to solve this problem we should

- ▶ Use better data structures
- ▶ Increase the hard disk space

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► Use the better algorithm

► Use as much data as we can store on the hard disk

Question No: 2 (Marks: 1) - Please choose one

In

an array list the current element is

- The first element
- The middle element
- The last element
- The element where the current pointer points to

Question No: 3 (Marks: 1) - Please choose one

Whic

h one of the following is a valid postfix expression?

- $ab+c*d-$
- $abc*+d-$
- $abc+*d-$
- $(abc*)+d-$

Question No: 4 (Marks: 1) - Please choose one

In

sequential access data structure, accessing any element in the data structure takes different amount of time. Tell which one of the following is sequential access data structure, [Linked list](#)

- Arrays
- Lists
- Both of these
- None of these

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

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have implemented the queue with a circular array. If data is a circular array of CAPACITY elements, and last is an index into that array, what is the formula for the index after last?

- $(last \% 1) + CAPACITY$
- $last \% (1 + CAPACITY)$
- $(last + 1) \% CAPACITY$
- $last + (1 \% CAPACITY)$

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

Com

piller uses which one of the following to evaluate a mathematical equation,

- Binary Tree
- Binary Search Tree
- Parse Tree

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► AVL Tree

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

If a max heap is implemented using a partially filled array called data, and the array contains n elements ($n > 0$), where is the entry with the greatest value? **Data[0]**

- data[1]
- data[n-1]
- data[n]
- data[2*n+1]

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

Which of the following heap method increase the value of key at position 'p' by the amount 'delta'?

- **increaseKey(p,delta)**
- decreaseKey(p,delta)
- preculatDown(p,delta)
- remove(p,delta)

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

If we have 1000 sets each containing a single different person. Which of the following relation will be true on each set:

- **Reflexive**
- Symmetric
- Transitive
- Associative

Question No: 13 (Marks: 1) - Please choose one

Which one of the following is not an example of equivalence relation:

- Electrical connectivity
- Set of people
- **$\leq$ relation**
- Set of pixels

Question No: 14 (Marks: 1) - Please choose one

A binary tree of N nodes has _____.

- $\log_{10} N$ levels
- **$\log_2 N$ levels**
- $N / 2$ levels
- $N \times 2$ levels

Question No: 15 (Marks: 1) - Please choose one

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

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- ▶ Sorted
- ▶ Unsorted
- ▶ Heterogeneous
- ▶ Random

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

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Consider the following array

23 15 5 12 40 10 7

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

1. 5 12 23 10 7 40

Name the algorithm used

- ▶ Heap sort
- ▶ Selection sort
- ▶ Insertion sort
- ▶ Bubble sort

Question No: 17 (Marks: 1) - Please choose one

Whic

Which of the following statements is correct property of binary trees?

- ▶ A binary tree with N internal nodes has N+1 internal links.
- ▶ A binary tree with N external nodes has 2N internal nodes.
- ▶ A binary tree with N internal nodes has N+1 external nodes.
- ▶ None of above statement is a property of the binary tree.

Question No: 18 (Marks: 1) - Please choose one

Whic

Which of the following is a property of binary tree?

- ▶ A binary tree of N external nodes has N internal node.
- ▶ A binary tree of N internal nodes has N+ 1 external node.
- ▶ A binary tree of N external nodes has N+ 1 internal node.
- ▶ A binary tree of N internal nodes has N- 1 external node.

Question No: 21 (Marks: 1) - Please choose one

In a

In a selection sort of n elements, how many times the swap function is called to complete the execution of the algorithm?

- ▶ n-1
- ▶ n log n
- ▶ n^2
- ▶ 1

Question No: 22 (Marks: 1) - Please choose one

Whic

Which of the following statement is correct about find(x) operation:

- ▶ A find(x) on element x is performed by returning exactly the same node that is found.
- ▶ A find(x) on element x is performed by returning the root of the tree containing x.
- ▶ A find(x) on element x is performed by returning the whole tree itself containing x.
- ▶ A find(x) on element x is performed by returning TRUE.

Question No: 23 (Marks: 1) - Please choose one

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Whic

h of the following statement is NOT correct about find operation:

- ▶ It is not a requirement that a find operation returns any specific name, just that finds on two elements return the same answer if and only if they are in the same set.
- ▶ One idea might be to use a tree to represent each set, since each element in a tree has the same root, thus the root can be used to name the set.

- ▶ Initially each set contains one element.

▶ Initially each set contains one element and it does not make sense to make a tree of one node only.

Question No: 24 (Marks: 1) - Please choose one

Cons

ider the following postfix expression S and the initial values of the variables.

$$S = A B - C + D E F - + ^$$

Assume that A=3, B=2, C=1, D=1, E=2, F=3

What would be the final output of the stack?

- ▶ 1
- ▶ 2
- ▶ 0
- ▶ -1

Question No: 25 (Marks: 1) - Please choose one

The

maximum number of external nodes (leaves) for a binary tree of height H is _____

- ▶ 2^H
- ▶ $2^H + 1$
- ▶ $2^H - 1$
- ▶ $2^H + 2$

Question No: 26 (Marks: 1) - Please choose one

In

threaded binary tree the NULL pointers are replaced by ,

- ▶ preorder successor or predecessor
- ▶ inorder successor or predecessor
- ▶ postorder successor or predecessor
- ▶ NULL pointers are not replaced

Question No: 27 (Marks: 1) - Please choose one

In a

min heap , precluateDown procedure will move smaller value _____ and bigger value _____.

- ▶ left,right
- ▶ right,left
- ▶ up,down
- ▶ down,up

Question No: 28 (Marks: 1) - Please choose one

Whic

h of the following statement is correct about union:

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► To perform Union of two sets, we merge the two trees by making the root of one tree point to the root of the other.

► To perform Union of two sets, we merge the two trees by making the leaf node of one tree point to the root of the other.

► To perform Union of two sets, merging operation of trees is not required at all.

► None of the given options.

Question No: 29 (Marks: 1) - Please choose one

Suppose A is an array containing numbers in increasing order, but some numbers occur more than once when using a binary search for a value, the binary search always finds _____

► the first occurrence of a value.

► the second occurrence of a value.

► may find first or second occurrence of a value.

► None of the given options.

Question No: 30 (Marks: 1) - Please choose one

Let heap stored in an array as H = [50, 40, 37, 32, 28, 22, 36, 13]. In other words, the root of the heap contains the maximum element. What is the result of deleting 40 from this heap

► [50, 32, 37, 13, 28, 22, 36]

► [37, 28, 32, 22, 36, 13]

► [37, 36, 32, 28, 13, 22]

► [37, 32, 36, 13, 28, 22]

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

In an array we can store data elements of different types.

► True

► False

Question No: 2 (Marks: 1) - Please choose one

Which one of the following statement is NOT correct .

► In linked list the elements are necessarily to be contiguous

► In linked list the elements may locate at far positions in the memory

► In linked list each element also has the address of the element next to it

► In an array the elements are contiguous

Question No: 3 (Marks: 1) - Please choose one

doubly Linked List always has one NULL pointer.

► True

► False

Question No: 4 (Marks: 1) - Please choose one

A queue is a data structure where elements are,

► inserted at the front and removed from the back.

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- ▶ inserted and removed from the top.
- ▶ inserted at the back and removed from the front.
- ▶ inserted and removed from both ends.

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

Each

node in doubly link list has,

- ▶ 1 pointer
- ▶ 2 pointers
- ▶ 3 pointers
- ▶ 4 pointers

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

1

have implemented the queue with a linked list, keeping track of a front pointer and a rear pointer. Which of these pointers will change during an insertion into an *EMPTY* queue?

- ▶ Neither changes
- ▶ Only front pointer changes.
- ▶ Only rear pointer changes.
- ▶ Both change.

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

Com

piler uses which one of the following to evaluate a mathematical equation,

- ▶ Binary Tree
- ▶ Binary Search Tree
- ▶ Parse Tree
- ▶ AVL Tree

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

If a

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

- ▶ $\log_2(n+1) - 1$
- ▶ 2^n
- ▶ $\log_2(n) - 1$

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► $2^n - 1$

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

If a

complete binary tree has height h then its no. of nodes will be,

► $\log(h)$

► $2^{h+1} - 1$

► $\log(h) - 1$

► $2^h - 1$

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

A

binary relation R over S is called an equivalence relation if it has following property(s)

► Reflexivity

► Symmetry

► Transitivity

► All of the given options

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

Binary

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

► Sorted

► Unsorted

► Heterogeneous

► Random

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

If

there are N elements in an array then the number of maximum steps needed to find an element using Binary Search is _____.

► N

► N^2

► $N \log_2 N$

► $\log_2 N$

Question No: 13 (Marks: 1) - Please choose one

Use

of binary tree in compression of data is known as _____.

► Traversal

► Heap

► Union

► Huffman encoding

Question No: 15 (Marks: 1) - Please choose one

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Whic

h of the following statements is correct property of binary trees?

- ▶ A binary tree with N internal nodes has N+1 internal links.
- ▶ A binary tree with N external nodes has 2N internal nodes.
- ▶ A binary tree with N internal nodes has N+1 external nodes.
- ▶ None of above statement is a property of the binary tree.

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

Whic

h of the following is a property of binary tree?

- ▶ A binary tree of N external nodes has N internal node.
- ▶ A binary tree of N internal nodes has N+ 1 external node.
- ▶ A binary tree of N external nodes has N+ 1 internal node.
- ▶ A binary tree of N internal nodes has N- 1 external node.

Question No: 21 (Marks: 1) - Please choose one

A

complete binary tree is a tree that is _____ filled, with the possible exception of the bottom level.

- ▶ partially
- ▶ completely
- ▶ incompletely
- ▶ partly

Question No: 24 (Marks: 1) - Please choose one

Supp

ose that a selection sort of 100 items has completed 42 iterations of the main loop. How many items are now guaranteed to be in their final spot (never to be moved again)?

- ▶ 21
- ▶ 41
- ▶ 42
- ▶ 43

Question No: 25 (Marks: 1) - Please choose one

Supp

ose you implement a Min heap (with the smallest element on top) in an array. Consider the different arrays below; determine the one that *cannot* possibly be a heap:

- ▶ 16, 18, 20, 22, 24, 28, 30
- ▶ 16, 20, 18, 24, 22, 30, 28
- ▶ 16, 24, 18, 28, 30, 20, 22
- ▶ 16, 24, 20, 30, 28, 18, 22

Question No: 26 (Marks: 1) - Please choose one

Whic

h of the following statement is NOT correct about find operation:

- ▶ It is not a requirement that a find operation returns any specific name, just that finds on two elements return the same answer if and only if they are in the same set.
- ▶ One idea might be to use a tree to represent each set, since each element in a tree has the same root, thus the root can be used to name the set.
- ▶ Initially each set contains one element.

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► Initially each set contains one element and it does not make sense to make a tree of one node only.

Question No: 27 (Marks: 1) - Please choose one

Con

sider the following infix expression:

$x - y * a + b / c$

Which of the following is a correct equivalent expression(s) for the above?

- $x y - a * b + c /$
- $x * y a - b c / +$
- $x y a * - b c / +$
- $x y a * - b / + c$

Question No: 28 (Marks: 1) - Please choose one

A

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

- 2
- 3
- 4
- 5

Question No: 29 (Marks: 1) - Please choose one

Here

is an array of ten integers:

5 3 8 9 1 7 0 2 6 4

The array after the FIRST iteration of the large loop in a selection sort (sorting from smallest to largest).

- 0 3 8 9 1 7 5 2 6 4
- 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

Question No: 30 (Marks: 1) - Please choose one

What

requirement is placed on an array, so that *binary search* may be used to locate an entry?

- The array elements must form a heap.
- The array must have at least 2 entries.
- The array must be sorted.
- The array's size must be a power of two.

Question No. 1 Marks : 02

Queue is the LIFO structure.

☐ True

☒ False

Question No. 2 Marks : 02

In binary search tree (BST) every node has two or zero node.

☒ True

☐ False

Question No.

3 Marks : 02

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In Stack we can access elements from both ends

☐ True

☒ False

Question No. 4 Marks : 02

Each node of linked list contains data element and pointer.

☒ True

☐ False

Question No. 5 Marks : 02

Every AVL is binary search tree (BST).

☒ True

☐ False

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

The arguments passed to a function should match in number, type and order with the parameters in the function definition.

► True

► False

Question No: 2 (Marks: 1) - Please choose one

If numbers 5, 222, 4, 48 are inserted in a queue, which one will be removed first?

► 48

► 4

► 222

► 5

Question No: 4 (Marks: 1) - Please choose one

A **Compound Data Structure** is the data structure which can have multiple data items of same type or of different types. Which of the following can be considered compound data structure?

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- ▶ Arrays
- ▶ LinkLists
- ▶ Binary Search Trees
- ▶ All of the given options

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

Here is a small function definition:

```
void f(int i, int &k)
{
    i = 1;
    k = 2;
}
```

Suppose that a main program has two integer variables x and y, which are given the value 0. Then the main program calls f(x,y); What are the values of x and y after the function f finishes?

- ▶ Both x and y are still 0.
- ▶ x is now 1, but y is still 0.
- ▶ x is still 0, but y is now 2.
- ▶ x is now 1, and y is now 2.

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

The difference between a binary tree and a binary search tree is that ,

- ▶ a binary search tree has two children per node whereas a binary tree can have none, one, or two children per node
- ▶ in binary search tree nodes are inserted based on the values they contain
- ▶ in binary tree nodes are inserted based on the values they contain
- ▶ none of these

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

Compiler uses which one of the following to evaluate a mathematical equation,

- ▶ Binary Tree
- ▶ Binary Search Tree
- ▶ Parse Tree
- ▶ AVL Tree

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

Which of the following method is helpful in creating the heap at once?

- ▶ insert
- ▶ add
- ▶ update
- ▶ preculatDown

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

The definition of Transitivity property is

- ▶ For all element x member of S , $x R x$
- ▶ For all elements x and y , $x R y$ if and only if $y R x$
- ▶ For all elements x, y and z , if $x R y$ and $y R z$ then $x R z$
- ▶ For all elements w, x, y and z , if $x R y$ and $w R z$ then $x R z$

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

A binary tree of N nodes has _____.

- ▶ $\log_{10} N$ levels
- ▶ $\log_2 N$ levels
- ▶ $N / 2$ levels
- ▶ $N \times 2$ levels

Question No: 14 (Marks: 1) - Please choose one

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

- ▶ Heap sort
- ▶ Selection sort
- ▶ Insertion sort
- ▶ Bubble sort

Question No: 19 (Marks: 1) - Please choose one

Consider a min heap, represented by the following array:

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

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

► 10,30,20,31,40,50,80,60,70

► 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

Question No: 20 (Marks: 1) - Please choose one

Which one of the following algorithms is most widely used due to its good average time,

► Bubble Sort

► Insertion Sort

► Quick Sort

► Merge Sort

Question No: 23 (Marks: 1) - Please choose one

The following are statements related to queues.

- (i) The last item to be added to a queue is the first item to be removed
- (ii) A queue is a structure in which both ends are not used
- (iii) The last element hasn't to wait until all elements preceding it on the queue are removed
- (iv) A queue is said to be a last-in-first-out list or LIFO data structure.

Which of the above is/are related to normal queues?

► (iii) and (ii) only

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- ▶ (i), (ii) and (iv) only
- ▶ (ii) and (iv) only
- ▶ None of the given options

Question No: 24 (Marks: 1) - Please choose one

The maximum number of external nodes (leaves) for a binary tree of height H is _____

- ▶ 2^H
- ▶ $2^H + 1$
- ▶ $2^H - 1$

▶ 2^{H+2}

Question No: 26 (Marks: 1) - Please choose one

We are given N items to build a heap , this can be done with _____ successive inserts.

- ▶ N-1
- ▶ N
- ▶ N+1
- ▶ N^2

Question No: 27 (Marks: 1) - Please choose one

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?

- ▶ 144
- ▶ 145
- ▶ 143
- ▶ 148

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Question No: 30 (Marks: 1) - Please choose one

In case of deleting a node from AVL tree, rotation could be prolong to the *root* node.

► Yes

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