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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 (According to rule)**

Question No: 3 (Marks: 1) - Please choose one
Suppose currentNode refers to a node in a linked list (using the Node class with member variables called data and nextNode). What statement changes currentNode so that it refers to the next node?

► currentNode ++;
► currentNode = nextNode;
► currentNode += nextNode;
► **currentNode = currentNode->nextNode;**

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?
► Arrays
► LinkLists
► Binary Search Trees
► **All of the given options** **Click here for detail**

Question No: 5 (Marks: 1) - Please choose one
Here is a small function definition:

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

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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** Click here for detail
- ► 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

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 (Page 274)**
- ► AVL Tree

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

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

- ► 54
- ► 55
- ► 56
- ► **57 (Page 303)**

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

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

- ► 23
- ► 24
- ► 21
- ► **22 (n-1) (Page 304)**

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

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

- ► insert
- ► add
- ► update
- ► **preculateDown (Page 358)**

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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 (Page 385)**
- 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
A binary tree of N nodes has _____.

- Log_{10} N levels
- **Log_2 N levels (Page 349)**
- N / 2 levels
- N x 2 levels

Question No: 13 (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
- $Nlog_2N$
- **log_2N (page 440)**

Question No: 14 (Marks: 1) - Please choose one
Consider te following array
23 15 5 12 40 10 7
After the first pass of a particular algorithm, the array looks like
15 12 23 10 7 40
Name the algorithm used

- Heap sort
- Selection sort
- Insertion sort
- **Bubble sort**

Question No: 15 (Marks: 1) - Please choose one
If both pointers of the node in a binary tree are NULL then it will be a/an _____ .

- Inner node
- **Leaf node (Page 313)**
- Root node
- None of the given options

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Question No: 16 (Marks: 1) - Please choose one
By using _____we avoid the recursive method of traversing a Tree, which makes use of stacks and consumes a lot of memory and time.

- ► Binary tree only
- ► **Threaded binary tree (page 306)**
- ► Heap data structure
- ► Huffman encoding

Question No: 17 (Marks: 1) - Please choose one
A complete binary tree of height *3* has between _____ nodes.

- ► 8 to 14
- ► **8 to 15 (Page 124)**
- ► 8 to 16
- ► 8 to 17

2^(d+1) - 1 = 2^(3+1) -1 = 2^4 -1 = 16-1 = 15

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

- ► 3,4,6,7,5,10,1
- ► 3,4,6,7,5,1,10
- ► 3,4,1,5,7,10,6
- ► **1,4,3,5,7,10,6 close to correct but correct ans is 1,4,3,7,5,10,6 (page 337)**

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

- ► **10,30,20,31,40,50,80,60,70 (page 337)**
- ► 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 Click here for detail**
- ► Merge Sort

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Question No: 21 (Marks: 1) - Please choose one
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**.
Click here for detail
► A find(x) on element x is performed by returning the whole tree itself containing x. (Page 10)
► A find(x) on element x is performed by returning TRUE.

Question No: 22 (Marks: 1) - Please choose one
Which 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: 23 (Marks: 1) - Please choose one
The following are statements related to queues.
The last item to be added to a queue is the first item to be removed False statement
A queue is a structure in which both ends are not used False statement
The last element hasn't to wait until all elements preceding it on the queue are removed False statement
queue is said to be a last-in-first-out list or LIFO data structure. False statement

Which of the above is/are related to normal queues?
► (iii) and (ii) only
► (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** **Click here for detail**
► 2^H+1
► 2^H-1
► 2^H+2

Question No: 25 (Marks: 1) - Please choose one
In complete binary tree the bottom level is filled from _____
► **Left to right (Page 323)**
► Right to left
► Not filled at all
► None of the given options

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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 (Page 353)**
- ► 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

Question No: 28 (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 (Page 477)**
- ► 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: 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. Click here for detail**
- ► The array's size must be a power of two.

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 (Page 267)**
- ► No

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

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

- **Stack (Page 81)**
- 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. (Page 113)**
- Every non-empty tree has exactly one root node.
- 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** Click here for detail

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),

- $Log_2(n+1)$
- $Log_2(n+1) -1$
- **$1.44\ Log_2n$ (Page 227)**
- $1.66\ Log_2n$

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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.

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**

According to max heap property

Question No: 8 (Marks: 1) - Please choose one
If there are 23 external nodes in a binary tree then what will be the no. of internal nodes in this binary tree?

- ► 23
- ► 24
- ► 21
- ► ***22 (N-1)***

Question No: 9 (Marks: 1) - Please choose one
If there are N external nodes in a binary tree then what will be the no. of internal nodes in this binary tree?

- ► **N -1 (Page 304)**
- ► N+1
- ► N+2
- ► N

Question No: 10 (Marks: 1) - Please choose one
Which one of the following is NOT the property of equivalence relation:

- ► Reflexive
- ► Symmetric
- ► Transitive
- ► **Associative (Page 385)**

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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 (Page 385)**
- ► 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 (Page 120)**
- ► Polynomial
- ► Exponential
- ► None of the given option

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. yes
- ► **A table consists of several columns, known as entities. (Page 408)**
- ► 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 log2 N (Page 441)**

Question No: 15 (Marks: 1) - Please choose on
Binary Search is an algorithm of searching, used with the _____ data.
- ► **Sorted (Page 432)**
- ► Unsorted
- ► Heterogeneous
- ► Random

Question No: 16 (Marks: 1) - Please choose on
Which of the following statement is correct?
- ► 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.
- ► 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 PREOREDR successor.
- ► **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. (Page 307)**
- ► 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.

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Question No: 17 (Marks: 1) - Please choose one
By using _____we avoid the recursive method of traversing a Tree, which makes use of stacks and consumes a lot of memory and time.

- ► Binary tree only
- ► **Threaded binary tree (page 306)**
- ► Heap data structure
- ► Huffman encoding

Question No: 18 (Marks: 1) - Please choose one
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. (page 321)**

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 (page 337)**
- ► 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 (page 349)**
- ► 4,6,5,7

Question No: 21 (Marks: 1) - Please choose one
We can build a heap in _____ time.

- ► **Linear (Page 353)**
- ► Exponential
- ► Polynomial
- ► None of the given options

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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:

2 5 1 7 9 12 11 10

Which statement is correct?

- **► The pivot could be either the 7 or the 9. (page 506)**
- ► 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 (base 2) of n (Page 353)**
- ► 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 It's not satisfy the min heap property.**

Question No: 25 (Marks: 1) - Please choose one
While joining nodes in the building of Huffman encoding tree if there are more nodes with same frequency, we choose the nodes _____.

- **► Randomly (Page 289)**
- ► 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 (Page 52)**
- ► (i) tree (ii) insertion (iii) removals (iv) top

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Question No: 27 (Marks: 1) - Please choose one
A binary tree with 33 internal nodes has _____ links to internal nodes.

- ► 31
- ► **32 (n-1 links to internal nodes) (Page 304)**
- ► 33
- ► 66 .

Question No: 28 (Marks: 1) - Please choose on
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** **Click here for detail**
- ► 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 (Page 112)**

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

Question No: 3 (Marks: 1) - Please choose one
Which one of the following is a valid postfix expression?

- ► ab+c*d-
- ► **abc*+d- (According to rule)**
- ► 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,

- ► Arrays
- ► **Lists** **Click here for detail**
- ► Both of these
- ► None of these

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

This expression will point to field after last that will be the first field.

Question No: 6 (Marks: 1) - Please choose one
Which one of the following is TRUE about recursion?

- ► **Recursion extensively uses stack memory. (page 149)**
- ► Threaded Binary Trees use the concept of recursion.
- ► Recursive function calls consume a lot of memory.
- ► Iteration is more efficient than iteration.

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 (Page 274)**
- ► AVL Tree

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Question No: 8 (Marks: 1) - Please choose one
Which one of the following is TRUE about iteration?

- Iteration extensively uses stack memory.
- Threaded Binary Trees use the concept of iteration.
- Iterative function calls consumes a lot of memory.
- **Recursion is more efficient than iteration.** **Click here for detail**

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] is correct**

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

Question No: 10 (Marks: 1) - Please choose one
If there are 56 internal nodes in a binary tree then how many external nodes this binary tree will have?

- 54
- 55
- 56
- **57 (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) (Page 363)**
- decreaseKey(p,delta)
- preculateDown(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 (page 387)**
- Symmetric
- Transitive
- Associative

Question No: 13 (Marks: 1) - Please choose one
Which one of the following is not an example of equivalence relation:

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- Electrical connectivity
- Set of people
- **<= relation (Page 388)**
- 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 (Page 212)**
- N / 2 levels
- N x 2 levels

Question No: 15 (Marks: 1) http://vustudents.ning.com - Please choose one
Binary Search is an algorithm of searching, used with the _____ data.

- **Sorted (Page 432)**
- Unsorted
- Heterogeneous
- Random

Question No: 16 (Marks: 1) - Please choose one
Consider te 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 (According to rule)**

Question No: 17 (Marks: 1) - Please choose one
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. (page 304)**
- None of above statement is a property of the binary tree.

Question No: 18 (Marks: 1) - Please choose one
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. (Page 304)**
- A binary tree of N external nodes has N+ 1 internal node.
- A binary tree of N internal nodes has N- 1 external node.

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Question No: 19 (Marks: 1) - Please choose one
Which of the following statement is true about dummy node of threaded binary tree?

► The left pointer of dummy node points to the itself while the right pointer points to the root of tree.
► **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 (Page 321)**
► The left pointer of dummy node points to the root node of the tree while the right pointer is always NULL.
► The right pointer of dummy node points to the itself while the left pointer is always NULL.

Question No: 20 (Marks: 1) - Please choose one
If the bottom level of a binary tree is NOT completely filled, depicts that the tree is NOT a

► Expression tree
► Threaded binary tree
► **complete Binary tree (Page 323)**
► Perfectly complete Binary tree

Question No: 21 (Marks: 1) - Please choose one
In a selection sort of n elements, how many times the swap function is called to complete the execution of the algorithm?

► **n-1** **Click here for detail**
► n log n
► n^2
► 1

Question No: 22 (Marks: 1) - Please choose one
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.** Click here for detail
► 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
Which 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.

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Question No: 24 (Marks: 1) - Please choose one
Consider 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** **Click here for detail**
► 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** **Click here for detail**
► 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 (Page 307)**
► postorder successor or predecessor
► NULL pointers are not replaced

Question No: 27 (Marks: 1) - Please choose one
In a min heap , preculateDown procedure will move smaller value_____ and bigger value_____.

► left,right
► right,left
► **up,down (Page 358)**
► down,up

Question No: 28 (Marks: 1) - Please choose one
Which of the following statement is correct about union:

► **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. (Greedy algorithms , Page 7)**
► 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 in not required at all.
► None of the given options.

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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.** **Click here for detail**
- 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] according to max heap property.**
- [37, 28, 32, 22, 36, 13]
- [37, 36, 32, 28, 13, 22]
- [37, 32, 36, 13, 28, 22]

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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 (page 18)**
- ► 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(page 39)**

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

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A queue is a data structure where elements are,

- **inserted at the front and removed from the back. .(see example at page #89 nd 90)**
- 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(page 39)**
- 3 pointers
- 4 pointers

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

Since it is an empty queue the front and rear are initialize to -1, so on insertion both the pointers will change and point to 0.

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(page 274)**
- 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,

- **$Log_2 (n+1) -1$(page 139)**
- 2^n
- $Log_2 (n) - 1$
- $2^n - 1$

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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(page 324)**
- Log (h) - 1
- 2^h - 1

Question No: 10 (Marks: 1) http://vustudents.ning.com - 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 (page 387)**

Question No: 11 (Marks: 1) - Please choose one
Binary Search is an algorithm of searching, used with the _____ data.

- **Sorted (page 432)**
- 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
- $N\log_2 N$
- **$\log_2 N$ (page 440)**

Question No: 13 (Marks: 1) - Please choose one
Use of binary tree in compression of data is known as _____ .

- Traversal
- Heap
- Union
- **Huffman encoding (page 287)**

Question No: 14 (Marks: 1) - Please choose one
While building Huffman encoding tree the new node that is the result of joining two nodes has the frequency.

- Equal to the small frequency
- Equal to the greater
- **Equal to the sum of the two frequencies (page 293)**
- Equal to the difference of the two frequencies

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Question No: 15 (Marks: 1) - Please choose one
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 node. (page 303)**
- ► None of above statement is a property of the binary tree.

Question No: 16 (Marks: 1) - Please choose one
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. (page 303)**
- ► 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: 17 (Marks: 1) - Please choose one
Which of the following statement is correct?

► 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.

► 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 PREOREDR successor.

► **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. (Page 307)**

► 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.

Question No: 18 (Marks: 1) - Please choose one
Which of the following statement is correct?

► 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.

► 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 PREOREDR successor.

► **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 predecessor.**

► 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 predecessor.

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

- ► levelorder
- ► Preorder

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► **Inorder** Click here for detail
► Postorder

Question No: 20 (Marks: 1) - Please choose one
Which of the following statement is true about dummy node of threaded binary tree?
► This dummy node never has a value.
► This dummy node has always some dummy value.
► **This dummy node has either no value or some dummy value. .(page 321)**
► This dummy node has always some integer value.

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 (page 323)**
► incompletely
► partly

Question No: 22 (Marks: 1) - Please choose one
A complete binary tree of height *3* has between _____ nodes.
► 8 to 14
► **8 to 15 (page 124)**
► 8 to 16
► 8 to 17

Question No: 23 (Marks: 1) - Please choose one
We can build a heap in _____ time.

► **Linear (page 353)**
► Exponential
► Polynomial
► None of the given options

Question No: 24 (Marks: 1) - Please choose one
Suppose 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** Click here for detail
► 43

Question No: 25 (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

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► 16, 20, 18, 24, 22, 30, 28
► 16, 24, 18, 28, 30, 20, 22
► **16, 24, 20, 30, 28, 18, 22** **It's not satisfy the min heap property**

Question No: 26 (Marks: 1) - Please choose one
Which 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: 27 (Marks: 1) - Please choose one
Consider 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 / +** **Hint :- (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 (page 124)**
► 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 (Page 477)**
► 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.

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- The array must have at least 2 entries.
- **The array must be sorted.** **Click here for detail**
- The array's size must be a power of two.

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