DATA STRUCTURE (CS301)

MID TERM MEGA FILE

❖ **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 next to it
► In an array the elements are contiguous

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

► One
► **Two**
► Three
► Four

❖ **Which one of the following calling methods does not change the original value of the argument in the calling function?**

► None of the given options
► **Call by passing the value of the argument**
► Call by passing reference of the argument
► Call by passing the address of the argument

❖ **A tree is an AVL tree if**

► Any one node fulfills the AVL condition
► At least half of the nodes fulfill the AVL condition
► All the nodes fulfill the AVL condition
► **None of the given options**

❖ **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;**

❖ **A queue where the de-queue operation depends not on FIFO, is called a priority queue**

► False
► **True**

❖ **Which one is a self- referential data type?**
► Stack
► Queue
► **Link list**
► All of these

❖ **Each node in doubly link list has,**

► 1 pointer
► **2 pointers**
► 3 pointers
► 4 pointers

❖ **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.

❖ **Consider the following tree**.

```
        14
       /  \
      2    11
     / \  / \
    1  3 10  30
        /  /
       7  40
```

How many of the nodes have at least one sibling?

► 8
► 7
► **5**
► 6

❖ **The nodes with no successor are called _____**

► Root Nodes
► **Leaf Nodes**
► Both of these
► None of these

❖ **AVL Tree is,**

► **Non Linear data structure**
► Linear data structure
► Hybrid data structure (Mixture of Linear and Non Linear)
► None of the given options.

❖ **We access elements in AVL Tree in,**

► Linear way only
► **Non Linear way only**
► Both linear and non linear ways
► None of the given options.

❖ **A binary search tree should have minimum of _____ node/s at each level,**

► **One**
► Two
► Three
► Four

❖ **Consider the following statements.**

(i) A binary tree can contain at least 2^L Nodes at level L.
(ii) A complete binary tree of depth d is a binary tree that contains 2^L Nodes at each level L between 0 and d, both inclusive.
(iii) The total number of nodes (T_n) in a complete binary tree of depth d is $2^{d+1} - 1$.
(iv) The height of the complete binary tree can be written as $h = \log_2 (T_n+1)-1$ where T_n is Total number of Nodes.

Which one of the following is correct in respect of the above statements regarding the Binary trees?

► (i) and (iii) only
► (i), (ii) and (iii) only
► (ii) and (iii) only
► **(ii), (iii) and (iv) only**

❖ **"+" is a _____ *operator.***

► Unary
► **Binary**
► Ternary
► None of the above

❖ **A queue where the de-queue operation depends not on FIFO, is called a priority queue**

► False
► **True**

❖ **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**
► Use the better algorithm
► Use as much data as we can store on the hard disk

❖ **Consider the function X as under**

```
int X (int& Value)
{
        return Value;
}
```

Now a and b are integers in a calling function. Which one of the following is a valid call to the above function X.

► a = X (b) ;
► a = X (&b) ;
► **a = X (*b) ;**
► None of the given options

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

► False
► **True**

❖ **The tree data structure is a**

► Linear data structure
► **Non-linear data structure**
► Graphical data structure
► Data structure like queue

❖ **When should you use a const reference parameter?**

► Whenever the parameter has huge size
► Whenever the parameter has huge size, the function changes the parameter within its body, and you do NOT want these changes to alter the actual argument.
► Whenever the parameter has huge size, the function changes the parameter within its body, and you DO want these changes to alter the actual argument.
► **Whenever the parameter has huge size, and the function does not change the parameter within its body.**

❖ Here is the start of a C++ class declaration:

```
class foo
    {
          public:
          void x(foo f);
          void y(const foo f);
          void z(foo f) const;
...
```
Which of the three member functions can alter the PRIVATE member variables of the foo object that activates the function?

► **Only x can alter the private member variables of the object that activates the function. (R)**
► Only y can alter the private member variables of the object that activates the function.

► Only z can alter the private member variables of the object that activates the function.
► Two of the functions can alter the private member variables of the object that activates the function.

❖ **What is the maximum depth of recursive calls a function may make?**

► 1
► 2
► **n (where n is the argument)**
► There is no fixed maximum

❖ **Suppose n is the number of nodes in a complete Binary Tree then maximum steps required for a search operation are,**

► **Log_2 (n+1) -1**
► Log_2 (n+1)
► Log_2 (n) - 1
► Log_2 (n)

❖ **In the linked list implementation of the stack class, where does the push member function places the new entry on the linked list?**

► **At the head**
► At the tail
► After all other entries that are greater than the new entry.
► After all other entries that are smaller than the new entry.

❖ **Suppose we have a *circular* array implementation of the queue class, with ten items in the queue stored at data[2] through data[11]. The CAPACITY is 42, i.e., the array has been declared to be of size 42. Where does the push member function place the new entry in the array?**

► data[1]
► data[2]
► **data[11]**
► data[12]

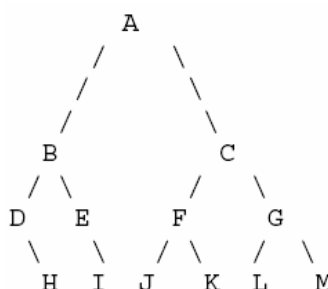❖ **The expression AB+C* is called ?**

► Prefix expression
► **Postfix expression**
► Infix expression
► None of these

❖ **_____ is a binary tree where every node has a value, every node's left subtree contains only values less than or equal to the node's value, and every node's right subtree contains only values that are greater then or equal ?**

► **Strictly Binary Tree**
► Binary Search tree
► AVL tree
► All of these

❖ **Consider the following binary search tree (BST):**

```
                A
               / \
              /   \
             /     \
            B       C
           / \     / \
          D   E   F   G
           \   \ / \ / \
            H   I J  K L  M
```

If node A in the BST is deleted, which two nodes are the candidates to take its place?

► **J and I (Pending)**

► H and E
► D and E
► L and M

❖ **Let's call the node as a that requires re-balancing. Consider the two cases given below:**

1) An insertion into left subtree of the left child of a
2) An insertion into right subtree of the right child of a.

Which of the following statement is correct about these two cases.

►The insertion occurs outside (i.e., left-left or right-right) in cases 1 and 2. single rotation can fix the balance in these two cases.
►The insertion occurs inside ((i.e., left-left or right-right) in cases 1 and 2. single rotation cannot fix the balance in these two cases

❖ **We access elements in AVL Tree in,**

► Linear way only
► **Non Linear way only**
► Both linear and non linear ways
► None of the given options.

❖ **AVL Tree is,**

► **Non Linear data structure**
► Linear data structure
► Hybrid data structure (Mixture of Linear and Non Linear)
► None of the given options.

❖ **Which one of the following is a valid postfix expression?**

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

❖ **The tree data structure is a**

► Linear data structure
► **Non-linear data structure**
► Graphical data structure
► Data structure like queue

❖ **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

❖ **Suppose a pointer has been declared in main but has not assigned any variable address then**
► ☐ That pointer points to First byte in main function
► **That pointer contains a NULL value**
► ☐ None of these
► That pointer points to any memory address

❖ Here is the start of a C++ class declaration:

```
class foo
    {
        public:
        void x(foo f);
        void y(const foo f);
        void z(foo f) const;
```

Which of the three member functions can alter the PRIVATE member variables of the foo object that activates the function?

► **Only x can alter the private member variables of the object that activates the function.**

► Only y can alter the private member variables of the object that activates the function.

► ☐ Only z can alter the private member variables of the object that activates the function.

► Two of the functions can alter the private member variables of the object that activates the function.

❖ **The operation for removing an entry from a stack is traditionally called:**

► delete
► peek
► **pop**
► remove

❖ **Which statement of the following statements is incorrect?**

► Lists can be implemented by using arrays or linked lists
► A list is a sequence of one or more data items
► **Stack is a special kind of list in which all insertions and deletions take place at one end**
► Stacks are easier to implement than lists

❖ **Parameters in function call are passed using,**

► Stack
► **Queue**
► Binary Search Tree
► AVL Tree

❖ **Consider the following sequence of push operations in a stack:**

stack.push('7');
stack.push('8');
stack.push('9');
stack.push('10');
stack.push('11');
stack.push('12');

► **☐ 7 8 9 10 11 12**
► 9 8 11 10 7 12
► 9 10 8 11 12 7
► 9 10 8 12 7 11

❖ **What is the maximum depth of recursive calls a function may make?**
► 1
► 2
► **n (where n is the argument)**
► There is no fixed maximum

❖ **Consider the following function:**

```
void test_a(int n)
    {
    cout << n << " ";
     if (n>0)
    test_a(n-2);
    }
```

What is printed by the call test_a(4)?
► 4 2
► 0 2 4
► 0 2
► **2 4**

❖ **Queue follows,**
► Last in First out
► First in Last out
► **First in First out**
► None of these

❖ **_____ is a binary tree where every node has a value, every node's left subtree contains only values less than or equal to the node's value, and every node's right subtree contains only values that are greater then or equal ?**

► **Strictly Binary Tree**
► Binary Search tree
► AVL tree
► All of these

❖ **Four statements about trees are below. Three of them are correct. Which one is INCORRECT?**

► **☐Trees are recursively defined multi-dimensional data structures**
► The order of a tree indicates a maximum number of childen allowed at each node of the tree
► A search tree is a special type of tree where all values (i.e. keys) are ordered
► If Tree1's size is greater than Tree2's size, then the height of Tree1 must also be greater than Tree2's height.

❖ **Below is a binary search tree. If we delete the value 50 using the algorithm we discussed, what value will be in the root of the remaining tree?**
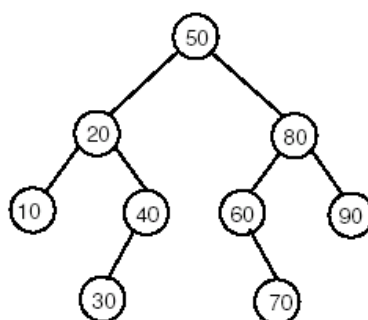
► 50
► 60
► 70
► **80**

❖ _____ is a data structure that can grow easily dynamically at run time without having to copy existing elements.

    ► Array
    ► **List**
    ► Both of these
    ► None of these

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

    ► **Stack**
    ► Queue
    ► Both of these
    ► None of these

❖ **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.

❖ **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.
    ► Every node has at most two children.
    ► Every non-root node has exactly one parent.

❖ **Every AVL is _____**

    ► Binary Tree
    ► Complete Binary Tree
    ► None of these
    ► **Binary Search Tree**

❖ **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

❖ **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.

❖ **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

❖ **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

❖ **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
► N+1
► N+2
► N

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

► Reflexive
► Symmetric
► Transitive
► Associative

❖ **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

❖ **Union is a _____ time operation.**

► Constant
► Polynomial
► Exponential
► None of the given options

❖ **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.

❖ **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**

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

► **Sorted**
► Unsorted
► Heterogeneous
► Random

❖ **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.**
► 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.

❖ **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**
► Heap data structure
► Huffman encoding

❖ **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.

❖ **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

❖ **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

❖ **We can build a heap in _____ time.**

► **Linear**
► Exponential
► Polynomial
► None of the given options

❖ **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.**
► 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.

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

► **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

❖ **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

❖ **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

❖ **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

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

► 31
► **32**
► 33
► 66

❖ **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

❖ **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.

❖ **Which of the following is a non linear data structure?**

► Linked List
► Stack
► Queue
► **Tree**

Question No: 1   (Marks: 1) - Please choose one
In the statement int x[6]; , we cannot assign any value to x because x is not an lvalue.

► **True**
► **False**

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

What will be postfix expression of the following infix expression?
Infix Expression : a+b*c-d

► **ab+c*d-**
► **abc*+d-**
► **abc+*d-**
► **abcd+*-**

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

Which one of the following calling methods does not change the original value of the argument in the calling function?

► None of the given options

► Call by passing the value of the argument
► Call by passing reference of the argument
► **Call by passing the address of the argument**

Question No: 4   (Marks: 1) - Please choose one
In a program a reference variable, say x, can be declared as

► **int &x ;**
► **int *x ;**
► **int x ;**
► **None of the given options**

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

 A tree is an AVL tree if

► **None of the given options**

Question No: 6   (Marks: 1) - Please choose one
Consider the following pseudo code
declare a stack of characters
    while (there are more characters in the word to read)
    {
      read a character
      push the character on the stack
    }
    while (the stack is not empty)
    {
      pop a character off the stack
      write the character to the screen
    }
    What is written to the screen for the input "apples"?

► **selpa**
► **selppa**
► **apples**
► **aaappppplleess**

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

In the following C++ code, how many function calls are made?
    int x, y, z;
    x = 2;
    y = 3 + x;
    z = foobar(x,y);

► 1
► 4
► 7
► **8**

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

We can add elements in QUEUE From _____
► **Front**
► Rear
► From Both Rare and Front

ZUBAIR & JAHANZAIB   14

► None of these

Question No: 9   (Marks: 1) - Please choose one
Consider the following tree.

How many of the nodes have at least one sibling?
   ► 8
   ► 7
   ► 5
   ► 6

Question No: 10   (Marks: 1) - Please choose one
Consider the following tree.

How many descendants does the root have?
   ► 5
   ► 6
   ► 7
   ► 8

Question No: 11   (Marks: 1) - Please choose one
Below is a binary search tree. If we delete the value 50 using the algorithm we discussed, what value will be in the root of the remaining tree?

   ► 50
   ► 60
   ► 70
   ► 80

Question No: 12   (Marks: 1) - Please choose one
 We access elements in AVL Tree in,
   ► Linear way only
   ► Non Linear way only
   ► Both linear and non linear ways
   ► None of the given options.

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

Which of the following statement regarding binary tree is NOT correct.

   ► A binary tree can contain at least 2^L Nodes at level L.
   ► A complete binary tree of depth d is a binary tree that contains 2^L Nodes at each level L between 0 and d, both inclusive.
   ► The total number of nodes (T_n) in a complete binary tree of depth d is $2^{d+1} - 1$.
   ► The height of the complete binary tree can be written as $h = \log_2 (T_n+1)-1$ where T_n is Total number of Nodes.

Question No: 14   (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
   ► (i), (ii) and (iv) only

► (ii) and (iv) only
► None of the given options

Question No: 15   (Marks: 1) - Please choose one
The_____ method of list data structure removes the element residing at the current position.

► Add
► next
► *remove*
► *find*

Question No: 16   (Marks: 1) - Please choose one
it will be efficient to place stack elements at the start of the list because insertion and removal take _____time.

► Variable
► **Constant**
► Inconsistent
► None of the above

Question No: 1   (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: 2   (Marks: 1)   - Please choose one
In a program a reference variable, say x, can be declared as
► **int &x ;**
► int *x ;
► int x ;
► None of the given options

Question No: 3   (Marks: 1)   - Please choose one
Linked lists are collections of data items "lined up in a row" , insertions and deletions can be made only at the front and the back of a linked list.
► True
► False

Question No: 4   (Marks: 1)   - Please choose one
A Linear Data Structure is the data structure in which data elements are arranged in a sequence or a linear list. Which of the following is Non Linear Data Structure?
► Arrays
► LinkLists
► **Binary Search Trees**
► None of these

Question No: 5   (Marks: 1)   - Please choose one
A queue where the de-queue operation depends not on FIFO, is called a priority queue

► False
► **True**

Question No: 6   (Marks: 1)   - Please choose one
Which one of the following statements is correct?
► ☐ Array size is fixed once it is created.

►Link List size is fixed□ once it is created.

►Binary Search Tree size is□ □ fixed once it is created

►AVL Tree size is fixed□ once it is created

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

Which one of the following is correct about pointers?

►They always point to□ different memory locations

►They may point to a single□ □ memory location

□ ►The address of two pointer variables is same

►None of these□

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

Which of the following abstract data types are NOT used by Integer Abstract Data type group?

►□ short

►int□

►float□

►long□□

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

The operation for adding an entry to a stack is traditionally called :

►add□

►append□

►insert□□

□ ►push

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

The operation for removing an entry from a stack is traditionally called:

►delete□

►peek□

►□ pop

►remove□

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

We can add elements in QUEUE From _____

►Front□

►□ Rear

►From Both Rare and Front□

►None of these□

□

Question No: 12   (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□□

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

Suppose n is the number of nodes in a complete Binary Tree then maximum steps required for a search operation are,

►□ $Log_2 (n+1) -1$

►$Log_2 (n+1)$

►$Log_2 (n) - 1$

►$Log_2 (n)$

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

The following is a segment of a C program.

```
int  pqr(BinaryNode t)
{ if (t == null )
return -1;
```

else
return 1+max(pqr(t.left),pqr(t.right)) }
Identify, what the above program intend(s) to do?

► Compute the height of a□ □ binary tree using an in-order traversal
► Compute the height of a□ □ binary tree using a pre-order traversal
► □ Compute the depth of a binary tree using a pre-order traversal
► Compute the depth of a□ □ binary tree using a post-order traversal

Question No: 15   (Marks: 1)   - Please choose one
Consider the following infix expression:
3 + 5 * 6 - 7 * (8 + 5)
Which of the following is a correct equivalent expression(s) for the above?
► 3 6 5 + * 7 5 8 + - *
► 3 6 5 7 5 8 + * + - *
► 3   5 6 + * 7 8 5 + - *
► 3   5 6 * + 7 8 5 + * -

Question No: 16   (Marks: 1)   - Please choose one
An array is a group of consecutive related memory locations.
► True
► False

Question No: 17   (Marks: 1)
Is this a correct statement?
Give answer in Yes or No.
► A node cannot be deleted, when the node to be deleted has both left and right subtrees.
► No, it can be deleted.

Question No: 18   (Marks: 1)
Deleting a leaf node in binary search tree involves setting _____ pointer/s of that nodes parent as null.
► 1
► 2
► 3
► 4

Question No: 1   (Marks: 1)   - Please choose one
A subscript of an array may be an integer or an integer expression.
► True
► False

Question No: 2   (Marks: 1)   - Please choose one
Doubly Linked List always has one NULL pointer.
► True
► False

Question No: 3   (Marks: 1)   - Please choose one
In which of the traversal method, the recursive calls can be used to traverse a binary tree ?
► In preorder traversal only
► In inorder traversal only
► In postorder traversal only
► All of the given options

Question No: 4   (Marks: 1)   - Please choose one
A tree is an AVL tree if

► Any one node fulfills the AVL condition
► At least half of the nodes fulfill the AVL condition
► All the nodes fulfill the AVL condition
► None of the given options

Question No: 5 (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 boolean expression will be true when cursor refers to the tail node of the list?
► (currentNode == null)
► (currentNode->nextNode == null)
► (nextNode.data == null)
► (currentNode.data == 0.0)

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

Suppose that the class declaration of SomeClass includes the following function prototype.
bool LessThan(SomeClass anotherObject);
Which of the following tests in the client code correctly compares two class objects alpha and beta?
► if (alpha < beta)
► if (alpha.LessThan(beta))
► if (LessThan(alpha, beta))
► if (LessThan(alpha).beta)

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

In C what is the operation that you can not do with primitive types?
► Assign a value to primitive type using a literal
► Declare primitive types to be constant using the Const keyword
► Create a new instance of primitive type with New keyword
► None of these

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

The operation for adding an entry to a stack is traditionally called :
► add
► append
► insert
► push

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

The operation for removing an entry from a stack is traditionally called:
► delete
► peek
► pop
► remove

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

Consider the following sequence of push operations in a stack:
stack.push('7');
stack.push('8');
stack.push('9');
stack.push('10');
stack.push('11');
stack.push('12');
► 7 8 9 10 11 12
► 9 8 11 10 7 12
► 9 10 8 11 12 7
► 9 10 8 12 7 11

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

_____ is the maximum number of nodes that you can have on a stack-linked list ?
► Zero

► 2n (where n is the number of nodes in linked list)
► Any Number
► None of these

Question No: 12   (Marks: 1)   - Please choose one
Which of the following can be used to reverse a string value,
► Stack
► Queue
► Both of these
► None of these

Question No: 13   (Marks: 1)   - Please choose one
Consider the following tree,

How many leaves does it have?
► 2
► 4
► 6
► 9

Question No: 14   (Marks: 1)   - Please choose one
AVL Tree is,
► **Non Linear data structure**
► Linear data structure
► Hybrid data structure (Mixture of Linear and Non Linear)
► None of the given options.

Question No: 15   (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
► (i), (ii) and (iv) only
► (ii) and (iv) only
► None of the given options

Question No: 16   (Marks: 1)   - Please choose one
An array is a group of consecutive related memory locations.
► True
► False

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

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

Which one of the following calling methods does not change the original value of the argument in the calling function?

► None of the given options
► **Call by passing the value of the argument**
► Call by passing reference of the argument
► Call by passing the address of the argument

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

Which one of the following statements is NOT correct?

► Array size can be changed after its creation.
► Link List size can be changed after its creation
► Binary Search Tree size can be changed after its creation
► AVL Tree size can be changed after its creation

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

Suppose that the class declaration of SomeClass includes the following function prototype.
    bool LessThan(SomeClass anotherObject);
Which of the following tests in the client code correctly compares two class objects alpha and beta?

► if (alpha < beta)
► if (alpha.LessThan(beta))
► if (LessThan(alpha, beta))
► if (LessThan(alpha).beta)

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

A queue is a _____data structure, whereas a stack is a _____data structure.
► **FIFO, LIFO**
► LIFO,FIFO
► none of these
► both of these

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

Which one of the following operators has higher priority than all of others ?
► Multiplication operator
► Minus operator
► Plus operator
► Exponentiation operator

Question No: 8   (Marks: 1) - Please choose one
Each node in Binary Search Tree has
► 1 pointer
► 2 pointers

► 3 pointers
► 4 pointers

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

Four statements about trees are below. Three of them are correct. Which one is INCORRECT?
    ► Trees are recursively defined multi-dimensional data structures
    ► The order of a tree indicates a maximum number of childen allowed at each node of the tree
    ► A search tree is a special type of tree where all values (i.e. keys) are ordered

    ► If Tree1's size is greater than Tree2's size, then the height of Tree1 must also be greater than Tree2's height.

Question No: 10   (Marks: 1) - Please choose one
    Which of the following is "TRUE" about arrays,

    ► We can increase the size of arrays after their creation.
    ► 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.

Question No: 11   (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**
    ► $1.66 Log_2$n

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

    There is/are _____ case/s for rotation in an AVL tree,

    ► 1
    ► 3
    ► 2
    ► 4

Question No: 13   (Marks: 1) - Please choose one
Consider the following statements.
    i.   A binary tree can contain at least 2^L Nodes at level L.
    ii.   A complete binary tree of depth d is a binary tree that contains 2^L Nodes at each level L between 0 and d, both inclusive.
    iii. The total number of nodes (T_n) in a complete binary tree of depth d is $2^{d+1} - 1$.
    iv.   The height of the complete binary tree can be written as h = $\log_2 (T_n+1)-1$ where T_n is Total number of Nodes.

Which one of the following is correct in respect of the above statements regarding the Binary trees?

    ► (i) and (iii) only
    ► (i), (ii) and (iii) only
    ► (ii) and (iii) only
    ► (ii), (iii) and (iv) only

Question No: 14   (Marks: 1) - Please choose one
Consider the following infix expression.
5 + 6/2

If one converts the above expression into postfix, what would be the resultant expression?

► 5 6 / + 2
► 5 6 2 / +
► 5 6 / 2 +
► / 6 2 + 5

Question No: 15   (Marks: 1) - Please choose one
Which of the following is a non linear data structure?

► Linked List
► Stack
► Queue
► **Tree**

Question No: 16   (Marks: 1) - Please choose one
"+" is a _____ operator.
► Unary
► **Binary**
► Ternary
► None of the above

Question: (Marks: 1) - Please choose one
In a complete binary tree of depth 5 the number of non-leaf nodes is
• 15
• 32
• 16
• 31

Question: (Marks: 1) - Please choose one
Which of the following is NOT a linear data structure?
• Linked List
• Stack
• Queue
• **Tree**

Question: (Marks: 1) - Please choose one
Recursive function calls are implemented internally using a data structure
• Stack
• Link-List
• **Tree**
• Queue

Question: (Marks: 1) - Please choose one
We access elements in AVL Tree in,
• Linear way only
• Non Linear way only
• Both linear and non linear ways
• None of the given options.

Question: (Marks: 1) - Please choose one
Consider the following tree,

How many leaves does it have?
• 2
• 4
• 6
• 9

Question: (Marks: 1) - Please choose one
In the statement int x[6]; , we cannot assign any value to x because x is not an lvalue.

- True
- **False**

Question: (Marks: 1) - Please choose one
In the following C++ code, how many function calls are made?

int x, y, z;
x = 2;
y = 3 + x;
z = foobar(x,y);

- 1
- 4
- 7
- 8

Question: (Marks: 1) - Please choose one
Consider the following infix expression:
3 + 5 * 6 - 7 * (8 + 5)
Which of the following is a correct equivalent expression(s) for the above?

- 6 5 + * 7 5 8 + - *
- 6 5 7 5 8 + * + - *
- 5 6 + * 7 8 5 + - *
- 3 5 6 * + 7 8 5 + * -

Question: (Marks: 1) - Please choose one
A subscript of an array may be an integer or an integer expression.
- True
- False
-

Question: (Marks: 1) - Please choose one
Which of the following is "TRUE" about arrays,
- We can increase the size of arrays after their creation.
- 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.

Question: (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: (Marks: 1) - Please choose one
There is/are _____ case/s for rotation in an AVL tree,
- 1
- 3
- 2
- 4

Question: (Marks: 1) - Please choose one
Consider the following infix expression.
5 + 6/2
If one converts the above expression into postfix, what would be the resultant expression?
- 5 6 / + 2
- 5 6 2 / +
- 5 6 / 2 +
- / 6 2 + 5

Question No: 16   (Marks: 1) - Please choose one
"+" is a _____ *operator*.

- Unary
- **Binary**
- Ternary
- None of the above

1. Addition of new items in stack make the pointer ------------ by 2 :-
    a. Increment, bits
    b. Increment, bytes
    c. Decrement, bits
    d. Decrement, bytes

2. Next item in a linked list is known as:-
    a. Index
    b. Item
    c. Node
    d. Child

3. **What will be the postfix notation of 5+6/2.**
    a. 56+/2
    b. 562+/
    c. 562/+
    d. 5+62/

4. In an AVL tree to delete a parent with two childs in a straight line following rotations will be required:-
    a. Single
    b. Double
    c. Triple
    d. None.

5. To check the depth of an AVL tree following time will be taken:-
    a. 1.66 Log2n
    b. 1.44 Log2n
    c. Log2(n+1)-1
    d. 1.66 Log2n (n+1)

6. BST is a _____ Structure:-
    a. Linear
    b. Non Linear
    c. Circular
    d. None of Above

7. After creation of an arry:-
    a. Size can be increase but can not be decreased.
    b. Size can be decreased but can not be increased.
    c. Size can neither be increased nor be decreased.
    d. Size can be increased and can also be decreased.

8. Each node in a BST has _____ Pointers:-
    a. 1
    b. 2
    c. 3
    d. 4

9. Highest Operators Precedence is of the following operator:-
    a. Plus
    b. Minus
    c. Multiply
    d. Exponentiation

10. Following are the linear data structures:-
    a. Stacks
    b. Queues

c. Both a & b
d. None of the above

11. Each entry which points to a null value in a Singly Linked List is known as:-
a. Node
b. First Node
c. Last Node
d. Head Node

12. Non recursive calls are faster than the Recursive calls.
a. True
b. False

13. Tree data structure is a _____
a. Linear
b. Non Linear
c. Circular
d. None of Above

14. What will be the valid postfix notation of A+B*C-D
a. ABC+*D-
b. ABC*+D-
c. ABCD+-*
d. AB+D*C

15. When an operator is used in between two operands this is which type of notation
a. Prefix
b. Postfix
c. Infix
d. None of the Above

Question No: 1 (Marks: 1) - Please choose one
Which one of the following operations returns top value of the stack?
Push
Pop
Top
First

Question No: 2 (Marks: 1) - Please choose one
In a complete binary tree of depth 4 the number of non-leaf nodes is
7
8
15
16

Question No: 3 (Marks: 1) - Please choose one
Which of the following is NOT a linear data structure?
Linked List
Stack
Queue
Tree

Question No: 4 (Marks: 1) - Please choose one
A Linear Data Structure is the data structure in which data elements are arranged in a sequence or a linear list. Which of the following is Non Linear Data Structure?
Arrays
LinkLists
Binary Search Trees
None of these

Question No: 5 (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

Both of these

None of these

Question No: 6 (Marks: 1) - Please choose one
If you know the size of the data structure in advance, i.e., at compile time, which one of the following is a good data structure to use.

Array

List

Both of these

None of these

Question No: 7 (Marks: 1) - Please choose one
Recursive function calls are implemented internally using a data structure

Stack

Link-List

Tree

Queue

Question No: 8 (Marks: 1) - Please choose one
Given a stack of n items, how many POP and PUSH operations need to be performed to remove the item at its bottom?

0 POP operation and 0 PUSH operation

1 POP operation and 1 PUSH operation

n POP operations and n PUSH operations

n POP operations and n-1 PUSH operations

Question No: 9 (Marks: 1) - Please choose one
One difference between a queue and a stack is:

Queues require dynamic memory, but stacks do not.

Stacks require dynamic memory, but queues do not.

Queues use two ends of the structure; stacks use only one.

Stacks use two ends of the structure, queues use only one.

Question No: 10 (Marks: 1) - Please choose one
In the following C++ code, how many function calls are made?

int x, y, z;

x = 2;

y = 3 + x;

z = foobar(x,y);

1

4

7

8

Question No: 11 (Marks: 1) - Please choose one
Consider the following function:
void test_a(int n)
{
cout << n << " ";
if (n>0)
test_a(n-2);

}
What is printed by the call test_a(4)?

> 4 2
> 0 2 4
> 0 2
> 2 4

Question No: 12 (Marks: 1) - Please choose one
Consider the following tree,
How many leaves does it have?

> 2
> 4
> 6
> 9

Question No: 13 (Marks: 1) - Please choose one
We access elements in AVL Tree in,

> Linear way only
>
> **Non Linear way only**
> Both linear and non linear ways
> None of the given options.

Question No: 14 (Marks: 1) - Please choose one
Consider the following statements.
(i)A binary tree can contain at least 2 L Nodes at level L.
(ii) A complete binary tree of depth d is a binary tree that contains 2 L Nodes at each
level L between 0 and d, both inclusive.
(iii) The total number of nodes (Tn) in a complete binary tree of depth d is 2 d+1- 1 .
(iv)The height of the complete binary tree can be written as h = log2(Tn+1)-1 where Tn is Total
number of Nodes.

Which one of the following is correct in respect of the above statements regarding the Binary
trees?
(i) and (iii) only
(i), (ii) and (iii) only
(ii) and (iii) only
(ii), (iii) and (iv) only

Question No: 15 (Marks: 1) - Please choose one
The following is a segment of a C program.
int pqr(BinaryNode t)
{ if (t == null)
return -1;
else
return 1+max(pqr(t.left),pqr(t.right)) }
Identify, what the above program intend(s) to do?

> Compute the height of a binary tree using an in-order traversal
> Compute the height of a binary tree using a pre-order traversal
> Compute the depth of a binary tree using a pre-order traversal
> Compute the depth of a binary tree using a post-order traversal

Question No: 16 (Marks: 1) - Please choose one
Consider the following infix expression.
3*2 5-1
If one converts the above expression into postfix, what would be the resultant expression?

> 3 2 * 5 1 -
> 3 2 * 5 1 -
> 3 2 * 5 - 1

3 2 5 * 1 -