

CS301 Updated 250+ MCqs

Lec 1 - 20 Spring 2022

Quiz 1 and Quiz 2

#Midterm Preparation

REMEMBER OWN PRAYER

Orange Monkey Team

Important NOTE:-

Like share and comment too ..ager koi
mistake hogaye ho to sorry and comment
main lazmi mention kr dijiye ga takey main
correction krlon file main And like
zaroor krein is hamein or bhe apsab
keyliye files makes krny ke himat milti hey
...JAZAKALLAH

Orange Monkey Team



1. In which traversal method root node is visited at left first subtree?

Inorder.....confirm

In-order Traversal

In this traversal method, the left subtree is visited first,

2. In which traversal method root node is visited at first step?

Preorder.....confirm

Pre-order Traversal

In this traversal method, the root node is visited first,

3. In which traversal method root node is visited at last step?

Postorder.....confirm

Post-order Traversal

In this traversal method, the root node is visited last,

4. In level-order traversal for binary Search Tree _____ data structure is used.

Queue....confirm

In **level-order traversal for Binary Search Tree**, _____ data structure is used.

Queue

5. _____ is used for reference variables in C++

&....confirm

The symbol &, used for **reference variable**

6. The first statement in the given code is called as:

```
Class BinarySearchTree;  
Class BinaryNode{  
Friend class BinarySearchTree;  
};
```

Forward declaration

7. Which of the following traversal method traverses the binary tree in sorted order?

Inorder....confirm

3, 4, 5, 7, 9, 14, 15, 16, 17, 18, 20. This **sorted order** is only in the inorder traversal.

8. The _____ symbol is used when we want to get the value of a variable using pointer.

***.....confirm**

By using *** operator** we can access the value of a variable through a pointer. I

9. The _____ of every node should be 1,0 or -1 otherwise it will not be an AVL tree.

Balance....confirm

means that the balance of **every node** should be 1, 0 or -1. Otherwise, it will not be an AVL tree.

10. The ____ tree has been named after two person Adelson-Velskii and landis

AVL confirm

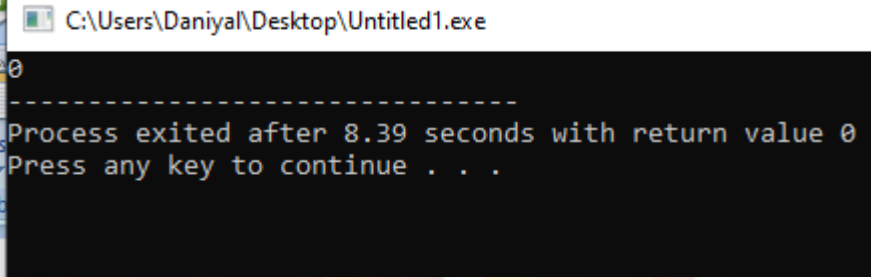
AVL Tree

AVL tree has been named after two persons Adelson-Velskii and Landis.

11. What will be output of the given C++ code?

```
Char lhs[] = "Army";  
Char rhs[] = "Army";  
Cout<<strcmp(lhs,rhs);  
}
```

0.....confirm



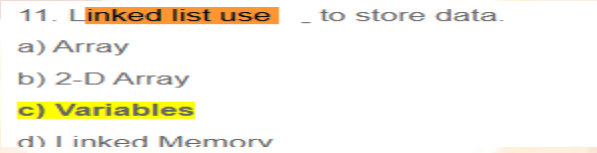
```
C:\Users\Danial\Desktop\Untitled1.exe  
0  
-----  
Process exited after 8.39 seconds with return value 0  
Press any key to continue . . .
```

12. _____ of an empty AVL tree is defined to be -1

Height.....confirm

13. Linked list use _____ to store data.?

Variables.....confirm



11. Linked list use _____ to store data.
a) Array
b) 2-D Array
c) Variables
d) Linked Memory

14. AVL stands for

Adelson-Velskii and Landis.....confirm

AVL Tree

AVL tree has been named after two persons Adelson-Velskii and Landis.

15. The balance of a node in a binary tree is defined as the height of its ____ sub tree minus height of its right sub tree.

Left....confirm

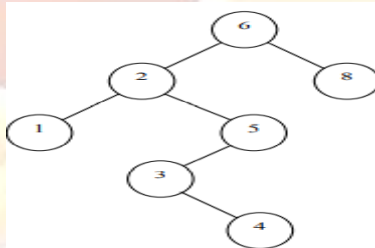
The **balance of a node** in a binary tree is defined as the height of its left subtree minus height of its right subtree.

16. The ____ sign before the name of the variable means that the address of the variable is being passed.

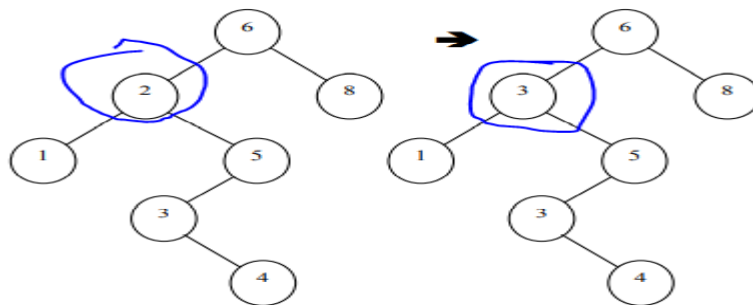
&.....confirm

The '**&**' **sign before** the name of the variable *myInt* means that the address of the variable is being passed. The called function will take it as a pointer. Remember that

17. If we delete node 2 from the given BST then which node will replace it?



3....confirm



18. During in order traversal using recursive calls if we found a node is NULL it means this node will satisfy following condition.

It will not have left child....confirm

19. A tree is an AVL tree if

All the nodes fulfill the AVL condition....confirm

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 (Page 213)
- ▶ None of the given options

20. Which of the following calling method does not change the original value of variable passed to a function on argument?

Call by passing as value....confirm

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 reference of function of the argument

21. Which of the following data structure is/are linear type?

Heap and stack

22. Which of the following is correct syntax to pass a constant variable by reference to a function?

Int display (const int& val)

The const keyword appears before a function parameter

```
int movePiece(const Piece & currentPiece)
```

23. In C++ we place the class interface in _____ file,

.h.....confirm

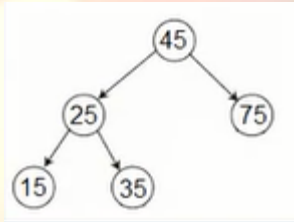
96. In C++, we place the class interface in _____ file.

- a) .cpp
- b) .cxxx
- c) .h

24. If we write functions for recursive and non recursive inorder traversal method of BST, what will be the difference between its functions prototypes?

Nothing will be different.....confirm

25. What will be the preorder traversal of the given tree?



45,25,15,35,75....confirm

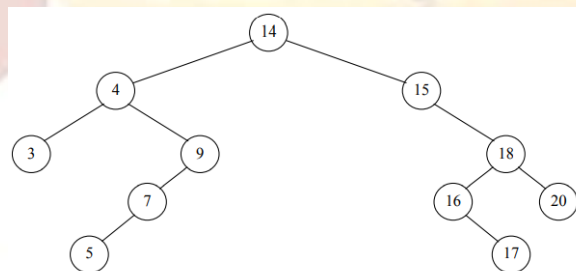


Fig 13.3: Preorder: 14 4 3 9 7 5 15 18 16 17 20

26. Binary Search Tree violates the condition of AVL tree when any node has balance factor equal to

0.....confirm

necessarily. Rather, the tree will be called AVL tree, if the *balance factor* of each node in a tree is 0, 1 or -1. By the way, if the *balance factor* of each node inside the tree is 0, it will be a perfectly balanced tree.



27. Binary Search Tree violates the condition of AVL tree when any node has balance factor equal to

1 or -1....confirm

201. Binary Search Tree violates the condition of AVL tree when any node has balance equal to
1 or -1

28. After deletion of a node from a binary search tree _____ traversal method should be maintained.

Inorder

In this delete case, we need to find the **inorder** successor of the node to be deleted which is the minimum value in the right subtree. Then we will put the value of this node to the node to be deleted. This node is saved in the variable *minNode*. The node to be deleted is now pointed by *tree*. Then we get the value of the **inorder** successor, stored in the *minNode* and assign it to the node to be deleted. Now we have to delete the *minNode*. For this purpose, we call the *remove* method recursively providing it the right subtree and the value of the *minNode*. We have also changed the value of the current node and can also send this value to the *remove* method. For clarity purposes, we provide it the *minNode* value. The node returned by the *remove* method, is stored

Page 173 of 505

in the temporary variable *t*. Then we assign *t* to the right subtree of *tree*. We do it due to the fact that the tree has to re-adjusted after the deletion of a node in the right subtree.

29. Link list can be special case of

Binary search tree

30. To create a reference variable we need to use _____ sign.

Ampersand.....confirm

The symbol &, used for reference variable has a few different purposes with respect to its occurrence in the code. In C++ programming, we have seen that when the ampersand sign i.e. & appears in front of a variable name, it is the address operator. It

31. At a particular node the difference in heights of its left and right subtree gives the _____ of the node.

Balance.....confirm

minus height of its right subtree. In other words, at a particular node, the difference in heights of its left and right subtree gives the balance of the node.

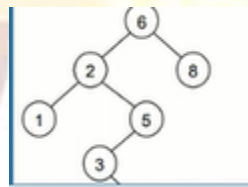
32. For string-based binary search tree, we use ASCII values of characters for comparing among letters. This method is known as _____.

Lexicographic order....confirm

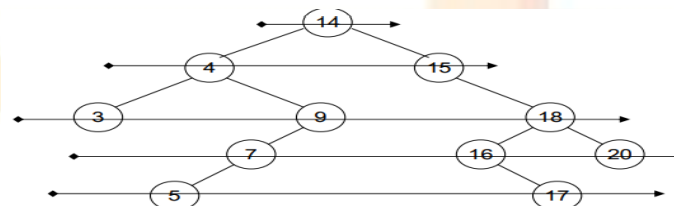
will happen in case of strings. You must remember, every character of a string has an associated ASCII value. We can make a lexicographic order of characters based on their ASCII values. For example, the ASCII value of B (66) is greater than A (65), therefore, character B is greater than character A. Similarly if a word is starting with the letter A, it is smaller than the words starting from B or any other character up to Z. This is called lexicographic order.

C++ provides us overloading facility to define the same operators (<, >, <=, >=, ==

33. What will be level order traversal of the given BST?



6,2,8,1,5,3,4.....confirm



level-order: 14 4 15 3 9 18 7 16 20 5 17

Fig 14.4: level order traversal

34. _____ parameter passing (by value or by reference) is similar to PASCAL.

C++....confirm

In **PASCAL**, you can pass a parameter by value or by reference like C++.

35. We can make a lexicographic order of characters based on their _____.

ASCII values....confirm

associated ASCII value. We can make a **lexicographic order** of characters based on their ASCII values. For example, the ASCII value of *B* (66) is greater than *A* (65), therefore, character *B* is greater than character *A*. Similarly if a word is starting with the letter *A*, it is smaller than the word starting from *B* or any other character to *Z*.

36. If we return the reference of a local variable form a function it will cause.

Dangling reference....confirm

To avoid **dangling reference**, don't return the reference of a local variable (transient) from a function.

37. Which one is the correct function call for the following function of calculating cube?

```
Int cube(int& num)
{
.
.
.
}
```

Cube(num)

38. Whenever a node is deleted from a binary search tree ____ has to be maintained.

Inorder traversal....confirm

Fig 15.10: Deleting a Node From BST

If we want to delete the node containing number 4 then we have to adjust the right subtree pointer in the node containing value 2 to the *inorder* successor of 4. The important point is that the *inorder* traversal order has to be maintained after the delete.

39. For a complete binary tree with n numbers of nodes the depth is calculated as _____.

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

binary tree. It was witnessed that if we have a complete binary tree with n numbers of nodes, the depth d of the tree can be found by the following equation:

$$d = \log_2(n+1) - 1$$

40. What will be the return type of the findMin method in the statement given below?
`Int& findMin(const;`

Integer reference

41. Which of the following is TRUE about recursive calls?

There is no terminating condition in recursive calls

42. Which of the following is correct syntax to declare a const function?

`Const int& findMin();`

43. A node in AVL tree can become imbalanced due to.

Both insertion and deletion operation....confirm

computation should be understood as it is used for the insertion and deletion of nodes in an AVL tree. We may come across a situation, when the tree does not remain

44. We can use binary search tree with _____.

Both integer and string data....confirm

45. Following is a keyword of C++ _____.

Delete....confirm

delete is a keyword of C++.

46. In a strictly complete binary tree the number of _ at any level k will be 2^k .

Nodes....confirm

the number of nodes at any level k will be 2^k .

47. A hash function returns a ___ value

Integer....confirm

A hash function returns a _____ value.

1. Integer

48. Following is true in case of using recursive method calls.

The code becomes very short....confirm

49. Suppose we have the following values to be inserted in constructing AVL tree, 10,13,15,5,7,8 tell when first rotation will take place

After inserting node 15....confirm

Suppose we have the following values to be inserted in constructing AVL tree,

10,13,15,5,7,8

Tell when first rotation will take place,

After inserting the node 15

50. Suppose we have the following values to be inserted in constructing AVL tree, 20,23,25,10,12,13 tell when first rotation will take place

After inserting node 25.....confirm

constructing AVL tree,

20,23,25,10, 12,13

Tell when first rotation will take place.

a. After increasing Node 25

b. After increasing Node 23

51. If the root of a tree is at level three in case of a complete binary tree i.e nodes will be at _____.

8....confirm

there will be 4 nodes in case of a complete binary tree. Similarly at level 3, the number of nodes will be 8 and so on. As discussed earlier, in a complete binary tree,

52. If the root of a tree is at level two in case of a complete binary tree i.e nodes will be at _____.

Level 4....confirm

tree is at level zero, its two children (subtrees) i.e. nodes will be at level 1. At level 2, there will be 4 nodes in case of a complete binary tree. Similarly at level 3, the

53. If the root of a tree is at level zero its two children subtree i.e nodes will be at _____.

Level 1....confirm

tree is at level zero, its two children (subtrees) i.e. nodes will be at level 1.

54. In Preorder traversal of a binary tree the second step is _____.

Traverse the left subtree....confirm

Que. In preorder traversal of a binary tree the second step is _____

- a. traverse the right subtree
- b. traverse the left subtree
- c. traverse right subtree and visit the root
- d. visit the root

Answer: traverse the left subtree

55. In a complete binary tree for 25000 nodes the depth will be _____.

14.....confirm

131. In a complete binary tree, for 25000 nodes the depth will be .

a) 13

b) 14

56. When a node to be deleted from a BST has both left and right child after deletion its _____ node will replace this node.

inorder Successor....confirm

Case III: The node to be deleted has both the left and right children (subtree). This is the most difficult case. In this case we find the inorder successor of the node. The left most node of the right subtree will be the inorder successor of it. We put the value of that inorder successor node into the node to be deleted. After it we delete the inorder successor node recursively.

57. In tree, the search operation is _____ as compared to the linked list.

Very fast....confirm

In tree, the search operation is _____ as compared to the linked list.

1. Very fast

58. Factorial is an example of _____ function

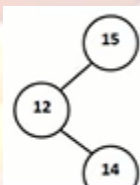
Recursive.....confirm

59. Function signatures are also called:

Function prototype....confirm

The function signature is also called the function prototype

60. Why following tree is not AVL tree?



Because _____.

The balance factor of root node is two

61. A BST generated from the data in ascending order is _____.

Linear....confirm

A BST generated from the data in ascending order is _____.
a. Linear

62. From operating system point of view the recursive function calls are made with the help of ____.

Stack....confirm

63. In which traversal method the recursive calls can be used to traverse a binary tree?

In preorder, postorder and inorder traversal only....confirm

at each level before proceeding to the next level. At each level, we visit the nodes in a left-to-right order. The traversal methods discussed earlier are inorder, preorder and post order. We print the node or to the left subtree or to the right subtree. In the

64. The functions calls are made with the help of _____.

Stack.....confirm

t function calls are made with the help of stacks.

65. What will be the output of following code?

```
Void explode(int& num){  
    Num++;}  
Main(){  
    Int power = 15;  
    explode(power);  
    cout<<power;  
}
```

16

66. What will be the output of following code?

```
Main(){  
    Int x=15;  
    Int &y;  
    Y=x;  
    Y=15;  
    Cout<<x;
```

}

Compile time error.....confirm

```
1 #include<iostream>
2 using namespace std;
3 int main()
4 {
5     int x = 15;
6     int &y;
7     y = x;
8     y = 15;
9     cout<<x;
10 }
```

67. We allocate memory dynamically by using _____ operator.

New.....confirm

When we allocate memory dynamically by using *new* operator,

68. When a function calls another the parameters and return address of the calling function are put in _____.

Stack....confirm

We know that function calls are made with the help of stacks. When a function calls some other function, the parameters and return address of the function is put in a stack. The local variables of the function are also located at the stack and the control is passed to the called function. When the called function starts execution, it performs

69. For searching a particular number in binary search tree (if it is not present) the maximum number of comparisons will be _____ comparisons(s) at each level.

2....confirm

Question 1: For searching a particular number in Binary Search Tree (if it is not present), the maximum number of comparisons will be _____ comparison at each level.



1



2



3



4

70. In which of the following function signature the value of variable num cannot be changed in function body?

Int cube(const int& num).....confirm

297. In which of the following function signatures, the value of variable "num" cannot be changed in function body?

Int cube(const int&num)

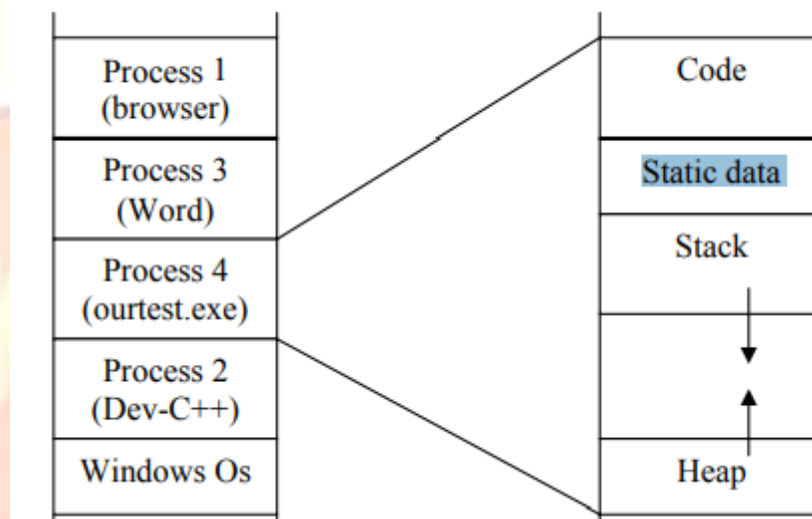
71. _____ is a self balancing tree.

AVL.....confirm

While an **AVL tree** is a **self-balancing binary search tree**.

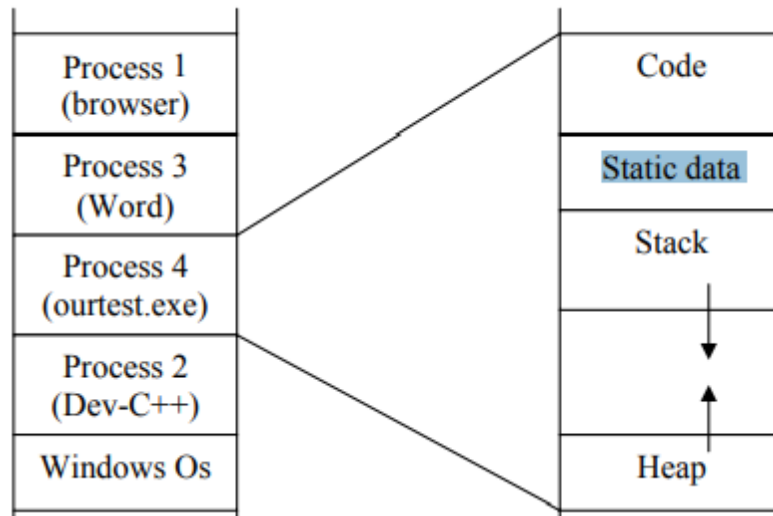
72. In the perspective of memory organization every process executing the first part of the memory is for _____ of the program.

Code....confirm



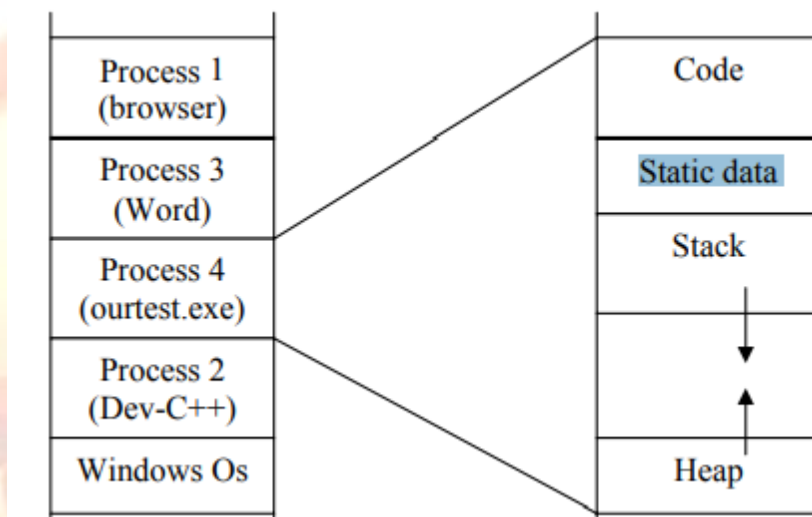
73. In the perspective of memory organization every process executing the third part of the memory is for _____ of the program.

Stack.....confirm

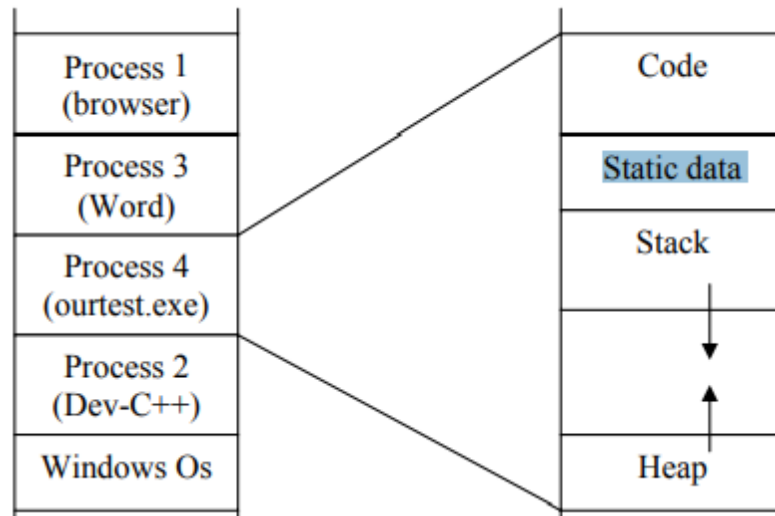


74. In the perspective of memory organization every process executing the last part of the memory is for the _____ of the program.

Heap....confirm

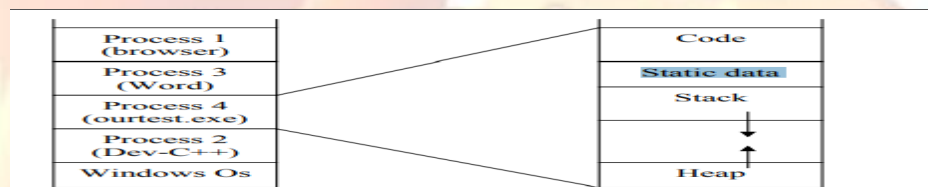


75. In the perspective of memory organization each process is divided into _____ sections.



76. In the perspective of memory organization every process executing the second part of the memory is for _____ of the program.

Static code



77. The structure of tree with _____ data is like a linked list

Sorted.....confirm

will be better to recap things talked about in the previous lecture. We built a balanced search tree (BST) with sorted data. The numbers put in that tree were in increasing sorted order. The tree built in this way was like a linked list. It was witnessed that the

78. Which one of the following case is the very simple to delete a node from BST?

The node to be deleted is the leaf node i.e it has no right or left child....confirm

The **node to be deleted** is the leaf node i.e. it has no right or left child. It is very simple to delete such node. We make the pointer in the parent node pointing to this node as

79. Which one of the following case is the most complicated case to delete a node from BST?

Node to be deleted has both the left and right children.....confirm

Case III: The **node to be deleted** has both the left and right children (subtree). This is the most difficult case. Let's recap this case. The following figure shows the tree and

80. After performing which task on the list, implementing array has to shift the entire remaining elements one place to the left.

By removing element at start.....confirm
elements on the right of this empty space **one place to the left**. If we remove an element from the beginning of the list, then we have to shift the entire remaining **elements one place to the left**. Suppose there is a large number of elements, say 10000 or 20000 in the list. We remove the first element from the list. Now to fill this space

81. In array list the worst case of removing an element is.

To remove an element from the end of the list.....confirm

In array list the **(Raise For Success)** worst case of removing an element is:

- **To remove an element from the end of the list Correct**

82. End() method of list performs it's tasks in

One step.....confirm

position just in one step. The length() method returns the value of the size of the list. The other methods *back()*, *start()* and **end()** also perform their tasks only in one step.

83. Start() method of list class is used to :

Moves the “current” pointer to very first element

84. In singly linked list “next” field of node contains

Addresss of the next node....confirm

a. None of the given

. In singly linked list “next” field of node contains:

a. Address of next node

85. If we do not have to move too much in the list then use of which one type of list is not necessary/essential

Circular linked list....confirm

advantages depend on its use. If we do not have to move too much in the list and have no problem checking the NULL, there is little need a circularly-linked list. But this facility is available to us.

86. Null is an invalid address and ____.

Inaccessible....confirm

memory address NULL in the last node. NULL is an invalid address and is inaccessible.

87. Suppose a stack class has been defined using template. Now, we want to declare a stack object of an int type. What will be the correct syntax.

Stack<int> stack....confirm

In the above code, consider the line

Stack <int> intstack ;

This line means that while creating an object *intstack* of Stack, the generic data type *T*

88. Which off the following is not a form of expression?

Pastfix....confirm

Infix, Postfix and Prefix notations are three different but equivalent ways of writing expressions. It is easiest to demonstrate the differences by looking at examples of

89. The back() method decreases the value of variable current by

One.....confirm

The *back()* method decreases the value of variable *current* by 1.

90. 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.....confirm

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

A. At the head ✓

91. Whenever we call a function, the compiler makes a ____ that it uses to fulfill this function call.

Stack.....confirm

domain compiler. Whenever we call a function, the compiler makes a stack that it uses to fulfill this function call. The compiler puts the entries on the stack in the way

92. Which of the following is not a Data structure?

Memory cell confirm

93. STL is a ____ that is a part of the official standard of C++.

Library.....confirm

our own data types. STL is an important code, pre-developed for us. It is available as a library. Different data structures like stack, queue etc is also there in STL. We can

94. Compiler uses which one of the following in functions call.

Stack....confirm

Question 1: Compiler uses which one of the following in Function calls _____.



Stack



Queue



Binary
Search Tree



AVL Tree

95. Which one option is associated with the data structures?

Time to perform each basic operation.....confirm

There are three basic things associated with data structures. A data structure requires:

- space for each data item it stores
- time to perform each basic operation
- programming effort

96. Which of the following line of code is incorrect?

Float *I = float new

97. Which kind of data structure is used to evaluate postfix expression?

Stack.....confirm

We are going to evaluate the postfix expression with the help of stack.

98. We cannot remove items randomly from _____.

Stack and queue....confirm

125. We can not remove items randomly from _

a) Stack

b) Queue

c) Both of these

99. Length() method of list class is used to __.

Return the length of the list.....confirm

s `length()` that simply returns the size of the list.

100. A template is a function or class that is written with a _____ data type

Generic.....confirm

in C++ language, a template is a function or class that is written with a generic data type. When a programmer uses this function or class, the generic data type is replaced

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

One...confirm

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

1. One

102. The principal benefit of a linked list over a conventional array is that the order of the linked items may be _____

Same...confirm

The principal benefit of a linked list over a conventional array is that the order of the linked items may be _____ from the order that the data items are stored in memory.

Same

103. IsEmpty() method of stack class will return true when _____

Stack is empty....confirm

scenarios. what happens if we can pop() while there is no element? One possible way-out is that we have `isEmpty()` function that returns true if stack is empty and false otherwise. This is a boolean function that returns false if there is no element in the

104. End() method of list performs its task in _____

One step.....confirm

`end()` also perform their tasks only in one step.

105. In queue data structure elements are removed from _____.

Front....confirm

Queues are data structures that follow the First In First Out (FIFO) i.e. the first element that is added to the queue is the first one to be removed. **Elements are always added to the back and removed from the front.** Think of it as a line of people waiting for a bus.

106. A software solution is said to be efficient if it solves the problem Within its resource constraints....confirm

A solution is said to be efficient if it solves the problem **within the required resource constraints.** Examples of resource constraints include the total space available to store the

107. Generalized code written for a class is called.

Template....confirm

and class so that first we define the class **BinaryNode** and its nodes, a binary tree is created. This **class is a template class.**

108. New int[11] will allocate memory for _____ integers.

11...confirm

"new int[11]" **will allocate memory for** _____ integers.
1. 10
2. **11**

109. At the time while evaluating an expression, if we want to give higher precedence to lower precedence operator, we used.

Parenthesis.....confirm

parenthesis in the infix especially at the times when we want to give a higher precedence to an operator of lower precedence. For example, if there is a + operator

110. "+" is a _____ operator.

Binary.....confirm

Binary operator who hoty hein jo 2 operand key sath use hoty hon ..like $A + B$..idher A or B operand hein or + operator hey.. or Uniary symbol just one operand key sath use hoty hein like $(- -a)$ idher - - ye operator hey or a operand hein

111. The stack implementing an array causes worst case behavior when the insertion and deletion of an element done from

Beginning of an array.....confirm

that the stack is internally implemented with the help of array. The worst case for insertion and deletion from an array may happen when we insert and delete from the beginning of the array. We have to shift elements to the right for insertion and left for

112. Each node in singly linked list contains _____.

One pointer....confirm

Each node in singly link list has,

1. 1 pointer

113. $2*(7+8)-6$ is an example of ____ expression

Infix.....confirm

how can we convert the infix expression $A + (B * C)$

114. If we use doubly linked list to implement list to implement list then there is an issue of;

Pre pointer of first node and next pointer of last node are

NULL.....confirm

pointers, we can move forward and backward very easily. Now we face another problem that the *prev* pointer of first node and the *next* pointer of the last node are NULL. Therefore, we have to be careful in case of NULL pointers. To remove the

115. Allocating and de-allocating memory for linked list nodes does take _ time than pre-allocated array.

More.....confirm

Allocating and de-allocating memory for list nodes **does take** more time than pre-allocated array. Memory allocation and de-allocation has cost in terms of time.

116. Circular linked list always has _ NULL pointer/s in a node.

0.....confirm

A circular list is a list that does not contain any pointer pointing to NULL.

117. The type of expression in which operator succeeds its operands is _____ expression.

Postfix.....confirm

postfix expression

Explanation: The expression in which operator succeeds its operands is called **postfix expression**.

118. Before using the push method of stack the user must call the _____ method.

isFull(); confirm

Before using the (Raise For Success) push method of stack, the user must call the _____ method.

- isEmpty();
- **isFull(); Correct**

119. What will be postfix expression of following infix expression?
 $4 * 1 \uparrow 7 + 2$

$41 \uparrow 7 * 2 +$ confirm

fix: $4*1\uparrow7+2$

Infix to Postfix

stfix: $41\uparrow7*2+$

120. If the input symbol is not ')' and the stack is not empty then which of the following option will be pushed on the stack.

Operator.....confirm

If the input symbol is not ')' and the stack is not empty, we will push the operator on the stack. Otherwise, it is advisable to pop the stack and discard the '('. The following

121. There is no such node whose next field is NULL, which one of the given option supports the statement .

Circular link list.....confirm

122. Trying to remove an element from an empty stuck is called _____.

Underflow of stack....confirm

Trying to remove an element from an empty stack is called _____ .

1. Garbage collector
2. Overflow of stack
3. Empty collection
4. Underflow of stack

123. In doubly linked list a node consists of three parts:

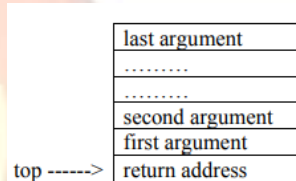
2 pointers and 1 object...confirm

In doubly linked **list a node** consists of three parts:

2 pointers and 1 object

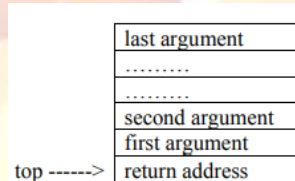
124. Whenever we call a function, the compiler makes a stack, the top element of the stack is _____ of the function

return address...confirm



125. Whenever we call a function, the compiler makes a stack, the last element of the stack is _____ of the function

last argument.....confirm



126. Linked list is generally considered an example of _____ type of memory location.

Dynamic....confirm

Que. Linked list is generally considered as an example of _____ type of memory allocation.

- a. Static
- b. Dynamic
- c. Compile Time
- d. None of these

Answer: Dynamic

127. In singly linked list “next” field of node contains
Address of the next node.....confirm

In singly linked list “next” field of node contains:

Address of next node

128. After evaluating this expression what will be the result?
 $7+3*3/(7-4)$

10....confirm

$$7 + 3 \times 3 \div 3 = 10$$

129. In the calling function after the execution of the function called the program continues its execution from the __ after the function call.

Next line....confirm

In the calling function, after the execution of the function called, the program continues its execution from the next line after the function call. The control comes

130. Consider the linked list implementation of a stack. Which of the following node is considered as top of the stack?

First node.....confirm

Consider linked list is used to implement the Stack then which of the following node is considered as Top of the Stack ?

- ☐ A Middle Node
- ☐ B Last Node
- ☒ C First Node
- ☐ D Any Node

131. “+” is a _____ operator

Binary.....confirm

Precedence of Operators

There are five **binary operators**, called *addition, subtraction, multiplication, division and exponentiation*. We are aware of some other **binary operators**. For example, all relational operators are binary ones. There are some unary operators as well. These require only one operand e.g. – and +. There are rules or order of execution of operators in Mathematics called precedence. Firstly, the *exponentiation* operation is

132. Convert the given infix form $12 + 60 - 23$ if expression in postfix form.

$12\ 60 + 23 -$ confirm

Infix: $12+60-23$

Infix to Postfix

Postfix: $1260+23-$

133. Which of the following is the correct conversation from infix to postfix expression?

$A*B+C/(E-F)$

$AB*CEF-/ +$ confirm

Infix: $A*B+C/(E-F)$

Infix to Postfix

Postfix: $AB*CEF-/+$

Step by

134. Stack.push(15) will push 15 on_____.

Top of stack....confirm

Stack.push(15) will push 15 on _____.

Top of the stack

135. In simple or singly linked list there is/are __ pointer/s in each node.

One.....confirm

In **simple or** singly linked list there is/are _____ pointer/s in each node.

1. **One**

136. Which of the following statement is correct for the variable “current—“?

Current = current - - confirm

current = **current -1** ;

137. Circular linked list solve the problem of _____ pointers/method of the doubly link list.

Add....confirm

Then we solve the problem by using the **add, start, length, next, remove** and **get** methods of the class **CList**.

138. Which one of the following is not a one-step method in list implementation using array?

Find()....confirm

The other methods `get()`, `length()` etc are **one-step** methods. They carry out their operation in one instruction. There is no need of any loop or other programming structures to perform the task. The `get()` method gets the value from the specified position just in one step. Similarly the `update()` method sets a value at the specific position just in **one-step**. The `length()` method returns the value of the size of the list. The other methods `back()`, `start()` and `end()` also perform their tasks only in one step.

139. Local variables of a function are stored in,

Stack.....confirm

One should be careful about transient objects that are stored by reference in data structures. We know that the **local variables of a function** are created on call stack. Those variables

140. A stack carries _____ behavior.

LIFO....confirm

Primarily, there are two operations of a stack; `push()` and `pop()`. **A stack carries lifo behavior i.e. last in, first out.**

141. The `--` is a decrement operator in C++ that decreases the value of the operand by _____.

One....confirm

The `--` is a decrement operator in C++ that **decreases the value** of the operand by one. The above statement can also be written as

142. In singly linked list which node will keep track of starting position of the list.

Next node.....confirm

In singly linked list which node **will keep** track of starting position of the list.

1. **Next Node**

143. Consider the linked list having data [6, 72, 35, 65, 25] stored in it. While current pointer is pointing to memory location having 72 stored in it. After calling add (4) function on the following linked list current point will point to memory location having value?

4...confrim

Consider the linked list having data [6, 72, 35, 65, 25] stored in it. While current pointer is pointing to memory location having 72 stored in it. After calling add(4) function on the following linked list current point will point to memory location having value?

1. 72
2. 35
3. 4

144. Consider the linked list having data [6, 72, 35, 65, 25] stored in it. While current pointer is pointing to memory location having 72 stored in it. After calling remove () function on the following linked list current point will point to memory location having value?

6....confirm

Consider the linked list having data [6, 72, 35, 65, 25] stored in it. While current pointer is pointing to memory location having 72 stored in it. After calling remove() function on the following linked list current point will point to memory location having value?

Select the correct option

☐	65
☐	25
☒	6

Handwritten note: 1. 35

145. Consider the following expression:

$$P = A * B + C - D$$

In the above expression “-“ is a _____ operator

Binary

146. **Y=&x[0];**

In the above statement, we get the address of the first location of the array x and store it in y. Here “y” is

Lvalue...confirm

```
y = &x[0];
```

In the above statement, we get the address of the first location of the array x and store it in y. As y is *lvalue*, so it can be used on left hand side. This means that the above statement is correct.

147. **The first step to add a node in a linked list between the existing nodes is**

newNode->setnext(currentNode->getNext());

The **first step** (Raise For Success) to add a node in a linked list between the existing nodes is:

- newNode->setNext();
- **newNode->setNext(currentNode->getNext()); Correct**

148. **Josephus problem is resolved by the implementation of _____.**

Circular linked list....confirm

Now we will see an example where **circular link list** is very useful. This is **Josephus Problem**. Consider there are 10 persons. They would like to choose a leader. The way

149. **In node class one field is an integer data and other field will be ____.**

Pointer to node....confirm

150. **Clear() of a list is used to _____.**

Clear a list(remove all elements)...confirm

<code>clear();</code>	Clear a list (remove all elements)
-----------------------	------------------------------------

151. **createList() of a list is used to _____.**

Create a new list (presumably empty)....confirm

<code>createList()</code>	Create a new list (presumably empty)
---------------------------	--------------------------------------

152. `copy()` of a list is used to _____.

Set one list to be a copy of another....confirm

<code>copy()</code>	Set one list to be a copy of another
---------------------	--------------------------------------

153. `insert(X,?)` of a list is used to _____.

Insert element X at a particular position in the list....confirm

<code>insert(X, ?)</code>	Insert element X at a particular position in the list
---------------------------	---

154. `remove(?)` of a list is used to _____.

Remove element at some position in the list...confirm

<code>remove(?)</code>	Remove element at some position in the list
------------------------	---

155. `get(?)` of a list is used to _____.

Get element at a given position...confirm

<code>get(?)</code>	Get element at a given position
---------------------	---------------------------------

156. `update(X,?)` of a list is used to _____.

Replace the element at a given position with X...confirm

<code>update(X, ?)</code>	Replace the element at a given position with X
---------------------------	--

157. `find(X)` of a list is used to _____.

Determine if the element X is in the list...confirm

<code>find(X)</code>	Determine if the element X is in the list
----------------------	---

158. `length()` method of a list class is used to _____.

Returns the length of the list...confirm

length()	Returns the length of the list.
----------	---------------------------------

159. First element of an int array can be manipulated by using the index zero as:

Int[0];

To manipulate the first element, we will use the index zero as `x[0]` and so on. The arrays look like in the memory as follows:

160. Which of the following is known as Last-In, First-Out or Lifo data structure?

Stack...confirm

Which one of the following is known as "Last-In, First-Out" or LIFO Data Structure?

1. Linked List
2. Stack

161. The computer memory can be thought of as a/an

Array confirm

The computer memory can be thought of as an array.

162. In doubly linked list there is/are _____ pointer/s in each node.

Two.....confirm

105. In doubly linked list there is/are _____ pointer/s in each node

- a) One
- b) Two

163. Which one option is correct to know the first element of the linked list

Head pointer....confirm

164. While implementing stack with an array and to achieve LIFO behavior, we used push and pop elements at

The end of the array.....confirm

You know that while implementing stack with an array and to achieve *lifo* behavior, we used **push** and **pop** elements at the end of the array. Instead of pushing and

165. Each node in a singly linked list contains two fields, one field called data field while other field contains.

Pointer to node.....confirm

Que. Each Node contain minimum two fields one field called data field to store data. Another field is of type _____.

- a. Pointer to Class
- b. Pointer to an Integer
- c. Pointer to Character
- d. Pointer to Node

Answer: Pointer to Node

166. What will be postfix expression of following infix expression? $4*1|7+2$

$41|7*2+$ confirm

Infix: $4*1|7+2$

Infix to Postfix

Postfix: $41|7*2+$

167. When add() operation of a linked list is called the following action is done.

A new node is made....confrim

We can create a new node in the following manner in the **add()** operation of the linked list with code in C++:

168. What will be the postfix expression of following infix expression?

$D + F * F / G$

DEF*G/+.....confirm

What will be the postfix expression of following infix expression?

$D + E * F / G$

1. $DE * F / G +$
2. $DE + F * G /$
3. **DEF*G/+**

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

Circularly-linked list....confirm

NULL pointers i.e. *prev* in the first node and *next* in the last node. A way around this potential hazard is to link the last node with the first node in the list to create a circularly-linked list.

170. Array cells are ____ in computer memory.

Contiguous

Array cells are contiguous in computer memory

171. Stack can be implemented by which of the following data structure?

Array or Linked list....confirm

Stack can be implemented using array and linked list.

172. Add(12) method of linked list class will;

Add 12 as value in linked list.....confirm

add(12) method of linked list class will:

Add 12 as value in linked list

173. Current pointer always points to the _____ of the linked list.

First node....confirm

element of the list is at index 1. Similarly in the linked list we need to know the starting point of the list. For this purpose, we have a pointer *head* that points to the first node of the list. If we don't use *head*, it will not be possible to know the starting

174. _____ is the major factor to see the efficiency of a program.

Time.....confirm

level upto which these are efficient in terms of CPU's time consumption. Time is the major factor to see the efficiency of a program.

175. An efficient program executes faster and helps in _____ the usage of resources like memory and disk.

Minimize....confirm

with their use. Data structures help us to organize the data in the computer, resulting in more efficient programs. An efficient program executes faster and helps minimize the usage of resources like memory, disk. Computers are getting more powerful with the passage of time with the increase in CPU speed in GHz, availability of faster

176. A list is the collection of items of the _____.

Same type.....confirm

A list is the collection of items of the same type

177. Consider the following push operations of a Stack

Stack push (4);

Stack push (6);

Stack push (5);

Stack push (8);

If a user calls a pop() operation then which value will be returned?

8...confirm

178. When an executable program runs, it is loaded in the computer memory and becomes a _____.

Process.....confirm

memory and becomes a process,

179. Head node pointer always points to the _____ of the linked list?

Current node

direction. With the help of these pointers, you can move in the clockwise direction or anti-clockwise direction. Head node pointer will remain at its position. You don't need to change it. If there is a need to remove the node pointed by head node than you

180. The abstract data type refers to the basic mathematical concept that defines the

Data type....confirm

implemented with the use of a particular hardware or software data structure. The term abstract data type (ADT) refers to the basic mathematical concept that defines the data type. We have discussed four different implementations of the list data structure. In case of implementation of the list with the use of an array, the size of the

181. Set() method of list class is used to

Set the value of object....confirm

In line 12, the value of the passed in parameter x, is set in the newly created node

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object using the set() method.

182. The next field in the last node in a singly-linked list is set to ____-.

NULL....confirm

Circularly-linked lists

Let's talk about circularly linked list. The next field in the last node in a singly-linked list is set to NULL. The same is the case in the doubly-linked list. Moving along a singly-linked list has to be done in a watchful manner. Doubly-linked lists have two

183. The postfix form of the expression $A+B*C$ and $(A+B)*C$ will be __

Different ...confirm

employ the infix form of expressions. Consider the infix expressions ' $A+B*C$ ' and ' $(A+B)*C$ '. The postfix versions are ' $ABC*+$ ' and ' $AB+C*$ ' respectively. The order

184. Each node in a singly linked list contains two fields, one field called data field while other field contains

Pointer to next node.....confirm

69. Each node in a singly linked list contains two fields, one field called data field while other field contains:

a) Pointer to an integer

b) Pointer to character

c) Pointer to next node

185. On performing which task on the list implementing array has to visit the entire from start to end

Finding an element.....confirm

▪ find

The worst-case in find is that we may have to search the entire list. In find, we have to search some particular element say x . If found, the *currentNode* pointer is moved at that node. As there is no order in the list, we have to start search from the beginning of the list. We have to check the value of each node and compare it with x (value to be searched). If found, it returns true and points the *currentNode* pointer at that node otherwise returns false. Suppose that x is not in the list, in this case, we have to search the list from start to end and return false. This is the worst case scenario. Though time gets wasted, yet we find the answer that x is not in the

186. Consider the linked list having data [6, 72, 35, 65, 25] stored in it. While current pointer is pointing to memory location having 35 stored in it. What will be the resultant linked list after calling add(18) function on the given linked list

6, 72, 35, 18, 65, 25.....confirm

187. In __ various cells of memory are not located continuously

Linked list....confirm

there is need of using linked memory in which the various cells of memory, are not located continuously. In this process, each cell of the memory not only contains the value of the element but also the information where the next element of the list is

188. Consider the linked list implementation of a stack. Which of the following node is considered as top of the stack?

First node....confirm

Q. Which of the following is considered as the top of the stack in the linked list implementation of the stack?

- A. last node
- B. first node
- C. random node
- D. middle node

Answer» B. first node

189. Memory address is stored in Pointer.....confirm

Memory address (Raise For Success) is stored in:

- Address operator
- Reference
- Pointer Correct

190. “-” is a _____ operator Unary.....confirm

Precedence of Operators

There are five binary operators, called addition, subtraction, multiplication, division and exponentiation. We are aware of some other binary operators. For example, all relational operators are binary ones. There are some unary operators as well. These require only one operand e.g. – and +. There are rules or order of execution of operators in Mathematics called precedence. Firstly, the exponentiation operation is

191. Which of the following is the limitation of the array? Fix size.....confirm

Which of the following (Raise For Success) is the limitation of the array?

- Cannot store user define objects
- Cannot store more than 1000 elements
- Have to random access
- Fix size Correct

192. In singly linked list a node consists of two parts: Object and pointer....confirm

In singly linked list a node consists of two parts:

1. Object and structure
2. Two pointers
3. Two objects
4. Object and pointer

193. Stack and Queue can be implemented using _____.

Singly Link List or doubly link list....confirm

requirements, we can change the list implementation. It can be implemented with the use of singly-link list or doubly link list. As long as the interface is same, a

194. _ is a collection of elements arranged in a linear order.

Stack.....confirm

"Stack is a collection of elements arranged in a linear order"

195. Consider the following infix expression

$7/8 + 9$

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

78/9+ confirm

Infix: 7/8+9

Infix to Postfix

Postfix: 78/9+

Step by

196. Which of the following operation is used to get an element from the top of stack?

Push(x).....confirm

push(x)	Insert x as the top element of the stack
---------	--

197. Which one of the following operations returns and removes top value of the stack.

Pop()....confirm

pop()	Remove the top element of the stack and return it.
-------	--

198. Which one of the following operations returns top value of the stack without removing it.

Top().....confirm

top()	Return the top element without removing it from the stack.
-------	--

199. _____ method returns the top element of the stack without removing it.

Top()....confirm

top()	Return the top element without removing it from the stack.
-------	--

200. What will be the postfix expression of following infix expression?
A*B/C+D-E

AB + CD/ + E - ..confirm

What will be the postfix expression of following infix expression?
A*B/C+D-E

1. A B / C * D + E -
2. A B * C / D + E -
3. A B * C + D E / -
4. A B + C D / + E -

201. In the statement template <T>. T represents _____.

Generic data type.....confirm

function, we have written

```
template <class T>
Stack<T> :: Stack() ;
```

This means that we are writing a template function that uses *T* wherever a data type is written. As we have declared the Stack class as a template class, <T> will be written with the class name before the access specifier (i.e. ::) while defining a method of the class. Then there is the implementation of the constructor in which we assign the value -1 to *top* and allocate memory by using the *new* operator for stack of size MAXSTACKSIZE of type *T* and put its starting address in the pointer *nodes*. It is pertinent to note that we create an array of type *T* (i.e. a generic type). Similarly we define the destructor ~Stack, which frees the memory by deleting the

202. The _ method of list will position the currentNode and lastcurrentNode at the start of the list

Start ()...confirm

have added the elements with data values 5, 13, 4, 8, 24, 48 and 12. Later, the start() method of list is called that will position the currentNode and lastCurrentNode at the start of the list. Now there is no need to worry about the implementation of the List.

203. Which of the following is the correct conversion of infix to postfix expression?

ZB+DH-K/-....confirm

Infix: Z+B-(D-H)/K

Infix to Postfix

Postfix: ZB+DH-K/-

204. Which of the following function don't belongs to the stack class?

Crash ().....confirm

which of the following function don't belongs to the stack class?

1. push()
2. pop()
3. crash()

205. Consider we have performed the following operations on a stack of size 5
Pust(10); Push(20); Push(30); Pop(); Pop(); Push(40);

1 or 4 or 20...both...confirm

Consider we have performed the following operations on stack of size 5.

Push(10);
Push(20);
Push(30);
Pop();
Pop();
Push(40);

1. 10
2. 20
3. 40
4. 20

206. Consider we have performed the following operations on a stack of size 5
Pust(10); Push(20); Push(30); Pop(); Push(40); Push(50); Pop();

4....confirm

207. In singly linked list a node comprises of _____ field/s

Two.....confirm

A singly link list's node is divided into two field.

208. Each operator in a postfix expression refers to the previous __ operands.

One.....confirm

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

1. **One**

209. Which of the following signature of the constructor function for a stack is correct as a generic data type?

Template<stack T>;

210. Last node in circular linked list contains

No null pointer....confirm

21. Last node in **circular linked list** contains

a) At least one null pointer

b) No null pointer

211. Back() method of list class is used to

Move the current position backward one element....confirm

back()	Move the current position backward one element
--------	--

212. Next() method of list class is used to

Move the current position forward one element....confirm

next()	Move the current position forward one element
--------	---

213. Tail() method of list class is used to

Move the “current” pointer to the very last element....confirm

tail()	Moves the “current” pointer to the very last element
--------	--

214. Start () method of list class is used to

Moves the “current” pointer to the very first element....confirm

Functions	Description
start()	Moves the “current” pointer to the very first element

215. To search an element which method of the list searches the entire list from beginning to end?

Find().....confirm

To search an element (Raise For Success) which method of the list searches the entire list from beginning to end?

- end():
- find(): Correct

216. In _ various cells of memory

217. If we use array to implement list, then there is an issue that gives difficulty when:

We will increase its size.....confirm

If we use array to implement list, then there is an issue that it gives difficulty when:

1. We will access values randomly
2. We will remove data from it
3. We will increase its size

All Updated MCqs the yahn tak file bhe upload krdon ga tommarrow ya phir 7 jun ko...JAZAKALLAH...Yad rahy ye promise nhe ker rhaa hon ...zindagi or mout ka hmy nhe pata hota try kron ga apni...copy that ☺))

218. For a perfect binary tree of height 4, what will be the sum of highest of node.

26

$$S = (2^{h+1} - 1) - (h+1) = (2^{4+1} - 1) - (4+1) = (2^5 - 1) - (5) = 31 - 5 = 26$$

219. If Ahmed is cousin of Ali and Ali is cousin of Asad then Ahmed is also cousin of Asad.

Transitivity....confirm

If Ahmad is **cousin of Ali** and Ali is cousin of Asad then Ahmad is also cousin of Asad. This statement has the following property

1. Reflexivity
2. Symmetry
3. **Transitivity**

220. Suppose there are 100 elements in an equivalence class, so initially there will be 100 trees the collection of these trees is called.

Forest....confirm

Suppose there are 100 elements **in an** equivalence class, so initially there will be 100 trees. The collection of these trees is called

1. Cluster
2. Class
3. **Forest**

221. The percolate Down procedure will move the smaller value and bigger value.

Up,down....confirm

will move downwards. In this regard, percolate procedures may be of great help. The *percolateDown* procedure will move the smaller value **up** and bigger value **down**.

222. For a perfect binary tree of height h, having N nodes, the sum of height of nodes is

$N - h - 1$ confirm

the **sum of heights** of nodes will be equal to $N - h - 1$.

223. If we want to find median of 50 elements, then after applying builtHeap method, how manytime deleteMin method will be called

25....confirm

If we want to find median of 50 elements, then after applying buildHeap methd, how many times deleteMin method will be called?

1. 5
2. 25

224. The Expression if(!heap-> isEmpty()) check
Heap is not empty....confirm

The expression
if (! heap ->isFull())
check

1. Heap is not empty
2. Heap is not full

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

decreaseKey(p, delta).....confirm

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

1. increaseKey(p,delta)
2. decreaseKey(p,delta)

226. Given the values are the array representation of heap; 12 23 26 31 34 44 56 64 78 100. What is the 5th smallest element in the given heap?

34.....confirm

given the values are the array representation of heap:
12 23 26 31 34 44 56 64 78 100
What is the 5th smallest element in the given heap?

1. 31
2. 34

227. Given the values are the array representation of heap; 12 23 26 31 34 44 56 64 78 100. If we perform 4 deleteMin operations the last element deleted is?

31....confirm

given the values are the array representation of heap:
12 23 26 31 34 44 56 64 78 100
If we perform 4 deleteMin operations, the last element deleted is _____.

1. 31

228. If the elements are 3, 5, 1, 6 in which order they will be removed from the Queue one by one?

3 5 1 6

229. The _____ of a binary tree is the maximum level of its leaves (also called the depth).

Height...confirm

- The *height* of a binary tree is the maximum level of its leaves (also called the depth).

230. The _____ of a binary tree is the maximum level of any leaf in the tree.

Depth...confirm

The *depth* of a binary tree is the maximum level of any leaf in the tree.

231. Following is a keyword of C++ _____.

Delete....confirm

Following is a keyword of C++ _____ .

1. del
2. delete

232. Analyze the given code carefully and identify which type of binary tree traversal this is;

```
Void traversal ( treeNode<int>*treeNode)
{
if(treeNode !=Null)
{
cout << *(treeNode->getinfo())<< " ";
Traversal ( treeNode->getleft( ));
Traversal ( treeNode->getRight( ));
}
}
```

Preorder....confirm

Let's write the C++ code for it. Following is the code of the *preorder* method.

```
void preorder(TreeNode<int>* treeNode)
{
if( treeNode != NULL )
{
cout << *(treeNode->getInfo())<<" ";
preorder(treeNode->getLeft());
preorder(treeNode->getRight());
}
}
```

233. The ____ of a node in a binary tree is defined as the height of its left subtree minus height of its right subtree.

Balance....confirm

The balance of a node in a binary tree is defined as the height of its left subtree minus height of its right subtree.

234. If p is pointing to a node in an existing tree then info(p) means;

Returns the contents of node p...confirm

We can define different operations on binary trees.
If p is pointing to a node in an existing tree, then

- $\text{left}(p)$ returns pointer to the left subtree
- $\text{right}(p)$ returns pointer to right subtree
- $\text{parent}(p)$ returns the father of p
- $\text{brother}(p)$ returns brother of p .
- $\text{info}(p)$ returns content of the node.

235. If p is pointing to a node in an existing tree then $\text{left}(p)$ means;
Returns pointer to the left subtree p.....confirm

If p is pointing to a node in an existing tree, then

- $\text{left}(p)$ returns pointer to the left subtree

236. If p is pointing to a node in an existing tree then $\text{right}(p)$ means;
Returns pointer to right subtree....confirm

If p is pointing to a node in an existing tree, then

- $\text{left}(p)$ returns pointer to the left subtree
- $\text{right}(p)$ returns pointer to right subtree

237. If p is pointing to a node in an existing tree then $\text{parent}(p)$ means;
Returns the father of p.....confirm

If p is pointing to a node in an existing tree, then

- $\text{left}(p)$ returns pointer to the left subtree
- $\text{right}(p)$ returns pointer to right subtree
- $\text{parent}(p)$ returns the father of p

238. If p is pointing to a node in an existing tree then $\text{brother}(p)$ means;
Returns brother of p.....confirm

We can define different operations on binary trees.
If p is pointing to a node in an existing tree, then

- $\text{left}(p)$ returns pointer to the left subtree
- $\text{right}(p)$ returns pointer to right subtree
- $\text{parent}(p)$ returns the father of p
- $\text{brother}(p)$ returns brother of p .

239. Every _____ tree is a binary search tree.

AVL.....confirm

Every AVL tree is a binary search tree.

240. If a function has recursive call as the last statement it is known as ____.

Tail recursion....confirm

During in-order traversal using recursive calls, if we found a node is NULL it means this node will satisfy following condition

241. During in-order traversal using recursive calls, if we found a node is NULL it means this node will satisfy following condition

It will not have left child.....confirm

During in-order traversal using recursive calls, if we found a node is NULL. It means this node will satisfy following condition.

Select correct option:

It will not have left child ok

242. In binary search tree deleting a node is easy if it is a _____ node

Root....confirm

In binary search tree deleting a node is easy if it is a..... node

Root

243. Which of the following operation returns the contents of a binary tree node?

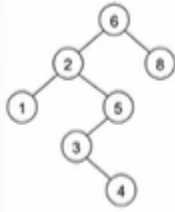
Info(p)....confirm

We can define different operations on binary trees. If p is pointing to a node in an existing tree, then

- $\text{left}(p)$ returns pointer to the left subtree
- $\text{right}(p)$ returns pointer to right subtree
- $\text{parent}(p)$ returns the father of p
- $\text{brother}(p)$ returns brother of p .
- $\text{info}(p)$ returns content of the node.

244. What will be level order of the given BST?

Orange Monkey Team



6,2,8,1,5,3,4

245. In a complete binary tree the number of nodes at level 5 are

31....confirm

no. of level in binary tree $5(5+1) + 1 = 31$

246. One should be careful about transient _____ that are stored by reference in data structures.

Objects....confirm

One should be careful about transient objects that are stored by reference in data structures.

247. In a tree we link the nodes in such a way that it _____ a linear structure.

Does not remain....confirm

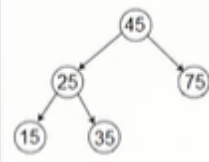
allocate memory, link and set pointers to it. It is not much difficult process we link the nodes in such a way that it does not remain a linear structure. 100,000, we have 1 million or 10 million or even 1 billion numbers and we

248. The function calls are made with the help of _____.

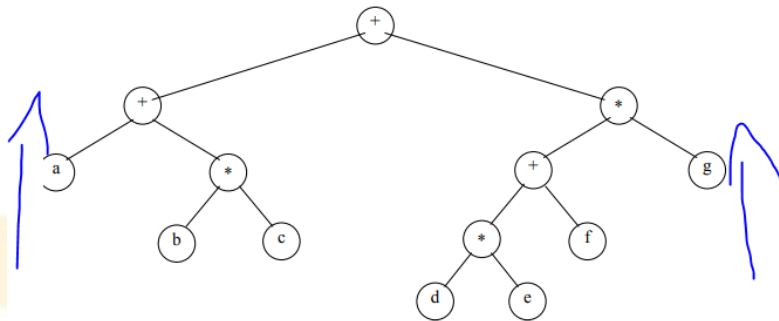
Stack....confirm

that function calls are made with the help of stacks.

249. What will be the postorder traversal of the given tree?



15,35,25,75,45.....confirm



Postorder traversal: a b c * + d e * f + g * +

250. A binary tree is said to be a _____ binary tree if every non-leaf node in a binary tree has non-empty left and right subtrees.

Strictly....confirm

There is a version of the binary tree, called strictly binary tree. A binary tree is said to be a strictly **binary tree** if **every non-leaf node in a binary tree has non-empty left and right subtrees.**

251. In which of the following tree for each node the value of root node is greater than left child and smaller than right child?

Complete binary tree...confirm

268. In which of the following tree for each node, the value of root node is greater than **left child and smaller than right child?**

- a) Binary search Tree
- b) Full Binary Tree

c) Complete Binary Tree

252. Two common models of simulation are _____ and _____.

Time-based, event-based....confirm

Let's discuss little bit about the simulation models. Two **common models** of simulation are **time-based simulation and event-based simulation.** In time-based

253. Generally there is/are _ case(s) to delete a node from BST.

3.....confirm

There are ____ cases for deleting a node from binary search tree.

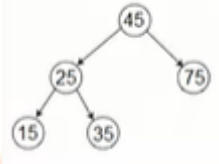
- a. 1
- b. 2
- c. 3

254. When a function calls another function the parameters and return address of the calling function are put in ____.

Stack...confirm

We know that function calls are made with the help of stacks. When a function calls some other function, the parameters and return address of the function is put in a stack. The local variables of the function are also located at the stack and the control

255. What will be the inorder traversal of the given tree?



15,25,35,45,75....confirm

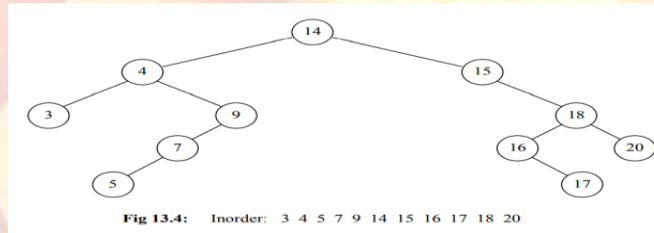


Fig 13.4: Inorder: 3 4 5 7 9 14 15 16 17 18 20

256. ~BinarySearchTree() is a ____
Constructor.....confirm

~BinarySearchTree() is a ____.

1. Constructor

257. We can calculate the ____ of a subtree by counting its levels from the bottom.

Height....confirm

We can calculate the height of a subtree by counting its levels from the bottom.

258. If there is a strictly complete binary tree of depth 3 the total number of nodes in it will be?

7....confirm

If **there is a strictly** complete binary tree of depth 3 the total number of nodes it will be

7

259. In which of the following function signatures the value of variable "num" cannot be changed in function body?

Int cube (int num).....confirm

In which of the following function signatures, the **value of variable "num"** cannot be changed in function body?

1. **int cube(int num)**

260. A _____ model attempts to model a real-world phenomenon.

Simulation.....confirm

Out of the numerous uses of the queues, one of the most useful is *simulation*. A simulation program attempts **to model a** real-world phenomenon. Many popular video

261. The process of getting the value of a variable using pointers is called
Deferencing.....confirm

The process of **getting** the value of a variable using a pointer is called

Dereferencing

262. When a function calling itself is called as _____.

(Recursive or recursion) both.....confirm

A function that calls itself is said to be **recursive**.

263. A _____ is a tree in which every level except possibly the last is completely filled

Complete binary tree....confirm

A is a tree in which every level except possibly the last is completely filled

Complete binary tree

264. _____ objects (objects accessed by pointers) are called anonymous objects.

Nameless objects....confirm

starting addresses of those objects to *c1* and *c2* pointers. Nameless objects (objects accessed by pointers) are called *anonymous* objects.

Here *c1* and *c2* are pointers to the objects not the actual objects themselves as it was

265. In the perspective of memory organization each process is divided into _____ sections.

4.....confirm

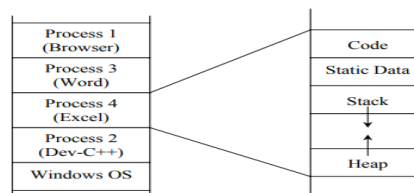


Fig 18.1: Memory Organization

266. Analyze the given code carefully and choose the statement which will be used if we want to set 7 as the value of root?

Int x [] = {14,15,4,9,7,18,4,5,16,4,20,17};

TreeNode * root = new TreeNode();

Root->setinfo(&x[4]);

267. In tree, the search operation is _____ as compared to the linked list.

Very fast....confirm

Thus in a tree, the search is very fast as compared to the linked list.

268. Level-order traversal for binary search tree can be implemented _____.

Only through recursive method confirm

Level-order traversal (Raise For Success) for Binary Search Tree can be implemented _____.

- Only through recursive method Correct

269. _____ is an area in computer memory that is used to allocate memory dynamically.

Heap....confirm

Heap is an area in computer memory that is allocated dynamically.

270. Suppose we want to create the right child of a node 'p' and set the value x in it. Which of the following statement is correct for this operation?

setRight (x,p)....confirm

Suppose we want to create the right child of 'p' and set the value x in it. which of the following statement is correct in this operation

Set Right (x,p)

271. In level-order traversal for binary Search Tree at each level we visit the nodes in _____ order

Left-to-right.....confirm

traversal procedures discussed previously. In level-order traversal, we visit the nodes at each level before proceeding to the next level. At each level, we visit the nodes in a left-to-right order. The traversal methods discussed earlier are inorder, preorder and

272. Which of the following function(s) is/are used for function call by using pointers?

```
void func1(int& num) {  
    num++;  
}  
void func2(int* num){  
    num++;  
}
```

Func2 only....confirm

```
// Function 2, call by using pointers  
int intMinus2( int* oldVal)  
{  
    *oldVal = *oldVal - 2;  
    return *oldVal;  
}
```

273. Which of the following function(s) is/are used for function call by value?

```
void func1(int& num) {  
    num++;  
}  
void func2(int num){  
    num++;  
}
```

func2 only....confirm

```
//Function 1, call by value  
int intMinus1( int oldVal)  
{  
    oldVal = oldVal - 1;  
    return oldVal;  
}
```

274. Which of the following function(s) is/are used for function call by reference?

```
void func1(int& num) {  
    num++;  
}  
void func2(int num){  
    num++;  
}
```

func1 only....confirm

```
// Function 3, call by reference
int intMinus3( int& oldVal)
{
    oldVal = oldVal - 3;
    return oldVal;
}
```

275. In a program a reference variable with name 'x' can be declared as

Int &x;....confirm

55. In a program a reference variable, say x, can be declared as **a) int &x;**

276. Suppose the elements are 3,5,1,6, if we want to enqueue '8' then dequeue all the elements what will be the order of elements?

8,3,5,1,6

After **dequeue()** is called once

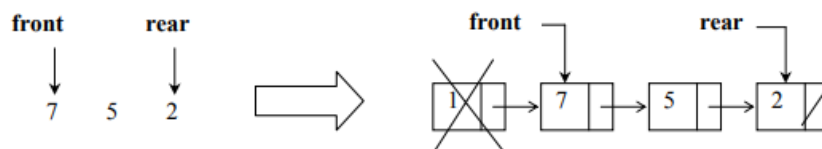


Fig 4. Removal of one element from queue using **dequeue()**

277. Which of the following data structure is linear type?

(List, Queue, Stack)....All options

49. Which of the following data structure **is linear** type?

- a) Stack
- d) List
- c) Queue
- d) All of the above**

278. Analyze the given code carefully and identify which type of binary tree traversal this is;

```
void traversal ( treeNode<int>*treeNode)
{
if(treeNode != Null)
{
traversal ( treeNode->getleft( ));
cout << *(treeNode->getinfo( ))<< “ ”;
Traversal ( treeNode->getRight( ));
}
}
```

Inorder....confirm

Here is the code of the *inorder* function.

```
void inorder(TreeNode<int>* treeNode)
{
if( treeNode != NULL )
{
inorder(treeNode->getLeft());
cout << *(treeNode->getInfo())<<" ";
inorder(treeNode->getRight());
}
}
```

279. Analyze the given code carefully and identify which type of binary tree traversal this is;

```
void traversal ( treeNode<int>*treeNode)
{
if(treeNode != Null)
{
traversal ( treeNode->getleft( ));
Traversal ( treeNode->getRight( ));
cout << *(treeNode->getinfo( ))<< “ ”;
}
}
```

Postorder.....confirm

```
void postorder(TreeNode<int>* treeNode)
{
    if( treeNode != NULL )
    {
        postorder(treeNode->getLeft());
        postorder(treeNode->getRight());
        cout << *(treeNode->getInfo())<<" ";
    }
}
```

280. Doubly Linked list always has one Null pointer.

False....confirm

implemented using list, there will be 1000 extra pointer variables. Remember that stack is implemented using 'singly-linked' list. Otherwise, for doubly linked list, this overhead is also doubled as two pointer variables are stored within each node in that case.

CS301 quiz(1) file

By

<https://vuonlinehelp.blogspot.com/>

Compose by (ALI HASSAN)

If the elements are 3, 5, 1, 6 in which order they will be removed from the queue one by one

3516

The.....of a binary tree is a maximum level of its leaves (also the depth).

height

.....of the an empty AVL tree is define to be

Height

Following is the keyword of c++

Delete

In the perspective of memory organization every process expecting the first part of memory is for.....of the program.

code

The.....of a node in a binary tree is define as the height of its left

subtree minus height of its right subtree.

balance

If p is pointing to a node in an existing tree then info (p) means

Return the content of node p.

Following is a keyword of c++.....

Delete

Every.....tree is a binary search tree

AVL

If a function has recursive call as last statement it is known as.....

Tail recursive

During in a order traversal call if we found a node is null it means this node will satisfy following condition

it will not have left child

In binary search tree deleting a node is easy if it is a..... node

Root

Which of the following operation returns the content of binary tree node?

Info (p)

1 2 6

5 8

3

4

1 2 3 4 5 6 8

in a complete binary tree the number of node of level 5 are

30

One should be careful about transient.....that are stored by reference I data structure

Objects

In a tree we link the node in such a way that it.....a linear structure

does not remain

the function call are mode with the help of.....

stack

18. 15 25 45

35 75

15 35 25 75 45

A binary is said to be a.....binary tree if every non leaf node in binary tree has non empty left and right structure

Strictly

In which of the following function signature the value of variable num cannot be changed in function body

Binary search tree

Two common method of simulations are.....are.....

Time based simulation and event based simulation

Generally there are case (s)to delete a node from BST

1

When a function calls another function the parameters and address of the calling function are put in...

Stock

Binary search tree ()is a.....

Destructor

We can calculate the.....of subtree by counting its level from the bottom

Nodes

If there is a strictly complete binary tree of depth 3 the total number of nodes it will be

7

A model attempt to model real word phenomenon

Simulation

The process of getting the value of a variable using a pointer is called

Dereferencing

When a function calling itself is called as.....

Recursion

A.....is a tree in which every except possibly the last, is completely filled

Strict binary tree

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

1

If a node is inserted in outer side of a node in binary search tree then to make it AVL tree,

We may have to apply single rotation

A zigzag rotation is performed. In Left-Left case of rotation in AVL tree.

False

The principal benefit of a linked list over a conventional array is that the order of the linked items may be_____ from the order that the data items are stored in memory.

Same

Stack.push(15) will push 15 on _____.

Top of the stack

Suppose we have the following values to be inserted in constructing AVL tree,

10,13,15,5,7,8

Tell when first rotation will take place,

After inserting the node 15

All the objects created using _____ operator have to be explicitly destroyed using the delete operator.

New

During the execution of a process, operating system constructs four things for that process. Which of the following is not part of that process?

Linked list

There are _____ cases of Rotation in AVL tree.

4

Which of the following line of code is incorrect?

`Float *l = float new` (not confirmed)

In simple or singly linked list there is/are _____ pointer/s in each node.

One

Suppose there are three nodes tree with three numbers 14, 4, 15. Following is not a permutation, or combination for output them.

(4, 4, 15)

The type of expression in which operator succeeds its operands is _____ expression.

Postfix

The _____ of a node in a binary tree is defined as the height of its left subtree minus height of its right subtree.

Balance

If both left and right nodes of a node are NULL then this type of node is called a _____ node.

Non leaf (not confirmed)

The function calls are made with the help of_____.

Stack

Which data structure is needed to convert infix expression to postfix expression?

Stack

In case of insertion of right inner node in BST,

Left rotation then right to make AVL

A BST generated from the data in ascending order is _____.

Linear

Which operation of queue data structure is used to get front element from the queue and then remove it from the queue?

Remove ()

In _____ various cells of memory are not located continuously.

Linked list

The _____ method of list will position the currentNode and lastCurrentNode at the start of the list.

Start

Which operation of queue data structure is used to insert an element into the Queue?

Enqueueer ()

From Operating System point of view, the recursive function calls are made with the help of _____.

Queue

We can make a lexicographic order of characters based on their _____.

ASCII values

What are the basic things associated with data structures?

All of the above

Consider the following push operations of a Stack:

Stack.push(4);

Stack.push(6);

Stack.push(5);

Stack.push(8);

If a user calls a pop() operation, then which value will be returned?

8 (stack is last in first out)

~BinarySearchTree() is a _____.

Destructor

Array cells are _____ in computer memory.

Contiguous

Leaf node of binary search tree contains _____

One Null Pointer

dequeue() operation of queue data structure is used to _____

remove an element from the front and return it

The depth of a binary tree is

Maximum level of a leaf

Which of the following operation returns but do not removes top value of the stack?

Top

Which of the following data structure is linear type?

All of above

In doubly linked list a node consists of three parts:

2 pointers and 1 object

Last node in circular linked list contains

No null pointer

A _____ model attempts to model a real-world phenomenon

Simulation

Factorial is an example of _____ function.

Recursive

The balance of a node in a binary tree is defined as the height of its _____ sub tree minus height of its right sub tree.

Left

In case of insertion of left outer node in BST,

We first apply left rotation and then rotation to make it an AVL Tree.

`int htdiff = height(root->getLeft()) - height(root->getRight());` The above line of code is taken from AVL insert method. Complete it by selecting an appropriate symbol.

Minus (-)

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

Two

For making Binary Search Tree for Strings we need, _____ data type.

Int

A _____ model attempts to model a real-world phenomenon

Simulation

The lifetime of a transient object cannot exceed that of the application.

True

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

Call by passing the value of the argument

In level-order traversal for Binary Search Tree, we visit the nodes at each level before proceeding to the next level, in a _____ order.

Left-to-right

In doubly linked list a node consists of three parts:

1 pointer and 2 objects

Binary Search Tree violates the condition of AVL tree when any node has balance equal to

1 or -1

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

True

How many cases of rotation are there in AVL tree?

4

_____ tree has been named after two persons Adelson-Velskii and Landis.

AVL

Which of the following is a nonlinear data structure?

Tree

AVL tree is nonlinear data structure.

True

_____ is when function is calling to itself.

Recursion

Which of the following function don't belongs to the stack class?

Crash ()

Which one is the cored function call for the following function of calculating cube?

```
int cube(int& num)
```

cube (num)

Binary search algorithm cannot be applied to ____

None of the given

copy() method of list data structure _____

Set one list to be a copy of another

While implementing non-recursive traversal for Binary Search Tree, we need to implement

Stack

Following is true in case of using Recursive method calls

The code becomes very short

_____is a self-balancing tree.

Binary Search Tree

While implementing stack with an array and to achieve LIFO behavior, we used push and pop elements at

The start of the array

Generalized code written for a class is called

Structure

Array cells are _____ in computer memory

Contiguous

In singly linked list a node comprises of _____ field/s.

Two

Which of the following statement is false?

Pointers store the next data element of a list

Leaf node of binary search tree contains _____

One null Pointer

What will be the result of evaluating following expression?

$5 + 3 * 2 / (6 - 3)$

7

Want and de-allocating memory for linked list nodes does take less time than pre-allocated array

MORE

Suppose you are writing a class for Node class and forgot to write the constructor of the class, then

Compiler will automatically generate a default constructor

Factorial is an example of _____ function.

Recursive

A binary tree is said to be a _____ binary tree if every non-leaf node in a binary tree has non-empty left and right subtrees.

Strictly

Memory address is stored in

Pointer

In level-order traversal for Binary Search Tree, _____ data structure is used.

Queue

Which of the following is the correct option for priority Queue?

The type of queues that is FIFO i.e. the person who comes first should leave first.

AVL tree is linear data structure.

False

AVL tree is a binary search tree

True

The post order traversal of a binary tree is DEBFCA. Find out the pre order traversal

A

Λ

B C

$\wedge /$

D E F

ABDCEF

In a tree, we link the nodes in such a way that it _____ a linear structure.

Does not remain

add(12) method of linked list class will:

Add 12 as value in linked list

Which of the following is the correct conversion of infix to postfix expression?

$Z+B-(D-H)/K$

ZB+DH-K/-

In singly linked list "next" field of node contains:

Address of next node

Which of the following line of code is incorrect?

The lifetime of a transient object can exceed that of the application which is accessing it.

A list is the collection of items of the _____

same type

back() method of List class is used to:

Moves the "current" pointer to backward one element.

Suppose you are writing a class for Node class and forgot to write the constructor of the class, then

_____ is the maximum height of the AVL tree.

$1.44\log_2 n$

length() method of List class is used to:

Return the length of the list

There are four cases of rotation in an _____ tree.

AVL

Allocating and de-allocating memory for linked list nodes does take _____ time than pre-allocated array.

More

_____ is utilized at the time of memory allocation in dynamic manner.

Heap

In which case of insertion we require double rotation to make the AVL tree balance.

None

The back() method decreases the value of variable current by _____.

One

In array list the worst case of removing an element is

To remove the item from start

Left, right, info, and parent are the operations of _____ data structure.

Tree

Which of the following is TRUE for search operations in a binary tree as compared to linked list or an array?

It increase the number of comparison

Which of the following is a correct statement?

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

length() method of List class is used to:

Return the length of the list

Whenever we call a function, the compiler makes a stack, the top element of the stack is _____ of the function.

Return Address

Whenever we call a function, the compiler makes a _____ that it uses to fulfill this function call.

Stack

_____ is the major factor to see the efficiency of a program.

Time

_____ rule applies for evaluating operators of same precedence in an expression

None

The postfix form of the expression $A + B * C$ and $(A + B) * C$ will be _____.

Same

If we use array to implement list, then there is an issue that it gives difficulty when:

We will access value randomly

During in-order traversal using recursive calls, if we found a node is NULL. It means this node will satisfy following condition.

It will not have left child

Which one the following is more closer to AVL tree, (chose the best option)

Binary Search Tree

start() method of List class is used to:

Move the current pointer to first element

Consider the following infix expression. $7/8 + 9$

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

78/9+

In internal memory organization of a process, there is some area of memory for static data that holds _____ variables.

Both Static and Global

In Left-Right case of rotation in _____ tree. A double rotation is performed.

AVL

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

5

Which one is not the property of binary tree?

Sibling node should be same parent (Not Sure)

Each node in singly linked list contains_____

One Pointers

What's wrong with following loop? `while( (i < 10) && (i > 24)) { }`

The Condition is always false

Which one of the following is TRUE about recursion?

1. Recursive function calls consume a lot of memory.
2. Recursion extensively uses stack memory.
3. Recursion extensively uses stack memory.
4. Iteration is more efficient than iteration.

Which of the following is not a data structure ?

1. Linked list

2. Queue
3. stack
4. Memory cell

“+” is a _____operator.

1. Unary
2. Binary
3. Ternary
4. None of the above

When an executable program run, it is loaded in the memory and becomes a_____.

1. Thread
2. .h file
3. Process
4. None of the above

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In array list the worst case of removing an element is

1. To remove an element from the end of the list
2. To remove an element from the middle of the list
3. To remove an element from the start of the list
4. We cannot remove element from an array list

The tree data structure is a

1. Linear data structure

2. Graphical data structure
3. Non-linear data structure (Not Confirm)
4. Data structure like queue

In_____, a programmer uses two pointers in the node, i.e. one to point to next node and the other to point to the previous node.

1. Linked list
2. doubly-link list
3. array
4. Structure

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

1. one
2. two
3. three
4. four

Which of the following operations returns top value of the stack?

1. push
2. pop
3. top
4. First

In the calling function, after the execution of the function called, the program continues its execution from the _____ after the function call.

1. Previous line
2. Next line
3. Beginning
4. None of the above

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

1. Queue
2. Stack
3. Both of these
4. None of these

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

1. After all other entries that are greater than the new entry.
2. At the head
3. After all other entries that are smaller than the new entry.
4. At the tail

Which of the following is known as "Last-In, First-Out" or LIFO Data Structure?

1. Linked List
2. Stack
3. Queue
4. Tree

A queue is a _____data structure, whereas a stack is a _____data structure.

1. FIFO, LIFO

Each node in doubly link list has

1. 2
2. 3
3. 4

Whenever we call a function, the compiler makes a stack, the top element of the stack is _____ of the function

1. First argument
2. Return address
3. Last argument
4. none of the above

_____ is the stack characteristic but _____ was implemented because of the size limitation of the array.

1. isFull(),isEmpty()

2. pop(), push()
3. isEmpty() , isFull()

Stack and Queue can be implemented using _____,

1. Singly Link List
2. Binary Tree
3. Binary Search Tree
4. AVL Tree

The _____ method of list will position the currentNode and lastCurrentNode at the start of the list.

1. Remove
2. next
3. start
4. back

In array list the worst case of removing an element is

1. To remove an element from the end of the list

2. To remove an element from the middle of the list
3. To remove an element from the start of the list
4. We cannot remove element from an array list

STL is a _____ that is a part of the official standard of C++.

1. C program file

2. .h file

When an executable program run, it is loaded in the memory and becomes a_____.

1. Thread

2. .h file

3. Process

4. None of the above

Each node in doubly link list has,

1. pointer

2. pointers

3. pointers

4. pointer

A queue is a _____data structure, whereas a stack is a _____data structure.

1. FIFO, LIFO

2. LIFO,FIFO

3. both of these

4. none of these

Which one of the following is TRUE about recursion?

1. Recursive function calls consume a lot of memory.

2. Recursion extensively uses stack memory.

3. Recursion extensively uses stack memory.
4. Iteration is more efficient than iteration.

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

1. Double linked list
2. Circularly-linked list
3. Linked list
4. None of the above

_____ is the stack characteristic but _____ was implemented because of the size limitation of the array.

1. isFull(),isEmpty()
2. pop(), push()

3. isEmpty() , isFull()

4. push(),pop()

The principal benefit of a linked list over a conventional array is that the order of the linked items may be_____ from the order that the data items are stored in memory.

1. Same

2. Identical

3. Different

4. Equivalent

In_____ the 'next' returns false when it reaches to the last node due to the fact that the next field of the last node is set to NULL.

1. Circular linked list

2. Triple linked list

3. Singly linked list

4. None of the above

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

1. 48

2. 4

3. 333

4. 5

Which boolean expression indicates whether the numbers in two nodes (p and q) are the same. Assume that neither p nor q is null.

1. `p == q`

2. `p.data == q.data`

3. `p.nextNode == q.nextNode`

4. `p.data == q`

Local variables of a function are stored in,

1. Binary Search Tree

2. Stack

3. Queue

4. AVL Tree

A queue is a data structure where elements are

1. inserted at the front and removed from the back.

2. inserted and removed from the top.

3. inserted at the back and removed from the front.

4. inserted and removed from both ends.

A kind of expressions where the operator is present between two

operands called _____expressions.

1. Infix

2. Postfix

3. Prefix

4. None of the above

A template is a function or class that is written with a _____data type.

1. Specific

2. Definite

3. Generic

4. None of the above.

Whenever we call a function, the compiler makes a stack, the top element of the stack is _____ of the function.

1. First argument

2. Return address

3. Last argument

4. None of the above

Which of the following can be used to reverse a string value,

1. Stack

2. Queue

3. Both of these

4. None of these

A queue is a _____data structure, whereas a stack is a _____data structure.

1. FIFO, LIFO

2. LIFO,FIFO
3. both of these
4. none of these

Stack and Queue can be implemented using _____,

1. Singly Link List
2. Binary Tree
3. Binary Search Tree
4. AVL Tree

Which of the following is not a data structure ?

1. Linked list
2. Stack
3. Queue
4. Memory cell

Compiler uses which one of the following in Function calls,

1. Stack
2. Queue
3. Binary Search Tree
4. AVL Tree

The principal benefit of a linked list over a conventional array is that the order of the linked items may be_____ from the order that the data items are stored in memory.

1. Same
2. Identical
3. Different
4. Equivalent

Doubly Linked List always has one NULL pointer.

1. True
2. False

We cannot remove items randomly from _____

1. Stack
2. Queue
3. Both of these
4. None of these

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

1. Zero
2. $2n$ (where n is the number of nodes in linked list)
3. Any Number
4. None of these

“+” is a _____operator.

1. Unary
2. Binary
3. Ternary
4. None of the above

In_____, a programmer uses two pointers in the node, i.e. one to point to next node and the other to point to the previous node.

1. Linked list
2. doubly-link list
3. array
4. structure

A queue is a data structure where elements are

1. inserted at the front and removed from the back.
2. inserted and removed from the top.

3. inserted at the back and removed from the front.

4. inserted and removed from both ends.

_____ is the stack characteristic but _____ was implemented because of the size limitation of the array.

1. isFull(),isEmpty()

2. pop(), push()

3. isEmpty() , isFull()

4. push(),pop()

The _____ method of list will position the currentNode and lastCurrentNode at the start of the list.

1. Remove

2. Next

3. Start

4. Back

Parameters in function call are passed using,

-
1. Stack
 2. Queue
 3. Binary Search Tree
 4. AVL Tree

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

1. 48
2. 4
3. 333
4. 5

For a perfect binary tree of height 4, what will be the sum of highest of node

1. 31
2. 30
3. 27

4. 26

If Ahmed is cousin of Ali and Ali is cousin of Asad then Ahmed is also cousin of Asad. This statement has the following property

1. Reflexivity
2. Symmetry
3. Transitivity
4. All of the above

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

1. Reflexive
2. Symmetric
3. Transitive
4. Associative

The main reason of using heap in priority queue is

1. Improve performance

2. Code readable
3. Less code
4. Heap can't be used in priority queues

The total numbers of nodes on 10th level of perfect binary tree are

1. 256
2. 512
3. 1024
4. Can't be determined

Suppose there are 100 elements in an equivalence class, so initially there will be 100 trees, the collection of these trees is called _____.

1. Cluster
2. Class
3. Forest
4. Bunch

The percolate Down procedure will move the smaller value and

bigger value.

1. Left, right
2. Right, left
3. Down, up
4. Up, down

For a perfect binary tree of height h , having N nodes, the Sum of height of nodes is

1. $N - h - 1$
2. $N - 1$
3. $N - 1 + h$
4. $N - (h - 1)$

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

1. Insert
2. Add
3. Update

4. percolateDown

If ahmad is boss of ehsan and ehsan is boss of umer then ahmad is also boss of umer, the above-mentioned relation is_____ .

1. Reflexive
2. Symmetry
3. Transitive
4. None of given

If we want to find median of 50 elements, then after applying builtHeap method, how many times deleteMin method will be called?

1. 5
2. 25
3. 35
4. 50

Which of the following properties are satisfied by equivalence relationship?

1. Reflexive, symmetric

2. Reflexive, transitive

3. Symmetric, transitive

4. Reflexive, symmetric and transitive

Sorting procedure normally takes___ time.

1. $N \log N$

2. $2N$

3. $N * N * N$

4. N

15. The Expression

if (! heap->isFull())

Check

1. Heap is empty

2. Heap is full

3. Heap is not empty

4. Heap is not full

The Expression

if (! heap->isEmpty())

Check

1. Heap is empty
2. Heap is full
3. Heap is not empty
4. Not a valid expression

Given the values are the array representation of heap: 12 23 26 31
34 44 56 64 78

100 If we perform 4 deleteMin operation, the last element deleted is_____ .

1. 31

2. 34

3. 44

4. 56

Which of the following heap method increase the value if key at

position 'p' by the amount 'delta'?

1. increaseKey(p, delta)
2. decreaseKey(p, delta)
3. percolateDown(p, delta)
4. remove(p, delta)

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

1. increaseKey(p, delta)
2. decreaseKey(p, delta)
3. percolateDown(p, delta)
4. remove(p, delta)

Which property of equivalence relation is satisfied if we say:
Ahmad R(is related to)Ahmad

1. Reflexivity
2. Symmetry

3. Transitivity

4. All of Above

Given the values are the array representation of heap; 12 23 26 31 34 44 56 64 78 100 What is the 5th smallest element in the given heap?

1. 31

2. 34

3. 44

4. 56

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For a perfect binary tree of height 4, what will be the sum of highest of node

26

If Ahmed is cousin of Ali and Ali is cousin of Asad then Ahmed is also cousin of Asad. This statement has the following property

Transitivity

Suppose there are 100 elements in an equivalence class, so initially there will be 100 trees, the collection of these trees is called.

Forest

The percolate Down procedure will move the smaller value and bigger value.

Up, down

For a perfect binary tree of height h , having N nodes, the sum of height of nodes is

$N-h-1$

If we want to find median of 50 elements, then after applying builtHeap method, how

Manytime deleteMin method will be called?

25

The Expression

If(!heap-> isEmpty ())

Check

Heap is not empty

Which of the following heap method increase the value if Key at position 'p' by the Amount 'delta'?

Increase Key(p,delta)

Given the values are the array representation of heap; 12 23 26 31 34 44 56 64 78 100

What is the 5th smallest element in the given heap?

34

Which of the following data structure linear type

All of above

in a program a reference variable with name 'x' can be declared as

int &'x';

Object (object oriented by pointers) are called anonymous object

Friend

in the perspective each process divided into.....section

4

In tree the search operation is.....as compared to the linked list

Very fast

Level order transversal for binary tree search can be implemented.....

Only through non recursive method

.....is an area in computer memory that is used to allocate memory dynamically

Stock

Suppose we want to create the right child of 'p' and set the value x in it. which of the following statement is correct in this operation

Set Right (x,p)

In level order traversal for binary search tree of each level we visit node in.....order

Right to left

We can calculate the.....of a subtree counting the level from the bottom

Data items

A is a tree in which every level except possibly the last is completely filled

Complete binary tree

Which of the following calling method does not change the original value of variable passed to a function as an argument?

Call by passing as value

The _____ of a binary tree is the maximum level of its leaves (also called the depth).

Select correct option:

Level

Width

Height

None of the above

Question # 2 of 10 (Start time: 06:40:41 PM) Total Marks: 1

If we write functions for recursive and non recursive inorder traversal method of BST, what will be the difference between its functions prototypes?

Select correct option:

Different return types

Different function names

Different arguments list

Nothing will be different

Question # 3 of 10 (Start time: 06:40:41 PM) Total Marks: 1

binary tree whose every node has either zero or two children is called _____

Select correct option:

Complete binary tree

Binary search tree

Strictly binary tree

None of above

Question # 4 of 10 (Start time: 06:40:41 PM) Total Marks: 1

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

Select correct option:

Call by passing reference of the argument

Call by passing the address of the argument

Call by passing the value of the argument

None of the given options

Question # 5 of 10 (Start time: 06:40:41 PM) Total Marks: 1

Longest path from root node to farthest leaf node is called _____ of tree

Select correct option:

Level

Length

Depth

Node level

Question # 6 of 10 (Start time: 06:40:41 PM) Total Marks: 1

Which of the following statement is false?

Select correct option:

Arrays are dense lists and static data structure

data elements in linked list need not be stored in adjacent space in memory

pointers store the next data element of a list

linked lists are collection of the nodes that contain information part and next pointer

The _____ of a node in a binary tree is defined as the height of its left subtree minus height of its right subtree.

Select correct option:

Height

Balance

Width

None of the above

A tree is an AVL tree if

Select correct option:

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

In a program a reference variable, say x, can be declared as

Select correct option:

int &x ;

int *x ;

int x ;

None of the given options

In which of the following functions, the value of variable cannot be changed in function body?

Select correct option:

int cube(int num)

int cube(int& num)

int cube(const int& num)

int cube(int* num)

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

n (where n is the argument)

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?

x is still 0, but y is now 2.

Write in postfix form $5 * (9 - 7)$

5 9 7 - *

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

Remove a randomly chosen wall if the cells it separates are already in the same set

An array x of 100 integers is declared as

int x[100];

Local variables defined inside function body are _____ automatically at the end of function execution.

Created

Which of the following statement is NOT correct regarding Table ADT?

A table consists of several columns known as entities

In doubly linked list there is/are _____ pointer/s in each node.

Two

"new int[11]" will allocate memory for _____ integers.

11

If a tree has 20 edges/links, then the total number of nodes in the tree will be:

21

In the statement `int& a=b;`

`b` hold the address of variable `a`

Which of the following is NOT an open addressing technique to resolve collisions?

Double hashing

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);`

For a perfect binary tree of height 4, What will be the sum of heights of nodes?

26

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

$\log_2 n$

Which of the following statement is NOT true for reference variable?

References can be uninitialized.

The tree data structure is a

Non-linear data structure

In singly linked list a node consists of two parts:

Object and pointer

The simplest case in a BST to delete a node is:

When the node, that is to be deleted is a leaf node

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

25

$a * (b+c)-d$ is an example of _____ expression.

infix

given the values are the array representation of heap:

12 23 26 31 34 44 56 64 78 100

If we perform 4 deleteMin operations, the last element deleted is _____.

31

In _____, a programmer uses two pointers in the node, i.e. one to point to next node and the other to point to the previous node.

Linked list

Trying to remove an element from an empty stack is called _____.

Underflow of stack

For reference variables, _____ sign is used.

ampersand

Which property of equivalence relation is satisfied if we say:
Ahmad R(is related to) Ahmad

Reflexivity

Suppose there is an image segmented into pixels. Each pixel has _____ neighbour(s).

8

The most difficult case for deleting a node from Binary Search Tree is when the node to be deleted _____.

is Leaf node

When an executable program runs, it is loaded in the computer memory and becomes a _____ .

Process

If class A defines class B as its friend, then:

Class B can access private members of Class A

In the post-order traversal of a binary search tree, nodes process as:

Left-subtree, Right-subtree, Root

The expression $AB+C^*$ is called?

Postfix expression

Binary Search can be categorized into which of following?

Divide and conquer

The main use of AVL tree is:

Storing of data

Select the one FALSE statement about binary trees:

Every binary tree has at least one node.

A table consists of several columns, known as

Fields

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

One

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

57

Which of the following function don't belong to the stack class?

crash()

Which of the following statement is false?

Arrays are dense lists and static data structure

During union by size method, which data structure is used to improve the balancing of tree?

Array

Non-recursive calls are faster than which of the following calls?

Recursive

Binary Search Tree violates the condition of AVL tree when any node has balance equal to

0

Each node in Binary Search Tree has

2 pointers

What will be postfix expression of the following infix expression?

Infix Expression: $a + b * c - d$

$abc * + d -$

The balance of a node is the result of "height of left subtree" _____ "height of right subtree".

Minus

A complete binary tree having "N" nodes consists of _____ Levels.

$\log_2 (N+1) - 1$

Consider a hash table of size seven, with starting index zero, and a hash function $(3x + 4) \bmod 7$. Assuming the hash table is initially empty, which of the following is the contents of table when the sequence 1, 3, 8, 10 is inserted into the table using closed hashing? Note that '_' denotes an empty location in the table.

1, 8, 10, _, _, _, 3

Which one of the following is known as "Last-In, First-Out" or LIFO Data Structure?

Stack

Parameters in function call are passed using,

Stack

If we singly linked list to implement list, then there is an issue that it gives difficulty when we:

Move backward in the list

Which of the following is correct about AVL Tree?

It is identical to BST except height of the left and right subtrees can differ by at most 1.

Insertion in a linked list can be done at

Front, Back and somewhere in the middle

If the height of a perfect binary tree is 4. What will be the total number of nodes in it?

31

AVL tree is linear data structure.

TRUE

During the union by size method, all the array element initialized to -1 shows:

Initial condition of tree

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"?

selppa

Consider the linked list having data [6, 72, 35, 65, 25] stored in it. While current pointer is pointing to memory location having 72 stored in it. After calling add(4) function on the following linked list current point will point to memory location having value?

4

One difference between a queue and a stack is

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

next() method of List class is used to:

Moves the current position forward one element

get(?) method of list class is used to:

Get element at the given position

If we want to find median of 50 elements, then after applying buildHeap methd, how many times deleteMin method will be called?

25

In simple or singly linked list there is/are _____ pointer/s in each node.

One

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

Reflexive

The total number of nodes on 10th level of a perfect binary tree are
:

1024

If there are 100 elements in a heap, and 100 deleteMin operation
are performed, will get _____ list.

Sorted

In simple implementation of stack, isFull() method is used due to
_____.

Limitation of array

If a tree has 50 nodes, then the total edges/links in the tree will be:

49

Following is a keyword of C++ _____ .

Delete

In level-order traversal for Binary Search Tree, at each level, we
visit the nodes in _____ order.

Left-to-right

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

FALSE

If we want to find 3rd minimum element from an array of elements, then after applying buildHeap method, how many times deleteMin method will be called?

3

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

_____.

$\log_2 N$

The _____ method of list data structure removes the element residing at the current position

Remove

Allocating and de-allocating memory for linked list nodes take _____ time than pre-allocated array.

More

In a tree, we link the nodes in such a way that it _____ a linear structure.

Forms

Longest path from root node to farthest leaf node is called _____ of tree.

Depth

In which of the following function signatures, the value of variable "num" cannot be changed in function body?

int cube(int num)

Binary search algorithm cannot be applied to _____ .

sorted linked list

The expression
if (! heap ->isFull())
check

Heap is not full

Which of the following is correct statement?

An AVL tree is identical to BST except height of the left and right subtree can differ by at most 1.

The easiest case of deleting a node from BST is the case in which the node to be deleted _____.

Is a leaf node

Every AVL is _____.

Binary Search Tree

_____ is when function is calling to itself.

Recursion

For a perfect binary tree of height h, having N nodes, the sum of heights of nodes is _____.

$N - h - 1$

The binary tree is the maximum level of its leaves (also called the depth).

Height

Which one of the following is NOT true regarding the skip list?

List Sh contains only the n special keys

Suppose we have been given the following data set for a Queue.

7 5 2 4

What will be the resultant Queue if we call enqueue(3) method?

Note that 7 is the front element whereas 4 is rear element of queue.

7 5 2 4 3

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

int htdiff = height(root->getLeft()) _____ height(root->getRight());

The above line of code is taken from AVL insert method.

Complete it by selecting an appropriate symbol.

-

Which of the following can be used to reverse a string value?

Stack

The next field in the last node of a singly-linked list is set to

_____.

'NULL

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

N +1

A hash function returns a _____ value.

Integer

The union operation is based on size or weight but the reducing the in-between links or path compression from _____ to the _____ is done by the find method.

nodes, root

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

22

_____ in AVL is logarithmic.

Searching

In case of insertion of right inner node in BST,

we need to apply single left rotation to make it AVL tree.

Consider the following infix expression.

$7/8 + 9$

If one converts the above expression into postfix. What would be the resultant expression?

7 8 9 / +

What are the basic things associated with data structures?

All of the given

Which of the following properties are satisfied by Equivalence relationship?

Reflexive, Symmetric and Transitive

For compiler, a postfix expression is easier to evaluate than infix expression?

True

The expression $DE + H^*$ is called _____.

Hybrid expression

Consider the following expression:

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

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

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

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

Value

There are four cases of rotation in an _____ tree.

AVL

In singly linked list which node will keep track of starting position of the list.

Next Node

The depth of a binary tree is

Maximum level of a leaf

What will be the value of root of an AVL and BST if built from the same data?

Root of AVL is square of root of BST

In 1990, Bill Pugh proposed an enhancement on linked lists and the new data structure was termed as

Skip list

Avl tree takes maximum _____ time to search an element.

1.44 $\log_2 n$

Can we store elements with different data types in a single array?

Yes

The _____ of a node in a binary tree is defined as the height of its left subtree minus height of its right subtree.

Balance

What is the depth of any tree if the union operation is performed by height?

$O(\log N)$

If a hash function returns 4 for more than one value, this condition is called _____.

Collision

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

Call by passing the value of the argument

Every AVL tree is a binary search tree.

TRUE

The difference between a "Binary Tree (BT)" and a "Binary Search Tree (BST)" is that,

In BST nodes are inserted based on the values they contain

The worst case of searching in binary search tree (BST) is:

When the data inserted in BST is sorted

Suppose there are 100 elements in an equivalence class, so initially there will be 100 trees. The collection of these trees is called

Forest

Factorial is an example of _____ function.

Recursive

Suppose a hash function returns 6 for the given value. At which index of array the value will be saved?

6

A binary tree of N nodes has _____ .

$\log_2 N$ levels

Every AVL is _____.

Binary Search Tree

If Ahmad is cousin of Ali and Ali is cousin of Asad then Ahmad is also cousin of Asad. This statement has the following property

Transitivity

What is the time complexity of binary search with iteration?

$O(\log n)$

A solution is said to be efficient if it solves the problem within its resource constraints i.e. hardware and time.

True

Searching an element in an AVL tree takes maximum _____ time (where n is number of nodes in AVL tree).

1.44 $\log_2 n$

Which of the following is not a form of expression?

Pastfix

Heap can be used to implement

Priority Queue

Sorting procedure normally takes _____ time.

$N \log N$

Consider we have performed the following operations on stack of size 5.

Push(10);

Push(20);

Push(30);

Pop();

Pop();

Push(40);

20

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

Associative

What is the hash function used in linear probing?

$h_i(x) = (\text{hash}(x) + f(i)) \bmod \text{table size}$

Recursive call of a function use _____ data structure.

Stack

Left, right, info, and parent are the operation of _____ data structure.

Tree

For Binary Search Tree, we call the findMax() method as _____.

findMin(tree->getLeft())

From Operating System point of view, the recursive function calls are made with the help of _____.

Stack

Which of the following is true regarding the maze generation?

All of the given

If there are 100 elements in an equivalence class then we will have _____ sets initially.

100

given the values are the array representation of heap: 12 23 26 31 34 44 56 64 78 100

What is the 5th smallest element in the given heap?

34

Which operation of queue data structure is used to get front element from the queue and then remove it from the queue?

enqueue()

_____ is an area in computer memory that is allocated dynamically.

Heap

The tree structure is a

Non-linear data structure

Binary Tree traversal can be performed with the help of _____ .

Both Recursive and Non-recursive calls

New items are added at the _____ of the stack.

Top

Leaf node of binary search tree contains _____.

All of the given

Suppose there are a set of fruits and a set of vegetables. Both sets are _____ sets.

Disjoint

Which of the following operations returns "most recently entered value" from the stack?

Top

back() method of list class is used to:

Moves the "current" pointer to backward one element.

Stack and Queue can be implemented using _____.

Singly Link List

The array in binary search is sub divided _____.

Untill a sublist is no more divisible

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

decreaseKey(p,delta)

What will be the postfix expression of following infix expression?
A*B/C+D-E

A B + C D / + E -

An efficient program executes faster and helps in _____ the usage of resources like memory and disk.

Maximizing

Array cells are _____ in computer memory.

Contiguous

Suppose there is an image of $7 * 7$, now we will have matrix of _____ rows and _____ columns.

7, 7

An array is a group of _____ memory locations.

Consecutive

for every process executing, the last part of the memory is for _____ of the program.

Heap

What will be the postfix expression of following infix expression?
 $D + E * F / G$

DEF*G/+

The expression
 if (! heap ->isEmpty())
 checks

Heap is not empty

_____ is used for Reference variables in C++.

&

For searching a particular number in Binary Search Tree (if it is not present), the maximum number of comparisons will be _____ comparison at each level.

2

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

$\log_2 (n+1) - 1$

If we use array to implement list, then there is an issue that it gives difficulty when:

We will increase its size

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

Doubly Linked List always has _____ NULL pointer/s in a node.

Two

The percolateDown procedure will move the smaller value _____ and bigger value _____.

up, down

What will be the result of evaluation following expression?
 $5 + 3 * 2 / (6 - 3)$

7

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

Stack

Linked list always contains elements that can be described as,

Self-referential

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

$abc * + d -$

In tree, the search operation is _____ as compared to the linked list.

Very fast

Each node in doubly link list has

1 pointer

Which of the is NOT true regarding the maze generation?

Remove a randomly chosen wall if the cells it separates are already in same set

The new operation in C++ for dynamically allocating memory returns,

Pointer to the memory it has allocated

Which of the following applications may use a stack?

Parentheses balancing program

Which one of the following statement is correct?

Array size is fixed once it is created

What will be result of following postfix expression?

1 2 3 * + 2 -

4

When we compare recursive method calls and non-recursive method calls, following statement is true.

Recursion is implemented in the same way as other functioncalls are implemented

A queue where the dequeue operation does not depend upon FIFO, is called:

Priority queue

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?

Binary Search Trees

_____ is the stack characteristic but _____ was implemented because of the size limitation of the array.

isEmpty(), isFull()

$Y = \&x[0];$

In the above statement, we get address of the first location of the array x and store it in y. Here "y" is:

lvalue

Each node in singly link list has,

1 pointer

If ahmad is boss of ehsan and ehsan is boss of umer then ahmad is also boss of umer.

The above mentioned relation is _____.

Transitive

Which of the following possible operation are performed on Table ADT?

Insert, Find, Remove

Which of the following operation returns but do not removes top value of the stack?

top

While implementing non-recursive traversal for Binary SearchTree, we need to implement _____ .

Stack

~BinarySearchTree() is a _____ .

Constructor

Which property of equivalence relation is satisfied if we say:
Ahmad is cousin of Ali and Ali is also cousin of Ahmad

Symmetry

The total number of nodes on 5th level of a perfect binary tree are :

32

In C++, we place the class interface in _____ file.

.cpp

The variables which are destroyed automatically when a function's execution ends are:

Local variables defined inside function body

If the elements are 3, 5, 1, 6 in which order they will be removed from the queue one by one

3516

The.....of a binary tree is a maximum level of its leaves (also the depth).

height

.....of the an empty AVL tree is define to be

Height

Following is the keyword of c++

Delete

In the perspective of memory organization every process expecting the first part of memory is for.....of the program.

code

The.....of a node in a binary tree is define as the height of its left subtree minus height of its right subtree.

balance

If p is pointing to a node in an existing tree then info (p)means

Return the content of node p.

Following is a keyword of c++.....

Delete

Every.....tree is a binary search tree

AVL

If a function has recursive call as last statement it is known as.....

Tail recursive

During in a order traversal call if we found a node is null it means this node will satisfy following condition

it will not have left child

In binary search tree deleting a node is easy if it is a..... node

Root

Which of the following operation returns the content of binary tree node?

Info (p)

14. 1 2 6
5 8
3
4

1 2 3 4 5 6 8

in a complete binary tree the number of node of level 5 are

30

One should be careful about transient.....that are stored by reference I data structure

Objects

In a tree we link the node in such a way that it.....a linear structure

does not remain

the function call are made with the help of.....

stack

18. 15 25 45
 35 75

15 35 25 75 45

A binary is said to be a.....binary tree if every non leaf node in binary tree has non empty left and right structure

Strictly

In which of the following function signature the value of variable num cannot be changed in function body

Binary search tree

Two common method of simulations are.....are.....

Time based simulation and event based simulation

Generally there are case (s) to delete a node from BST

1

When a function calls another function the parameters and address of the calling function are put in...

Stock

Binary search tree () is a.....

Destructor

We can calculate the.....of subtree by counting its level from the bottom

Nodes

If there is a strictly complete binary tree of depth 3 the total number of nodes it will be

7

A model attempt to model real word phenomenon

Simulation

The process of getting the value of a variable using a pointer is called

Dereferencing

When a function calling itself is called as.....

Recursion

A.....is a tree in which every except possibly the last, is completely filled

Strict binary tree

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

1

If a node is inserted in outer side of a node in binary search tree then to make it AVL tree,

We may have to apply single rotation

A zigzag rotation is performed. In Left-Left case of rotation in AVL tree.

False

The principal benefit of a linked list over a conventional array is that the order of the linked items may be_____ from the order that the data items are stored in memory.

Same

Stack.push(15) will push 15 on _____.

Top of the stack

Suppose we have the following values to be inserted in constructing AVL tree,

10,13,15,5,7,8

Tell when first rotation will take place,

After inserting the node 15

All the objects created using _____ operator have to be explicitly destroyed using the delete operator.

New

During the execution of a process, operating system constructs four things for that process. Which of the following is not part of that process?

Linked list

There are _____ cases of Rotation in AVL tree.

4

Which of the following line of code is incorrect?

Float *I = float new (not confirmed)

In simple or singly linked list there is/are _____ pointer/s in each node.

One

Suppose there are three nodes tree with three numbers 14, 4, 15. Following is not a permutation, or combination for output them.

(4, 4, 15)

The type of expression in which operator succeeds its operands is _____ expression.

Postfix

The _____ of a node in a binary tree is defined as the height of its left subtree minus height of its right subtree.

Balance

If both left and right nodes of a node are NULL then this type of node is called a _____ node.

Non leaf (not confirmed)

The function calls are made with the help of _____.

Stack

Which data structure is needed to convert infix expression to postfix expression?

Stack

In case of insertion of right inner node in BST,

Left rotation then right to make AVL

A BST generated from the data in ascending order is _____.

Linear

Which operation of queue data structure is used to get front element from the queue and then remove it from the queue?

Remove ()

In _____ various cells of memory are not located continuously.

Linked list

The _____ method of list will position the currentNode and lastCurrentNode at the start of the list.

Start

Which operation of queue data structure is used to insert an element into the Queue?

Enqueuer ()

From Operating System point of view, the recursive function calls are made with the help of _____.

Queue

We can make a lexicographic order of characters based on their _____.

ASCII values

What are the basic things associated with data structures?

All of the above

Consider the following push operations of a Stack:

Stack.push(4);

Stack.push(6);

Stack.push(5);

Stack.push(8);

If a user calls a pop() operation, then which value will be returned?

8 (stack is last in first out)

~BinarySearchTree() is a _____.

Destructor

Array cells are _____ in computer memory.

Contiguous

Leaf node of binary search tree contains _____

One Null Pointer

dequeue() operation of queue data structure is used to _____

remove an element from the front and return it

The depth of a binary tree is

Maximum level of a leaf

Which of the following operation returns but do not removes top value of the stack?

Top

Which of the following data structure is linear type?

All of above

In doubly linked list a node consists of three parts:

2 pointers and 1 object

Last node in circular linked list contains

No null pointer

A_____ model attempts to model a real-world phenomenon

Simulation

Factorial is an example of _____function.

Recursive

The balance of a node in a binary tree is defined as the height of its _____ sub tree minus height of its right sub tree.

Left

In case of insertion of left outer node in BST,

We first apply left rotation and then rotation to make it an AVL Tree.

`int htdiff = height(root->getLeft()) height(root->getRight());` The above line of code is taken from AVL insert method. Complete it by selecting an appropriate symbol.

Minus (-)

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

Two

For making Binary Search Tree for Strings we need, _____ data type.

Int

A _____ model attempts to model a real-world phenomenon

Simulation

The lifetime of a transient object cannot exceed that of the application.

True

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

Call by passing the value of the argument

In level-order traversal for Binary Search Tree, we visit the nodes at each level before proceeding to the next level, in a _____ order.

Left-to-right

In doubly linked list a node consists of three parts:

1 pointer and 2 objects

Binary Search Tree violates the condition of AVL tree when any node has balance equal to

1 or -1

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

True

HOW many cases of rotation are there in AVL tree?

4

_____ tree has been named after two persons Adelson-Velskii and Landis.

AVL

Which of the following is a nonlinear data structure?

Tree

AVL tree is nonlinear data structure.

True

_____ is when function is calling to itself.

Recursion

Which of the following function don't belongs to the stack class?

Crash ()

Which one is the core function call for the following function of calculating cube?

int cube(int& num)

cube (num)

Binary search algorithm cannot be applied to ____

None of the given

copy() method of list data structure _____

Set one list to be a copy of another

While implementing non-recursive traversal for Binary Search Tree, we need to implement

Stack

Following is true in case of using Recursive method calls

The code becomes very short

_____is a self-balancing tree.

Binary Search Tree

While implementing stack with an array and to achieve LIFO behavior, we used push and pop elements at

The start of the array

Generalized code written for a class is called

Structure

Army cells are _____ in computer memory

Contiguous

In singly linked list a node comprises of _____ field/s.

Two

Which of the following statement is false?

Pointers store the next data element of a list

Leaf node of binary search tree contains _____

One null Pointer

What will be the result of evaluating following expression?
 $5+3*2/(6-3)$

7

Want and de-allocating memory for linked list nodes does take more time than pre-allocated array

MORE

Suppose you are writing a class for Node class and forgot to write the constructor of the class, then

Compiler will automatically generate a default constructor

Factorial is an example of _____function.

Recursive

A binary tree is said to be a _____ binary tree if every non-leaf node in a binary tree has non-empty left and right subtrees.

Strictly

Memory address is stored in

Pointer

In level-order traversal for Binary Search Tree, _____ data structure is used.

Queue

Which of the following is the correct option for priority Queue?

The type of queues that is FIFO i.e. the person who comes first should leave first.

AVL tree is linear data structure.

False

AVL tree is a binary search tree

True

The post order traversal of a binary tree is DEBFCA. Find out the pre order traversal

A

Λ

B C

Λ /

D E F

ABDCEF

In a tree, we link the nodes in such a way that it _____ a linear structure.

Does not remain

add(12) method of linked list class will:

Add 12 as value in linked list

Which of the following is the correct conversion of infix to postfix expression?

$Z+B-(D-H)/K$

ZB+DH-K/-

In singly linked list “next” field of node contains:

Address of next node

Which of the following line of code is incorrect?

The lifetime of a transient object can exceed that of the application which is accessing it.

A list is the collection of items of the _____

same type

back() method of List class is used to:

Moves the “current” pointer to backward one element.

Suppose you are writing a class for Node class and forgot to write the constructor of the class, then

_____ is the maximum height of the AVL tree.

$1.44\log_2 n$

length() method of List class is used to:

Return the length of the list

There are four cases of rotation in an _____ tree.

AVL

Allocating and de-allocating memory for linked list nodes does take _____ time than pre-allocated array.

More

_____ is utilized at the time of memory allocation in dynamic manner.

Heap

In which case of insertion we require double rotation to make the AVL tree balance.

None

The back() method decreases the value of variable current by _____.

One

In array list the worst case of removing an element is

To remove the item from start

Left, right, info, and parent are the operations of _____ data structure.

Tree

Which of the following is TRUE for search operations in a binary tree as compared to linked list or an array?

It increase the number of comparison

Which of the following is a correct statement?

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

length() method of List class is used to:

Return the length of the list

Whenever we call a function, the compiler makes a stack, the top element of the stack is _____ of the function.

Return Address

Whenever we call a function, the compiler makes a _____ that it uses to fulfill this function call.

Stack

_____ is the major factor to see the efficiency of a program.

Time

_____ rule applies for evaluating operators of same precedence in an expression

None

The postfix form of the expression $A + B * C$ and $(A + B) * C$ will be _____.

Same

If we use array to implement list, then there is an issue that it gives difficulty when:

We will access value randomly

During in-order traversal using recursive calls, if we found a node is NULL. It means this node will satisfy following condition.

It will not have left child

Which one the following is more closer to AVL tree, (chose the best option)

Binary Search Tree

start() method of List class is used to:

Move the current pointer to first element

Consider the following infix expression. $7/8 + 9$

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

$78/9+$

In internal memory organization of a process, there is some area of memory for static data that holds _____ variables.

Both Static and Global

In Left-Right case of rotation in _____ tree. A double rotation is performed.

AVL

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

5

Which one is not the property of binary tree?

Sibling node should be same parent (Not Sure)

Each node in singly linked list contains_____

One Pointers

What's wrong with following loop? while((i < 10) && (i > 24)) {
}

The Condition is always false

Which one of the following is TRUE about recursion?

1. Recursive function calls consume a lot of memory.
2. **Recursion extensively uses stack memory.**
3. Recursion extensively uses stack memory.
4. Iteration is more efficient than iteration.

Which of the following is not a data structure ?

1. Linked list
2. Queue
3. stack
4. **Memory cell**

“+” is a _____ operator.

1. Unary
2. **Binary**
3. Ternary
4. None of the above

When an executable program run, it is loaded in the memory and becomes a_____.

1. Thread
2. .h file
3. **Process**
4. None of the above

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In array list the worst case of removing an element is

1. To remove an element from the end of the list
2. To remove an element from the middle of the list
3. To remove an element from the start of the list
4. We cannot remove element from an array list

The tree data structure is a

1. Linear data structure
2. Graphical data structure
3. Non-linear data structure (Not Confirm)
4. Data structure like queue

In_____, a programmer uses two pointers in the node, i.e. one to point to next node and the other to point to the previous node.

1. Linked list
2. doubly-link list
3. array
4. Structure

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

1. one
2. two
3. three
4. four

Which of the following operations returns top value of the stack?

1. push
2. **pop**
3. top
4. First

In the calling function, after the execution of the function called, the program continues its execution from the _____ after the function call.

1. Previous line
2. **Next line**
3. Beginning
4. None of the above

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

1. Queue
2. Stack
3. Both of these
4. **None of these**

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

1. After all other entries that are greater than the new entry.
2. **At the head**
3. After all other entries that are smaller than the new entry.
4. At the tail

Which of the following is known as "Last-In, First-Out" or LIFO Data Structure?

1. Linked List
2. Stack
3. Queue
4. Tree

A queue is a _____ data structure, whereas a stack is a _____ data structure.

1. FIFO, LIFO

Each node in doubly link list has

1. 2
2. 3
3. 4

Whenever we call a function, the compiler makes a stack, the top element of the stack is _____ of the function

1. First argument
2. Return address
3. Last argument
4. none of the above

_____ is the stack characteristic but _____ was implemented because of the size limitation of the array.

1. isFull(),isEmpty()
2. pop(), push()
3. isEmpty() , isFull()

Stack and Queue can be implemented using _____,

1. Singly Link List
2. Binary Tree
3. Binary Search Tree
4. AVL Tree

The _____ method of list will position the currentNode and lastCurrentNode at the start of the list.

1. Remove
2. next
3. start
4. back

In array list the worst case of removing an element is

1. To remove an element from the end of the list
2. To remove an element from the middle of the list
3. To remove an element from the start of the list
4. We cannot remove element from an array list

STL is a _____ that is a part of the official standard of C++.

1. C program file
2. .h file

When an executable program run, it is loaded in the memory and becomes a_____.

1. Thread
2. .h file
3. Process
4. None of the above

Each node in doubly link list has,

1. pointer
2. pointers
3. pointers
4. pointer

A queue is a _____data structure, whereas a stack is a _____data structure.

1. FIFO, LIFO
2. LIFO,FIFO
3. both of these
4. none of these

Which one of the following is TRUE about recursion?

1. Recursive function calls consume a lot of memory.
2. Recursion extensively uses stack memory.
3. Recursion extensively uses stack memory.
4. Iteration is more efficient than iteration.

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

1. Double linked list
2. Circularly-linked list
3. Linked list
4. None of the above

_____ is the stack characteristic but _____ was implemented because of the size limitation of the array.

1. isFull(),isEmpty()
2. pop(), push()
3. isEmpty() , isFull()
4. push(),pop()

The principal benefit of a linked list over a conventional array is that the order of the linked items may be _____ from the order that the data items are stored in memory.

1. Same
2. Identical
3. Different
4. Equivalent

In _____ the 'next' returns false when it reaches to the last node due to the fact that the next field of the last node is set to NULL.

1. Circular linked list
2. Triple linked list
3. Singly linked list

4. None of the above

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

1. 48
2. 4
3. 333
4. 5

Which boolean expression indicates whether the numbers in two nodes (p and q) are the same. Assume that neither p nor q is null.

1. $p == q$
2. $p.data == q.data$
3. $p.nextNode == q.nextNode$
4. $p.data == q$

Local variables of a function are stored in,

1. Binary Search Tree
2. Stack
3. Queue
4. AVL Tree

A queue is a data structure where elements are

1. inserted at the front and removed from the back.
2. inserted and removed from the top.
3. inserted at the back and removed from the front.

4. inserted and removed from both ends.

A kind of expressions where the operator is present between two operands called _____ expressions.

1. Infix
2. Postfix
3. Prefix
4. None of the above

A template is a function or class that is written with a _____ data type.

1. Specific
2. Definite
3. Generic
4. None of the above.

Whenever we call a function, the compiler makes a stack, the top element of the stack is _____ of the function.

1. First argument
2. Return address
3. Last argument
4. None of the above

Which of the following can be used to reverse a string value,

1. Stack
2. Queue
3. Both of these
4. None of these

A queue is a _____ data structure, whereas a stack is a _____ data structure.

1. FIFO, LIFO
2. LIFO, FIFO
3. both of these
4. none of these

Stack and Queue can be implemented using _____,

1. Singly Link List
2. Binary Tree
3. Binary Search Tree
4. AVL Tree

Which of the following is not a data structure ?

1. Linked list
2. Stack
3. Queue
4. Memory cell

Compiler uses which one of the following in Function calls,

1. Stack

2. Queue
3. Binary Search Tree
4. AVL Tree

The principal benefit of a linked list over a conventional array is that the order of the linked items may be _____ from the order that the data items are stored in memory.

1. **Same**
2. Identical
3. Different
4. Equivalent

Doubly Linked List always has one NULL pointer.

1. True
2. **False**

We cannot remove items randomly from _____

1. Stack
2. Queue
3. Both of these
4. **None of these**

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

1. Zero
2. $2n$ (where n is the number of nodes in linked list)
3. **Any Number**
4. None of these

“+” is a _____ operator.

1. Unary
2. Binary
3. Ternary
4. None of the above

In _____, a programmer uses two pointers in the node, i.e. one to point to next node and the other to point to the previous node.

1. Linked list
2. doubly-link list
3. array
4. structure

A queue is a data structure where elements are

1. inserted at the front and removed from the back.
2. inserted and removed from the top.
3. inserted at the back and removed from the front.
4. inserted and removed from both ends.

_____ is the stack characteristic but _____ was implemented because of the size limitation of the array.

1. isFull(),isEmpty()
2. pop(), push()
3. isEmpty() , isFull()
4. push(),pop()

The _____ method of list will position the currentNode and lastCurrentNode at the start of the list.

1. Remove
2. Next
3. Start
4. Back

Parameters in function call are passed using,

1. Stack
2. Queue
3. Binary Search Tree
4. AVL Tree

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

1. 48
2. 4
3. 333
4. 5

For a perfect binary tree of height 4, what will be the sum of highest of node

1. 31
2. 30
3. 27
4. 26

If Ahmed is cousin of Ali and Ali is cousin of Asad then Ahmed is also cousin of Asad. This statement has the following property

1. Reflexivity

2. Symmetry
3. Transitivity
4. All of the above

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

1. Reflexive
2. Symmetric
3. Transitive
4. Associative

The main reason of using heap in priority queue is

1. Improve performance
2. Code readable
3. Less code
4. Heap can't be used in priority queues

The total numbers of nodes on 10th level of perfect binary tree are

1. 256
2. 512
3. 1024
4. Can't be determined

Suppose there are 100 elements in an equivalence class, so initially there will be 100 trees, the collection of these trees is called _____.

1. Cluster
2. Class
3. Forest
4. Bunch

The percolate Down procedure will move the smaller value and bigger value.

1. Left, right
2. Right, left
3. Down, up
4. Up, down

For a perfect binary tree of height h , having N nodes, the Sum of height of nodes is

1. $N - h - 1$
2. $N - 1$
3. $N - 1 + h$
4. $N - (h - 1)$

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

1. Insert
2. Add
3. Update
4. percolateDown

If ahmad is boss of ehsan and ehsan is boss of umer then ahmad is also boss of umer, the above-mentioned relation is_____ .

1. Reflexive
2. Symmetry
3. Transitive
4. None of given

If we want to find median of 50 elements, then after applying builtHeap method, how many times deleteMin method will be called?

1. 5
2. 25
3. 35
4. 50

Which of the following properties are satisfied by equivalence relationship?

1. Reflexive, symmetric
2. Reflexive, transitive
3. Symmetric, transitive
4. Reflexive, symmetric and transitive

Sorting procedure normally takes____ time.

1. $N \log N$
2. $2N$
3. $N * N * N$
4. N

15. The Expression
if (! heap->isFull())
Check

1. Heap is empty
2. Heap is full
3. Heap is not empty
4. Heap is not full

The Expression
if (! heap->isEmpty())
Check

1. Heap is empty
2. Heap is full

- 3. Heap is not empty
- 4. Not a valid expression

Given the values are the array representation of heap: 12 23 26 31 34 44 56 64 78

100 If we perform 4 deleteMin operation, the last element deleted is _____ .

- 1. 31
- 2. 34
- 3. 44
- 4. 56

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

- 1. increaseKey(p, delta)
- 2. decreaseKey(p, delta)
- 3. percolateDown(p, delta)
- 4. remove(p, delta)

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

- 1. increaseKey(p, delta)
- 2. decreaseKey(p, delta)
- 3. percolateDown(p, delta)
- 4. remove(p, delta)

Which property of equivalence relation is satisfied if we say:
Ahmad R(is related to)Ahmad

- 1. Reflexivity
- 2. Symmetry
- 3. Transitivity
- 4. All of Above

Given the values are the array representation of heap; 12 23 26 31 34 44 56 64 78 100 What is the 5th smallest element in the given heap?

1. 31
2. 34
3. 44
4. 56

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CS301-Data Structure

Solved MCQS for Mid terms papers

Solved by JUNAID MALIK and Team



AL-Junaid Institute

Contact no: 03041659294



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1. Consider the following infix expression. $7/8+9$

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

- a. $789/+$
 - b. $78/+9$
 - c. $/78+9$
 - d. $78/9+$
2. Suppose there are 100 elements in an equivalence classes so initially there will be 100 tree. The collection of tree is called _
- a. Cluster
 - b. Class
 - c. Forest
 - d. Bunch
3. For a perfect binary tree of height h , having N nodes the sum of height of nodes is
- a. $N-h-1$
 - b. $N-1$
 - c. $N-1+h$
 - d. $-(h-1)$
4. Sorting procedure normally takes _____ time
- a. $N \log N$
 - b. $2N$
 - c. $N*N*N$
 - d. N
5. there are 100 elements in an equivalence classes then will have _____ state initially
- a. 50
 - b. 100
 - c. 1000
 - d. 80
6. _____ objects (objects accessed by pointers) are called anonymous objects.
- a. Private
 - b. Nameless
 - c. Friend
 - d. Public

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7. _____ is a self-balancing tree.
- a. AVL
 - b. Binary Tree
 - c. Binary Search Tree
 - d. ALV
8. Which of the following operation returns but do not removes top value of the stack?
- a. Push
 - b. Pop
 - c. Top
 - d. First
9. `Int htdiff = height(root->getLeft()) _____ height(root->getRight());` The above line of code is taken from AVL insert method. Complete it by selecting an appropriate symbol.
- a. -
 - b. +
 - c. /
 - d. *
10. Which operation of the queue data structure is used to insert an element into the Queue?
- a. Enqueue()
 - b. Dequeue()
 - c. Fornt()
 - d. Remove()
11. For making binary search tree for strings we need, _____ data type.
- a. Char
 - b. Int
 - c. Float
 - d. Double
12. Local variables defined inside function body are _____ automatically at the end of function execution.
- a. Created
 - b. Destroyed
 - c. Incremented
 - d. Decrementd

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9. If a node has three fields, then this node will be related to
- Linked list
 - Doubly linked list**
 - Circular linked list
 - All of the given
10. _____ is an area in computer memory that is allocated dynamically.
- Heap**
 - Stack
 - Queue
 - Linked list
11. Linked list use _____ to store data.
- Array
 - 2-D Array
 - Variables**
 - Linked Memory
12. The lifetime of a transient object cannot exceed that of the application.
- True**
 - False
 - In some cases
 - None of the given
13. To represent hierarchical relationship between elements, which data structure is suitable?
- Dequeue
 - Priority
 - Stack
 - Tree**
14. Local variables of a function are stored in,
- Binary search tree
 - Stack**
 - Queue
 - AVL tree
15. In-order traversal method traverses the data in
- Non sorted order
 - Random order
 - Sorted order**

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- d. None of the given
16. Dequeue() operation of queue data structure is used to _____
- a. Get an element from the front of the queue
 - b. Remove an element from the front and return it**
 - c. Insert an element at the front
 - d. Insert an element at the back
17. In a tree, we link the nodes in such a way that it _____ a linear structure.
- a. Does not remain**
 - b. Forms
 - c. Reverses
 - d. Remains
18. Factorial is an example of _____ function.
- a. Recursive**
 - b. Non-recursive
 - c. Cube
 - d. Log
19. All the objects created using _____ operator have to be explicitly destroyed using delete operator.
- a. New**
 - b. Delete
 - c. Del
 - d. Create
20. In the calling function, after the execution of the function called, the program continues its execution from the _____ after the function call.
- a. Previous line
 - b. Next line**
 - c. Beginning
 - d. None of the above
21. Last node in circular linked list contains
- a. At least one null pointer
 - b. No null pointer**
 - c. Maximum two null pointers
 - d. None of the given

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22. One should be careful about transient _____ that are stored by reference in data structures.
- a. Objects
 - b. Stack
 - c. Function
 - d. Tree
23. Binary search tree violates the condition of AVL tree when any node has balance equal to
- a. 2 or -2
 - b. 1 or -1
 - c. 0
 - d. None of the options
24. Security of data is the main usage of AVL tree.
- a. True
 - b. False
 - c. In some cases
 - d. None of the given
25. A binary tree whose every node has either zero or two children is called _____.
- a. Complete binary tree
 - b. Binary search tree
 - c. Strictly binary tree
 - d. None of above
26. In internal memory organization of a process, there is some area of memory for static data that holds _____ variables.
- a. Static
 - b. Global
 - c. Not static neither global
 - d. Both static and global
27. Following is true in case of using recursive method calls.
- a. The code becomes very long
 - b. There is no effect on length of code
 - c. The code becomes very short
 - d. Code becomes very easy to understand
28. In which traversal method, the recursive calls can be used to traverse a binary tree?
- a. In preorder traversal only

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- b. In inorder traversal only
 - c. In postorder traversal only
 - d. All of the given options
29. If we use doubly linked list to implement list then there is an issue of
- a. Next pointer of first node and pre pointer of last node are NULL
 - b. Next pointer of first node and next pointer of last node are NULL
 - c. Pre pointer of first node and next pointer of last node are NULL
 - d. Pre pointer of first node and pre pointer of last node are NULL
30. In case of insertion of left outer node in BST,
- a. We apply single right rotation to make it AVL tree.
 - b. We apply single left rotation to make it AVL tree.
 - c. We first apply right rotation and then left rotation to make it AVL tree.
 - d. We first apply left rotation and then right rotation to make it AVL tree.
31. Whenever we call a function, the compiler makes a stack, the top element of the stack is _____ of the function.
- a. First argument
 - b. Return address
 - c. Last argument
 - d. None of the above
32. Suppose a stack class has been defined using template. Now, we want to declare a Stack object of an int type. What will be the correct syntax?
- a. <int>Stack stack;
 - b. Stack<int> stack;
 - c. Stack int stack;
 - d. Int Stack stack;
33. In node class one field is an integer data and other field will be _____
- a. Pointer to class
 - b. Pointer to node
 - c. Pointer to integer
 - d. None of given options

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34. If there are 100,000 unique members (nodes) stored in a complete binary tree, the tree will have _____ levels.
- a. 10
 - b. 20**
 - c. 30
 - d. 40
35. ~BinarySearchTree() is a _____.
- a. Constructor
 - b. Destructor**
 - c. Switch case
 - d. Template method call
36. _____ is utilized at the time of memory allocation in dynamic manner.
- a. Stack
 - b. Queue
 - c. Heap**
 - d. All of the given
37. How many cases of rotation are there in AVL tree?
- a. 2
 - b. 4**
 - c. 6
 - d. 8
38. A list is the collection of items of the _____.
- a. May be of same or may be of different type
 - b. Different type
 - c. Same type**
 - d. None of the above
39. `Int * i = new int[10];`
Above given code will:
- a. Create an integer having value 10
 - b. Allocate memory for 9 integers
 - c. Allocate memory for 10 integers**
 - d. Create 10 pointers of integer type
40. The depth of a binary tree is
- a. Total number of nodes in the tree

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- b. Number of leaf nodes in the tree
 - c. Number of non-leaf nodes in the tree
 - d. Maximum level of a leaf
41. A _____ model attempts to model a real-world phenomenon
- a. Physical
 - b. Logical
 - c. Simulation
 - d. Conceptual
42. In level-order traversal for binary search tree, we visit the nodes at each level before proceeding to the next level, in a _____ order.
- a. Right-to-left
 - b. Left-to-right
 - c. Top-to-bottom
 - d. Bottom-to-top
43. The balance of a node in a binary tree is defined as the height of its _____ sub tree minus height of its right sub tree.
- a. Right
 - b. Left
 - c. Upper
 - d. Lower
44. Allocating and de-allocating memory for linked list nodes does take _____ time than pre-allocated array.
- a. Less
 - b. More
 - c. Equal
 - d. No
45. Consider we have performed the following operations on a stack of size 5. Push(10);
Push(20);
Push(30);
Pop();
Pop();
Pop();
Push(40);
Push(50);

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Pop();

After the completion of all operation, the top element in stack is

_____.

- a. 10
 - b. 20
 - c. 40**
 - d. 50
46. Each operator in a postfix expression refers to the previous _____ operand(s).
- a. One
 - b. Two**
 - c. Three
 - d. Four
47. In doubly linked list a node consists of three parts:
- a. 1 pointer and 2 objects
 - b. 2 pointers and 1 object**
 - c. 3 objects
 - d. 3 pointers
48. For reference variables, _____ sign is used.
- a. Ampersand**
 - b. Asterisk
 - c. Sigma
 - d. Dollar
49. Which of the following data structure is linear type?
- a. Stack
 - b. List
 - c. Queue
 - d. All of the above**
50. The - - is a decrement operator in C++ that decreases the value of the operand by _____.
- a. One**
 - b. Two
 - c. Three
 - d. Four
51. Which of the following statement is correct for the variable "current- -"?

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- a. $\text{Current} = \text{current} + 1$
 - b. $\text{Current} = \text{current} - 1$**
 - c. $\text{Current} = \text{current} - 2$
 - d. $\text{Current} - 1 = \text{current}$
52. When an executable program runs, it is loaded in the computer memory and becomes a _____.
- a. Thread
 - b. .h file
 - c. Process**
 - d. None of the above
53. start() method of list class is used to:
- a. Moves the "current" pointer to very first element**
 - b. Moves the "current" pointer to very last element
 - c. Moves the "current" pointer to one step after the first element of the array
 - d. Moves the "current" pointer to one step before the first element of the array
54. $a * (b + c) - d$ is an example of _____ expression.
- a. Infix**
 - b. Prefix
 - c. Postfix
 - d. Alfix
55. In a program a reference variable, say x, can be declared as
- a. `int &x;`**
 - b. `int *x;`
 - c. `int x;`
 - d. none of the given options
56. We allocate memory dynamically by using _____ operator.
- a. This
 - b. New**
 - c. Increment
 - d. Decrement
57. Get(?) method of list class is used to:
- a. Get element from the last position
 - b. Get element from the first position

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- c. Get element from the middle position
d. Get element at the given position
58. STL is a _____ that is a part of the official standard of C++.
- a. C program file
 - b. .h file
 - c. .cpp file
 - d. Library
59. There are _____ cases for deleting a node from binary search tree.
- a. 1
 - b. 2
 - c. 3
 - d. 4
60. In a list, tail() method of current pointer _____
- a. Returns the last element of the “current” pointer
 - b. Moves the “current” pointer to the very first element
 - c. Moves the “current” pointer to the very last element
 - d. Returns the first element of the “current” pointer
61. Suppose we have been given the following data set for a queue:
37524
What will be the resultant queue if we call a front() method?
- a. 7524
 - b. 37524
 - c. 75243
 - d. 5 2 4
62. Suppose we have been given the following data set for a queue:
7524
What will be the resultant queue if we call enqueue(3) method? Note that 7 is the front element whereas 4 is rear element of queue.
- a. 7524
 - b. 37524
 - c. 75243
 - d. 5243
63. Maximum time that an insertion operation can take in AVL tree is _____. Here log stands for log to the base of 2.
- a. Log (n)

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- b. $1.44 \log(n)$
 - c. $1.66 \log(n)$
 - d. $\log(n+1)$
64. _____ is when function is calling to itself.
- a. Loop
 - b. Recursion
 - c. Iteration
 - d. Nested loop
65. Left, right, info, and parent are the operations of _____ data structure.
- a. Stack
 - b. Tree
 - c. Queue
 - d. Linked list
66. Following is a keyword of C++
- a. Del
 - b. Delete
 - c. Remove
 - d. Eliminate
67. The expression $DE+H^*$ is called _____
- a. Prefix expression
 - b. Infix expression
 - c. Postfix expression
 - d. Hybrid expression
68. A software solution is said to be efficient if it solves the problem _____.
- a. By using some extra resources
 - b. Within no time
 - c. By consuming more hardware resources
 - d. Within its resources constraints
69. Each node in a singly linked list contains two fields, one field called data field while other field contains:
- a. Pointer to an integer
 - b. Pointer to character

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- c. Pointer to next node
- d. Pointer to class
70. Each node in singly linked list contains _____
- a. One pointer
- b. Two pointers
- c. No pointer
- d. NULL pointer
71. Every AVL tree is a binary search tree.
- a. True
- b. False
- c. Not in some cases
- d. None of the given
72. In singly linked list “next” field of node contains:
- a. Address of next node
- b. Object of next node
- c. Object of current node
- d. Address of head node
73. Two common models of simulation are _____ and _____.
- a. Circuit-based simulation and Event- based simulation
- b. Circuit-based simulation and Time-based simulation
- c. Time-based simulation and Event- based simulation
- d. None of the above
74. Stack and Queue can be implements using _____.
- a. Singly Link List
- b. Binary Tree
- c. Binary search Tree
- d. AVL Tree
75. What are the basic things associated with data structures?
- a. Space for each data item it stores
- b. Time to perform each basic operation
- c. Programming effort
- d. All of the above
76. In AVL tree insertion occurs on the inside in case _____ and 3 which a single rotation cannot fix.
- a. 1
- b. 2
- c. 4

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- d. 5
77. add(12) method of linked list class will
- a. Add 12 nodes in linked list
 - b. Add 12 pointers in linked list
 - c. Add 12 as value in linked list
 - d. Add 12 values in linked list
78. Which of the following is a non-linear data structure?
- a. Stack
 - b. Queue
 - c. Tree
 - d. Linked list
79. Which data structure allows deleting data elements from front and inserting at rear?
- a. Stacks
 - b. Queues
 - c. Deques
 - d. Binary search tree
80. Array cells are _____ in computer memory.
- a. Contiguous
 - b. Random
 - c. Store in multiple Variables
 - d. Store in multiple functions
81. A kind of expression where the operator is present between two operands called _____ expressions.
- a. Infix
 - b. Postfix
 - c. Prefix
 - d. None of the above
82. back() method of list class is used to
- a. Moves the "current" pointer to backward one element.
 - b. Moves the "current" pointer to backward two element.
 - c. Moves the "current" pointer to backward three element.
 - d. Moves the "current" pointer to backward four element.
83. next() method of List class is used to:
- a. Moves the Current position backward one element

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- b. Moves the "Current" pointer to two steps after the last element of the array
 - c. Moves the Current position forward one element
 - d. Moves the "Current" pointer to two steps before the last element of the array
84. _____ tree has been named after two persons Adelson-Velskii and Landis.
- a. Binary
 - b. Black
 - c. AVL
 - d. VLA
85. There are four cases of rotation in an _____ tree.
- a. ELV
 - b. EVL
 - c. AVL
 - d. ALV
86. _____ is used for reference variable in C++.
- a. !
 - b. @
 - c. #
 - d. &
87. A _____ is a tree in which every level, except possibly the last, is completely filled, and all nodes are as far left as possible.
- a. Strict binary tree
 - b. Full binary tree
 - c. Perfect binary tree
 - d. Complete binary tree
88. A queue is a data structure where elements are
- a. Inserted at the front and removed from the back
 - b. Inserted and removed from the top
 - c. Inserted at the back and removed from the front
 - d. Inserted and removed from both ends
89. Longest path from root node to farthest leaf node is called _____ of tree.
- a. Level
 - b. Length
 - c. Depth

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- d. Node level
90. New items are added at the _____ of the stack.
- a. Bottom
 - b. Middle
 - c. Center
 - d. Top
91. Length() method of list class is used to:
- a. Return the length of the array
 - b. Return the length of the list
 - c. Return the length of empty part of the array
 - d. Return the length of empty part of the list
92. The function calls are made with the help of _____.
- a. Stack
 - b. Heap
 - c. Dynamic memory
 - d. External memory
93. An efficient program execute faster and helps in _____ the usage of resources like memory and disk
- a. Maximizing
 - b. Minimizing
 - c. Equalizing
 - d. None of the given
94. Generalized code written for a class is called:
- a. Function
 - b. Template
 - c. Structure
 - d. Stack
95. "set()" method of list class is used to:
- a. Set the value of Pointer
 - b. Set the value of Null Nodes
 - c. Set the value of objects
 - d. Set the value of Value
96. In C++, we place the class interface in ____ file.
- a. .cpp
 - b. .cppp
 - c. .h

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- d. .hh
97. Every _____ tree is a binary search tree.
- a. AVL
 - b. binary
 - c. big
 - d. small
98. If both left and right nodes of a node are NULL then this type of node is called _____ node.
- a. Non leaf
 - b. internal
 - c. inner
 - d. leaf
99. Which of the following function don't belongs to the stack class?
- a. push()
 - b. pop()
 - c. crash()
 - d. top()
100. For a complete binary tree, the depth is calculated as _____
- a. $\log_2(\text{number of nodes}+1)-1$
 - b. $\log_2(\text{number of nodes} \times 1)+1$
 - c. $\log_2(\text{number of nodes}-1)-1$
 - d. $\log_2(\text{number of nodes}-1)+1$
101. _____ only removes items in reverse order as they were entered
- a. Queue
 - b. Stack
 - c. Both of these
 - d. None of these
102. What will be the postfix expression of following infix expression? $D+E \times F/G$
- a. $DE \times F/G$
 - b. $DE+F \times G/$
 - c. $DEF \times /+$
 - d. $DE+FG \times /$
103. The _____ of a node in a binary tree is defined as the height of its _____ sub tree minus height of its right sub tree.
- a. Height
 - b. Balance

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- c. Width
 - d. None
104. The back() method decreases the value of Variable current by_____
- a. Four
 - b. Three
 - c. Two
 - d. One**
105. In doubly linked list there is/are _____ pointer/s in each node.
- a. One
 - b. Two**
 - c. Three
 - d. Four
106. Suppose we have the following values to be inserted in constructing AVL tree,
10, 13, 15, 5, 7, 8
Tell when first rotation will take place.
- a. After inserting node 13**
 - b. After inserting node 15
 - c. After inserting node 5
 - d. After inserting node 7
107. Binary search algorithm cannot be applied to _____
- a. Sorted linked list**
 - b. sorted binary trees
 - c. sorted linear array
 - d. None of given option
108. During the execution of a process operating system constructs focus things for that process which of the following is not part of that process
- a. A section for static data including global variable
 - b. Stack
 - c. Heap**
 - d. Linked list
109. Which one of the following method does not change the original value of the argument in the calling function?
- a. Call by passing reference of the argument
 - b. Call by passing the address of the argument

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- c. Call by passing the value of the argument
- d. None of the given options
110. _____ is the major factor to see the efficiency of a program.
- a. Quality
 - b. Time
 - c. Correctness
 - d. None of the given
111. While implementing stack with an array and to achieve LIFO behavior, we used push and pop elements at _____.
- a. The start of the array
 - b. The end of the array
 - c. The mid of the array
 - d. At least one position before array starting index.
112. A template is a function or class that is written with a _____.
- a. Specific
 - b. Definite
 - c. Generic
 - d. None of the above
113. In the linked list implementation of the stack class, where does the push member function places the new entry on the linked list?
- a. After all other entries that are greater than the new entry
 - b. At the head
 - c. After all other entries that are smaller than the new entry
 - d. At the tail
114. The next field in the last node in a singly-linked list is set to _____.
- a. 0
 - b. 1
 - c. NULL
 - d. False
115. Consider the linked list having data [6, 72, 35, 65, 25] stored in it. While current pointer is pointing memory location having 72 stored in it. After calling remove() function on the following linked list current point will point to memory location having value?
- a. 6

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- b. 35
 - c. 65
 - d. 25
116. If we write functions for recursive and non recursive inorder traversal method of BST, what will be the difference between its functions prototypes?
- a. Different return types
 - b. Different function names
 - c. Different arguments list
 - d. Nothing will be different
117. In singly linked list a node comprises of _____ field/s.
- a. One
 - b. Two
 - c. Three
 - d. Four
118. Doubly linked list always has _____ NULL pointers in a node.
- a. One
 - b. Two
 - c. Three
 - d. Four
119. A BST generated from the data in ascending order is _____.
- a. Linear
 - b. Nonlinear
 - c. Balanced
 - d. Un sorted
120. Linked list is generally considered an example of _____ type of memory location.
- a. Static
 - b. Compile time
 - c. Dynamic
 - d. None of given options
121. What's wrong with following loop?
- ```
while((i < 10) && (i > 24)){
}
```
- a. The logical operator && cannot be used in a test condition
  - b. The while loop is an exit-condition loop
  - c. The test condition is always false

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- d. The test condition is always true
122. Making the tree unbalanced, it violates the \_\_\_\_\_ rule.
- a. Linked list
  - b. Stack
  - c. AVL**
  - d. Queue
123. copy() method of list data structure \_\_\_\_\_
- a. copy first item of list
  - b. set one list to be a copy of another**
  - c. copy last item of list
  - d. copy any item of list
124. Deleting a \_\_\_\_\_ node in BST is a \_\_\_\_\_ case.
- a. Root, simplest
  - b. Left child, simplest
  - c. Right child, simplest
  - d. Leaf, simplest**
125. We can not remove items randomly from \_\_\_\_\_
- a. Stack
  - b. Queue
  - c. Both of these**
  - d. None of these
126. NULL is an invalid address and \_\_\_\_\_.
- a. Accessible
  - b. Inaccessible**
  - c. Points to the start point of the list
  - d. Points to the last point of the list
127. A stack carries \_\_\_\_\_ behavior.
- a. FIFO
  - b. LIFO**
  - c. AVCO
  - d. FEFO
128. The tree data structure is a
- a. Linear data structure
  - b. Non-linear data structure**
  - c. Graphical data structure
  - d. Data structure like queue

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129. Can we store elements with different data types in a single array?
- a. Yes
  - b. No**
  - c. In some cases
  - d. None of given
130. The lifetime of a transient object can exceed that of application which is accessing it.
- a. True
  - b. False**
  - c. In some cases
  - d. None of the given
131. In a complete binary tree, for 25000 nodes the depth will be \_\_\_\_\_.
- a. 13
  - b. 14**
  - c. 15
  - d. 16
132. The smallest value element in a binary search tree(Each node with left and right pointer) lies at
- a. Root Node
  - b. Left Child of Root
  - c. Right Most Node
  - d. Left Most Node**
133. if we use array to implement list, then there is an issue that is gives difficulty when
- a. We will access values randomly
  - b. We will remove data from it
  - c. We will increase its size
  - d. We will decrease its size
134. if there are \_\_\_\_\_ nodes in an avl tree its levels will be roughly as  $\log_2(10 \text{ million})$
- a. 100 million
  - b. 10 million**
  - c. 5 million

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- d. 2 million
135. Which one is the correct function call for the following function of calculatincube?
- ```
int cube(int&num)
{
.
.
.
}
```
- a. Cube(&num)
b. Cube(&&num)
c. Cube(*num)
d. Cube(num)
136. Which of the following is the correct option for priority Queue?
- a. The type of Queue that is not FIFO i.e the person who comes first may not leave first
b. The type of Queue that is not FIFO i.e the person who comes first should leave first
c. The type of Queue that is not FIFO i.e the person who comes first should leave first
d. The type of Queue that is not FIFO i.e the person who comes first may not leave first
137. For String-based Binary Search Tree, We use ASCII values of characters for comparing among letters. This method is known as
- a. Lexicographic order
b. Alphabet coding procedure
c. Asymmetric technique
d. heap-based approach
138. Elements in a queue data structure are added from ____ and remove from ____.
- a. Rear end. front end
b. Front end. Rear end
c. Front end
d. rear end
139. If numbers 5,222,4,48 are inserted in a queue. Which one will be remove first?
- a. 48

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- b. 4
 - c. 222
 - d. 5
140. A zigzag rotation is performed. In Left-Left case of rotation in AVL tree.
- a. True
 - b. False
 - c. In some cases
 - d. None of the above
141. During deletion of node from BST. if we found this node don't have in- order successor and predecessor. it means this node is _____
- a. Left Most node in the binary search tree
 - b. Right most node in the binary search tree
 - c. Root node
 - d. None of the given option
142. _____ rule applies for evaluating operators of same precedence in an expression
- a. right to left
 - b. Cascading
 - c. Associative
 - d. None of the above
143. What will be result of following postfix expression?
123*+2-
- a. 3
 - b. 4
 - c. 5
 - d. 10
144. The main use of AVL tree is:
- a. Searching of data
 - b. Storing of data
 - c. Insertion of data
 - d. Security of data
145. $y = \&x[0];$
In the above statement, we get the address of the first location of the array x and store it in y.
Here "y" is:
- a. rvalue

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- b. xvalue
 - c. lvalue**
 - d. zvalue
146. what will be postfix expression of the following infix expression? Infix expression $a+b*c-d$
- a. $ab+c*d-$
 - b. $abc*+d-$**
 - c. $abcd+*-$
 - d. $abc+*d-$
147. Which of the following is the correct conversion of infix to postfix expression? $Z+B-(D-H)/K$
- a. $ZB+D-H-K/$
 - b. $ZB+DH-K-/$
 - c. $ZB+DH-K/-$**
 - d. $ZB+DHK--/$
148. Leaf node of binary search tree contains _____.
- a. One null pointer
 - b. Three null pointers
 - c. Two null pointers**
 - d. All of the given
149. A tree is an AVL tree if
- a. Any one node fulfills the AVL condition**
 - b. At least half of the nodes fulfill the AVL condition
 - c. All the nodes fulfill the AVL condition
 - d. None of the given options
150. The _____ of a binary tree is the maximum level of its leaves (also called the depth).
- a. Level
 - b. Width
 - c. Height**
 - d. None of the above
151. Memory address is stored in
- a. Address operator
 - b. Reference
 - c. Pointer**
 - d. All of the given

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152. A binary tree is said to be a _____ binary tree if every non-leaf node in a binary tree has non-empty left and right sub trees.
- a. Complete
 - b. Strictly**
 - c. AVL
 - d. Perfect
153. “+” is a _____ operator.
- a. Unary
 - b. Binary**
 - c. Ternary
 - d. None of the above
154. Which of the following a nonlinear tree
- a. Stack
 - b. Que
 - c. Tree**
 - d. Linked List
155. For every Process execute the last part of the Memory is for _____ of the Program
- a. Data
 - b. Code
 - c. Stack
 - d. Heap**
156. While implement non recursive traversal for binary search tree we need to implement _____
- a. Que
 - b. Stack**
 - c. Min heap
 - d. Max Heap
157. Suppose we have the following values to be inserted in constructing AVL tree,
20,23,25,10, 12,13
Tell when first rotation will take place.
- a. After increasing Node 25**
 - b. After increasing Node 23
 - c. After increasing Node 10
 - d. After increasing Node 12

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158. If a tree has a 50 Node then the total linked in the tree will be
- a. 55
 - b. 51
 - c. 50
 - d. 49
159. The percolate down procedure will move the smaller value _____ and Bigger value _____
- a. Left, right
 - b. Right, left
 - c. Down, up
 - d. Up, down
160. Circular Linked List Solve the problem of _____ pointer/method of the doubly link list.
- a) Remove
 - b) Null
 - c) Add
 - d) Find
161. isEmpty() method of stack class will return true when.
- a) Stack is full
 - b) Stack is Partially
 - c) Stack is not empty or Null
 - d) Stack is empty
162. "New int[11]" will allocate memory for _____ integers.
- a) 13
 - b) 12
 - c) 11
 - d) 10
163. For searching a particular number in Binary Search Tree (if it is not present), the maximum number of comparisons will be _____ comparison at each level.
- a) 1
 - b) 2
 - c) 3
 - d) 4
164. In singly linked list which node will keep track of starting position of the list.

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a) Next Node

b) Previous Node

c) Head Node

d) Last Node

165. If we singly linked list to implement list, then there is an issue that it gives difficulty when we:

a) Move forward in the list

b) Move backward in the list

c) We will increase its size

d) We will decrease its size

166. Can we store elements with different data types in a single array?

a) Yes

b) No

c) In some cases

d) None of the given

167. During union by size method, which data structure is used to improve the balancing of tree?

a) Array

b) Stack

c) Linked List

d) Tree

168. The difference between a "Binary Tree (BT)" and a "Binary Search Tree (BST)" is that,

a) A BST has two children per node whereas a BT can have none, one or two children per node

b) In BST nodes are inserted based on the values they contain

c) In BT nodes are inserted based on the values they contain

d) There is no difference

169. The main use of AVL tree is:

a) Searching of data

b) Storing of data

c) Insertion of data

d) Security of data

e) The expression

170. if (! heap ->isEmpty())

checks

a) Heap is empty

b) Heap is full

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c) Heap is not empty

d) Not a valid expression

171. A solution is said to be efficient if it solves the problem within its resource constraints i.e. hardware and time.

a) True

b) False

172. A queue where the dequeue operation does not depend upon FIFO, is called:

a) enqueue

b) simple queue

c) stack

d) priority queue

173. In simple or singly linked list there is/are _____ pointer/s in each node.

a) One

b) Two

c) Three

d) Four

174. Which one of the following statement is correct?

a) Array size is fixed once it is created

b) Link List size is fixed once it is created

c) Binary Search Tree size is fixed once it is created

d) AVL Tree size is fixed once it is created

175. Which of the is NOT true regarding the maze generation?

a) Randomly remove walls until the entrance and exit cells are in same set.

b) Removing a wall is the same as doing a union operation

c) Remove a randomly chosen wall if the cells it separates are already in same set

d) Do not remove a randomly chosen wall if the cells it separates are already in same set.

176. If Ahmad is cousin of Ali and Ali is cousin of Asad then Ahmad is also cousin of Asad. This statement has the following property

a) Reflexivity

b) Symmetry

c) Transitivity

d) All of the given

177. Stack and Queue can be implemented using _____.

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a) Singly Link List

b) Binary Tree

c) Binary Search Tree

d) AVL Tree

178. 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?

a) Arrays

b) Linked Lists

c) Binary Search Trees

d) Stack

179. Recursive call of a function use _____ data structure.

a) Linked List

b) Queue

c) Stack

d) Table

180. The _____ of a node in a binary tree is defined as the height of its left subtree minus height of its right subtree.

a) Height

b) Balance

c) Width

d) None of the above

181. Which operation of queue data structure is used to get front element from the queue and then remove it from the queue?

a) enqueue()

b) dequeue()

c) front()

d) remove()

182. Suppose we have been given the following data set for a Queue.

7 5 2 4

What will be the resultant Queue if we call enqueue(3) method?

Note that 7 is the front element whereas 4 is rear element of queue.

a) 7 5 2 4

b) 7 5 2 4

c) 7 5 2 4 3

d) 5 2 4 3

183. In C++, we place the class interface in _____ file.

a) .cpp

b) .cppp

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c) .h

d) .hh

184. The array in binary search is sub divided _____.

a) Once

b) Twice

c) N time

d) **Untill a sublist is no more divisible**

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

a) $\log 3n$

b) **$\log_2 n$**

c) $n \log_2 n$

d) $\log n * n$

186. _____ in AVL is logarithmic.

a) Updating

b) **Searching**

c) Deletion

d) Insertion

187. What is the depth of any tree if the union operation is performed by height?

a) $O(N)$

b) $O(N \log N)$

c) **$O(\log N)$**

d) $O(M \log N)$

188. Avl tree takes maximum _____ time to search an element.

a) **$1.44 \log_2 n$**

b) $\log_2(n+n)$

c) $\log_2(n+1)+1$

d) $1.88 \log_2 n$

189. Which of the following is correct about AVL Tree?

a) It is identical to BST except height of the left and right subtrees can differ by at least 1.

b) It is identical to BST except height of the left and right subtrees must differ by at least 1.

c) It is not identical to BST, it is totally different kind of tree.

d) **It is identical to BST except height of the left and right subtrees can differ by at most 1.**

190. "new int[11]" will allocate memory for _____ integers.

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a) 10

b) 11

c) 12

d) 13

191. The _____ method of list data structure removes the element residing at the current position

a) Add

b) Next

c) Remove

d) Find

192. While implementing non-recursive traversal for Binary SearchTree, we need to implement _____ .

a) Queue

b) Stack

c) Min heap

d) Max heap

193. Doubly Linked List always has _____ NULL pointer/s in a node.

a) One

b) Two

c) Three

d) Four

194. For a perfect binary tree of height h , having N nodes, the sum of heights of nodes is _____ .

a) $N - h - 1$

b) $N - 1$

c) $N - 1 + h$

d) $N - (h - 1)$

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

a) N

b) N^2

c) $N \log_2 N$

d) $\log_2 N$

196. Here is a small function definition:

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

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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?

- a) Both x and y are still 0.
- b) x is now 1, but y is still 0.
- c) x is still 0, but y is now 2.
- d) x is now 1, and y is now 2.

197. The worst case of searching in binary search tree (BST) is:

- a) When the data inserted in BST is sorted
- b) When the height of left sub-tree is greater than right sub-tree
- c) When the height of right sub-tree is greater than left sub-tree
- d) When the tree is balanced

198. What will be postfix expression of the following infix expression?

Infix Expression: $a+b*c-d$

- a) $ab+c*d-$
- b) $abc*+d-$
- c) $abcd+*-$
- d) $abc+*d-$

199. What is the hash function used in linear probing?

- a) $hi(x) = \text{hash}(x) \bmod \text{table size}$
- b) $hi(x) = (\text{hash}(x) + f(i^2)) \bmod \text{table size}$
- c) $hi(x) = (\text{hash}(x) + f(i)) \bmod \text{table size}$
- d) $hi(x) = X \bmod 17$

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

- a) One
- b) Two
- c) Three
- d) Four

201. In the statement $\text{int} \& a=b;$

- a) a and b pointing to two different memory location
- b) a and b are two different names of the same memory location
- c) a and b are two different variable names
- d) b hold the address of variable a

202. In 1990, Bill pugh proposed an enhancement on linked lists and the new data structure was termed as

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a) Linked list

b) B-Tree

c) Skip list

d) Spelling checker

203. Which of the following statement is NOT correct regarding Table ADT?

a) In a table, the type of information in columns may be different.

b) A table consists of several columns known as entities

c) The row of a table is called a record

d) A major use of table is in databases where we build and use tables for keeping information

204. A binary tree of N nodes has _____.

a) $\log_{10} N$ levels

b) $\log_2 N$ levels

c) $N / 2$ levels

d) $N \times 2$ levels

205. If the height of a perfect binary tree is 4. What will be the total number of nodes in it?

a) 15

b) 16

c) 31

d) 32

206. Which property of equivalence relation is satisfied if we say:
Ahmad R(is related to) Ahmad

a) Reflexivity

b) Symmetry

c) Transitivity

d) All of the given

207. If ahmad is boss of ehsan and ehsan is boss of umer then ahmad is also boss of umer. The above mentioned relation is _____.

a) Reflexive

b) Symmetry

c) Transitive

d) None of the given

208. Which of the following statement is false?

a) Arrays are dense lists and static data structure

b) data elements in linked list need not be stored in adjacent space in memory

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- c) pointers store the next data element of a list
- d) linked lists are collection of the nodes that contain information part and next pointer

209. Binary search algorithm cannot be applied to _____ .

- a) **Sorted linked list**
- b) sorted binary trees
- c) sorted linear array
- d) None of the given

210. Suppose there is an image segmented into pixels. Each pixel has _____ neighbour(s).

- a) 0
- b) 4
- c) **8**
- d) 16

211. In singly linked list a node consists of two parts:

- a) Object and structure
- b) Two pointers
- c) Two objects
- d) **Object and pointer**

212. A hash function returns a _____ value.

- a) **Integer**
- b) Double
- c) Float
- d) Char

213. In a tree, we link the nodes in such a way that it _____ a linear structure.

- a) does not remain
- b) **forms**
- c) reverses
- d) remains

214. The principal benefit of a link list over a conventional array is that the order of the linked items may be _____ from the order that the data seems are stored in memory.

- a) Different
- b) Identical
- c) **Same**
- d) Equivalent

215. The Computer memory can be thought of as a/an.

- a) List

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- b) Queue
 - c) Stack
 - d) Array
216. Before using the Pop method of a stack, the user must call the ____ method.
- a) isFull()
 - b) push()
 - c) pop()
 - d) isEmpty()
217. A stack carries ____ behavior.
- a) FIFO
 - b) FEFO
 - c) LIFO
 - d) AVCO
218. ____ Method returns the top element of the stack without removing it.
- a) Pop()
 - b) Front()
 - c) Push()
 - d) Top()
219. In Queue data structure element are removed from ____.
- a) Pop
 - b) Push
 - c) Rear
 - d) Front
220. In Queue data structure element are full from ____.
- a) Pop
 - b) Push
 - c) Rear
 - d) Front
- 221.
222. “end()” method of list performs its tasks in
- a) Many Steps
 - b) Three Steps
 - c) One Steps
 - d) Two Steps
223. Linked List use ____ to store data.
- a) Array
 - b) Variables

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- c) Linked Memory
- d) 2-D Array
- 224. Complete the push method code of stack void push (int x) {
A{____}=x}
 - a) Count++
 - b) Count—
 - c) ++count
 - d) –count
- 225. A template is a Function or Class that is Written a ____ data type.
 - a) Generic
 - b) None of These
 - c) Define
 - d) Specific
- 226. Trying to remove an element from an empty Stack is called ____
 - a) Garbage Collection
 - b) Overflow stack
 - c) Empty collection
 - d) Underflow of Stack
- 227. Stack and Queue can be implemented using ____
 - a) Binary Tree
 - b) Singly Linked List
 - c) AVL Tree
 - d) Binary Search Tree
- 228. A software solution is said to be efficient if it solves the problem.
 - a) With its resource constraints
 - b) With No Time
 - c) By Consuming more hardware resources.
 - d) By Using some extra resources.
- 229. we cannot remove items randomly from ____
 - a) Stack
 - b) Queue
 - c) Stack and Queue
 - d) List
- 230. Stack push(15) will push 15 on ____
 - a) Top of the Stack
 - b) Anywhere of the Stack
 - c) Middle of the Stack
 - d) Bottom of the Stack

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231. Which of the following is the correct conservation from infix to postfix expression $A*B+C/(E-F)$.

- a) $ABC*+EF-/$
- b) $AB*CFE-/*$
- c) $AB*C+EF/*$
- d) $AB+C*E-F/$

232. Convert the Given infix from $12+60-23$ of expression in postfix form.

- a) $12+60\ 23-$
- b) $12\ 60+ -23$
- c) $-12\ 60 -23$
- d) None

233. $Y=\&x[0];$

In the above statement, we get the address of the Location of the array x and store it in y. Here "Y" is;

- a) Xvalue
- b) Zvalue
- c) Ivalue
- d) Nvalue

234. Last Node in Circular Linked list Contains.

- a) Maximum Two points
- b) No Null Pointer
- c) Atleast one Null pointer
- d) None

235. Consider the linked list having data $[6, 72, 35, 65, 25]$ stored in it. While current pointer is pointing memory location having 72 stored in it. After calling $\text{add}(4)$ function on the following linked list current point will point to memory location having value?

- a) 36
- b) 4
- c) 72
- d) 25

236. there is no such Node whose next filed is NULL which one of the given option support the statement

- a) Linked List
- b) Circular Link list
- c) Array
- d) Queue

DATA STRUCTURE (CS301)

MID TERM MEGA FILE

SOLVED BY

VU HELPER

❖ 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

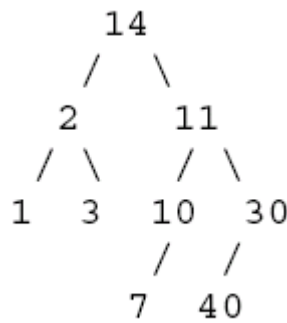
❖ Each node in doubly link list has,

- ▶ 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.



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]`

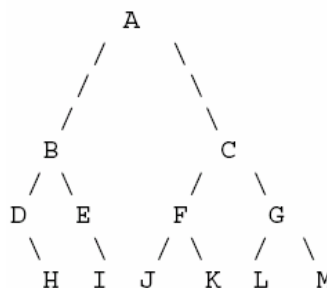
- ❖ The expression $AB+C^*$ is called ?

- ▶ 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 than or equal ?

- ▶ **Strictly Binary Tree**
- ▶ Binary Search tree
- ▶ AVL tree
- ▶ All of these

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



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 than 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?

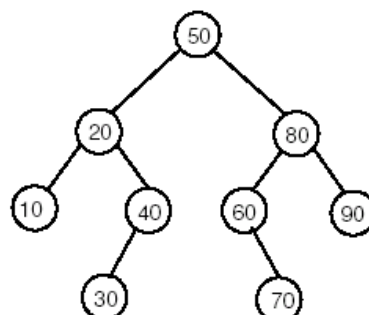
▶ ☐ **Trees are recursively defined multi-dimensional data structures**

▶ The order of a tree indicates a maximum number of children 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 $\log_2 N$

❖ 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 PREORDER 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?

▶ **$\log(\text{base } 2) \text{ of } n$**

- ▶ 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

- ▶ 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.

- The last item to be added to a queue is the first item to be removed
- A queue is a structure in which both ends are not used
- The last element hasn't to wait until all elements preceding it on the queue are removed
- 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 postorder 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 children 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),

- ▶ $\log_2(n+1)$
- ▶ $\log_2(n+1) - 1$
- ▶ **$1.44 \log_2 n$**
- ▶ $1.66 \log_2 n$

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.

- 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.

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?

- ▶ $56 / + 2$
- ▶ $5\ 6\ 2\ /\ +$
- ▶ $5\ 6\ /\ 2\ +$
- ▶ $/62\ +\ 5$

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?

- $65 + * 758 + - *$
- $65758 + * + - *$
- $56 + * 785 + - *$
- $356 * + 785 + * -$

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?

- $56 / + 2$
- $562 / +$
- $56 / 2 +$
- $/62 + 5$

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

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



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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. $1.66 \log_2 n$
 - b. $1.44 \log_2 n$**
 - c. $\log_2(n+1)-1$
 - d. $1.66 \log_2(n+1)$
6. BST is a _____ Structure:-
 - a. Linear
 - b. Non Linear**
 - c. Circular
 - d. None of Above
7. After creation of an array:-
 - 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 $h = \log_2(Tn+1) - 1$ 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



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CS301- Data Structures

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MIDTERM EXAMINATION

Spring 2010

CS301- Data Structures

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

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

- ▶ False
- ▶ **True (Page 101)**

Question No: 2 (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 (Page 5)**
- ▶ Use the better algorithm
- ▶ Use as much data as we can store on the hard disk

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

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

Here function argument passing by reference method is used, so when we call a function we will give the variable reference as parameter.

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

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

- ▶ False
- ▶ **True (Page 202)**

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

The tree data structure is a

- ▶ Linear data structure
- ▶ **Non-linear data structure (Page 112)**
- ▶ Graphical data structure
- ▶ Data structure like queue

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

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.

Declaring a parameter as a const simply means that the function can't change the value of its parameters.

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

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.**

Only the x and y can alter the private member variable of the foo class object. Last Option is more correct but not exact. In the last option the two function name are not mentioned

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

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**

Question No: 9 (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,

- ▶ **$\log_2 (n+1) - 1$ (Page 139)**
- ▶ $\log_2 (n+1)$
- ▶ $\log_2 (n) - 1$
- ▶ $\log_2 (n)$

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

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** (Page 53)
- ▶ 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.

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

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]**

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

The expression $AB+C^*$ is called?

- ▶ Prefix expression
- ▶ **Postfix expression** (Page 70)
- ▶ Infix expression
- ▶ None of these

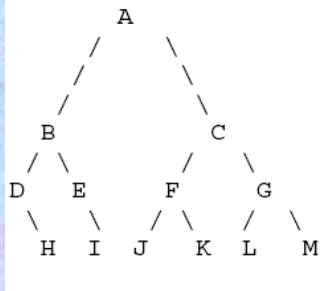
Question No: 13 (Marks: 1) - Please choose one

_____ 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** [Click here for detail](#)
- ▶ AVL tree
- ▶ All of these

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

Consider the following binary search tree (BST):



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

- ▶ J and I
- ▶ H and E
- ▶ D and E
- ▶ **L and M**

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

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

- 1) An insertion into left sub tree of the left child of a
- 2) An insertion into right sub tree of the right child of a.

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

- 1) 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.
- 2) 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

Question No: 16 (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: 17 (Marks: 2)

AVL Tree is,

- ▶ **Non Linear data structure** [Click here for detail](#)
- ▶ Linear data structure
- ▶ Hybrid data structure (Mixture of Linear and Non Linear)
- ▶ None of the given options.

MIDTERM EXAMINATION

Spring 2010

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** [Click here for detail](#)
- ▶ 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

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

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

- ▶ One
- ▶ **Two (Page 67)**
- ▶ Three
- ▶ Four

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** [Click here for detail](#)
- ▶ Call by passing reference of the argument
- ▶ Call by passing the address of the argument

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 (Page 213)**
- ▶ 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 statement changes currentNode so that it refers to the next node?

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

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

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

- ▶ False
- ▶ **True (Page 101)**

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

Which one is a self- referential data type?

- ▶ Stack
- ▶ Queue
- ▶ Link list
- ▶ **All of these** [Click here for detail](#)

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

Each node in doubly link list has,

- ▶ 1 pointer
- ▶ **2 pointers (Page 39)**
- ▶ 3 pointers
- ▶ 4 pointers

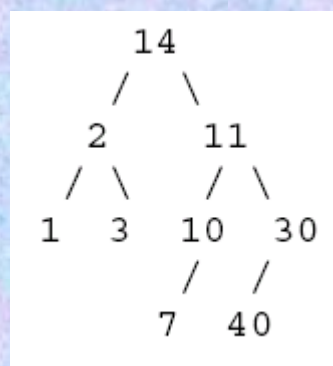
Question No: 9 (Marks: 1) - Please choose one

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.

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

Consider the following tree.



How many of the nodes have at least one sibling?

- ▶ 8
- ▶ 7
- ▶ 5
- ▶ 6

A sibling is an element that shares the same parent with another element

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

The nodes with no successor are called _____

- ▶ Root Nodes
- ▶ **Leaf Nodes**
- ▶ Both of these
- ▶ None of these

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

AVL Tree is,

- ▶ **Non Linear data structure** [Click here for detail](#)
- ▶ Linear data structure
- ▶ Hybrid data structure (Mixture of Linear and Non Linear)
- ▶ None of the given options.

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

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

- ▶ One
- ▶ **Two** [Click here for detail](#)
- ▶ Three
- ▶ Four

Question No: 15 (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** [Click here for detail](#)

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

- ▶ Unary
- ▶ **Binary** (Page 64)
- ▶ Ternary
- ▶ None of the above

MIDTERM EXAMINATION

Spring 2010

Question No: 1 (M a r k s: 1)

A subscript of an array may be an integer or an integer expression.

- ▶ **True** [Click here for detail](#)
- ▶ False

Question No: 2 (M a r k s: 1)

Doubly Linked List always has one NULL pointer.

- ▶ True
- ▶ **False** (Page 43)

Question No: 3 (M a r k s: 1)

In which of the traversal method, the recursive calls can be used to traverse a binary tree ?

- ▶ **In preorder traversal only** (Page 143)
- ▶ In inorder traversal only
- ▶ In postorder traversal only
- ▶ All of the given options

Question No: 4 (M a r k s: 1)

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** (Page 213)
- ▶ None of the given options

Question No: 5 (Marks: 1)

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))** [Click here for detail](#)
- ▶ if (LessThan(alpha, beta))
- ▶ if (LessThan(alpha).beta)

Question No: 7 (Marks: 1)

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** [Click here for Detail](#)
- ▶ None of these

Question No: 8 (Marks: 1)

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

- ▶ add
- ▶ append
- ▶ insert
- ▶ **push** (Page 53)

Question No: 9 (Marks: 1)

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

- ▶ delete
- ▶ peek
- ▶ **pop** (Page 53)
- ▶ remove

Question No: 10 (Marks: 1)

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)

_____ 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** [Click here for detail](#)
- ▶ None of these

Question No: 12 (Marks: 1)

Which of the following can be used to reverse a string value,

- ▶ **Stack** [Click here for detail](#)
- ▶ Queue
- ▶ Both of these
- ▶ None of these

Question No: 14 (Marks: 1)

AVL Tree is,

- ▶ **Non Linear data structure** [Click here for detail](#)
- ▶ Linear data structure
- ▶ Hybrid data structure (Mixture of Linear and Non Linear)
- ▶ None of the given options.

Question No: 15 (Marks: 1)

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** [Click here for detail](#)

Question No: 16 (Marks: 1)

An array is a group of consecutive related memory locations.

- ▶ **True** [Click here for detail](#)
- ▶ False

MIDTERM EXAMINATION

Spring 2010

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

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

- ▶ True
- ▶ **False** (Page 7)

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

In an array list the current element is

- ▶ **The first element** [Click here for detail](#)
- ▶ 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** [Click here for detail](#)
- ▶ 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.** [Click here for detail](#)
- ▶ 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))** [Click here for detail](#)
- ▶ 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** (Page 161,54)
- ▶ 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** [Click here for detail](#)

- 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** [Click here for detail](#)
- 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 tree
 - The order of a tree indicates a maximum number of children allowed at each node of the
 - 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.**
- [Click here for detail](#)

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.** [Click here for detail](#)

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

Searching an element in an AVL tree take maximum in AVL tree,

- $\log_2(n+1)$
time (where n is no. of nodes)
- $\log_2(n+1) - 1$
- **$1.44 \log_2 n$** (Page 227)
- $1.66 \log_2 n$

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

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

- 1
- 3
- 2
- **4** (Page 229)

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 [Click here for detail](#)

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?

- ▶ $56/ + 2$
- ▶ **5 6 2 / +** (Page 66)
- ▶ $5 6 / 2 +$
- ▶ $/62 + 5$

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

Which of the following is a non linear data structure?

- ▶ Linked List
- ▶ Stack
- ▶ Queue
- ▶ **Tree** (Page 112)

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

“+” is a operator.

- ▶ Unary
- ▶ **Binary** (Page 64)
- ▶ Ternary
- ▶ None of the above

MIDTERM EXAMINATION

Spring 2010

1. Addition of new items in stack make the pointer ----- by 2

- a. Increment, bits
- b. Increment, bytes
- c. Decrement, bits
- d. Decrement, bytes** [Click here for detail](#)

2. Next item in a linked list is known as

- a. Index
- b. Item
- c. Node** [Click here for detail](#)
- d. Child

3. What will be the postfix notation of $5+6/2$.

- a. $56+/2$
- b. $562+/$
- c. $562/+$** (Page 66)
- d. $5+62/$

4. In an AVL tree to delete a parent with two children 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. $1.66 \log_2 n$
- b. $1.44 \log_2 n$** (Page 227)
- c. $\log_2 (n+1)-1$
- d. $1.66 \log_2 (n+1)$

6. BST is a Structure:-

- a. Linear
- b. Non Linear** [Click here for detail](#)
- c. Circular
- d. None of Above

7. After creation of an array:-

- 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.** [Click here for detail](#)
- d. Size can be increased and can also be decreased.

8. Each node in a BST has Pointers:-

- a. 1
- b. 2** [Click here for detail](#)
- c. 3
- d. 4

9. Highest Operators Precedence is of the following operator:-

- a. Plus
- b. Minus
- c. Multiply** [Click here for detail](#)
- d. Exponentiation

10. Following are the linear data structures:-

- a. Stacks
- b. Queues
- c. Both a & b (Page 52, 87)**
- 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 (Page 323)**
- b. False

13. Tree data structure is a

- a. Linear
- b. Non Linear (Page 112) rep**
- c. Circular
- d. None of Above

14. What will be the valid postfix notation of $A+B*C-D$

- a. $ABC+*D-$
- b. $ABC*+D-$ (According to rule)**
- 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 (Page 64)**
- d. None of the Above

MIDTERM EXAMINATION

Spring 2009

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

The tree data structure is a

- ▶ Linear data structure
- ▶ **Non-linear data structure (Page 112)**
- ▶ Graphical data structure
- ▶ Data structure like queue

Question No: 3 (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** [Click here for detail](#)
- ▶ LinkLists
- ▶ Binary Search Trees
- ▶ All of the given options

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

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**

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

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.**

Only the x and y can alter the private member variable of the foo class object. Last Option is more correct but not exact. In the last option the two function name are not mentioned

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

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

- delete
- peek
- **pop (Page 53)**
- remove

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

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**

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

Parameters in function call are passed using,

- **Stack (Page 80)**
- Queue
- Binary Search Tree
- AVL Tree

Question No: 9 (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: 10 (Marks: 1) - Please choose one

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**

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**
- ▶ 0 2 4
- ▶ 0 2
- ▶ 2 4

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

Queue follows,

- ▶ Last in First out
- ▶ First in Last out
- ▶ **First in First out** (Page 87)
- ▶ None of these

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

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 than or equal ?

- ▶ **Strictly Binary Tree**
- ▶ **Binary Search tree** [Click here for detail](#)
- ▶ AVL tree
- ▶ All of these

Question No: 14 (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** [Click here for detail](#)
- ▶ The order of a tree indicates a maximum number of children 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: 15 (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: 16 (Marks: 1) - Please choose one

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

MIDTERM EXAMINATION

Spring 2009

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** [Click here for detail](#)
- ▶ 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 ;** [Click here for detail](#)
- ▶ 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** [Click here for detail](#)

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** [Click here for detail](#)
- ▶ 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** (Page 101)

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

Which one of the following statements is correct?

- ▶ **Array size is fixed once it is created** [Click here for detail](#)
- ▶ 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** [Click here for detail](#)
- ▶ 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** (Page 53)

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

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

- ▶ delete
- ▶ peek
- ▶ **pop** (Page 53)
- ▶ remove

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

We can add elements in QUEUE From _____

- ▶ Front
- ▶ **Rear** (Page 91)
- ▶ 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** [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: 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,

▶ **$\log_2(n+1) - 1$** (Page 139)

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

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** [Click here for detail](#)
- ▶ False

Question No: 17 (Marks: 1)

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(PLHR25)

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.

False ---- No, it can be deleted.

Question No: 18 (Marks: 1)

Deleting a leaf node in binary search tree involves setting _____ pointer/s of that node's parent as null.

- 1
- 2
- 3
- 4