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Data Structures (CS301)

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Objective Questions

1. _____ is when function is calling to itself.
 1. Loop
 2. Recursion
 3. Iteration
 4. Nasted loop
2. Which of the following operations returns "most recently entered value" from the stack?
 1. Push
 2. Recent
 3. Top
 4. First
3. The array in binary search is sub divided _____.
 1. Once
 2. Twice
 3. N time
 4. Untill a sublist is no more divisible
4. 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)
 3. percolateDown(p,delta)
 4. remove(p,delta)
5. Which property of equivalence relation is satisfied if we say: Ahmad is cousin of Ali and Ali is also cousin of Ahmad
 1. Reflexivity
 2. Symmetry
 3. Transitivity

4. All of the given

6. Factorial is an example of _____ function.

1. Recursive
2. Non-Recursive
3. Cube
4. Log

7. 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
2. 34
3. 44
4. 56

8. The difference between a "Binary Tree (BT)" and a "Binary Search Tree (BST)" is that,

1. A BST has two children per node whereas a BT can have none, one or two children per node
2. In BST nodes are inserted based on the values they contain
3. In BT nodes are inserted based on the values they contain
4. There is no difference

9. If a tree has 20 edges/links, then the total number of nodes in the tree will be:

1. 19
2. 20
3. 21
4. Can't be determined

10. An array x of 100 integers is declared as

1. `int x = [100];`
2. `int x[100];`
3. `integer array x = 100;`
4. `integer x [] = 100;`

11. An array is a group of _____ memory locations.

1. Scattered
2. Isolated
3. Random (non-consecutive)
4. Consecutive

12. What will be the value of root of an AVL and BST if built from the same data?

1. Same
2. Different in some cases
3. Root of AVL is square of root of BST

4. None of the given

13. 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
4. We will decrease its size

14. 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

15. 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)?

1. 4 2 0
2. 0 2 4
3. 0 2
4. 2 4

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

1. TRUE
2. FALSE
3. In some cases
4. None of the given

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

1. Height
2. Balance
3. Width
4. None of the above

18. for every process executing, the last part of the memory is for _____ of the program.

1. Data
2. Code
3. Stack
4. Heap

19. The next field in the last node of a singly-linked list is set to _____.

1. NAN
2. 1
3. 'NULL
4. -1

20. 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.

1. roots, node
2. nodes, root
3. root, root
4. node, node

21. While implementing non-recursive traversal for Binary SearchTree, we need to implement _____ .

1. Queue
2. Stack
3. Min heap
4. Max heap

22. 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 the given

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

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

24. In 1990, Bill pugh proposed an enhancement on linked lists and the new data structure was termed as

1. Linked list
2. B-Tree
3. Skip list
4. Spelling checker

25. 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 the given

26. A binary tree with 24 internal nodes has _____ external nodes.
1. 22
 2. 23
 3. 48
 4. 25
27. Local variables defined inside function body are _____ automatically at the end of function execution.
1. created
 2. destroyed
 3. incremented
 4. decremented
28. What is the maximum depth of recursive calls a function may make?
1. 1
 2. 2
 3. n (where n is the argument)
 4. There is no fixed maximum
29. What is the time complexity of binary search with iteration?
1. $O(n \log n)$
 2. $O(n^2)$
 3. $O(n)$
 4. $O(\log n)$
30. For a perfect binary tree of height 4, What will be the sum of heights of nodes?
1. 31
 2. 30
 3. 27
 4. 26
31. The balance of a node is the result of "height of left subtree" _____ "height of right subtree".
1. Plus
 2. Minus
 3. Multiply
 4. Divided by
32. Which one of the following is known as "Last-In, First-Out" or LIFO Data Structure?
1. Linked List
 2. Stack
 3. Queue
 4. Tree
33. The total number of nodes on 5th level of a perfect binary tree are :

1. 16
2. 15
3. 31
4. 32

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

1. 23
2. 24
3. 22
4. 21

35. 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?

1. Arrays
2. Linked Lists
3. Binary Search Trees
4. Stack

36. 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

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

1. $\log_2 (n+1) - 1$
2. $\log_2 (n+1)$
3. $\log_2 (n) - 1$
4. $\log_2 (n)$

38. What is the hash function used in linear probing?

1. $h_i(x) = \text{hash}(x) \bmod \text{table size}$
2. $h_i(x) = (\text{hash}(x) + f(i^2)) \bmod \text{table size}$
3. $h_i(x) = (\text{hash}(x) + f(i)) \bmod \text{table size}$
4. $h_i(x) = X \bmod 17$

39. 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.

1. 7 5 2 4
2. 3 7 5 2 4
3. 7 5 2 4 3
4. 5 2 4 3

40. In singly linked list a node consists of two parts:

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

41. Linked list always contains elements that can be described as,

1. Redundant
2. Recursive
3. Self-referential
4. Bidirectional

42. If a tree has 50 nodes, then the total edges/links in the tree will be:

1. 55
2. 51
3. 50
4. 49

43. Each node in Binary Search Tree has

1. 1 pointer
2. 2 pointers
3. 3 pointers
4. 4 pointers

44. Heap can be used to implement

1. Stack
2. Linked list
3. Queue
4. Priority Queue

45. For compiler, a postfix expression is easier to evaluate than infix expression?

1. True
2. False

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

1. $ab+c*d-$
2. $abc*+d-$
3. $abcd+*-$
4. $abc+*d-$

47. The worst case of searching in binary search tree (BST) is:

1. When the data inserted in BST is sorted
2. When the height of left sub-tree is greater than right sub-tree
3. When the height of right sub-tree is greater than left sub-tree
4. When the tree is balanced

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

1. Next Node
2. Previous Node
3. Head Node
4. Last Node

49. The depth of a binary tree is

1. Total number of nodes in the tree
2. Number of leaf nodes in the tree
3. Number of non-leaf nodes in the tree
4. Maximum level of a leaf

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

1. $N - 1$
2. N
3. $N + 1$
4. $N + 2$

51. What are the basic things associated with data structures?

1. Space for each data item it stores
2. Time to perform each basic operation
3. Programming effort
4. All of the given

52. In the post-order traversal of a binary search tree, nodes process as:

1. Left-subtree, Right-subtree, Root
2. Right-subtree, Root, Left-subtree
3. Left-subtree, Root, Right-subtree
4. Right-subtree, Left-subtree, Root

**53. The expression
if (! heap ->isEmpty())
checks**

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

54. One difference between a queue and a stack is

1. Queues require dynamic memory, but stacks do not.
2. Stacks require dynamic memory, but queues do not.
3. Queues use two ends of the structure, stacks use only one.
4. Stacks use two ends of the structure, queues use only one.

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

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

56. A queue where the dequeue operation does not depend upon FIFO, is called:

1. enqueue
2. simple queue
3. stack
4. priority queue

57. Which of the following statement is NOT true for reference variable?

1. Once a reference is created, it cannot be later made to reference another object.
2. Reference cannot be NULL
3. References can be uninitialized.
4. It is not possible to refer directly to a reference object after it is defined.

58. For reference variables, _____ sign is used.

1. ampersand
2. asterisk
3. sigma
4. dollar

59. Select the one FALSE statement about binary trees:

1. Every binary tree has at least one node.
2. Every non-empty tree has exactly one root node.
3. Every node has at most two children.
4. Every non-root node has exactly one parent.

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

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

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

1. $5 (9 7 -) *$
2. $5 9 * 7 -$
3. $5 9 7 - *$
4. $5 (9 7 -)$

62. A complete binary tree having "N" nodes consists of _____ Levels.

1. $\log_2 (N+1) - 1$

2. $\log_2 (N-1) - 1$
3. $\log_2 (N+1) + 1$
4. $\log_2 (N-1) + 1$

63. Insertion in a linked list can be done at

1. Front only
2. Back only
3. Somewhere in middle only
4. Front, Back and somewhere in the middle

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

1. does not remain
2. forms
3. reverses
4. remains

65. back() method of list class is used to:

1. Moves the "current" pointer to backward one element.
2. Moves the "current" pointer to backward two element.
3. Moves the "current" pointer to backward three element.
4. Moves the "current" pointer to backward four element.

66. ~BinarySearchTree() is a _____ .

1. Constructor
2. Destructor
3. Switch case
4. Template method call

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

1. Queue
2. Stack
3. Linked list
4. Binary Search Tree

68. A table consists of several columns, known as

1. Entity
2. Tuple
3. Fields
4. Record

69. The easiest case of deleting a node from BST is the case in which the node to be deleted _____.

1. Is a leaf node
2. Has left subtree only
3. Has right subtree only
4. Has both left and right subtree

70. Which of the following is not a form of expression?

1. Infix
2. Postfix
3. Prefix
4. **Pastfix**

71. 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?

1. a = X(b);
2. a = X(&b);
3. **a = X(*b);**
4. a = X(&*b);

72. A hash function returns a _____ value.

1. **Integer**
2. Double
3. Float
4. Char

73. 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-linked list
3. Array
4. Structure

74. Which of the following applications may use a stack?

1. Accessing a shared resource
2. **Parentheses balancing program**
3. Buffering messages
4. Waiting list

75. The percolateDown procedure will move the smaller value _____ and bigger value _____.

1. left, right
2. right, left
3. down, up
4. **up, down**

76. Every AVL is _____.

1. Binary Tree
2. Complete Binary Tree
3. **Binary Search Tree**

4. None of the given

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

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

78. 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?

1. 1
2. 2
3. 3
4. 4

**79. The expression
if (! heap ->isFull())
check**

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

80. 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
4. All of the given

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

1. Reference
2. Value
3. Reference & Value
4. Copy of the object can not be passed

82. Recursive call of a function use _____ data structure.

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

83. In the statement `int& a=b;`

1. a and b pointing to two different memory location
2. a and b are two different names of the same memory location
3. a and b are two different variable names

4. **b hold the address of variable a**

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

1. N
2. N^2
3. $N\log_2 N$
4. **$\log_2 N$**

85. Suppose there is an image segmented into pixels. Each pixel has _____ neighbour(s).

1. 0
2. 4
3. **8**
4. 16

86. Binary Search can be categorized into which of following?

1. Greedy algorithm
2. Dynamic programming
3. **Divide and conquer**
4. Brute Force technique

87. Suppose a hash function returns 6 for the given value. At which index of array the value will be saved?

1. 0
2. 5
3. **6**
4. 7

88. During the union by size method, all the array element initialized to -1 shows:

1. Tree is complete now
2. **Initial condition of tree**
3. Every tree has two elements each
4. None of given

89. Which of the following properties are satisfied by Equivalence relationship?

1. Reflexive, Symmetric
2. Reflexive, Transitive
3. Symmetric, transitive
4. **Reflexive, Symmetric and Transitive**

90. Which one of the following statement is correct?

1. **Array size is fixed once it is created**
2. Link List size is fixed once it is created
3. Binary Search Tree size is fixed once it is created
4. AVL Tree size is fixed once it is created

91. Consider the following infix expression.

$7/8 + 9$

If one converts the above expression into postfix. What would be the resultant expression?

1. $7\ 8\ 9\ /\ +$
2. $7\ 8\ /\ +\ 9$
3. $\ /\ 7\ 8\ +\ 9$
4. $7\ 8\ /\ 9\ +$

92. In case of insertion of right inner node in BST,

1. we need to apply single left rotation to make it AVL tree.
2. we need to apply single right rotation to make it AVL tree.
3. single left rotation first and then single right rotation to make it AVL tree.
4. single right rotation first and then single left rotation to make it AVL tree.

93. 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"?

1. selpa
2. selppa
3. apples
4. aaappppplleess

94. Which of the following is correct about AVL Tree?

1. It is identical to BST except height of the left and right subtrees can differ by at least 1.
2. It is identical to BST except height of the left and right subtrees must differ by at least 1.
3. It is not identical to BST, it is totally different kind of tree.
4. It is identical to BST except height of the left and right subtrees can differ by at most 1.

95. Consider the following expression:

$x - y * a + b / c$

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

1. $x\ y\ -a * b + c /\$
2. $x * y\ a - b\ c /\ +$
3. $x\ y\ a * - b\ c /\ +$
4. $x\ y\ a * - b / + c$

96. Each node in doubly link list has

1. 1 pointer
2. 2 pointers
3. 3 pointers

4. 4 pointers

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

1. 2 or -2
2. 1 or -1
3. 0
4. None of the options.

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

1. int cube(int num)
2. int cube(int& num)
3. int cube(const int& num)
4. int cube(int* num)

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

1. 54
2. 57
3. 56
4. 55

100. Non-recursive calls are faster than which of the following calls?

1. Parameterized
2. Recursive
3. Function
4. Non-Function

101. The new operation in C++ for dynamically allocating memory returns,

1. Size of the memory it has allocated
2. Pointer to the memory it has allocated
3. Both size and pointer to the memory it has allocated
4. Value of the memory it has allocated

102. _____ 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()

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

1. enqueue()
2. dequeue()
3. front()
4. remove()

104. Parameters in function call are passed using,

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

105. Suppose there are a set of fruits and a set of vegetables. Both sets are _____ sets.

1. **Disjoint**
2. Subsets
3. Whole
4. Equal

**106. 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. **$A\ B\ +\ C\ D\ /\ +\ E\ -$**

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

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

**108. What will be the result of evaluation following expression?
 $5+3*2/(6-3)$**

1. 3
2. 5
3. **7**
4. 10

109. Which of the following possible operation are performed on Table ADT?

1. Insert, Remove
2. Find, Remove
3. Insert, Find
4. **Insert, Find, Remove**

110. There are four cases of rotation is an _____ tree.

1. ELV
2. EVL
3. **AVL**
4. ALV

111. The _____ method of list data structure removes the element residing at the current position

1. Add
2. Next
3. Remove
4. Find

112. The total number of nodes on 10th level of a perfect binary tree are :

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

113. 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:

1. rvalue
2. xvalue
3. lvalue
4. zvalue

114. _____ in AVL is logarithmic.

1. Updating
2. Searching
3. Deletion
4. Insertion

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

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

116. AVL tree is linear data structure.

1. TRUE
2. FALSE
3. In some cases
4. None of the given

117. The most difficult case for deleting a node from Binary Search Tree is when the node to be deleted _____.

1. is Leaf node
2. has only left children (subtree)
3. has only right children (subtree)
4. has both the left and right children (subtree)

118. Every AVL tree is a binary search tree.

1. TRUE
2. FALSE

3. Not in some cases
4. None of the given

119. The main use of AVL tree is:

1. Searching of data
2. Storing of data
3. Insertion of data
4. Security of data

120. Doubly Linked List always has _____ NULL pointer/s in a node.

1. One
2. Two
3. Three
4. Four

121. If there are 100 elements in a heap, and 100 deleteMin operation are performed, will get _____ list.

1. Sorted
2. Unsorted
3. Nonlinear
4. None of the given

122. _____ is an area in computer memory that is allocated dynamically.

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

123. Searching an element in an AVL tree takes maximum _____ time (where n is number of nodes in AVL tree).

1. $\log_2(n+1)$
2. $\log_2(n+1) - 1$
3. $1.44 \log_2 n$
4. $1.66 \log_2 n$

124. Which of the following statement is false?

1. Arrays are dense lists and static data structure
2. data elements in linked list need not be stored in adjacent space in memory
3. pointers store the next data element of a list
4. linked lists are collection of the nodes that contain information part and next pointer

125. Which of the following is true regarding the maze generation?

1. Randomly remove walls until the entrance and exit cells are in same set.
2. Removing a wall is the same as doing a union operation
3. Do not remove a randomly chosen wall if the cells it separates are already in the same set
4. All of the given

126. **Allocating and de-allocating memory for linked list nodes take _____ time than pre-allocated array.**
1. Less
 2. **More**
 3. Equal
 4. No
127. **If there are 100 elements in an equivalence class then we will have _____ sets initially.**
1. 50
 2. **100**
 3. 1000
 4. 80
128. **Suppose there is an image of $7 * 7$, now we will have matrix of _____ rows and _____ columns.**
1. **7, 7**
 2. 49, 49
 3. 100, 100
 4. 8, 8
129. **In doubly linked list there is/are _____ pointer/s in each node.**
1. One
 2. **Two**
 3. Three
 4. Four
130. **Which of the following is correct statement?**
1. **An AVL tree is identical to BST expect height of the left and right subtree can differ by at most 1.**
 2. An AVL tree is identical to BST expect height of the left and right subtree can differ by at least 1.
 3. An AVL tree is identical to BST expect height of the left and right subtree must differ by at least 1.
 4. An AVL tree is not identical to BST, its another kind of tree.
131. **Which of the following is NOT an open addressing technique to resolve collisions?**
1. Quadratic probing
 2. **Double hashing**
 3. Cubic probing
 4. Linear probing
132. **In level-order traversal for Binary Search Tree, at each level, we visit the nodes in _____ order.**
1. right-to-left
 2. **left-to-right**
 3. top to botton

4. any

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

1. Level
2. Length
3. Depth
4. Node level

134. In simple implementation of stack, isFull() method is used due to _____.

1. Limitation of array
2. Strength of array
3. Linked list connectivity
4. Complexity of linked list

135. New items are added at the _____ of the stack.

1. Bottom
2. Middle
3. Top
4. Center

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

1. del
2. delete
3. Remove
4. eliminate

137. For Binary Search Tree, we call the findMax() method as _____.

1. findMin(tree->getLeft())
2. findMin(tree->getRight())
3. findMin(tree->getCenter())
4. findMin(tree->getDown())

138. The expression $AB+C*$ is called?

1. Prefix expression
2. Postfix expression
3. Infix expression
4. Prefix and Infix expression

139. 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. 1
2. 2
3. 3
4. 4

140. The expression $DE+H^*$ is called _____.

1. Prefix expression
2. Infixexpression
3. Postfix expression
4. Hybrid expression

141. Binary search algorithm cannot be applied to _____ .

1. sortrd linked list
2. sorted binary trees
3. sorted linear array
4. None of the given

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

Infix Expression: $a+b*c-d$

1. $ab+c*d-$
2. $abc*+d-$
3. $abc+*d-$
4. $abcd+*-$

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

1. .cpp
2. .cppp
3. .h
4. .hh

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

1. $N - 1$
2. $N + 1$
3. $N + 2$
4. N

145. Leaf node of binary search tree contains _____.

1. One Null pointer
2. Three Null pointers
3. Two Null pointers
4. All of the given

146. The tree structure is a

1. Linear data structure
2. Non-linear data structure
3. Graphical data structure
4. data structure like queue

147. Every AVL is _____.

1. Ternary Tree
2. Complete Binary Tree

3. Heap
4. Binary Search Tree

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

1. Stack
2. Queue
3. Both of the given
4. None of the given

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

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

150. "new int[11]" will allocate memory for _____ integers.

1. 10
2. 11
3. 12
4. 13

151. 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

152. `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.

1. -
2. +
3. /
4. *

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

1. Maximizing
2. Minimizing
3. Equalizing
4. None of the given

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

1. $\log 3n$
2. $\log_2 n$
3. $n \log_2 n$

4. $\log n * n$

155. Which of the following can be used to reverse a string value?

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

156. 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

157. The tree data structure is a

1. Linear data structure
2. Non-linear data structure
3. Graphical data structure
4. Data structure like queue

158. A binary tree of N nodes has _____ .

1. $\log_{10} N$ levels
2. $\log_2 N$ levels
3. $N / 2$ levels
4. $N \times 2$ levels

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

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

160. If the height of a perfect binary tree is 4. What will be the total number of nodes in it?

1. 15
2. 16
3. 31
4. 32

161. 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/+
4. DE+FG*/

162. The simplest case in a BST to delete a node is:

1. When the node, that is to be deleted is root node
2. When the node, that is to be deleted has both left and right child
3. When the node, that is to be deleted has only one child
4. When the node, that is to be deleted is a leaf node

163. Sorting procedure normally takes _____ time.

1. $N \log N$
2. $2N$
3. $N * N * N$
4. N

164. Stack and Queue can be implemented using _____.

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

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

1. Very fast
2. not fast
3. equally time-taken
4. very slow

166. If we singly linked list to implement list, then there is an issue that it gives difficulty when we:

1. Move forward in the list
2. Move backward in the list
3. We will increase its size
4. We will decrease its size

167. If a hash function returns 4 for more than one value, this condition is called _____.

1. Merging
2. Collision
3. Mapping
4. Clustering

168. next() method of List class is used to:

1. Moves current position backward one element
2. Moves the "current" pointer to two steps after the last element of the array
3. Moves the current position forward one element
4. Moves the "current" pointer to two steps before the last element of the array

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

1. Level
2. Width

3. Height
4. None of the given

170. When we compare recursive method calls and non-recursive method calls, following statement is true.

1. Recursion is implemented in the same way as other function calls are implemented
2. Non-recursive methods are always efficient than recursive methods
3. Both options are true
4. None of the given options are true

171. During union by size method, which data structure is used to improve the balancing of tree?

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

172. If class A defines class B as its friend, then:

1. Class A can access private members of Class B
2. Class B can access only the public members of Class A
3. Class A can access only the public members of Class B
4. Class B can access private members of Class A

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

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

174. $a * (b+c)-d$ is an example of _____ expression.

1. infix
2. prefix
3. postfix
4. allfix

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

1. Call by passing the value of the argument
2. Call by passing reference of the argument
3. Call by passing the address of the argument
4. Call by passing pointer of the argument

176. Binary Tree traversal can be performed with the help of _____ .

1. Recursive calls only
2. Non-recursive calls
3. Both Recursive and Non-recursive calls

4. None of the given

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

1. One
2. Two
3. Three
4. Four

178. Array cells are _____ in computer memory.

1. Contiguous
2. Random
3. Store in multiple variables
4. Store in multiple functions

179. 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
2. 1, _, _, _, _, _, 3
3. 1, 10, 8, _, _, _, 3
4. 1, 8, 10, _, _, _, 3

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

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

181. Each node in singly link list has,

1. 1 pointer
2. 2 pointers
3. 3 pointers
4. 4 pointers

182. get(?) method of list class is used to:

1. Get element from the last position
2. Get element from the first position
3. Get element from the middle position
4. Get element at the given position

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

1. One
2. Two
3. Three

4. Four

184. 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?

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

185. The variables which are destroyed automatically when a function's execution ends are:

1. Global variables
2. Local variables defined inside function body
3. Variables (objects) defined inside function body dynamically
4. Variables (objects) defined inside function body statically

186. Can we store elements with different data types in a single array?

1. Yes
2. No
3. In some cases
4. None of the given

187. What is the depth of any tree if the union operation is performed by height?

1. $O(N)$
2. $O(N \log N)$
3. $O(\log N)$
4. $O(M \log N)$

188. A solution is said to be efficient if it solves the problem within its resource constraints i.e. hardware and time.

1. True
2. False

189. Avl tree takes maximum _____ time to search an element.

1. $1.44 \log_2 n$
2. $\log_2(n+n)$
3. $\log_2(n+1)+1$
4. $1.88 \log_2 n$

190. 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
4. 25

191. Which one of the following is NOT true regarding the skip list?

1. Each list S_i contains the special keys $+\infty$ and $-\infty$
2. List S_0 contains the keys of S in non-decreasing order
3. List S_h contains only the n special keys
4. Each list is a subsequence of previous one

192. _____ is used for Reference variables in C++.

1. !
2. @
3. #
4. &

193. Which of the is NOT true regarding the maze generation?

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

194. What will be result of following postfix expression?

1 2 3 * + 2 -

1. 3
2. 4
3. 5
4. 10

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