


Question # 1 Revisit

What is time complexity of the following code?

```
int sum=0;
for (int i = 0; i < n; i++) {
    sum=sum+10;
    for (int j = 0; j < n; j++) {
        sum=sum + j;
        break;
    }
}
```

Choose the best option

- ☐ $O(n^2)$
- ☐ $O(n)$
- ☐ $O(1)$
- ☐ $O(\log n)$


Question # 2 Revisit

If the list is a circular linked list, with first points to the first node and temp points to the last node. Which of the following code snippet will delete a node, which is after temp?

```
class Node{
    int data;
    Node next;
}
```

Choose the best option

- ☐ mynode=first
mynode.next=temp.next;
mynode.next=first;
- ☐ mynode=first
temp.next=mynode;
mynode.next=first;
- ☐ temp.next=first.next;
mynode=first;
first=first.next;
mynode.next=null
- ☐ None of the above


Question # 3 Revisit

What is the time complexity of the following code:

```
int a = 0, i = N;
while (i > 0)
{
    a += i;
    i /= 2;
}
```

Choose the best option


- ☐ $O(N)$
- ☐ $O(\sqrt{N})$
- ☐ $O(N/2)$
- ☐ $O(\log N)$

Question # 4 Revisit

How many Stacks are required to implement Queue data structure?

Choose the best option

- ☐ 5
- ☐ 1
- ☐ 2
- ☐ 3

Question # 5 Revisit

What does the following return?

```
Public int getval( Bnode T)
{ // T = root node
  int value = 0;
  if(T)
  { // LC = Left child and RC = right child
    if((T.LC) == NULL && (T.RC) == NULL))
      value = 1;
    else
      value = value + getval(T.LC) + getval(T.RC);
  }
  return value;
}
```

Choose the best option


- ☐ Number of internal nodes in the tree
- ☐ height of the tree
- ☐ Number of nodes without right sibling in the tree
- ☐ Number of leaf nodes in the tree

Question # 6 Revisit

Which of the following options is not true about the Binary Search Tree?

Choose the best option


- ☐ The value of the left child should be less than the root node.
- ☐ The value of the right child should be greater than the root node.
- ☐ The left and the right sub trees should also be a binary search tree.
- ☐ None of the above.

Question # 7 Revisit

What is the maximum height of any AVL tree with 7 nodes? Assume that the height of a tree with single node is 0.

Choose the best option


- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5

Question # 8 Revisit

An algorithm that calls itself directly or indirectly is known as _____.

Choose the best option

- ☐ Sub algorithm
- ☐ Recursive algorithm
- ☐ Polish notation
- ☐ Traversal algorithm

Question # 9 Revisit

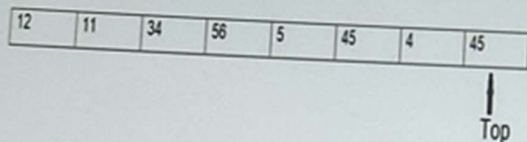
_____ is a collision-resolution scheme that searches the hash table for an unoccupied location beginning with the original location that the hash function specifies and continuing at increments of 1^2 , 2^2 , 3^2 , and so on.

Choose the best option

- ☐ Linear probing
- ☐ Double hashing
- ☐ Quadratic probing
- ☐ Separate chaining

Question # 10

Consider the stack shown below:



After performing the following operations in sequence, which value will be at the top of the stack?
pop, pop, pop, push 29, push 30, pop, pop, pop

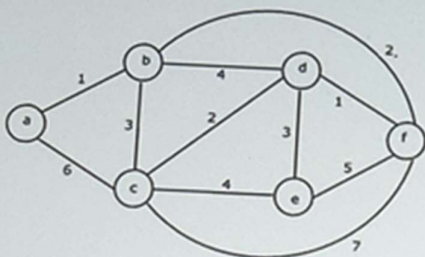
Revisit

Choose the best option

- ☐ 29
- ☐ 30
- ☐ 5
- ☐ 56

Question # 11

Find the MST for Figure 1 and List order in which the edges are added in MST using kruskals algorithm.



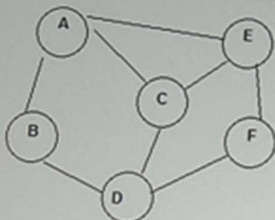
Revisit

Choose the best option

- ☐ a-b, d-f, b-f, c-d, d-e
- ☐ a-b, b-f, d-f, d-c, d-e
- ☐ d-f, d-c, -f-b, a-b, d-e
- ☐ None of the above

Question # 12

Which is the correct representation of the given graph using adjacency matrix?



Revisit

Choose the best option

- ☐

	A	B	C	D	E	F
A	0	1	1	0	1	0
B	1	1	0	1	0	0
C	1	0	1	1	1	0
D	0	1	1	0	0	1
E	1	0	1	0	0	1
F	0	0	0	1	1	0
- ☐

	A	B	C	D	E	F
A	0	1	1	0	1	0
B	1	0	0	1	0	0
C	1	0	0	1	1	0
D	1	1	1	0	0	1
E	1	0	1	0	0	1
F	0	0	0	0	1	0
- ☐

	A	B	C	D	E	F
A	0	1	1	0	1	0

Question # 13

Using _____ in java, one can sort the arrays.

Revisit

Choose the best option

- ☐ System.sort()
- ☐ Collection.sort()
- ☒ Arrays.sort()
- ☐ Array.sort()

Question # 14

In Hash Table, which collision handling technique results in Secondary Clustering?

Revisit

Choose the best option

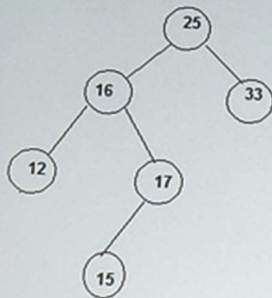
- ☐ Mid-Square
- ☐ Quadratic Probing
- ☐ Linear Probing
- ☐ Folding

Question # 15

Which of the following statement is true for the given tree?

Revisit

Choose the best option



- ☐ Given tree is AVL tree.
- ☐ Given tree is not AVL tree.
- ☐ Given tree is not AVL tree but it is binary search tree.
- ☐ Given tree is Ordered Binary Search Tree.

Question # 16

What is the worst case time complexity of Search() operation in an unbalanced Binary Search Tree having 'n' nodes?

Revisit

Choose the best option

- ☐ $O(1)$
- ☐ $O(\log n)$
- ☐ $O(n)$
- ☐ $O(n \log n)$

Question # 17


What is the best-case time complexity of Bubble sort to sort an array of 'n' elements?

Revisit

Choose the best option

- ☐ $O(n^2)$
- ☐ $O(n \log n)$
- ☐ $O(1)$
- ☒ $O(n)$

Question # 18

 Revisit

An ADT is defined to be a mathematical model of a user-defined type along with the collection of all _____ operations on that model.

Choose the best option

- ☐ Cardinality
- ☐ Assignment
- ☐ Primitive
- ☐ Structure

Question # 19


 Revisit

Which data structure is required to convert the infix to prefix notation?

Choose the best option

- ☐ Stack
- ☐ Linked List
- ☐ Binary Tree
- ☐ Queue

Question # 20


 Revisit

Which of the following data structure is BEST suited to implement LRU Cache?

Choose the best option

- ☐ Array
- ☐ Binary Tree
- ☐ Doubly Linked List
- ☐ Graph

Question # 21

 Revisit

Which of the following algorithm can be used to efficiently sort a linked list?

Choose the best option

- ☐ Merge Sort
- ☐ Quick Sort
- ☐ Heap Sort
- ☐ Selection Sort

Question # 22

 Revisit

How many numbers of comparisons will be done in worst case using Binary Search if the number of elements in the array are 32?

Choose the best option

- ☐ 10
- ☐ 2
- ☐ 5
- ☐ 4

Question # 23

Revisit

Which of the given options provides the increasing order of asymptotic complexity of functions f_1 , f_2 , f_3 and f_4 ?

$$\begin{aligned} f_1(n) &= 2^n \\ f_2(n) &= n^{3/2} \\ f_3(n) &= n \log n \\ f_4(n) &= n^{\log n} \end{aligned}$$

Choose the best option

- ☐ f_3, f_2, f_4, f_1
- ☐ f_3, f_2, f_1, f_4
- ☐ f_2, f_3, f_1, f_4
- ☐ f_2, f_3, f_4, f_1

Question # 24

Revisit

Which node pointer should be updated if a new node B is to be inserted in the middle of A and C nodes of a doubly linked list?

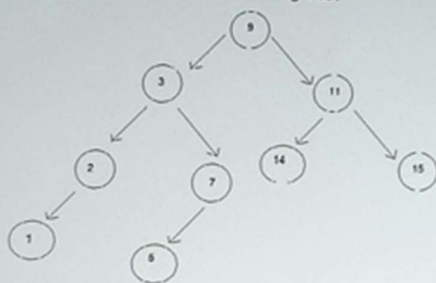
Choose the best option

- ☐ Next Pointer of A, Previous Pointer of B, Next Pointer of C, and previous pointer of C
- ☐ Next Pointer of A, Previous Pointer of B, Next Pointer of B and previous pointer of C
- ☐ Next Pointer of A, Previous pointer of A, next pointer of B and previous pointer of C
- ☐ None of the above

Question # 25

Revisit

What is Inorder traversal of the following tree?



Choose the best option

- ☐ 1 2 3 5 7 14 9 15 11
- ☐ 1 2 3 5 7 9 14 11 15
- ☐ 1 2 3 5 9 7 14 11 15
- ☐ 1 2 3 5 7 9 11 14 15

Question # 26

Revisit

Which of the following data structure is BEST suited to implement Priority Queue?

Choose the best option

- ☐ Doubly Linked List
- ☐ Heap
- ☐ Queue using Linked List
- ☐ Array

Question # 27

Revisit

Which algorithm strategy builds up a solution by choosing the option that looks the best at every step?

Choose the best option

- ☐ Greedy method
- ☐ Branch and bound
- ☐ Dynamic programming
- ☐ Divide and conquer return count

Question # 28

Revisit

If already sorted array is passed to a sorting algorithm, which one will be the slowest?

Choose the best option

- ☐ Insertion Sort
- ☐ Selection Sort
- ☐ Heap Sort
- ☐ Merge Sort

Question # 29

Revisit

The time complexity of merge sort algorithm is _____.

Choose the best option

- ☐ $O(n)$
- ☐ $O(\log n)$
- ☐ $O(n^2)$
- ☒ $O(n \log n)$

Question # 30

Revisit

Complete the following code if the function implements bubble sort, to sort elements in ascending order.

```
public static void bubbleSort(int arr[]){
    int n=arr.length;
    for(int i=0;i<n;i++)
    {
        for(int j=1;j<(n-i);j++) {
            if(arr[j-1]>arr[j]) {
                _____//code goes here
            }
        }
    }
}
```

Choose the best option

- ☐ int temp=arr[j];
arr[j+1]=arr[j];
arr[j]=temp;
- ☐ int temp=arr[j-1];
arr[j-1]=arr[j];
arr[j]=temp;
- ☐ int temp=arr[i-1];
arr[i-1]=arr[j];
arr[i]=temp;
- ☐ int temp=arr[i-1];
arr[i-1]=arr[j];
arr[j]=temp;

Question # 31

Revisit

In singly linked list if headpoints to the first node, which of the following code will print data in the last node?

Choose the best option

- ☐ temp=head;
while(temp!=null) {
temp=temp.next;
}
System.out.println(temp.data);
- ☐ temp=head;
while(temp.next!=null) {
temp=temp.next;
}
System.out.println(temp.data);
- ☐ temp=head;
while(temp.next==null) {
temp=temp.next;
}
System.out.println(temp.data);
- ☐ temp=head;
while(temp==null) {

Question # 32

The Inorder traversal of _____ will yield a sorted listing of elements.

Revisit

Choose the best option

- ☐ Binary trees
- ☐ Binary search trees
- ☐ Heaps
- ☐ AVL Trees

Question # 33

Which of the following is recursive preorder traversal function, if class node is defined as follows?

```
class Node {  
    int data;  
    Node left, right;  
    public Node(int key) {  
        data = key;  
        left = right = null;  
    }  
}
```

Revisit

Choose the best option

- ☐

```
void preorder(Node node) {  
    if (node == null)  
        return;  
    System.out.print(node.data + "---->");  
    preorder(node.left);  
    preorder(node.right);  
}
```
- ☐

```
void preorder(Node node) {  
    if (node != null)  
        return;  
    System.out.print(node.data + "---->");  
    preorder(node.left);  
    preorder(node.right);  
}
```
- ☐

```
void preorder(Node node) {  
    if (node != null)  
        return;
```

Question # 34

Which of the following is NOT an example of balanced Binary Search Tree?

Revisit

Choose the best option

- ☐ Threaded Binary Tree
- ☐ AVL Tree
- ☐ Red-black Tree
- ☐ Splay Tree

Question # 35

In Computational thinking terms, breaking down a complex problem into smaller, more specific sub-problems is called as _____.

Revisit

Choose the best option

- ☐ Problem Identification
- ☐ Decomposition
- ☐ Pattern Recognition
- ☐ Algorithmic Thinking

Question # 36

Consider the following type declaration for a doubly linked list node.

```
class DListNode {
    int data;
    DListNode prev;
    DListNode next;
}
```

Which of the following statements (in correct order) will correctly insert a 'newNode' node, before the node referenced by current? Assume that current is neither first nor last node in the linked list.

Choose the best option

- ☐ newNode.next = current; current.prev = newNode; newNode.prev = current.prev; current.prev.next = newNode;
- ☐ current.prev = newNode; newNode.next = current; newNode.prev = current.prev; current.prev.next = newNode;
- ☐ newNode.prev = current.prev; newNode.next = current; current.prev.next = newNode; current.next.prev = newNode;
- ☐ newNode.prev = current.prev; newNode.next = current; current.prev.next = newNode; current.prev = newNode;

Question # 37

Which of the following algorithm can be used to detect negative cycle in a Graph?

Choose the best option

- ☐ Prim
- ☐ Kruskal
- ☐ Dijkstra
- ☐ Bellman Ford

Question # 38

Create a Binary search tree for the given set of strings :
MAR, MAY, NOV, AUG, APR, JAN, DEC, JULY, FEB, JUNE, OCT, SEPT

What are the leaf nodes generated in the tree?

Choose the best option

- ☐ APR, FEB DEC, JULY, SEPT
- ☐ FEB, JUNE, SEPT
- ☐ Can't create the tree
- ☐ None of the above

Question # 39

You are very hungry and you decide to bake a batch by following your grandmother's chocolate chip cookie recipe. Which of the following computational thinking skills required to complete the abovetask?

Choose the best option

- ☐ Abstraction
- ☐ Algorithm Design
- ☐ Pattern Recognition
- ☐ Decomposition

Question # 40

Which of the following uses queue as data structure to store data?

Choose the best option

- ☐ Waiting queue for railway reservation system
- ☐ To check whether given string is palindrome
- ☐ Display string in reverse order
- ☐ DFS traversal of the tree