Choose the correct answer and update in Google form

QP No: JDIZ

1. You are trapped in a room with no food. After 2 days you are given 4 bottles of milk,out of which one bottle is poisonous. For testing there is a rat to which you can feed samples of milk and try to find out which bottle is poisonous. But the challenge is that the poison takes effect exactly after 10 hrs from feeding, you have only 24hrs in hand, within which you must consume 3 bottles of milk to satisfy your hunger or else you will die. In worst case what is the minimum hrs required to find the poisonous bottle

   A.   13

   B.   24

   C.   18

   D.   12

2. What is the functionality of below code

```
int function(int x, int y) {
   int m, n;
   m = x; n = y;
   while (m != n) {
     if (m > n)
       m = m - n;
     else
       n = n - m;
   }
   return n;
}
```

   A.   Determines the absolute difference between two integers.

   B.   Checks if two integers are prime to each other.

   C.   Calculates the greatest common divisor (GCD) of two integers.

   D.   Calculates the least common multiple (LCM) of two integers.

3. You are given a rod of length 5 and the profit of each length are given in table: What is the maximum profit that you can get after cutting the rod and selling the pieces?

Length of pieces	Profit per piece
1	2
2	5
3	9
4	6
5	8

   A.   14

   B.   13

   C.   15

   D.   12

4. You have a pile of 3,000 bananas. You wish to transport them to a place 1,000Kms away on the back of a camel; however, the camel can only carry a maximum of 1,000 bananas, and will eat one banana every KM it travels (and will not go anywhere if it does not have any bananas). However, you can load and unload as many bananas as you want anywhere. What are the most bananas you can bring over to your destination?â€¨

    A.   627

    B.   533

    C.   1000

    D.   2000

5. Consider a sapnning tree with n=4 vertices. What is the maximum number of spanning tree can be formed

    A.   n^(n+2)

    B.   n^(n-1)

    C.   n^(n+1)

    D.   n^(n-2)

6. Given a 8x8 chess board, Find the total number of Queens can be placed in a board such that no queen should attack each other,a queen can move horizontally, vertically, and diagonally across the board

    A.   6

    B.   8

    C.   7

    D.   9

7. To toggle a particular bit, which of the following bitwise operator would be used?

    A.   AND operator

    B.   XOR operator

    C.   NOT operator

    D.   OR operator

8. Apply Quick sort on a given sequence 7 11 14 6 9 4 3 12. What is the sequence after the first phase, pivot is the first element?

    A.   6 4 3 7 11 9 14 12

    B.   7 6 4 3 9 14 11 12

    C.   6 3 4 7 9 14 11 12

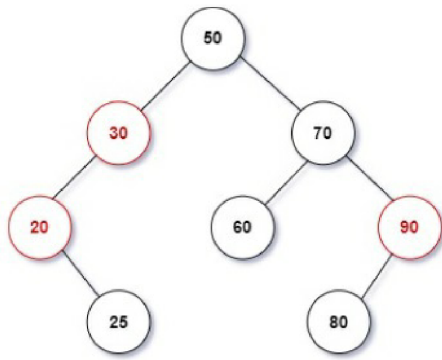   D.   7 6 14 11 9 4 3 12

9. What is the time complexity of rotating a linked list by some places clockwise?

    A.   O(N^2)

    B.   O(2N)

    C.   O(N*log(N))

    D.   O(N)

10. Consider a following BST(Binary Search Tree) of values 50 30 70 20 60 90 25 80 which of the following snippet code will find all the parent node which is having a single child

A.
```
void sum(struct Node*root)
{
   if(root==NULL)
       return;
   if((root->left==NULL|| root->right!=NULL) ||( root->left!=NULL || root->right==NULL))
   {
       arr.push_back(root->data)
   }
   sum(root->left);
   sum(root->right);
   }
```

B.
```
void sum(struct Node*root)
{
   if(root==NULL)
       return;
   if((root->left==NULL&&root->right!=NULL) ||( root->left!=NULL && root->right==NULL))
   {
       arr.push_back(root->data)
   }
   sum(root->left);
   sum(root->right);

}
```

C.
```
void sum(struct Node*root)
{
   if(root==NULL)
       return;
   if((root->left==NULL|| root->right!=NULL) && ( root->left!=NULL || root->right==NULL))
   {
       arr.push_back(root->data)
   }
   sum(root->left);
   sum(root->right);
}
```

D.
```
void sum(struct Node*root)
{
   if(root==NULL)
       return;
   if((root->left!=NULL&&root->right!=NULL) ||( root->left==NULL && root->right==NULL))
   {
       arr.push_back(root->data)
   }
   sum(root->left);
   sum(root->right);
   }
```
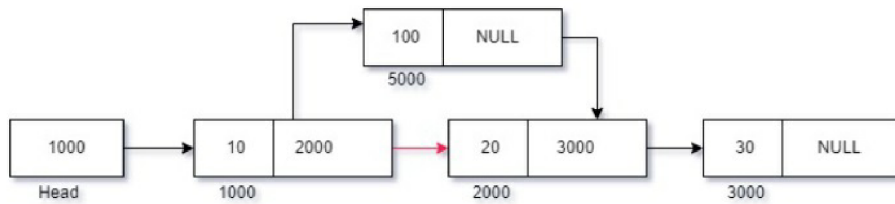
11. Given a linked list with values 10,20,30 which of the following snippet code will insert a node between 10 & 20

A.
```
void insert(int d){
    struct Node*temp=head;
    struct Node*newnode=(struct Node*)malloc(sizeof(struct Node));
    newnode->data=d;
    newnode->next=NULL;
    temp->next=newnode->next;
    newnode->next=temp;
}
```

B.
```
void insert(int d){
    struct Node*temp=head;
    struct Node*newnode=(struct Node*)malloc(sizeof(struct Node));
    newnode->data=d;
    newnode->next=NULL;
    newnode->next=temp->next;
    temp->next=newnode;
}
```

C.
```
void insert(int d){
    struct Node*temp=head;
    struct Node*newnode=(struct Node*)malloc(sizeof(struct Node));
    newnode->data=d;
    newnode->next=NULL;
    temp->next=newnode;
    newnode->next=temp->next;
}
```

D.
```
void insert(int d){
    struct Node*temp=head;
    struct Node*newnode=(struct Node*)malloc(sizeof(struct Node));
    newnode->data=d;
    newnode->next=NULL;
    temp->next->next=newnode;
    newnode->next=temp->next;
}
```

12. Total how many iterations are required to find the sum of elements in a given range of (l,r) in an array of size n when we use square root optimization?
   A. 2*SQRT(n)
   B. n*SQRT(n)
   C. 3*SQRT(n)
   D. SQRT(n)

13. How is the 4th element in an array accessed based on pointer notation

   A.   *a+4

   B.   *(*a+4)

   C.   a+4

   D.   *(a+4)

14. Given Inorder traversal and Postorder traversal of a Binary search tree(BST). Find Preorder traversal
Inorder traversal: A,B,C,D,E,F,G,H,I,J,K
Postorder traversal: B,A,E,D,C,H,G,K,J,I,F

   A.   F,C,A,D,B,E,I,G,J,H,K

   B.   F,C,A,B,D,E,I,G,H,J,K

   C.   F,C,A,B,D,E,G,I,H,J,K

   D.   F,C,A,B,D,E,I,H,G,J,K

15. Consider a B-tree of order m where each node can have at most m children and at least [m/2] children. Which of the following statements about B-trees is true?

   A.   B-trees are a special case of binary search trees (BSTs) with an order of m=2, where each node has exactly two children.

   B.   B-trees allow for efficient disk-based storage and retrieval of large datasets due to their ability to minimize the number of disk I/O operations.

   C.   B-trees are primarily used for search operations only and are not suitable for insertion and deletion operations.

   D.   B-trees are height-balanced trees, ensuring that the height of the tree is always logarithmic with respect to the number of elements stored in the tree.

16. Convert infix expression to postfix expression using stack A+B-C*D

   A.   AB-CD*+

   B.   AB+CD-*

   C.   AB-CD+*

   D.   AB+CD*-

17. Consider a Doubly Linked list of values 10,20,30,40,50,60. what is the functionality of the following code

```
void display()
{
    struct Node*temp=head;
    while(temp->right!=NULL)
    {
        temp=temp->right;
    }
    while(temp!=NULL)
    {
        cout<<temp->data<<" ""
```

   A.   Prints all nodes of Linked list in reverse order except last node

   B.   Prints all nodes of Linked list except first node

   C.   Prints all nodes of Linked list in reverse order

   D.   Prints alternate nodes in reverse order

18. Below code will rotate the array in a cyclic right shift by moving each element one position to the right, Which of the array input will fail to produce the desired output

```
void function(int arr[], int n) {
    int last = arr[n-1];
    for(int i = n-1; i > 0; i--) {
 if(arr[i]>=arr[i+1] || arr[i]<=arr[i+1])
        arr[i] = arr[i-1];
    }
    arr[0] = last;
}
```

    A.   Array input in shuffled order

    B.   Array input in ascending order

    C.   Array input in decreasing order

    D.   Array input with negative values

19. Suppose you have a B-tree of order 5 and you need to insert a new element in the tree. Which of the following is true about the time complexity of this operation?

    A.   It takes O(log m) time, where m is the order of the tree.

    B.   It takes O(1) time, regardless of the order or size of the tree.

    C.   It takes O(log n) time, where n is the number of elements in the tree

    D.   It takes O(m) time, regardless of the order or size of the tree.

20. Given the val[]={60, 100, 120 } , wt[]={10, 20, 30}, n=3 and W=50 Trace the below code and predict the output

```
int function(int W, int wt[], int val[], int n) {
    int i, w;
    int K[n+1][W+1];
    for (i = 0; i <= n; i++) {
        for (w = 0; w <= W; w++) {
            if (i==0 || w==0)
                K[i][w] = 0;
            else if (wt[i-1] <= w)
                K[i][w] = max(val[i-1] + K[i-1][w-wt[i-1]], K[i-1][w]);
            else
                K[i][w] = K[i-1][w];
        }
    }

    return K[n][W];
}
```

    A.   210

    B.   220

    C.   230

    D.   200

21. Given Binary expression tree, find the postfix expression
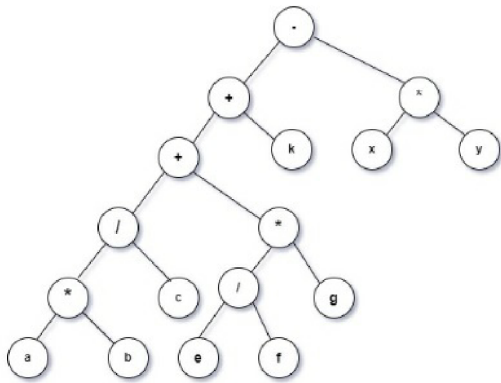
    A.   ab*c/ef/g*+k+xy*-

    B.   abc*/ef/g*+k+xy*-

    C.   ab*/c/efg*+k+xy*-

    D.   ab*c/ef/g*+kxy+*-

22. Consider an AVL tree with the following values inserted in the given order: 7, 3, 10, 5, 15, 12, 20. After performing the necessary rotations to maintain the AVL tree balance, what will be the maximum number of rotations performed?

    A.   2

    B.   1

    C.   3

    D.   4

23. Consider a Linked list of values 1,2,3,4,5,6,7,8,9,10. what is the functionality of the following code

```
Node *function(Node *head, int k)
{
    Node* current = head;
    Node* next;
    Node* prev = NULL;
    int count = 0;

    while (current != NULL && count < k)
    {
    next = current->next;
    current->next = prev;
    prev = current;
    current = next;
    count++;
    }

    if(head != NULL)
    head->next = current;

    count = 0;
    while(count < k-1 && current != NULL )
    {
    current = current->next;
    count++;
    }
    if(current != NULL)
    current->next = function(current->next, k);
    return prev;
}
```

    A.   Finds kth node in given linked list

    B.   Finds kth node from end of linked list

    C.   Rotate linked list from Kth node

    D.   Reverse alternate kth node in a singly linked list

24. What is the space complexity of the following snippet code

```
int** arr = new int*[m];
for (int i = 0; i < m; i++) {
    arr[i] = new int[n];
}
```

    A.   O(n)

    B.   O(m*n)

    C.   O(m^2)

    D.   O(m)

25. Which among these, heap sort uses to sort an array in O(log n)

    A.   Max heap

    B.   Quick sort

    C.   Min heap

    D.   Binary heap