Wipro Elite NTH Coding Placement Questions

1) Print the below pattern (half diamond using numbers)

Input:

3 4

Output:

```
 3
44
555
6666
555
44
3
```

Input :

4 4

Output:

```
4
55
666
7777
666
55
4
```

Program:

```
#include
int main()
{
   int i,j,s,N,count=0;
   scanf(“%d%d”,&s,&N);
   for(i=s;count<4;count++)
   {
      for(j=0;j<count+1;j++)
         printf(“%d”,i);
      printf(“\n”);
      i=i+1;
   }
   for(i=s+N-2;count>0;count–)
```

```
    {
        for(j=0;j<count-1;j++)
            printf("%d",i);
        printf("\n");
        i=i-1;
    }
    return 0;
}
```

2) Print the following pattern (half diamond using numbers)
Input :
3
Output:
1
2*2
3*3*3
3*3*3
2*2
1

Input :
4
Output:
1
2*2
3*3*3
4*4*4*4
4*4*4*4
3*3*3
2*2
1

Program:

```
#include
int main()
{
    int i,j,k,N,count=0;
```

```
    scanf(“%d”,&N);
    for(i=1;i<=N;i++)
    {
        k=1;
        for(j=0;j<i;j++)
        {
            printf(“%d”,i);
            if(k<i)
            {
                printf(“*”);
                k=k+1;
            }
        }
        printf(“\n”);
    }
    for(i=N;i>0;i–)
    {
        k=1;
        for(j=0;j<i;j++)
        {
            printf(“%d”,i);
            if(k<i)
            {
                printf(“*”);
                k=k+1;
            }
        }
        printf(“\n”);
    }
    return 0;
}
```

3) Print the below pattern.

Input:
4
Output:

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1
2*3
4*5*6
7*8*9*10
7*8*9*10
4*5*6
2*3
1

Program:

```
#include
int main()  {
  int i,j,count=1,n;
 printf(“Enter a number\n”);
 scanf(“%d”,&n);
 for(i=1;i<=n;i++)
  {
for(j=1;j<=i;j++)
       {
           if(j<i)
           printf(“%d*”,count++);
           else
           printf(“%d”,count++);
       }         printf(“\n”);
      }
count=count-n;
 for(i=n;i>=1;i–)
   {        for(j=1;j<=i;j++)
       {
           if(j<i)
           printf(“%d*”,count++);
           else
           printf(“%d”,count++);
       }
       count=(count+1)-2*i;
       printf(“\n”);
     }
```

```
   return 0;
 }
```

4) Print the following pattern.

Input:
3 4
Output:
3
44
555
6666
6666
555
44
3

Program:

```
#include<stdio.h>
int main()
{
    int i,j,s,N,count=0;
    scanf(“%d%d”,&s,&N);
    for(i=s;count<4;count++)
    {
        for(j=0;j<count+1;j++)
            printf(“%d”,i);
        printf(“\n”);
        i=i+1;
    }
 for(i=s+N-2;count>0;count–)
    {
        for(j=0;j<count-1;j++)
            printf(“%d”,i);
        printf(“\n”);
        i=i-1;
     }
```

```
    return 0;
}
```

5) Print the below pattern.

Input:
5
Output:
1
3*2
4*5*6
10*9*8*7
11*12*13*14*15

Program:

```
#include<stdio.h>
int main()
{
    int i,j,k,l=1,N,d,r,count=0;
    scanf("%d",&N);
    for(i=1;i<=N;i++)
    {
        k=1;
        d=i%2;
        r=l+i-1;
        for(j=0;j<i;j++)
        {

 if(d==0)
            {
                printf("%d",r);
                r--;
                if(k<i)
                {
                    printf("*");
                    k=k+1;
                }
```

```
            l++;
            continue;
        }
        printf("%d",l);
        l++;
        if(k<i)
        {
            printf("*");
            k=k+1;
        }
    }
    printf("\n");
  }
  return 0;
}
```

6) Print the below pattern.

Input:
4
Output:
1*2*3*4*17*18*19*20
– -5*6*7*14*15*16
– – – -8*9*12*13
– – – – – -10*11

Program:

```
#include<stdio.h>
void pattern(int);
int main()
{
          int n;
          scanf("%d", &n);
          pattern(n);
          return 0;
}
void pattern(int n)
```

```
{
        int i, j, k, s, a = 1,b = n*n + 1;
        for (i = n; i >= 1; i–) {
                for (s = 0; s < n – i; s++)
                        printf(“–“);
                for (j = 0; j < i; j++)
                        printf(“%d*”, a++);
                for (k = 0; k < i – 1; k++)
                        printf(“%d*”, b++);
                printf(“%d\n”, b);                      // last b should without *
                b -= 2*(i – 1);
        }
}
```

7) Prims Algorithm

```
// A C / C++ program for Prim's Minimum
// Spanning Tree (MST) algorithm. The program is
// for adjacency matrix representation of thegraph
#include <stdio.h>
#include <limits.h>
#include<stdbool.h>
// Number of vertices in the graph
#define V 5

// A utility function to find the vertex with
// minimum key value, from the set of vertices
// not yet included in MST
int minKey(int key[], bool mstSet[])
{
// Initialize min value
int min = INT_MAX, min_index;

for (int v = 0; v < V; v++)
if (mstSet[v] == false && key[v] < min)
min = key[v], min_index = v;
return min_index;
```

```
}

// A utility function to print the
// constructed MST stored in parent[]
int printMST(int parent[], int n, int graph[V][V])
{
printf("Edge \tWeight\n");
for (int i = 1; i < V; i++)
printf("%d - %d \t%d \n", parent[i], i, graph[i][parent[i]]);
}

// Function to construct and print MST for
// a graph represented using adjacency
// matrix representation
void primMST(int graph[V][V])
{
// Array to store constructed MST
int parent[V];
// Key values used to pick minimum weight edge in cut
int key[V];
// To represent set of vertices not yet included in MST
bool mstSet[V];
//
// Initialize all keys as INFINITE
for (int i = 0; i < V; i++)
key[i] = INT_MAX, mstSet[i] = false;

// Always include first 1st vertex in MST.
// Make key 0 so that this vertex is picked as first vertex.
key[0] = 0;
parent[0] = -1; // First node is always root of MST

// The MST will have V vertices
for (int count = 0; count < V-1; count++)
{
// Pick the minimum key vertex from the
```

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```
// set of vertices not yet included in MST
int u = minKey(key, mstSet);

// Add the picked vertex to the MST Set
mstSet[u] = true;

// Update key value and parent index of
// the adjacent vertices of the picked vertex.
// Consider only those vertices which are not
// yet included in MST
for (int v = 0; v < V; v++)

// graph[u][v] is non zero only for adjacent vertices of m
// mstSet[v] is false for vertices not yet included in MST
// Update the key only if graph[u][v] is smaller than key[v]
if (graph[u][v] && mstSet[v] == false && graph[u][v] < key[v])
parent[v] = u, key[v] = graph[u][v];
}

// print the constructed MST
printMST(parent, V, graph);
}
// driver program to test above function
int main()
{
/* Let us create the following graph
2 3

(0)--(1)--(2)
| / \ |
6| 8/ \5 |7
| / \ |
(3)-------(4)
9 */
int graph[V][V] = {{0, 2, 0, 6, 0},
{2, 0, 3, 8, 5},
{0, 3, 0, 0, 7},
```

```
{6, 8, 0, 0, 9},
{0, 5, 7, 9, 0}};

// Print the solution

primMST(graph);

return 0;

}
```

Output:

```
Edge Weight
0 - 1 2
1 - 2 3
0 - 3 6
1 - 4 5
```

8) Print the below pattern.

Input:

```
3
```

Output:

```
3 3 3
3 1 3
3 2 3
3 3 3
```

Program:

```
#include<stdio.h>
int main()
{
   int i, j, n, c=1;
   scanf("%d", &n);
   for(i=1; i<=n+1; i++)
   {
      for(j=1; j<=n; j++)
      {
```

```
        if(i!=1 && j==n-1)
        {
        printf("%d ", c);
                        c++;
        }
        else
        printf("%d ", n);
          }
             printf("\n");
           }
           return 0;
}
```

9) Program to find the average of n (n < 10) numbers using arrays

```
#include <stdio.h>
int main()
{
int marks[10], i, n, sum = 0, average;
printf("Enter n: ");
scanf("%d", &n);
for(i=0; i<n; ++i)
{
printf("Enter number%d: ",i+1);
scanf("%d", &marks[i]);
sum += marks[i];
}
average = sum/n;
printf("Average = %d", average);
return 0;
}
```

```
Enter n: 5
Enter number1: 45
Enter number2: 35
Enter number3: 38
Enter number4: 31
Enter number5: 49
```

Average = 39

10) Operations On Linked List

```
#include<stdio.h>
#include<stdlib.h>
struct node
{
int data;
struct node *next;
};
void display(struct node* head)
{
struct node *temp = head;
printf("\n\nList elements are - \n");
while(temp != NULL)
{
printf("%d --->",temp->data);
temp = temp->next;
}
}
void insertAtMiddle(struct node *head, int position, int value) {
struct node *temp = head;
struct node *newNode;
newNode = malloc(sizeof(struct node));
newNode->data = value;
int i;
for(i=2; inext != NULL) {
temp = temp->next;
}
}
newNode->next = temp->next;
temp->next = newNode;
}
void insertAtFront(struct node** headRef, int value) {
struct node* head = *headRef;
struct node *newNode;
```

```
newNode = malloc(sizeof(struct node));
newNode->data = value;
newNode->next = head;
head = newNode;
*headRef = head;
}
void insertAtEnd(struct node* head, int value){
struct node *newNode;
newNode = malloc(sizeof(struct node));
newNode->data = value;
newNode->next = NULL;
struct node *temp = head;
while(temp->next != NULL){
temp = temp->next;
}
temp->next = newNode;
}
void deleteFromFront(struct node** headRef){
struct node* head = *headRef;
head = head->next;
*headRef = head;
}
void deleteFromEnd(struct node* head){
struct node* temp = head;
while(temp->next->next!=NULL){
temp = temp->next;
}
temp->next = NULL;
}
void deleteFromMiddle(struct node* head, int position){
struct node* temp = head;
int i;
for(i=2; inext != NULL) {
temp = temp->next;
}
}
temp->next = temp->next->next;
```

```
}
int main() {
/* Initialize nodes */
struct node *head;
struct node *one = NULL;
struct node *two = NULL;
struct node *three = NULL;
/* Allocate memory */
one = malloc(sizeof(struct node));
two = malloc(sizeof(struct node));
three = malloc(sizeof(struct node));
/* Assign data values */
one->data = 1;
two->data = 2;
three->data = 3;
/* Connect nodes */
one->next = two;
two->next = three;
three->next = NULL;
/* Save address of first node in head */
head = one;
display(head); // 1 --->2 --->3 --->
insertAtFront(&head, 4);
display(head); // 4 --->1 --->2 --->3 --->
deleteFromFront(&head);
display(head); // 1 --->2 --->3 --->
insertAtEnd(head, 5);
display(head); // 1 --->2 --->3 --->5 --->
deleteFromEnd(head);
display(head); // 1 --->2 --->3 --->
int position = 3;
insertAtMiddle(head, position, 10);
display(head); // 1 --->2 --->10 --->3 --->
deleteFromMiddle(head, position);
display(head); // 1 --->2 --->3 --->
}
```

Output:

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List elements are -
1 --->2 --->3 --->
List elements are -
4 --->1 --->2 --->3 --->
List elements are -
1 --->2 --->3 --->
List elements are -
1 --->2 --->3 --->5 --->
List elements are -
1 --->2 --->3 --->
List elements are -
1 --->2 --->10 --->3 --->
List elements are -
1 --->2 --->3 --->