

WRITE THE FOLLOWING PROGRAM:

a. Print all the nodes reachable from a given starting node in a digraph using BFS method

Program :

```
#include<stdio.h>

int a[20][20],q[20],visited[20],n,i,j,f=0,r=-1;
void bfs(int v)
{
    for(i=1;i<=n;i++) {
        if(a[v][i] && !visited[i])
            q[++r]=i; }
    if(f<=r)
    {
        visited[q[f]]=1;
        bfs(q[f++]);
    }
}

int main()
{
    int v;

    printf("\n Enter the number of vertices:");
    scanf("%d",&n);
    for(i=1;i<=n;i++)
    {
        q[i]=0;
        visited[i]=0;
    }
    printf("\n Enter graph data in matrix form:\n");
    for(i=1;i<=n;i++)
        for(j=1;j<=n;j++)
            scanf("%d",&a[i][j]);
    printf("\n Enter the starting vertex:");
    scanf("%d",&v);
    bfs(v);
    printf("\n The node which are reachable are:\n");
    for(i=1;i<=n;i++)
        if(visited[i])
            printf("%d\t",i);
    return 0;
}
```

OUTPUT SCREENSHOT:

```
Select D:\ADA\labs\ada_lab\LAB4-BFS.exe

Enter the number of vertices:6

Enter graph data in matrix form:
0 0 1 1 0
0 0 0 1 1
1 0 0 1 0 1
1 0 1 0 0 0
1 1 0 0 0 1
0 1 1 0 1 0

Enter the starting vertex:1

The node which are reachable are:
1      2      3      4      5      6
Process returned 0 (0x0)   execution time : 114.339 s
Press any key to continue.
```

b. Check whether a given graph is connected or not using DFS method.

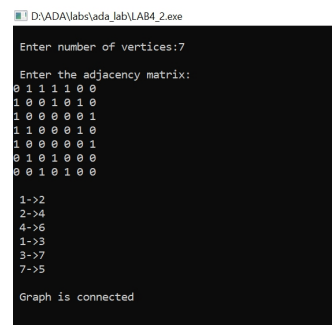
PROGRAM

```
#include<stdio.h>
#include<conio.h>
int a[20][20],reach[20],n;
void dfs(int v)
{
    int i;
    reach[v]=1;
    for(i=1;i<=n;i++)
        if(a[v][i] && !reach[i])
        {
            printf("\n %d->%d",v,i);
            dfs(i);
        }
}
int main()
{
    int i,j,count=0;

    printf("\n Enter number of vertices:");
    scanf("%d",&n);
    for(i=1;i<=n;i++)
    {
        reach[i]=0;
        for(j=1;j<=n;j++)
            a[i][j]=0;
    }
    printf("\n Enter the adjacency matrix:\n");
    for(i=1;i<=n;i++)
        for(j=1;j<=n;j++)
            scanf("%d",&a[i][j]);
    dfs(1);
    printf("\n");
    for(i=1;i<=n;i++)
    {
        if(reach[i])
            count++;
    }
    if(count==n)
        printf("\n Graph is connected");
    else
        printf("\n Graph is not connected");
```

```
getch();  
return 0;  
}
```

OUTPUT SCREENSHOT:



```
D:\ADA\labs\ada_lab\LAB4_2.exe  
Enter number of vertices:7  
Enter the adjacency matrix:  
0 1 1 1 0 0  
1 0 0 1 0 1 0  
1 0 0 0 0 0 1  
1 1 0 0 0 1 0  
1 0 0 0 0 1  
0 1 0 1 0 0 0  
0 0 1 0 1 0 0  
  
1->2  
2->4  
4->6  
1->3  
3->7  
7->5  
  
Graph is connected
```