

1. Write program to do the following:
 - a. Print all the nodes reachable from a given starting node in a digraph using BFS method.
 - b. Check whether a given graph is connected or not using DFS method.

Code:

```
#include<stdio.h>
#include<conio.h>

int a[10][10],n,vis[10];
int dfs(int root){
    int j;
    vis[root]=1;
    for(j=1;j<=n;j++)
        if(a[root][j]==1&&vis[j]!=1)
            dfs(j);
    for(j=1;j<=n;j++) {
        if(vis[j]!=1)
            return 0;
    }
    return 1;
}

void main()
{
    int i,j,root,ans;
    for(j=1;j<=n;j++)
        vis[j]=0;
    printf("\nEnter the no of nodes:\t");
    scanf("%d",&n);
    printf("\nEnter the adjacency matrix:\n");
    for(i=1;i<=n;i++)
        for(j=1;j<=n;j++)
            scanf("%d",&a[i][j]);
    printf("\nEnter the source node:\t");
    scanf("%d",&root);
    ans=dfs(root);
    if(ans==1)
        printf("\nGraph is connected\n");
    else
        printf("\nGraph is not connected\n");
    getch();
}
```

Output:

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL

PS D:\VS Code> cd "d:\VS Code\OS\" ; if ($?) { gcc ada.c -o ada } ; if ($?) { .\ada }

Enter the no of nodes: 4

Enter the adjacency matrix:
0 1 1 1
0 0 0 1
0 0 0 0
0 0 1 0

Enter the source node: 1

Graph is connected
█
```

Code:

```
#include<stdio.h>
#include<conio.h>

int a[15][15],n;
void bfs(int);

void main() {
    int i,j,root;

    printf("\nEnter the no of nodes:\t");

    scanf("%d",&n);

    printf("\nEnter the adjacency matrix:\n");

    for(i=1;i<=n;i++)

        for(j=1;j<=n;j++)

            scanf("%d",&a[i][j]);

    printf("\nEnter the source node:\t");

    scanf("%d",&root);
```

```

    bfs(root);

}

void bfs(int root) {

    int q[15],f=0,r=-1,vis[15],i,j;

    for(j=1;j<=n;j++)

        vis[j]=0;

    vis[root]=1;

    r=r+1;

    q[r]=root;

    while(f<=r) {

        i=q[f];

        f=f+1;

        for(j=1;j<=n;j++)

        {

            if(a[i][j]==1&&vis[j]!=1) {

                vis[j]=1;

                r=r+1;

                q[r]=j;

            }

        }

    }

    for(j=1;j<=n;j++) {

```

```
if(vis[j]!=1)

printf("\nNode %d is not reachable",j);

else

printf("\nNode %d is reachable",j);

}

}
```

Output:

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL

PS D:\VS Code\OS> cd "d:\VS Code\OS\" ; if ($?) { gcc ada.c -o ada } ; if ($?) { .\ada }

Enter the no of nodes:  4

Enter the adjacency matrix:
0 1 1 1
0 0 0 1
0 0 0 0
0 0 1 0

Enter the source node:  1

Node 1 is reachable
Node 2 is reachable
Node 3 is reachable
Node 4 is reachable
PS D:\VS Code\OS> █
```

Observation: