

ADA-LAB-1

Q) 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>

int q[20],top=-1,front=-1,rear=-1,a[20][20],vis[20],stack[20];
int delete();
void add(int item);
void bfs(int s,int n);
void dfs(int s,int n);
void push(int item);
int pop();

void main()
{
    int n,i,s,ch,j;
    printf("Enter The Number of Vertices ");
    scanf("%d",&n);
    for(i=1;i<=n;i++)
    {
        for(j=1;j<=n;j++)
        {
            printf("Enter 1 If %d Has A Node With %d Else 0 ",i,j);
            scanf("%d",&a[i][j]);
        }
    }
    printf("the adjacency matrix is\n");
    for(i=1;i<=n;i++)
    {
        for(j=1;j<=n;j++)
        {
            printf(" %d",a[i][j]);
        }
        printf("\n");
    }

    while(1){
        {
            for(i=1;i<=n;i++)
            vis[i]=0;
            printf("\nMENU\n1.BFS\n2.DFS\nenter choice");
            scanf("%d",&ch);
            printf("Enter source vertex:");
            scanf("%d",&s);

            switch(ch)
            {
                case 1:bfs(s,n);
                break;
                case 2:
                dfs(s,n);
                break;
            }
        }
    }
}
```

```

}
void bfs(int s,int n)
{
int p,i;
add(s);
vis[s]=1;
p=delete();
if(p!=0)
printf(" %d",p);
while(p!=0)
{
for(i=1;i<=n;i++)
if((a[p][i]!=0)&&(vis[i]==0))
{
add(i);
vis[i]=1;
}
p=delete();
if(p!=0)
printf(" %d ",p);
}
for(i=1;i<=n;i++)
if(vis[i]==0)
bfs(i,n);
}

```

```

void add(int item)
{
if(rear==19)
printf("QUEUE FULL");
else
{
if(rear== -1)
{
q[++rear]=item;
front++;
}
else
q[++rear]=item;
}
}
int delete()
{
int k;
if((front>rear)|| (front== -1))
return(0);
else
{
k=q[front++];
return(k);
}
}

```

```

void dfs(int s,int n)
{
int i,k;
push(s);
vis[s]=1;
k=pop();
if(k!=0)
printf(" %d ",k);
while(k!=0)
{
for(i=1;i<=n;i++)

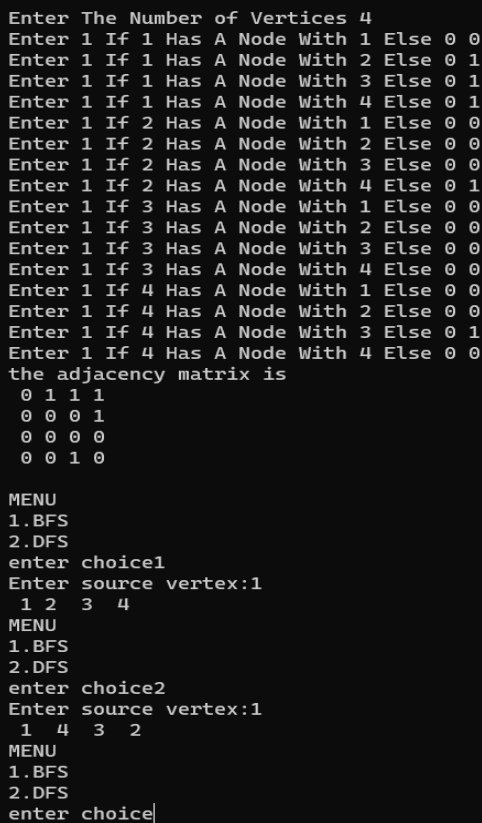
```

```

if((a[k][i]!=0)&&(vis[i]==0))
{
push(i);
vis[i]=1;
}
k=pop();
if(k!=0)
printf(" %d ",k);
}
for(i=1;i<=n;i++)
if(vis[i]==0)
dfs(i,n);
}
void push(int item)
{
if(top==19)
printf("Stack overflow ");
else
stack[++top]=item;
}
int pop()
{
int k;
if(top== -1)
return(0);
else
{
k=stack[top--];
return(k);
}
}

```

OUTPUT-



```

Enter The Number of Vertices 4
Enter 1 If 1 Has A Node With 1 Else 0 0
Enter 1 If 1 Has A Node With 2 Else 0 1
Enter 1 If 1 Has A Node With 3 Else 0 1
Enter 1 If 1 Has A Node With 4 Else 0 1
Enter 1 If 2 Has A Node With 1 Else 0 0
Enter 1 If 2 Has A Node With 2 Else 0 0
Enter 1 If 2 Has A Node With 3 Else 0 0
Enter 1 If 2 Has A Node With 4 Else 0 1
Enter 1 If 3 Has A Node With 1 Else 0 0
Enter 1 If 3 Has A Node With 2 Else 0 0
Enter 1 If 3 Has A Node With 3 Else 0 0
Enter 1 If 3 Has A Node With 4 Else 0 0
Enter 1 If 4 Has A Node With 1 Else 0 0
Enter 1 If 4 Has A Node With 2 Else 0 0
Enter 1 If 4 Has A Node With 3 Else 0 1
Enter 1 If 4 Has A Node With 4 Else 0 0
the adjacency matrix is
0 1 1 1
0 0 0 1
0 0 0 0
0 0 1 0

MENU
1.BFS
2.DFS
enter choice1
Enter source vertex:1
1 2 3 4
MENU
1.BFS
2.DFS
enter choice2
Enter source vertex:1
1 4 3 2
MENU
1.BFS
2.DFS
enter choice|

```