ADA LAB TEST-1

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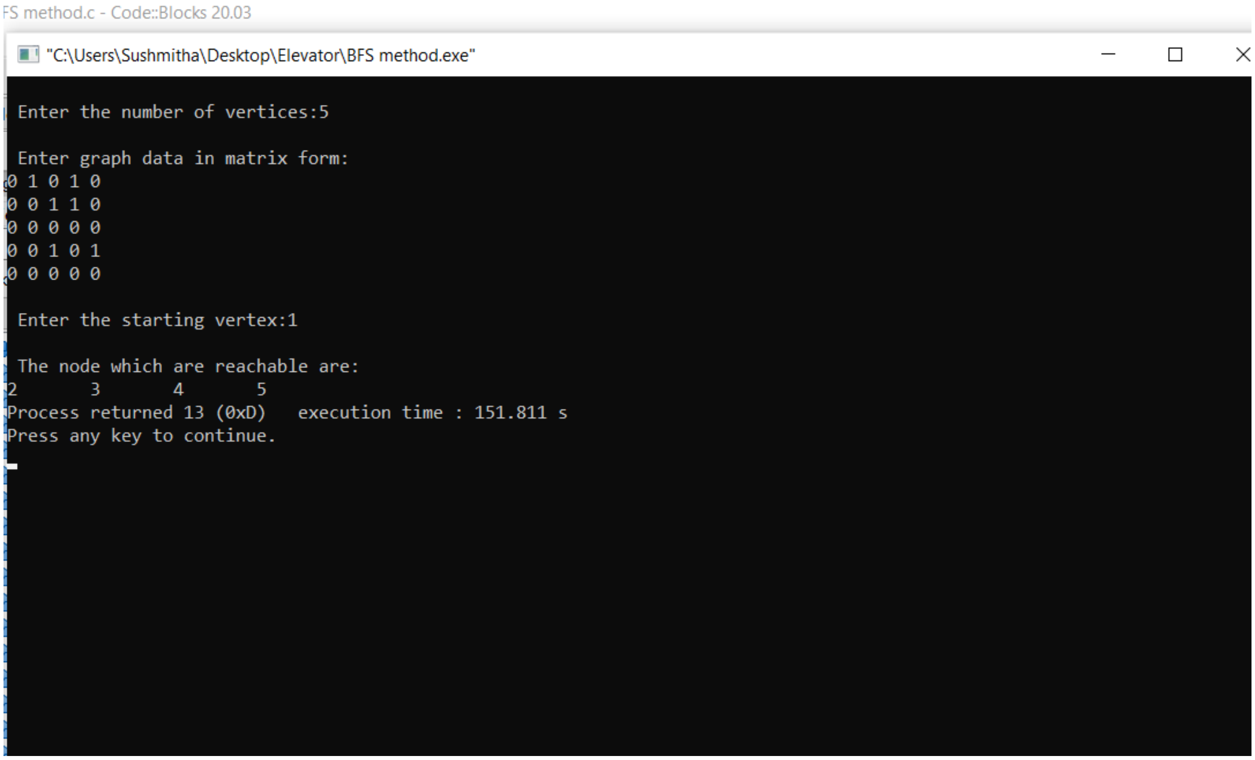
1BM19CS165

4(a) BFS Method:

```
#include<stdio.h>
#include<conio.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++]);
}
}
void 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);
getch();
}
```

Output:



FS method.c - Code::Blocks 20.03
"C:\Users\Sushmitha\Desktop\Elevator\BFS method.exe"

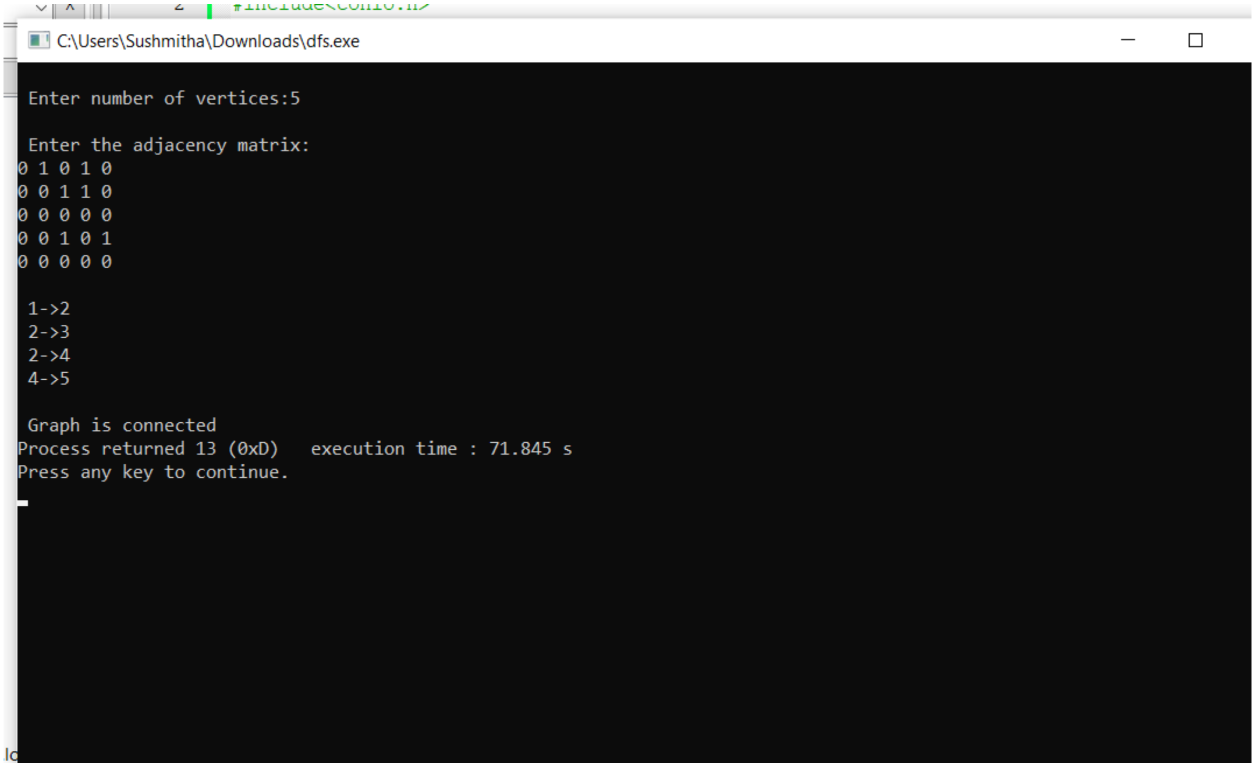
```
 Enter the number of vertices:5

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

 Enter the starting vertex:1

 The node which are reachable are:
2       3       4       5
Process returned 13 (0xD)   execution time : 151.811 s
Press any key to continue.
```

4(b) DFS Method:

```
#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);
}
}
```

```
void 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();
}
```

Output:



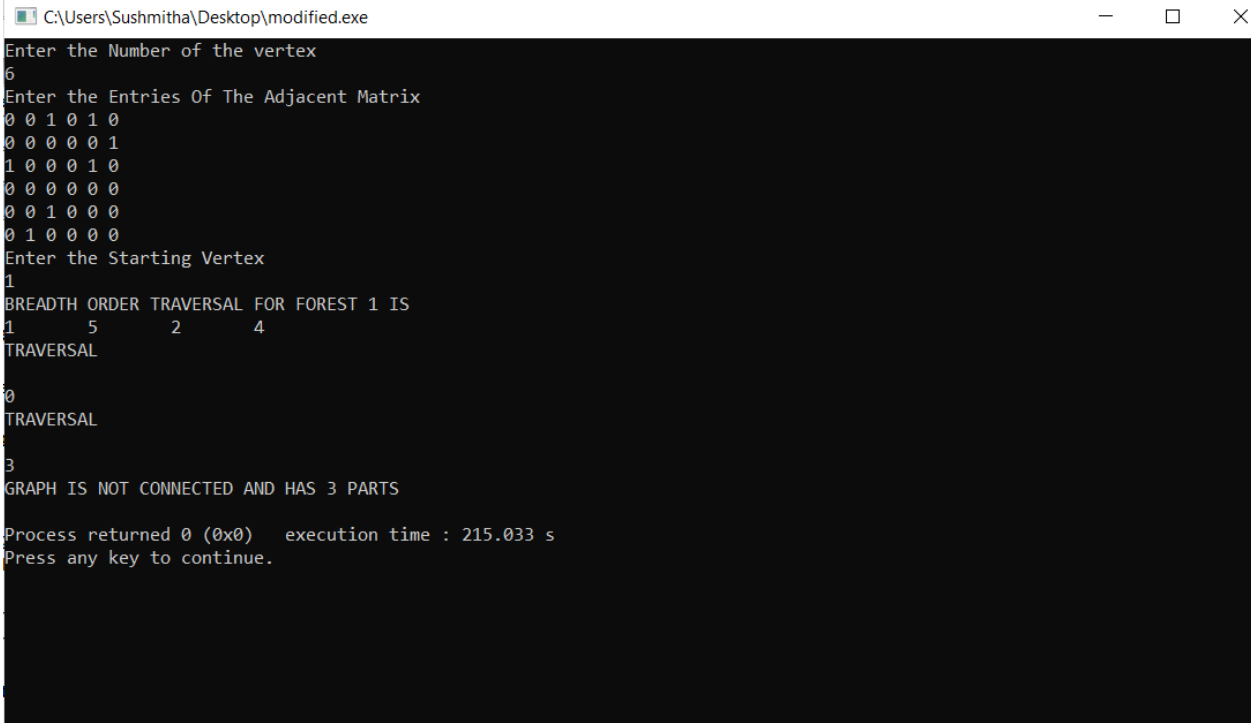
```
 Enter number of vertices:5

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

 1->2
 2->3
 2->4
 4->5

 Graph is connected
Process returned 13 (0xD)   execution time : 71.845 s
Press any key to continue.
```

Modification:

```
#include<stdio.h>
#include<math.h>
#include<stdlib.h>
#include<string.h>
#include<time.h>
int q[100];
int visited[100];
int adj[20][20];
int n;

int front=-1, rear=-1;
void enqueue(int v)
{
    if(front==-1 && rear==-1)
    {
        front=rear=0;
    }
    if(rear==n-1)
    {
        printf("Queue Full\n");
        return;
    }
    q[rear]=v;
    rear++;
```

```
}
int dequeue()
{
    int val;
    if(front==-1 || front>rear)
    {
        //printf("Queue Underflow\n");
        return -1;
    }
    val=q[front];
    if(front==rear || front>rear)
    {
        front=-1;
        rear=-1;
    }
    front++;
    return val;
}
void bfs(int v)
{
    for(int i=0;i<n;i++)
    {
        if(adj[v][i]==1 && visited[i]==0)
        {
            enqueue(i);
            printf("%d\t",i);
            visited[i]=1;
        }
    }
    int val=dequeue();

    if(val!=-1)
    {
        bfs(val);
    }
    else
    {
        //printf("\n");
        return;
    }
}

int main()
{

    int flag=0;
    int ci=2;
    int v,count = 1;
    printf("Enter the Number of the vertex\n");
    scanf("%d",&n);
    printf("Enter the Entries Of The Adjacent Matrix\n");
    for(int i=0;i<n;i++)
    {
        for(int j=0;j<n;j++)
        {
            scanf("%d",&adj[i][j]);
        }
    }
    printf("Enter the Starting Vertex\n");
    scanf("%d",&v);
    printf("BREADTH ORDER TRAVERSAL FOR FOREST
1 IS\n");
    printf("%d\t",v);
    visited[v]=1;
    bfs(v);



    for(int i=0;i<n;i++)
    {
        if(visited[i]!= 1)
        {
            printf("\nTRAVERSAL \n");
            printf("\n%d\t",i);

            visited[i]=1;
            bfs(i);
            count++;
            flag = 1;
        }
    }
    if(flag==0)
    {
        printf("\nGRAPH IS CONNECTED\n");
    }
     if(flag==1)
    {
        printf("\nGRAPH IS NOT CONNECTED AND HAS
%d PARTS\n",count);
    }
}
```

Output:



```
Enter the Number of the vertex
6
Enter the Entries Of The Adjacent Matrix
0 0 1 0 1 0
0 0 0 0 0 1
1 0 0 0 1 0
0 0 0 0 0 0
0 0 1 0 0 0
0 1 0 0 0 0
Enter the Starting Vertex
1
BREADTH ORDER TRAVERSAL FOR FOREST 1 IS
1       5       2       4
TRAVERSAL

0
TRAVERSAL

3
GRAPH IS NOT CONNECTED AND HAS 3 PARTS

Process returned 0 (0x0)   execution time : 215.033 s
Press any key to continue.
```