

Aim:

Write a program to implement Depth First Search for a graph.

Source Code:**GraphsDFS.c**

```
#include<stdio.h>
#include<stdlib.h>
struct node
{
    struct node *next;
    int vertex;
};
typedef struct node * GNODE;
GNODE graph[20];
int visited[20];
int n;
void DFS(int i)
{
    GNODE p;
    printf("\n%d",i);
    p=graph[i];
    visited[i]=1;
    while(p!=NULL)
    {
        i=p->vertex;
        if(!visited[i])
            DFS(i);
        p=p->next;
    }
}
void main()
{
    int N,E,i,s,d,v;
    GNODE q,p;
    printf("Enter the number of vertices : ");
    scanf("%d",&N);
    printf("Enter the number of edges : ");
    scanf("%d",&E);
    for(i=1;i<=E;i++)
    {
        printf("Enter source : ");
        scanf("%d",&s);
        printf("Enter destination : ");
        scanf("%d",&d);
        q =(GNODE)malloc(sizeof(struct node));
        q->vertex=d;
        q->next=NULL;
        if(graph[s]==NULL)
            graph[s]=q;
        else
        {
```

```

        p=graph[s];
        while(p->next!=NULL)
        p=p->next;
        p->next=q;
    }
}

    for(i=0;i<n;i++)
    visited[i]=0;
    printf("Enter Start Vertex for DFS : ");
    scanf("%d",&v);
    printf("DFS of graph : ");
    DFS(v);
    printf("\n");
}

```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Enter the number of vertices : 6
Enter the number of edges : 7
Enter source : 1
Enter destination : 2
Enter source : 1
Enter destination : 4
Enter source : 4
Enter destination : 2
Enter source : 2
Enter destination : 3
Enter source : 4
Enter destination : 5
Enter source : 1
Enter destination : 3
Enter source : 3
Enter destination : 6
Enter Start Vertex for DFS : 1
DFS of graph :
1
2
3
6
4
5

Test Case - 2
User Output
Enter the number of vertices : 5
Enter the number of edges : 5

Enter source : 1
Enter destination : 2
Enter source : 1
Enter destination : 4
Enter source : 4
Enter destination : 2
Enter source : 2
Enter destination : 3
Enter source : 4
Enter destination : 5
Enter Start Vertex for DFS : 1
DFS of graph :
1
2
3
4
5