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
```