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
```