/*3.Write a C program depth first search (DFS) using array.*/

```
#include<stdio.h>
#include<stdlib.h>
typedef struct node
{
   struct node *next;
   int vertex;
}node;

node *G[20];
int visited[20];
int n;
void read_graph();
void insert(int,int);
void DFS(int);
void main()
{
   int i;
   read_graph();
   for(i=0;i<n;i++)
      visited[i]=0;
   DFS(0);
}
void DFS(int i)
{
   node *p;
         printf("\n%d",i);
   p=G[i];
   visited[i]=1;
   while(p!=NULL)
   {
     i=p->vertex;
           if(!visited[i])
         DFS(i);
      p=p->next;
   }
}
```

```
void read_graph()
{
   int i,vi,vj,no_of_edges;
   printf("Enter number of vertices:");
         scanf("%d",&n);
         for(i=0;i<n;i++)
   {
      G[i]=NULL;
      printf("Enter number of edges:");
         scanf("%d",&no_of_edges);
   for(i=0;i<no_of_edges;i++)
      {
         printf("Enter an edge(u,v):");
                        scanf("%d%d",&vi,&vj);
                        insert(vi,vj);
      }
   }
}

void insert(int vi,int vj)
{
   node *p,*q;
         q=(node*)malloc(sizeof(node));
   q->vertex=vj;
   q->next=NULL;
   if(G[vi]==NULL)
      G[vi]=q;
   else
   {
      p=G[vi];

                  while(p->next!=NULL)
         p=p->next;
      p->next=q;
   }
}
```

OUTPUT:

```
Enter number of vertices:8
Enter number of edges:10
Enter an edge(u,v):0 1
Enter an edge(u,v):0 2
Enter an edge(u,v):0 3
Enter an edge(u,v):0 4
Enter an edge(u,v):1 5
Enter an edge(u,v):2 5
Enter an edge(u,v):3 6
Enter an edge(u,v):4 6
Enter an edge(u,v):5 6
Enter an edge(u,v):6 7
0
1
5
7
2
3
6
4
Program executed…….
```

/* 4.Write a C program breadth-first search (BFS) using an array */

```
 #include<stdio.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 is reachable are:\n");
    for (i=1;i<=n;i++)
      if(visited[i])
       printf("%d\t",i);
  else
       printf("\n Bfs is not possible");

  }
```

OUTPUT:

```
Enter the number of vertices:4
Enter graph data in matrix form:
1 1 1 1
0 1 0 0
0 0 1 0
0 0 0 1
Enter the starting vertex:1
The node which is reachable are:
1
2
3
4
```