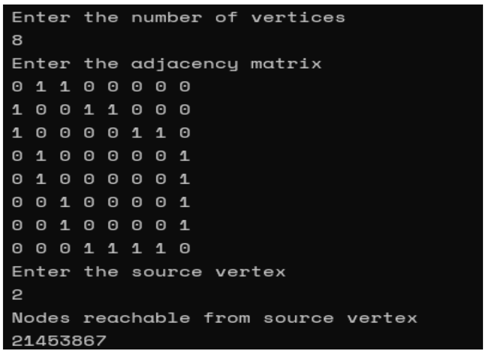
Lab-3

1) Write a program to print all the nodes reachable from a given starting node in a digraph using BFS method.

```
#include<stdio.h>

void bfs(int);

int a[10][10],vis[10],n;


void main()

{

  int i,j,src;


  printf("Enter the number of vertices\n");

  scanf("%d",&n);

  printf("Enter the adjacency matrix\n");

  for(i=1;i<=n;i++)

  {

    for(j=1;j<=n;j++)

    {

      scanf("%d",&a[i][j]);


    }


    vis[i]=0;

  }


  printf("Enter the source vertex\n");

  scanf("%d",&src);

  printf("Nodes reachable from source vertex\n");

  bfs(src);


}
```

```
void bfs(int v)
{
   int q[10],f=1,r=1,u,i;
   q[r]=v;
   vis[v]=1;
   while(f<=r)
   {
      u=q[f];
      printf("%d",u);
      for(i=1;i<=n;i++)
      {
          if(a[u][i]==1 && vis[i]==0)
          {
             vis[i]=1;
             r=r+1;
             q[r]=i;
          }
      }
      f=f+1;
   }
}
```

OUTPUT

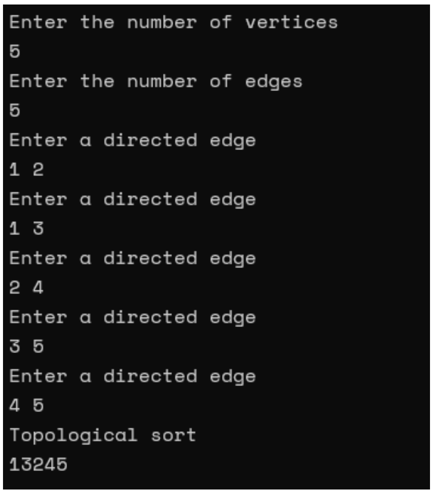


```
Enter the number of vertices
8
Enter the adjacency matrix
0 1 1 0 0 0 0 0
1 0 0 1 1 0 0 0
1 0 0 0 0 1 1 0
0 1 0 0 0 0 0 1
0 1 0 0 0 0 0 1
0 0 1 0 0 0 0 1
0 0 1 0 0 0 0 1
0 0 0 1 1 1 1 0
Enter the source vertex
2
Nodes reachable from source vertex
21453867
```

2) Write a program to obtain the Topological ordering of vertices in a given digraph.

```
#include<stdio.h>
#include<conio.h>

void dfs(int);
int a[10][10],vis[10],exp[10],n,j,m;

void main()
{
  int i,x,y;
  printf("Enter the number of vertices\n");
  scanf("%d",&n);
  for(i=1;i<=n;i++)
  {
    for(j=1;j<=n;j++)
    {
         a[i][j]=0;
    }
    vis[i]=0;
   }
   printf("Enter the number of edges\n");
   scanf("%d",&m);
   for(i=1;i<=m;i++)
   {
     printf("Enter a directed edge\n");
     scanf("%d %d",&x,&y);
     a[x][y]=1;
   }
   j=0;
   for(i=1;i<=n;i++)
   {
     if(vis[i]==0)
          dfs(i);
   }
   printf("Topological sort\n");
   for(i=n-1;i>=0;i--)
   {
     printf("%d",exp[i]);
   }
   getch();
}

void dfs(int v)
{
  int i;
  vis[v]=1;
  for(i=1;i<=n;i++)
  {
    if(a[v][i]==1 && vis[i]==0)
    dfs(i);
  }
  exp[j++]=v;
}
```

OUTPUT



```
Enter the number of vertices
5
Enter the number of edges
5
Enter a directed edge
1 2
Enter a directed edge
1 3
Enter a directed edge
2 4
Enter a directed edge
3 5
Enter a directed edge
4 5
Topological sort
13245
```