LAB PROGRAM 9

AIM: Find Minimum Cost Spanning Tree of a given undirected graph using Prim/Kruskal's algorithm

SOURCE CODE

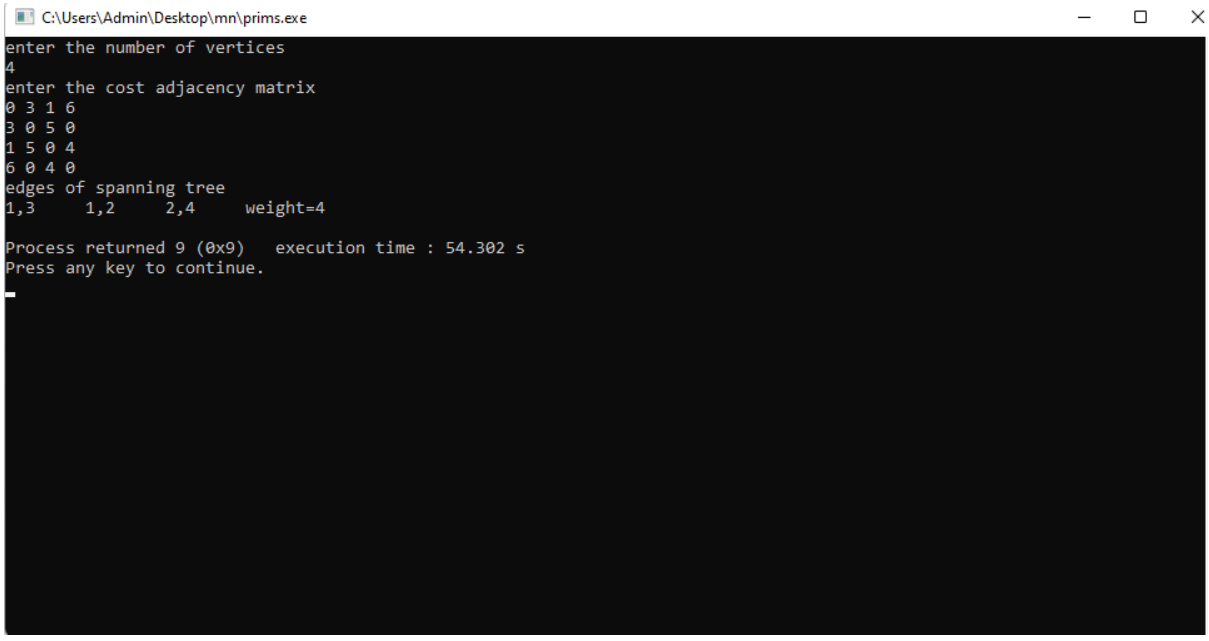
PRIMS ALGORITHM

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

int cost[10][10],vt[10],et[10][10],vis[10],j,n;
int sum=0;
int x=1;
int e=0;
void prims();

void main()
{
  int i;
  printf("enter the number of vertices\n");
  scanf("%d",&n);
  printf("enter the cost adjacency matrix\n");
  for(i=1;i<=n;i++)
  {
     for(j=1;j<=n;j++)
     {
            scanf("%d",&cost[i][j]);
     }
     vis[i]=0;
   }
```

```
    prims();
    printf("edges of spanning tree\n");
    for(i=1;i<=e;i++)
    {
            printf("%d,%d\t",et[i][0],et[i][1]);
    }
    printf("weight=%d\n",sum);
}

void prims()
{
  int s,min,m,k,u,v;
  vt[x]=1;
  vis[x]=1;
  for(s=1;s<n;s++)
  {
     j=x;
     min=999;
     while(j>0)
     {
            k=vt[j];
            for(m=2;m<=n;m++)
            {
              if(vis[m]==0)
              {
                    if(cost[k][m]<min)
                    {
                      min=cost[k][m];
                      u=k;
                      v=m;
                    }
```

```
            }
        }
        j--;
  }
  vt[++x]=v;
  et[s][0]=u;
  et[s][1]=v;
  e++;
  vis[v]=1;
  sum=sum+min;
 }
}
```

OUTPUT SCREENSHOT



KRUSHKALS ALGORITHM

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

```
int find(int v,int parent[10])
{
  while(parent[v]!=v)
  {
    v=parent[v];
  }
  return v;
}

void union1(int i,int j,int parent[10])
{
  if(i<j)
    parent[j]=i;
  else
    parent[i]=j;
}

void kruskal(int n,int a[10][10])
{
  int count,k,min,sum,i,j,t[10][10],u,v,parent[10];
  count=0;
  k=0;
  sum=0;
  for(i=0;i<n;i++)
    parent[i]=i;
  while(count!=n-1)
  {
    min=999;
    for(i=0;i<n;i++)
```

```
 {
        for(j=0;j<n;j++)
        {

          if(a[i][j]<min && a[i][j]!=0)
          {
                min=a[i][j];
                u=i;
                v=j;
           }
        }
   }
   i=find(u,parent);
   j=find(v,parent);
   if(i!=j)
   {
        union1(i,j,parent);
        t[k][0]=u;
        t[k][1]=v;
        k++;
        count++;
        sum=sum+a[u][v];
   }
   a[u][v]=a[v][u]=999;
}
if(count==n-1)
{
   printf("spanning tree\n");
   for(i=0;i<n-1;i++)
```

```
    {
        printf("%d %d\n",t[i][0],t[i][1]);
    }
    printf("cost of spanning tree=%d\n",sum);
  }
  else
    printf("spanning tree does not exist\n");
 }



void main()
{
  int n,i,j,a[10][10];
  printf("enter the number of nodes\n");
  scanf("%d",&n);
  printf("enter the adjacency matrix\n");
  for(i=0;i<n;i++)
   for(j=0;j<n;j++)
        scanf("%d",&a[i][j]);
  kruskal(n,a);
}
```

OUTPUT SCREENSHOT