

WEEK 8

Find the minimum cost spanning tree of given undirected graph using prims and kruskal's algorithm.

PRIMS:

CODE:

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

```
float cost[10][10];
```

```
int vt[10],et[10][10],vis[10],j,n;
```

```
float 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 of adjacency matrix\n");
```

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

```
    {
```

```

        for(j=1;j<=n;j++)
        {
            scanf("%f",&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=%f\n",sum);
}

void prims()
{
    int s,m,k,u,v;
    float min;
    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:

```
enter the number of vertices
6
enter the cost of adjacency matrix
0 3 999 999 6 5
3 0 1 999 999 4
999 1 0 6 999 4
999 999 6 0 8 5
6 999 999 8 0 2
5 4 4 5 2 0
edges of spanning tree
1,2    2,3    3,6    6,5    6,4    weight=15.000000

Process returned 17 (0x11)    execution time : 73.031 s
Press any key to continue.
```

KRUSHKAL'S:

CODE:

```
#include <stdio.h>
#include <conio.h>
#include <stdlib.h>
int i,j,k,a,b,u,v,n,ne=1;
int min,mincost=0,cost[9][9],parent[9];
int find(int);
int uni(int,int);
void main()
{
    printf("\nEnter the no. of vertices:");
    scanf("%d",&n);
    printf("\nEnter the cost of adjacency matrix:\n");
    for(i=1;i<=n;i++)
    {
        for(j=1;j<=n;j++)
        {
            scanf("%d",&cost[i][j]);
            if(cost[i][j]==0)
                cost[i][j]=999;
        }
    }
}
```

```

printf("The edges of Minimum Cost Spanning Tree are\n");
while(ne < n)
{
    for(i=1,min=999;i<=n;i++)
    {
        for(j=1;j <= n;j++)
        {
            if(cost[i][j] < min)
            {
                min=cost[i][j];

                a=u=i;
                b=v=j;
            }
        }
    }
    u=find(u);
    v=find(v);
    if(uni(u,v))
    {
        printf("%d edge (%d,%d) =%d\n",ne++,a,b,min);
        mincost +=min;
    }
    cost[a][b]=cost[b][a]=999;
}

```

```
    printf("\nMinimum cost =
    %d\n",mincost); getch();
}
int find(int i)
{
    while(parent[i])
        i=parent[i];
    return i;
}
int uni(int i,int j)
{
    if(i!=j)
    {
        parent[j]=i;
        return 1;
    }
    return 0;
}
```

OUTPUT:

```
Enter the no. of vertices:5

Enter the cost of adjacency matrix:
0 5 999 6 999
5 0 1 3 999
0 1 0 4 6
6 3 4 0 2
0 0 6 2 0

The edges of Minimum Cost Spanning Tree are
1 edge (2,3) =1
2 edge (4,5) =2
3 edge (2,4) =3
4 edge (1,2) =5

      Minimum cost = 11
```