PROGRAM 16

From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijkstra's algorithm.

//Code

```
#include<stdio.h>
void dijkstras();
int c[10][10],n,src;
int main()
{
int i,j;

printf("\nenter the no of vertices:\t");
scanf("%d",&n);
printf("\nenter the cost matrix:\n");
for(i=1;i<=n;i++)
{
 for(j=1;j<=n;j++)
 {
  scanf("%d",&c[i][j]);
 }
}
printf("\nenter the source node:\t");
scanf("%d",&src);
dijkstras();
}

void dijkstras()
{
 int vis[10],dist[10],u,j,count,min;
 for(j=1;j<=n;j++)
 {
  dist[j]=c[src][j];
```

```
 }
 for(j=1;j<=n;j++)
 {
  vis[j]=0;
 }
 dist[src]=0;
 vis[src]=1;
 count=1;
 while(count!=n)
 {
  min=9999;
  for(j=1;j<=n;j++)
  {
   if(dist[j]<min&&vis[j]!=1)
   {
    min=dist[j];
    u=j;
   }
  }
  vis[u]=1;
  count++;
  for(j=1;j<=n;j++)
  {
   if(min+c[u][j]<dist[j]&&vis[j]!=1)
   {
    dist[j]=min+c[u][j];
   }
  }
 }
 printf("\nthe shortest distance is:\n");
 for(j=1;j<=n;j++)
 {
  printf("\n%d----->%d=%d",src,j,dist[j]);
 }
}
```

//Output

```
clang++-7 -pthread -std=c++17 -o main main.cpp
./main

enter the no of vertices:   5

enter the cost matrix:
9999 3 9999 7 9999
3 9999 4 2 9999
9999 4 9999 5 6
7 2 5 9999 4
9999 9999 6 4 9999

enter the source node:  1

the shortest distance is:

1----->1=0
1----->2=3
1----->3=7
1----->4=5
1----->5=9
```