**Assignment No:-**

**Assignment Name:- Write a program to find shortest path using single source shortest path.**

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**Roll No:- 136.**

#include<iostream.h>

#include<conio.h>

class GRAPH

{

private:

int COST[10][10],DIST[10],n,v;

public:

GRAPH(int);

void READ();

void DISPLAY();

void SHOW\_DIST();

void SHORTEST\_PATH(int);

};

GRAPH:: GRAPH(int size)

{

n=size;

}

void GRAPH:: READ()

{

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

{

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

{

cin>>COST[i][j];

}

}

}

void GRAPH:: DISPLAY()

{

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

{

cout<<endl;

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

{

cout<<COST[i][j]<<" ";

}

}

}

void GRAPH:: SHOW\_DIST()

{

cout<<"\n Source \t Destination \t Dist ";

for(int k=1;k<=n;k++)

{

cout<<" "<<v<<"\t"<<k<<"\t"<<DIST[k]<<"\n";

}

}

void GRAPH:: SHORTEST\_PATH(int v)

{

int s[10];

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

{

s[i]=0;DIST[i]=COST[v][i];

}

s[v]=1;DIST[v]=0;

for(int num=2;num<=n-1;num++)

{

int w,u,min=9999;

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

{

if(s[w]==0 && DIST[w]<min)

{

min=DIST[w];

u=w;

}

}

s[u]=1;

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

{

if(s[w]==0)

{

if(DIST[w]<DIST[u]+COST[u][w])

DIST[w]=DIST[w];

else

DIST[w]=DIST[u]+COST[u][w];

}

}

}

}

void main()

{

clrscr();

int size;

cout<<"\n Enter the Number of Node \t";

cin>>size;

GRAPH g(size);

cout<<"\n Enter Nodes for Graph \t";

g.READ();

cout<<"\n Your Graph is \n";

g.DISPLAY();

g.SHORTEST\_PATH(1);

g.SHOW\_DIST();

getch();

}