



# SHREE L. R. TIWARI COLLEGE OF ENGINEERING

Approved by AICTE & DTE, Maharashtra State & Affiliated to University of Mumbai, NAAC Accredited, NBA Accredited program,  
ISO 9001:2015 Certified | DTE Code No: 3423, Recognized under Section 2(f) of the UGC Act 1956, Minority Status (Hindi Linguistic)

Name: Samit Dubey

Roll no.: 22 Div: A

Batch: A1

## **Program:**

```
#include<stdio.h>
#define INFINITY 9999
#define MAX 10

void dijkstra(int G[MAX][MAX],int n,int startnode);

int main()
{
    int G[MAX][MAX],i,j,n,u;
    printf("Enter no. of vertices:");
    scanf("%d",&n);
    printf("\nEnter the adjacency matrix:\n");

    for(i=0;i<n;i++)
        for(j=0;j<n;j++)
            scanf("%d",&G[i][j]);

    printf("\nEnter the starting node:");
    scanf("%d",&u);
    dijkstra(G,n,u);

    return 0;
}

void dijkstra(int G[MAX][MAX],int n,int startnode)
{
    int cost[MAX][MAX],distance[MAX],pred[MAX];
    int visited[MAX],count,mindistance,nextnode,i,j;

    //pred[] stores the predecessor of each node
    //count gives the number of nodes seen so far
    //create the cost matrix
    for(i=0;i<n;i++)
        for(j=0;j<n;j++)
            if(G[i][j]==0)
                cost[i][j]=INFINITY;
            else
                cost[i][j]=G[i][j];
```



# SHREE L. R. TIWARI COLLEGE OF ENGINEERING

Approved by AICTE & DTE, Maharashtra State & Affiliated to University of Mumbai, NAAC Accredited, NBA Accredited program,  
ISO 9001:2015 Certified | DTE Code No: 3423, Recognized under Section 2(f) of the UGC Act 1956, Minority Status (Hindi Linguistic)

Name: Samit Dubey

Roll no.: 22 Div: A

Batch: A1

```
//initialize pred[],distance[] and visited[]
for(i=0;i<n;i++)
{
    distance[i]=cost[startnode][i];
    pred[i]=startnode;
    visited[i]=0;
}

distance[startnode]=0;
visited[startnode]=1;
count=1;

while(count<n-1)
{
    mindistance=INFINITY;

    //nextnode gives the node at minimum distance
    for(i=0;i<n;i++)
        if(distance[i]<mindistance&&!visited[i])
        {
            mindistance=distance[i];
            nextnode=i;
        }

    //check if a better path exists through nextnode
    visited[nextnode]=1;
    for(i=0;i<n;i++)
        if(!visited[i])
            if(mindistance+cost[nextnode][i]<distance[i])
            {
                distance[i]=mindistance+cost[nextnode][i];
                pred[i]=nextnode;
            }
    count++;
}

//print the path and distance of each node
for(i=0;i<n;i++)
    if(i!=startnode)
    {
        printf("\nDistance of node%d=%d",i,distance[i]);
        printf("\nPath=%d",i);
    }
```



# SHREE L. R. TIWARI COLLEGE OF ENGINEERING

Approved by AICTE & DTE, Maharashtra State & Affiliated to University of Mumbai, NAAC Accredited, NBA Accredited program,  
ISO 9001:2015 Certified | DTE Code No: 3423, Recognized under Section 2(f) of the UGC Act 1956, Minority Status (Hindi Linguistic)

Name: Samit Dubey

Roll no.: 22 Div: A

Batch: A1

```
j=i;
do
{
    j=pred[j];
    printf("<-%d",j);
}while(j!=startnode);
}
```

## **Output:**

Enter no. of vertices:4

Enter the adjacency matrix:

0 5 0 10

5 0 3 0

0 3 0 1

10 0 1 0

Enter the starting node:0

Distance of node1=5

Path=1<-0

Distance of node2=8

Path=2<-1<-0

Distance of node3=9

Path=3<-2<-1<-0