ASSIGNMENT

Dijkstra's Shortest Path Algorithm

CODE

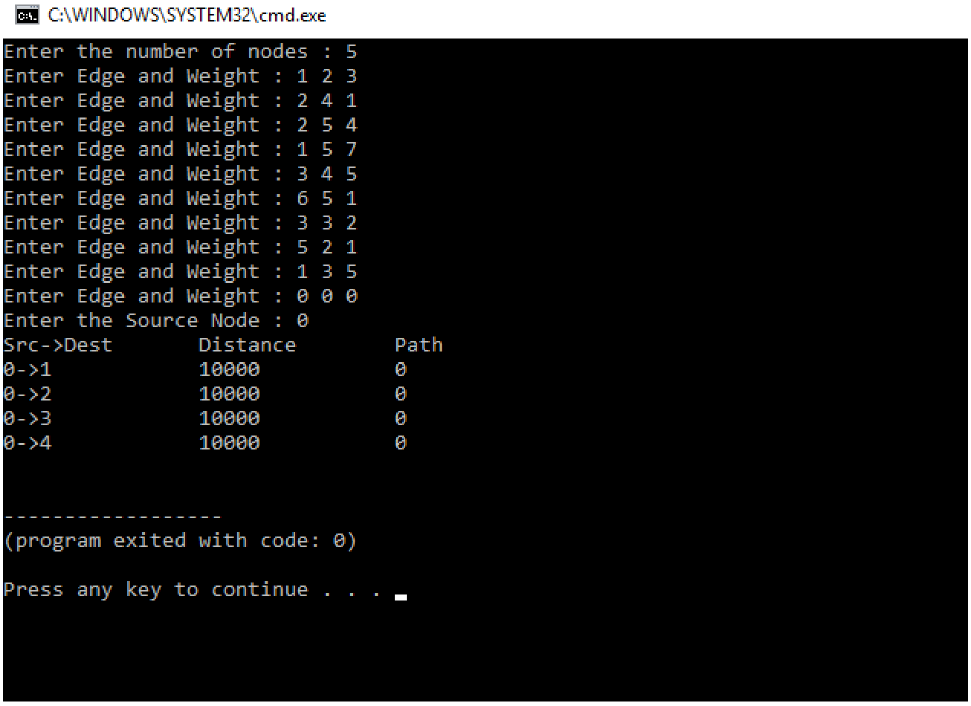
```
#include<iostream>
using namespace std;
int N;
int graph[10][10];
int dist[10];
bool visited[10];
int parent[10];
void createGraph()
{
    int i,j,max,u,v,w;
    cout<<"Enter the number of nodes : ";
    cin>>N;
    for(i=0;i<=N;i++)
     for(j=0;j<=N;j++)
      graph[i][j]=0;
    max=N*(N+1);
    for(i=0;i<max;i++)
    {
     cout<<"Enter Edge and Weight : ";
     cin>>u>>v>>w;
     if(u==0)    break;
     else
     {
        graph[u][v]=w;
        graph[v][u]=w;
     }
    }
}
int minDistance()
{
    int min = 10000, minDist;
   for (int v = 0; v < N; v++)
        if (visited[v] == false && dist[v] <= min)
        {
            min = dist[v];
            minDist = v;
        }
    return minDist;
}
void printPath(int j)
{
    if (parent[j]==0)
        return;
    printPath(parent[j]);
    cout<<j<<" ";
}
void dijkstra()
{
    int src;
    cout<<"Enter the Source Node : ";
    cin>>src;
    for (int i = 0; i < N; i++)
    {
        parent[0] = -1;
        dist[i] = 10000;
        visited[i] = false;
    }
    dist[src] = 0;
    for (int count = 0; count < N-1; count++)
    {
        int u = minDistance();
        visited[u] = true;
        for (int v = 0; v < N; v++)
            if (!visited[v] && graph[u][v] &&
                dist[u] + graph[u][v] < dist[v])
            {
                parent[v]  = u;
                dist[v] = dist[u] + graph[u][v];
            }
    }
    cout<<"Src->Dest\tDistance\tPath"<<endl;
    for (int i = 1; i < N; i++)
    {
        cout<<src<<"->"<<i<<"\t\t"<<dist[i]<<"\t\t"<<src<<" ";
        printPath(i);
        cout<<endl;
    }
}
int main()
{
    createGraph();

    dijkstra();

    return 0;

}
```

OUTPUT



```
Enter the number of nodes : 5
Enter Edge and Weight : 1 2 3
Enter Edge and Weight : 2 4 1
Enter Edge and Weight : 2 5 4
Enter Edge and Weight : 1 5 7
Enter Edge and Weight : 3 4 5
Enter Edge and Weight : 6 5 1
Enter Edge and Weight : 3 3 2
Enter Edge and Weight : 5 2 1
Enter Edge and Weight : 1 3 5
Enter Edge and Weight : 0 0 0
Enter the Source Node : 0
Src->Dest       Distance        Path
0->1            10000           0
0->2            10000           0
0->3            10000           0
0->4            10000           0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(program exited with code: 0)

Press any key to continue . . .
```