SSN COLLEGE OF ENGINEERING
(Autonomous)

DEPARTMENT OF CSE

UCS308 Data Structures Lab

Assignment 12

Djikstra

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FILE NAME : Djikstra.h

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

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;


for(i=1;i<=n;i++)
	for(j=1;j<=n;j++)
		if(G[i][j]==0)
			cost[i][j]=INFINITY;
		else
			cost[i][j]=G[i][j];


for(i=1;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)
{
	mindistance=INFINITY;


	for(i=1;i<=n;i++)
		if(distance[i]<mindistance&&!visited[i])
		{
			mindistance=distance[i];
			nextnode=i;
		}


		visited[nextnode]=1;
		for(i=1;i<=n;i++)
			if(!visited[i])
				if(mindistance+cost[nextnode][i]<distance[i])
				{
					distance[i]=mindistance+cost[nextnode][i];
					pred[i]=nextnode;
```

```
                    }
        count++;
    }


    for(i=1;i<=n;i++)
        if(i!=startnode)
        {
            printf("\nDistance of node%d=%d",i,distance[i]);
            printf("\nPath=%d",i);

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

FILE NAME : main.c

```
#include “Djikstra.h”

int main()
{
    int G[MAX][MAX],i,j,n,u,ch=1;
    while(ch!=0)
    {
    printf("Enter no. of vertices:");
    scanf("%d",&n);
    printf("\nEnter the adjacency matrix:\n");

    for(i=1;i<=n;i++)
        for(j=1;j<=n;j++)
            scanf("%d",&G[i][j]);

    printf("\nEnter the starting node:");
    scanf("%d",&u);
    dijkstra(G,n,u);
    printf("Enter 1 to continue and 0 to exit:");
    scanf("%d",&ch);
    }
```

```
        return 0;
}
```

Output:

```
Enter no. of vertices:7

Enter the adjacency matrix:
0 2 0 1 0 0 0
0 0 0 3 10 0 0
4 0 0 0 0 5 0
0 0 2 0 2 8 4
0 0 0 0 0 0 6
0 0 0 0 0 0 0
0 0 0 0 0 1 0

Enter the starting node:1

Distance of node2=2
Path=2->1
Distance of node3=3
Path=3->4->1
Distance of node4=1
Path=4->1
Distance of node5=3
Path=5->4->1
Distance of node6=6
Path=6->7->4->1
Distance of node7=5
Path=7->4->1
Enter 1 to continue and 0 to exit:1

Enter no. of vertices:6

Enter the adjacency matrix:
0 5 0 6 10 0
5 0 1 0 2 7
0 1 0 0 0 8
6 0 0 0 3 0
10 2 0 3 0 4
7 0 8 0 5 0

Enter the starting node:1
```

```
Distance of node2=5
Path=2->1
Distance of node3=6
Path=3->2->1
Distance of node4=6
Path=4->1
Distance of node5=7
Path=5->2->1
Distance of node6=11
Path=6->5->2->1
Enter 1 to continue and 0 to exit:0
```