**NAME: sai ram reddy**

**REG.NO.: 192111657**

**CODE: CSA0734**

**EXPERIMENT: 27**

**AIM:**  To implement distance vector routing using JAVA programming.

**PROGRAM:**

import java.io.\*; public class DVR

{

static int graph[][]; static int via[][]; static int rt[][]; static int v;

static int e;

public static void main(String args[]) throws IOException

{

BufferedReader br = new BufferedReader(new InputStreamReader(System.in)); System.out.println("Please enter the number of Vertices: ");

v = Integer.parseInt(br.readLine()); System.out.println("Please enter the number of Edges: "); e = Integer.parseInt(br.readLine());

graph = new int[v][v]; via = new int[v][v];

rt = new int[v][v]; for(int i = 0; i < v; i++) for(int j = 0; j < v; j++)

{

if(i == j) graph[i][j] = 0; else

graph[i][j] = 9999;

}

for(int i = 0; i < e; i++)

{

System.out.println("Please enter data for Edge " + (i + 1) + ":"); System.out.print("Source: ");

int s = Integer.parseInt(br.readLine()); s--;

System.out.print("Destination: ");

int d = Integer.parseInt(br.readLine()); d--;

System.out.print("Cost: ");

int c = Integer.parseInt(br.readLine()); graph[s][d] = c;

graph[d][s] = c;

}

dvr\_calc\_disp("The initial Routing Tables are: ");

System.out.print("Please enter the Source Node for the edge whose cost has changed: "); int s = Integer.parseInt(br.readLine());

s--;

System.out.print("Please enter the Destination Node for the edge whose cost has changed: ");

int d = Integer.parseInt(br.readLine()); d--;

System.out.print("Please enter the new cost: "); int c = Integer.parseInt(br.readLine()); graph[s][d] = c;

graph[d][s] = c;

dvr\_calc\_disp("The new Routing Tables are: ");

}

static void dvr\_calc\_disp(String message)

{

System.out.println(); init\_tables(); update\_tables(); System.out.println(message); print\_tables(); System.out.println();

}

static void update\_table(int source)

{

for(int i = 0; i < v; i++)

{

if(graph[source][i] != 9999)

{

int dist = graph[source][i]; for(int j = 0; j < v; j++)

{

int inter\_dist = rt[i][j]; if(via[i][j] == source) inter\_dist = 9999;

if(dist + inter\_dist < rt[source][j])

{

rt[source][j] = dist + inter\_dist; via[source][j] = i;

}

}

}

}

}

static void update\_tables()

{

int k = 0;

for(int i = 0; i < 4\*v; i++)

{

update\_table(k); k++;

if(k == v) k = 0;

}

}

static void init\_tables()

{

for(int i = 0; i < v; i++)

{

for(int j = 0; j < v; j++)

{

if(i == j)

{

rt[i][j] = 0;

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via[i][j] = i;

}

else

{

rt[i][j] = 9999;

via[i][j] = 100;

}

}

}

}

static void print\_tables()

{

for(int i = 0; i < v; i++)

{

for(int j = 0; j < v; j++)

{

System.out.print("Dist: " + rt[i][j] + " ");

}

System.out.println();

}

}

}

**OUTPUT:**

Please enter the number of Vertices: 4 Please enter the number of Edges: 5 Please enter data for Edge 1:

Source: 1

Destination: 2

Cost: 1

Please enter data for Edge 2: Source: 1

Destination: 3

Cost: 3

Please enter data for Edge 3: Source: 2

Destination: 3

Cost: 1

Please enter data for Edge 4: Source: 2

Destination: 4

Cost: 1

Please enter data for Edge 5: Source: 3

Destination: 4

Cost: 4

|  |  |  |  |
| --- | --- | --- | --- |
| The initial Routing Tables are: Dist: 0 | Dist: 1 | Dist: 2 | Dist: 2 |
| Dist: 1 | Dist: 0 | Dist: 1 | Dist: 1 |
| Dist: 2 | Dist: 1 | Dist: 0 | Dist: 2 |
| Dist: 2 | Dist: 1 | Dist: 2 | Dist: 0 |

Please enter the Source Node for the edge whose cost has changed: 2 Please enter the Destination Node for the edge whose cost has changed: 4 Please enter the new cost: 10

The new Routing Tables are: Dist: 0 Dist: 1 Dist: 2 Dist: 6

Dist: 1 Dist: 0 Dist: 1 Dist: 5

Dist: 2 Dist: 1 Dist: 0 Dist: 4

Dist: 6 Dist: 5 Dist: 4 Dist: 0

**RESULT:** Therefore distance vector routing has been successfully excecuted using JAVA programming