**package** GraphTheory;

**import** java.util.LinkedList;

**import** java.util.Queue;

**import** java.util.Scanner;

**class** BellManFord

{

**public int**[][] **graph**;

**public int vertex**;

**public int edge**;

**public int**[] **distance**;

**public int check**;

Scanner **input**;

Queue<Integer> **queue1**;

Queue<Integer> **queue2**;

**public** BellManFord(**int**[][] graph, **int** vertex, **int** edge) {

**this**.**graph** = graph;

**this**.**vertex** = vertex;

**this**.**edge** = edge;

**this**.**distance** = **new int**[vertex];

**this**.**input** = **new** Scanner(System.***in***);

**this**.**queue1** = **new** LinkedList<>();

**this**.**queue2** = **new** LinkedList<>();

}

**public void** bellManFord()

{

**for** (**int** i=0;i<**vertex**;i++)

{

**distance**[i] = Integer.***MAX\_VALUE***;

}

**distance**[0] = 0;

**for** (**int** i=0;i<**edge**;i++)

{

**int** n1 = **input**.nextInt();

**int** n2 = **input**.nextInt();

**int** weight = **input**.nextInt();

**graph**[n1][n2] = weight;

}

**check** = **vertex** - 1;

**queue1**.add(0);

**while** (**check** > 0)

{

**while** (!**queue1**.isEmpty())

{

**int** j = **queue1**.remove();

**queue2**.add(j);

**for** (**int** i=0;i<**vertex**;i++)

{

**if** (**graph**[j][i] !=0)

{

**queue1**.add(i);

**int** newDistance = **distance**[j] + **graph**[j][i];

**if** (newDistance < **distance**[i])

{

**distance**[i] = newDistance;

}

}

}

}

**if** (**queue1**.isEmpty())

{

**while** (!**queue2**.isEmpty())

{

**queue1**.add(**queue2**.peek());

**queue2**.remove();

}

}

**check** = **check** - 1;

}

**for** (**int** i=0;i<**vertex**;i++)

{

System.***out***.println(**"Distance "**+i+**": "**+**distance**[i]);

}

}

}

**public class** BellManFordAlgorithm {

**public static void** main(String[] args) {

Scanner input = **new** Scanner(System.***in***);

**int**[][] graph = **new int**[100][100];

System.***out***.println(**"Enter number of vertex: "**);

**int** vertex = input.nextInt();

System.***out***.println(**"Enter number of edges: "**);

**int** edge = input.nextInt();

BellManFord object = **new** BellManFord(graph,vertex,edge);

object.bellManFord();

}

}