**package** GraphTheory;

**import** java.util.Scanner;

**class** PrimsAlgorithmImplementation

{

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

**public int vertex**;

**public int edge**;

**public boolean**[] **visited**;

**public int**[] **weight**;

Scanner **input**;

**public int**[] **parent**;

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

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

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

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

**this**.**visited** = **new boolean**[vertex];

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

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

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

}

**public void** prims()

{

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

{

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

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

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

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

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

}

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

{

**parent**[i] = -1;

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

**visited**[i] = **false**;

}

**weight**[0] = 0;

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

{

**int** minVertex = *findMinVertex*(**weight**,**visited**,**vertex**);

**visited**[minVertex] = **true**;

**for** (**int** j = 0; j <**vertex** ; j++) {

**if** (**graph**[minVertex][j]!=0 && !**visited**[j])

{

**int** newDistance = **graph**[minVertex][j];

**if** (newDistance<**weight**[j])

{

**weight**[j] = newDistance;

**parent**[j] = minVertex;

}

}

}

}

System.***out***.println(**"After Prim: "**);

**for** (**int** i=1;i<**vertex**;i++)

{

**if** (**parent**[i]<i)

{

System.***out***.println(**parent**[i]+**" "**+i+**" "**+**weight**[i]);

}**else**

{

System.***out***.println(i+**" "**+**parent**[i]+**" "**+**weight**[i]);

}

}

System.***out***.println(**"------------------"**);

System.***out***.print(**"Total cost:"**);

**int** cost = 0;

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

{

cost = cost + **weight**[i];

}

System.***out***.print(cost);

}

**public static int** findMinVertex(**int**[] weight, **boolean**[] visited, **int** vertex)

{

**int** minVertex = Integer.***MAX\_VALUE***;

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

{

**if** (!visited[i] && minVertex > weight[i])

{

minVertex = i;

}

}

**return** minVertex;

}

}

**public class** PrimsAlgorithm {

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

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

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

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

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

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

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

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

object.prims();

}

}