Project: Dijkstra for a Map

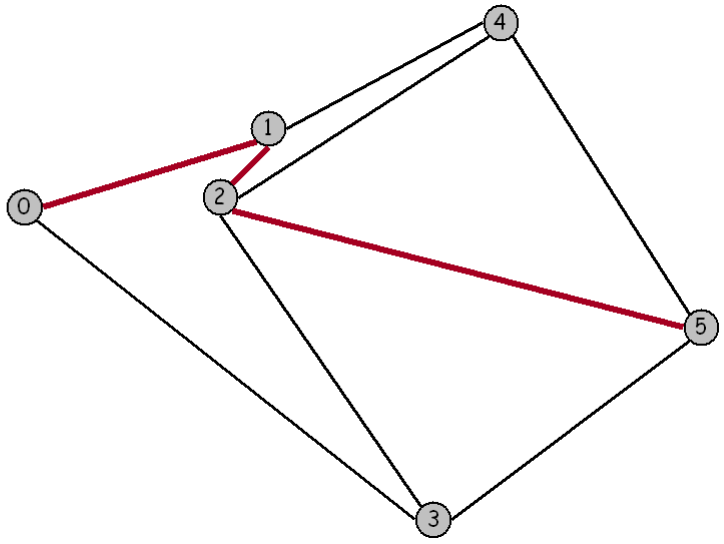
Due Date: 12/7/2015 (optional)

Description

For this assignment you will implement Dijkstra's single source shortest path algorithm. You will be working with maps, or graphs whose vertices are points in the plane and are connected by edges whose weights are Euclidean distances. Think of the vertices as cities and the edges as roads connected to them. To represent a map in a file, we list the number of vertices and edges, then list the vertices (index followed by its x and y coordinates), then list the edges (pairs of vertices), and finally the start and destination vertices. For example, the input below represents the map below:

```
6 9
0 1000 2400
1 2800 3000
2 2400 2500
3 4000    0
4 4500 3800
5 6000 1500

0 1
0 3
1 2
1 4
2 4
2 3
2 5
3 5
4 5
0 5
```



Output

Best path from 0 to 5 is:

0-1 1-2 2-5 with total distance 6274.

Requirements

Your heap implementation will allow constant time access to the entry based on the vertex number. You will implement decrease-key such that it runs in O(lg n) time.

Your program should get the name of the input file from the 1st argument on the command line. All output should be to standard output (the screen).

As always, all code should be you own.