Csci 335 Assignment 5

Due December 11

Graph Representation

You will read a directed graph from a text file. Below is an example:

`Graph1.txt`

```
5
0 1 0.2 3 10.1 4 0.5 -1
1 0 1.5 -1
2 1 100.0 3 50.2 -1
3 -1
4 1 10.5 2 13.9 -1
```

The first line is the number of vertices N (= 5 in this example). Each vertex is represented by an integer from 0 to $N - 1$.

For each vertex you have a list of the adjacent vertices with positive edge weights. Each list terminates with -1 to indicate the end of the line. For instance, in the above example, vertex 0 is connected to vertex 1 (edge weight 0.2), to vertex 3 (edge weight 10.1) and to vertex 4 (edge weight 0.5).

Represent a graph using an adjacency list. Read the vertices and edges from a text file.

Dijkstra's Algorithm

Implement Dijkstra's Algorithm.

Write a program that runs as follows:

`FindPaths <GRAPH_FILE> <STARTING_VERTEX>`

This program should use Dijkstra's Algorithm to find the shortest paths from a given starting vertex to all vertices in the graph file. The program should output the all paths in the form:

Start -> Destination: Start, V1, V2, … , Destination, Total cost: X

You should print out the paths to every destination.

Also printout out the total number of times vertices are being accessed and the total number of times edges are being accessed.