Andrew Rutherford

CSCI 3104

CPU: 2.8 GHz Intel Core i7

Ram: 16 GB 1600 MHz DDR3

OSX Yosemite

Homework #5

On my honor, as a University of Colorado at Boulder student, I have neither given nor received any unauthorized help.

1. Adding a large constant to each edge so that all negative edges become positive will not work.  
     
     
   If you were to add a constant of 4 to all the nodes, the distance from a-b-c would be 6, and the distance from a-b would be 1. In reality the shortest distance from a to c would be a-b-c.

-3

-1

-1

c

b

a

1. Running Dijkstra’s Algorithm once from city s to city t and again from city t to city s in graph G will give you all shortest path distances between cities s and t. The time complexity of doing this is O(|V^2|). In constant time, you can compute the length of the shortest path from city s to city t going through e’ for any e’ in E’. Which of these paths is shortest give the best edge to add and that length will be the maximum decrease between the two fixed cities. The overall time complexity is O(|V^2| + |E’|).