Algorithm Analysis Homework 6

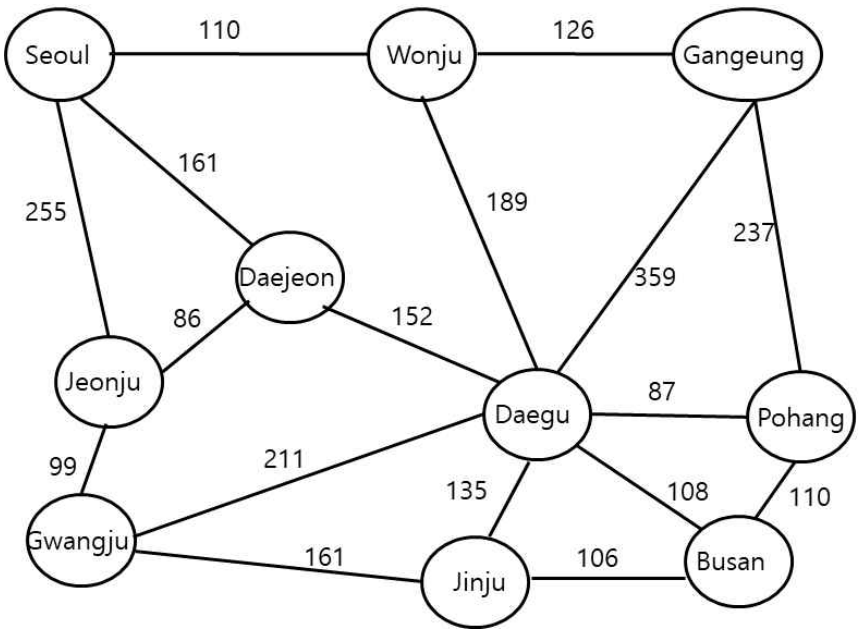
Due by 6/9(Fri.)

You are to write a program for all pairs shortest path problem using following algorithms.

a) Apply Dijkstra's algorithm |V| times on each vertex.

b) Apply Floyd's algorithm

Sample graph is as follows.



Input file for above graph is named as 'hw6.data'. Input file represents data in adjacency matrix form. (Assume there is one tab between data.) Also assume number of vertices in your graph is less than or equal to 30. Program outline is as follows. When there is no direct path between two cities, distance is represented as 'INF'.

Read input file

Create array of adjacency list for a given graph

Apply Dijkstra's algorithm for |V| times and print result

Run Floyd's algorithm and print result

Sample output)

The followings are shortest distances between cities with Dijkstra's algorithm.

	Busan	Daegu	Daejeon	Gang neung	Gwang ju	Jeonju	Jinju	Pohang	Seoul	Wonju
Busan	0	108	..	..	..	..	..	110	..	297
Daegu	108	0	..	..	..	..	..	..	..	..
Daejeon	..	..	0							
Gang neung	..	..	..	0	..	..	..	..	..	..
Gwang ju	..	..	..	..	0	..	..	..	..	..
Jeonju	..	..	..	..	..	0	..	..	..	..
Jinju	..	..	..	..	..	..	0	..	..	..
Pohang	110	..	..	..	..	..	..	0	..	..
Seoul	..	..	..	..	..	..	..	**386**	0	..
Wonju	297	..	..	..	..	..	..	..	..	..

(You have to fill out '..' part.)

The followings are shortest distances between cities with Floyd algorithm as follows.

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Test your program with graph with negative weight edge and with negative weight cycle, and check if your program works as you expected. (No extra points for this part, but you can see the difference between two algorithms.)

Note

1) Try to make your output as neat as possible, so that other person can see what you have done clearly.
2) Write program in C++. You may use any feature in C++ including STL.
3) If the program does not compile, you will get no point. Make sure that your program runs in g++.
4) Test your program with above example and several other graphs.
5) Do not use hyper scale AI.
6) At header part of comment, list all the references you used when you do this homework.

   For ex)

   (1) 강의 slide chapter 16.

   (2) Blog: ** URL here **

   (3) book: "Algorithm analysis in C++" by Someone