Algorithm Analysis Homework 5

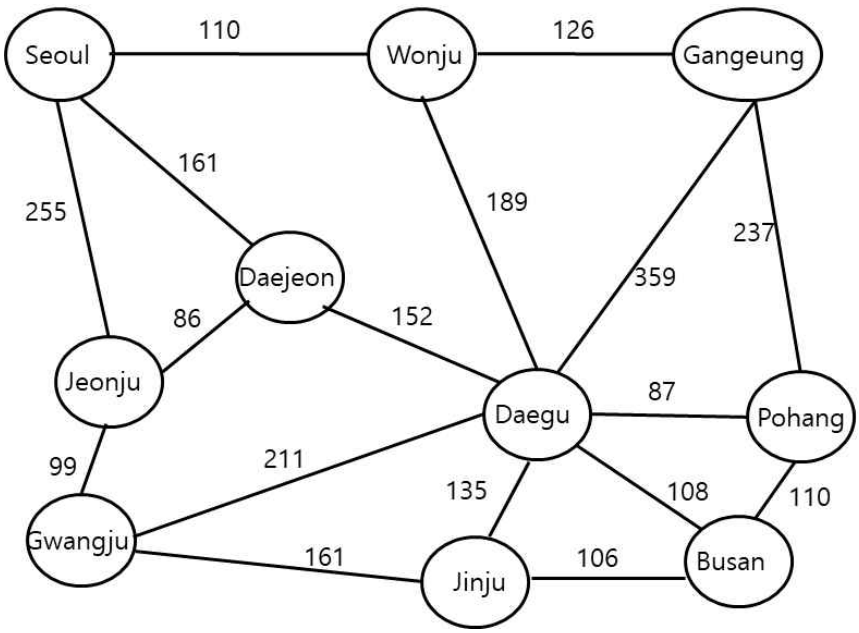
Due by 5/27(Fri.)

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. (There are white spaces – such as tab or space – between data.) Assume number of nodes in your graph is less than or equal to 30. Program outline is as follows.

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	..	..	..	..	..	..	..	400	0	..
Wonju	297	..	..	..	..	..	..	..	..	..

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

.....

.....

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)

Try to make your output as neat as possible, so that other person can see what you have done clearly. And you should use 'C/C++(extension is cpp)' language for homeworks as described in syllabus. You may use any feature in C++ including STL. Test your program with above example and several other graphs.

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) 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