Algorithm Analysis Homework 6

Due by 6/7(Fri.) through HISNET

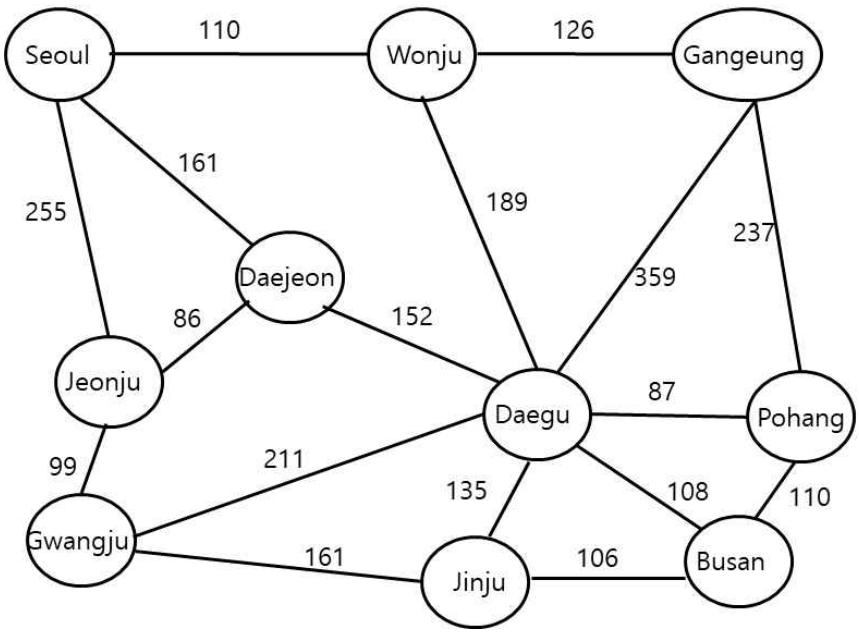
You are to write a program for all pairs shortest path problem using three ways.

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

b) Apply Bellman-Ford algorithm |V| times on each vertex.

c) Apply Floyd's algorithm

Sample graph is as follows.



Input file for above graph is named as 'hw6_2019.data' and available at hisnet. Input file represents data in adjacency matrix form as in hw4. (There are white spaces – such as tab or space – between data.) 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
Apply Bellman-Ford's algorithm for |V| times and print result
Run Floyd's algorithm and print result

You should compute run time for each algorithm.

Sample output)

It took _____ seconds to compute shortest path between cities with Dijkstra's algorithm as follows.

	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	..	..	..	..	..	..	..	..	..

It took _____ seconds to compute shortest path between cities with Bellman Ford algorithm as follows.

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It took _____ seconds to compute shortest path 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)