Assignment 5

Course: CS 5343 Algorithm Analysis and Data Structures		Instructor: Prof. Neeraj Gupta
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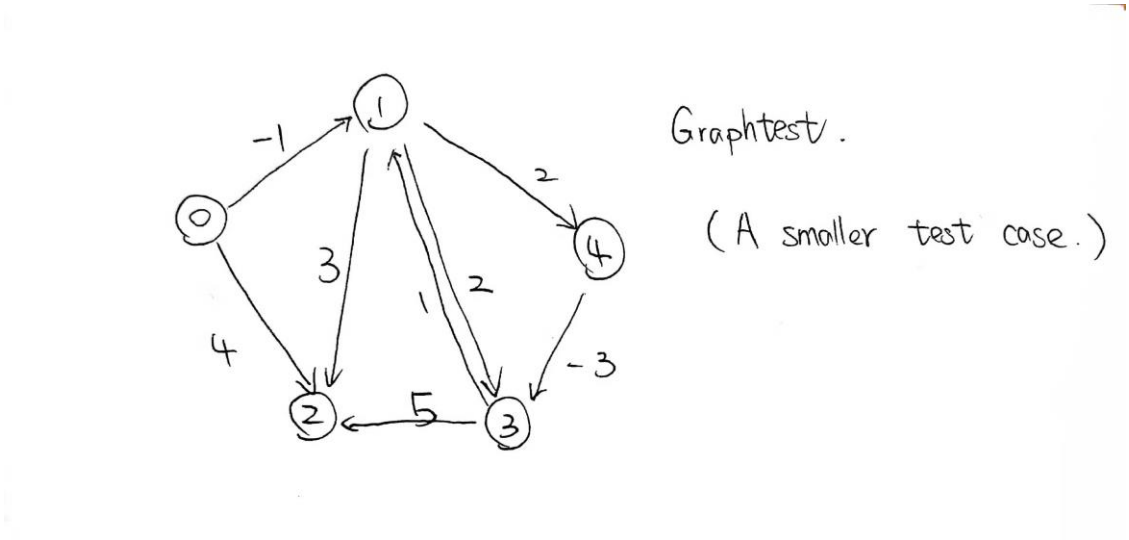
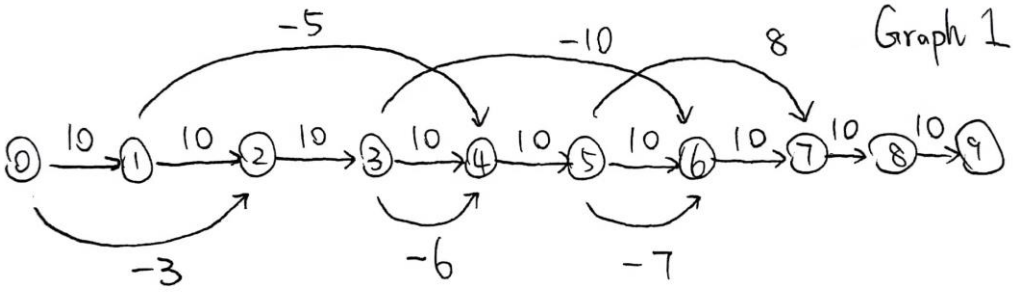
The method of my version of Bellman-Ford Algorithm is written as “public static List bellmanFordAlgorithm(int[][] graph, int startNode){}”, in which “graph” means the adjacency matrix representing the graph, and startNode representing the starting node in this graph.

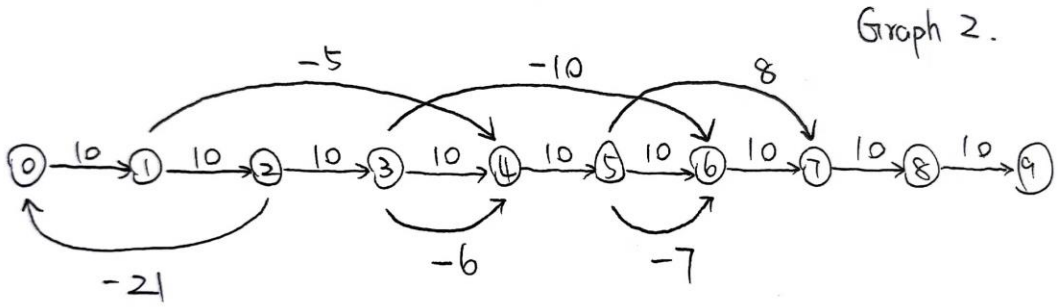
Before the actual graph I’m working on, I have a small test case to see if my program works, and it looks like this:



As for the graph that has at least 10 vertices and 15 edges, there are two different version. Both of them have negative weight edge, but only one of them has negative cycle.



(Graph 1 has negative weight edges but no negative cycle.)



(Graph 2 has negative weight edges and negative cycle.)

Here is the result after I run my program. (startNode is 0.)

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Run:  Assignment5
"C:\Program Files\Java\jdk-11.0.1\bin\java.exe" "-javaagent:D:\My Softwares\IntelliJ IDEA\lib\idea_
The nodes are: [0, 1, 2, 3, 4]
From 0 to 0, the distance is 0, and its predecessor is 0.
From 0 to 1, the distance is -1, and its predecessor is 0.
From 0 to 2, the distance is 2, and its predecessor is 1.
From 0 to 3, the distance is -2, and its predecessor is 4.
From 0 to 4, the distance is 1, and its predecessor is 1.

The nodes are: [0, 1, 2, 3, 4, 5, 6, 7, 8, 9]
From 0 to 0, the distance is 0, and its predecessor is 0.
From 0 to 1, the distance is 10, and its predecessor is 0.
From 0 to 2, the distance is -3, and its predecessor is 0.
From 0 to 3, the distance is 7, and its predecessor is 2.
From 0 to 4, the distance is 1, and its predecessor is 3.
From 0 to 5, the distance is 11, and its predecessor is 4.
From 0 to 6, the distance is -3, and its predecessor is 3.
From 0 to 7, the distance is 7, and its predecessor is 6.
From 0 to 8, the distance is 17, and its predecessor is 7.
From 0 to 9, the distance is 27, and its predecessor is 8.

Negative loop exists. There is no shortest path for this graph.

Process finished with exit code 0
```