Data Structures and Algorithms

Assignment 6

1. Write a program to perform a topological sort on a graph (Note: you may choose the graph on page 32 in Course_12 as input)
   a) Implement with adjacency list.
   b) Implement the routines, e.g., InitializeGraph(), InsertEdge(), InDegree(), OutDegree(), etc.
   c) Store the graph information in a text file;
   d) Implement a ReadGraph() routine to call InitializeGraph() and InsertEdge() to construct the graph in memory.
   e) Output the topological sort result to screen.

2. Write a program to solve the single-source shortest-path problem, i.e., Dijkstra algorithm (Note: you may choose the graph on page 61 in Course_12 as input and vertex 0 as start vertex)
   a) Implement with adjacency list.
   b) Implement the routines, e.g., InitializeGraph(), InsertEdge(), InDegree(), OutDegree(), etc.
   c) Store the graph information in a text file;
   d) Implement a ReadGraph() routine to call InitializeGraph() and InsertEdge() to construct the graph in memory.
   e) Output all shortest paths from vertex 0 to screen.

3. Write a program of the Floyd-Warshall algorithm (Note: you may choose the graph on page 31 in Course_13 as input).
   a) Implement with adjacency matrix (i.e., a two-dimensional array).
   b) Store the graph information in a text file;
   c) Implement a ReadGraph() routine to construct the graph in memory.
   d) Output the pairwise short paths together with shortest lengths to screen.

Note:

- Due date: Jan. 2nd, 2019.