GraphADT Assignment
Total = 35pts

The objective of this assignment is to learn the application of Graph ADT as stated in the learning outcomes of the course.

*Review the **Graph ADT** and then design, write a program, test the program, and analyze the program.*

Write Java programs for the following.

1. Create undirected graphs of sizes of 10, 100, 1000,10000,100000 nodes with the number of edges being 80% of ${}^{n}C_{2}$. Example: If the graph has 10 nodes, then the number of edges should be 32 and every node should have at least an edge. The edges can be randomly connected to the nodes. Test the graph that you are created such that every node has an edge. Write the steps (algorithms) to describe how you constructed the graphs. Implement the steps (algorithm) using Java. Test the graph that you are created such that every node has an edge. record the time it takes to create each size of graph. [5pts + 5pts + 2pts + 3pts]

2. Implement a Java program for computation of the strongly connected components of the graphs that you have created in (1). Record the time by the program to compute the strongly connected components on the graphs created in (1). [8pts + 2pts]

3. Write a program to create directed graph of sizes of 10, 100, 1000, 10000 and 100000 nodes similar to that the ones that you created in (1). Implement any graph algorithm to perform topological sort. Record the times of your algorithm on the graph sizes. [3pts + 5pts + 2pts]

Upload a document that contains the solutions of the above problems (explanations and timings) and well commented code(s) that you have created. Write a README file.