EXAM 3 will be held on December 3rd from 9 AM to 10.50 AM at ENB 162 (our regular classroom).

It is in-class, OPEN notes. But, there is no sharing of notes during the exam. Each student is required to refer to only his/her notes.

Reading List for Exam 3

Module 9 - Graphs

1) Given a bipartite graph, run the Breadth First Search (BFS) algorithm on the graph: indicate the level numbers of the vertices and identify the tree edges and cross edges, using all of which determine the two partitions of the graph.

2) Given a graph, run the Depth First Search (DFS) algorithm on a given graph to identify the articulation points and bridge edges. Merely guessing and writing an answer will get you only ZERO points.

3) Run the Depth First Search (DFS) algorithm on a given directed graph.
(a) Identify the different types of edges as part of DFS.
(b) Determine the push and pop order of the vertices.
(c) Determine the strongly connected component(s) of the graph
(d) Determine the weakly connected component(s) of the graph

4) Given an undirected graph, run the Depth First Search (DFS) algorithm.
(a) Draw the DFS tree with tree edges and back edges as well as show the push and pop orders of the vertices.
(b) Use the results of (a) to assign directions to the edges such that the resulting directed graph has all the vertices in one strongly connected component.
(c) Use the results of (a) to assign directions to the edges such that the resulting directed graph is a directed acyclic graph (DAG).

5) Run the Depth First Search algorithm on a given directed acyclic graph (DAG) and determine a topological sort of the vertices.

6) Given an undirected graph.
a) Assign directions to the edges such that the resulting directed graph is a directed acyclic graph with a given topological sort order.
b) Without running DFS, what can you say about the strongly connected components of the directed graph obtained in (a)?

Module 7 - Binary Search Trees

7) Given a binary search tree, insert a new node with specific data such that the binary tree after the insertion is also a binary search tree.

8) Given a binary search tree, delete a node with a specific data value such that the binary tree after the deletion is also a binary search tree.

There will be sub parts to this question to cover the four scenarios (scenarios 1, 2, 3.1 and 3.2) discussed in class/slides.