Due Date: Dec. 05, 2018, BEFORE the class begins

This assignment is an **OPTIONAL** homework and provides **extra credits** to help students to improve the homework grade. You may choose to finish none, some or all of them. The purpose of this assignment is to help you review Chapter 10 and 12 and prepare for later chapters. Students should have learned these materials in previous classes (e.g., Computing I, Computing II). You need to review these two chapters and work on the homework even you choose not to submit it.

1. **Linked List** (40 points)
(1) (30 points) Rewrite algorithm COUNTING-SORT on p195 in the textbook using a Linked list data structure. Make sure that the algorithm is still *stable*.
Hint: Let's assume that the input (needs to sort) does not only contain a key and it also contains some type of satellite data (defined in textbook p147). For example, an employee record contains social security number as a key and also contains the employee's name, contact information, etc.
(2) (10 points) What is the running time of your algorithm? Show a detailed analysis.

2. **Trees** (10 points)
Exercise 10.4-1, textbook p248

3. **Binary Search Tree and Heap** (10 points)
Exercise 12.1-2, textbook p289

4. **Binary Search Tree** (10 points)
Exercise 12.2-1, textbook p293

Algorithms -- COMP.4040 Honor Statement

(Courtesy of Prof. Tom Costello and Karen Daniels with modifications)

Must be attached to each submission

Academic achievement is ordinarily evaluated on the basis of work that a student produces independently. Infringement of this Code of Honor entails penalties ranging from reprimand to suspension, dismissal or expulsion from the University.

Your name on any exercise is regarded as assurance and certification that what you are submitting for that exercise is the result of your own thoughts and study. Where collaboration is authorized, you should state very clearly which parts of any assignment were performed with collaboration and name your collaborators.

In writing examinations and quizzes, you are expected and required to respond entirely on the basis of your own memory and capacity, without any assistance whatsoever except such as what is specifically authorized by the instructor.

I certify that the work submitted with this assignment is mine and was generated in a manner consistent with this document, the course academic policy on the course website on Blackboard, and the UMass Lowell academic code.

Date: _____

Name (please print): _____

Signature: _____