CP 1895 Assignment #6

Due Wed July 5th

Part 1. Binary Search Tree

Using a linked binary search tree representation

1. Insert the following values. 5, 6, 12, 2, 1, 4, 13
2. Hand draw the tree representation
3. Write a method which generates the InOrder, PreOrder and PostOrder traversal values
4. Write code which initializes 100000 random integers between 0 and 1000000 and inserts them into a binary search tree. Write a loop which chooses 100 random numbers between 1000 and 2000 and searches for them in the tree. Output how long the search took and how many of the 100 integers were found.
5. Perform the same test as in part d) , this time without a binary search tree. Simply store the 1000000 random integers in a list. Write a method which will search the list for a specific value. Then time how long the test takes to search for the 100 integers and how many were found just like in part d.

Part 2. Heaps

1. Implement Heap Sort using a heap by placing all items in a heap and then removing
2. Implement a Priority Queue data structure using a heap which stores Customer objects. Each customer has the following fields. (Customer Name, Customer ID, Customer Priority). Write code which inserts 1000 random customers with random priority values in the Priority Queue. Then using a loop, remove 10 customers from the priority queue. Benchmark the time it takes for this to run.
3. Implement the same Priority Queue without a heap (use a list and loops). Perform the same steps as in part b.
4. Compare the runtime results from part b and part c