**Data Structures (2080C) – Fall 2018 – Lab 8**

***Topics covered: Balancing Binary Search Trees***

*Homework due:* ***Nov 5 at 6:00PM***

**Objective:**

The objective of this Lab is to create an implementation of a Binary Search Tree that remains in constant balance.

**Requirements:**

1. Modify your Binary Search Tree class from Lab 6 to remain balanced at all times. Create a menu that allows the user to:
   1. Add items to the tree.
   2. Remove items from the tree
2. Create a print function that displays the contents of the tree. I recommend you do this horizontally rather than vertically (as demonstrated below)

|  |  |
| --- | --- |
| 5 -4 --2 ---1 --3 -7 --6 --8 | Tree represented by the output on the left |

Above is right for a red black tree

**Lab Submission:**

1. Write a lab report including the following information:
   1. A demonstration of the output of your testing. Show the pre and post conditions for rotating left and right when adding and removing an item from the tree.
2. Include all source code from all tasks, input and output files (if any), and any special instructions to compile and run those programs.
3. Package all files in a single zip folder and submit the file as a group via Blackboard.

**Lab Grading:**

1. 20% - Lab attendance
2. 50% - Requirement 1 has been correctly implemented.
3. 10% - Task 2 has been correctly implemented and meets all requirements.
4. 20% - Lab report contains all required information and is well written.

If program fails to compile, 0% will be given for that Task.