**CS220 - Lesson 21 – AVL Tree Worksheet**

1. Compute the balance factor (BF) of each node in the below AVL tree. Any value for BF other than 1, 0, or -1 indicates an imbalance. Height of left sub-tree (HL), height of right sub-tree (HR)

*BF = height of left sub-tree - height of right sub-tree*

\_\_\_

HR

\_\_\_

HL

\_\_\_

BF

\_\_\_

HL

\_\_\_

HR

\_\_\_

HL

\_\_\_

HR

\_\_\_

BF

\_\_\_

BF

\_\_\_

HR

\_\_\_

HR

\_\_\_

HL

\_\_\_

HL

\_\_\_

BF

\_\_\_

BF

1. Re-compute the balance factor, height of the left sub-tree, and height of the right sub-tree after a six (6) is inserted in the AVL tree.
2. Identify the P, and Q and R nodes.
3. What type of imbalance needs to be corrected (LL, RR, LR, or RL)?

\_\_\_

HR

\_\_\_

HL

\_\_\_

BF

\_\_\_

HL

\_\_\_

HR

\_\_\_

HL

\_\_\_

HR

\_\_\_

BF

\_\_\_

BF

\_\_\_

HR

\_\_\_

HR

\_\_\_

HL

\_\_\_

HL

\_\_\_

BF

\_\_\_

BF

\_\_\_

HR

\_\_\_

HL

\_\_\_

BF

1. Perform the correct rotation to fix the imbalance in the AVL tree in Problem 2. Redraw the tree and re-compute the balance factors.

1. Compute the balance factors in the AVL tree where eighteen (18) was just inserted.
2. Identify the P, and Q and R nodes.
3. What type of imbalance needs to be corrected (LL, RR, LR, or RL)?
4. What is the correct rotation(s) to fix it?

\_\_\_

HR

\_\_\_

HL

\_\_\_

BF

\_\_\_

HL

\_\_\_

HR

\_\_\_

HL

\_\_\_

HR

\_\_\_

BF

\_\_\_

BF

\_\_\_

HR

\_\_\_

HL

\_\_\_

BF

\_\_\_

HR

\_\_\_

HL

\_\_\_

BF

1. Balance the tree in Problem 4 using the rotation(s) identified in 4c. Redraw the tree and re-compute the balance factors.
2. Using P and Q, write pseudocode to perform left and right rotations. This can be done in three lines of code plus a return.