Data Structures Quiz 7 (20 minutes)

Name: _____ NetID: _____

By participating in this quiz, you agree to adhere to the honor code.

Imagine we have implemented IntAVLSearchTree which stores entries with integer values in nodes. The nodes have attributes Node parent, Node left, Node right, Entry¡V¿ element (the key is int!), and int height (we keep track of their height), with getters and setters for each. Imagine we just performed put(K, V): 1) we add an entry, lets call it X, as in a normal binary tree, 2) we update the heights of all the nodes between X and the root, 3) we find the first unbalanced node between X and the root, let's call it A. On the path from A to X, A has descendants B then C. We now want to rearrange A, B and C to re-balance the tree using the AVL rules.

1. (4pt) Write code that determines which of these three nodes should become the parent

   Node findParent(Node A, Node B, Node C, boolean B_left, boolean C_left)

2. (4pt) Write code that determines which of the remaining two nodes should be the left and right children of this parent.

   Node returnLeftNode(Node A, Node B, Node C, boolean B_left, boolean C_left, Node parent)

3. (2pt) Draw a A, B, and C in a position such that after rearrangement, C is the parent, A is the left child, and B is the right child.