CSCI 3333 Practice Quiz AVL1

Problem 1. Fill in the blanks with answers based on the AVL tree in Figure 1.

If \text{insert}(3) were called, the left child of \text{number} would change to \text{number} during the first rotation.

If \text{insert}(3) were called, \text{number} rotations would occur during the call.

Calling \text{insert}(\text{number}), then \text{insert}(\text{number}) causes 0 total rotations.

Calling \text{erase}(\text{number}) causes 15 to become the root of the tree.

![AVL tree](image)

Figure 1: The AVL tree for Problem 1.

Problem 2. Determine the truth of the following statements about AVL trees.

Every AVL tree is balanced. \hspace{1cm} \square \text{True} \hspace{1cm} \square \text{False}

The \text{erase} operation on an AVL tree with \(n\) nodes has \(\Theta(\log(n))\) worst-case running time. \hspace{1cm} \square \text{True} \hspace{1cm} \square \text{False}

The minimum number of rotations done in an AVL tree \text{insert} is 1. \hspace{1cm} \square \text{True} \hspace{1cm} \square \text{False}

The minimum number of nodes in an AVL tree of height 0 is 0. \hspace{1cm} \square \text{True} \hspace{1cm} \square \text{False}
**Problem 3.** Fill in the blanks with answers based on the AVL tree in Figure 2.

If `insert(1)` were called, the left child of number would change to number during the first rotation.

If `insert(1)` were called, number rotations would occur during the call.

If `erase(12)` were called, the left child of number would change to number during the first rotation.

If `erase(12)` were called, number rotations would occur during the call.

![Figure 2: The AVL tree for Problem 3.](image)

**Problem 4.** Determine the truth of the following statements about AVL trees.

Every AVL tree is weight-balanced. □ True □ False

The `insert` operation on an AVL tree with \( n \) nodes has \( \Theta(\log(n)) \) worst-case running time. □ True □ False

The minimum number of rotations done in an AVL tree `erase` is 1. □ True □ False

The minimum number of nodes in an AVL tree of height 1 is 1. □ True □ False