CS272 Lab Assignment #12: AVL Tree

Learning objectives: Objective 1 (AVL tree), Objective 2 (recursive thinking), Objective 5, Objective 6, Objective 7

Note:

- **Specifications** for all your classes and methods:
  Please properly explain (1) the functionality of the methods, (2) the parameters, (3) the return values, (4) the pre-conditions if there is any;
  Please use inline comments, meaningful variable names, indentation, formatting, and whitespace throughout your program to improve its readability.
- You can (but are not required to) design and implement other facilitating methods (E.g., other get and set methods, toString method) to finish the implementation of the required methods.

Requirements

Implement the following methods for AVL (**AVL.java**) given AVL.java.

1. (35%) Insert a new element *e* into the AVL tree. Duplicate elements are allowed.

   ```
   public void insert(int e)
   ```

2. (35%) Remove ONE node of a specified element from the AVL tree. When *e* exists in the tree and one node is successfully removed, return true; Otherwise, return false.

   ```
   public boolean remove (int e)
   ```

3. (15%) Find the number of times that a given element *e* exists in the tree.

   ```
   public int countOccurrences (int e)
   ```

4. (10%) Print the tree using pre-order traversal strategy. You MUST implement this method non-recursively.

   ```
   public void preOrderPrtNonRecursive()
   ```

5. (5%) Design test cases to test your program *thoroughly*. Please put your test cases in a new file *AVLtest.java*. If your test cases cannot cover important conditions, points may be deducted.
   FOR YOUR REFERENCE, given a test file AVLTest.java The results for running test() is at AVL_test_output.txt.

Submission:

A zipped file *your-bannerid-lab12.zip* containing your java file(s).

Grading Criteria

- The score allocation has already been put beside the questions.
- Please make sure that you test your code thoroughly by considering all possible test cases.
  Your code may be testd using more test cases.