CS526
Homework Assignment 5

This assignment is an extension of Part 2 of Homework 3. You need to extend IntLinkedBinaryTree, which you wrote for Homework 3, in the following way:

(1). Implement a delete method whose specification is given below:

Signature: public Integer delete(Position<Integer> *p*, Integer *e*)

Input:
p: the root of the tree from which a node is deleted
e: the integer key of the node to be deleted

Output: Returns the deleted key, if *e* exists. If *e* does not exist, returns null.

How to delete a node from a binary search tree is described in pages 464 and 465 of the textbook.

(2). Make your program a menu driven program. When your program starts, it must display the following main menu:

Choose an option:

1. Add a key
2. Remove a key
3. Print the tree
4. Exit

If the user chooses option 1, your program performs the followings:

- Prompt the user to enter an integer.
- If the integer does not exist in the tree, add the integer and display an appropriate message, such as “the key added successfully,” and display the main menu.
- If the integer already exists, display an appropriate message, such as “the key already exists,” and display the main menu.

If the user chooses option 2, your program performs the followings:

- Prompt the user to enter an integer.
- If the integer does not exist in the tree, display an appropriate message, such as “the key does not exist,” and display the main menu.
- If the integer exists, display an appropriate message, such as “the key deleted successfully,” and display the main menu.

If the user chooses option 3, display all keys in the tree in increasing order, and display the main menu.

If the user chooses option 4, terminate a program.

Documentation

No separate documentation is needed. However, you must include the specification of each method in your program, right above each method, and you must include sufficient inline comments within your program.

At the beginning of the source code, write your name as comments.

Grading

Program correctness is worth 80% and documentation is worth 20%.

Your program will be tested by adding and deleting a series of integers and points will be deducted if your program does not behave as expected.

Points will be deducted if you do not include specifications of methods or sufficient inline comments.

Deliverables

Combine the revised *IntLinkedBinaryTree.java* file and all other necessary files into a single archive file, and name it *LastName_FirstName_hw*5.*EXT*, where *EXT* is an appropriate file extension (such as *zip* or *rar*). Upload this archive file to Blackboard.