CS526
Homework Assignment 5

This assignment is an extension of Homework 3. In Homework 3, you implemented a generic binary search tree *MyBST* and implemented an *add* method in it.

For this assignment, you are required to implement the following methods.

```
Algorithm successor(p)
  Input parameter:
    p: The position of the node whose successor is searched
  Output:
    Returns the position of the successor of p
    If there is no successor of p in the tree, returns null.
```

Note: Let *e* be the element of *p*. The *successor* of *p* is the node which has the smallest element that is larger than *e*. In other words, if we list all nodes in the tree in increasing order of elements, the *p*'s successor is located immediately after *p*.

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Algorithm predecessor(p)
  Input parameter:
    p: The position of the node whose predecessor is searched
  Output:
    Returns the position of the predecessor of p
    If there is no predecessor of p in the tree, returns null.
```

Note: Let *e* be the element of *p*. The predecessor of *p* is the node which has the largest element that is smaller than *e*. In other words, if we list all nodes in the tree in increasing order of elements, the *p*'s predecessor is located immediately before *p*.

```
Algorithm delete(p, e)
  Input parameters:
    p: The position of the root of the tree (or subtree) from which
       the node with the element e is to be deleted
    e: The element of the node to be deleted
  Output:
    Returns e if a node with e exists.
    If there is no node with e in the tree, returns null.
```

Note: You must implement the delete method that is described in pages 464-465 of the textbook. Otherwise, you will lose points even if your implementation deletes a given node correctly.

Documentation

No separate documentation is needed. However, you must include sufficient inline comments within your program.

Grading

The successor method will be tested three times and 3 points will be deducted for each wrong result.

The predecessor method will be tested three times and 3 points will be deducted for each wrong result.

The delete method will be tested three times and 5 points will be deducted for each wrong result.

Points will be deducted up to 20 points if you do not include sufficient inline comments.

Deliverables

You need to submit a revised the *MyBST.java* file. Combine this file with all other files, which are necessary to compile and execute your program, into a single archive file, such as a *zip* file or a *rar* file, and name it *LastName_FirstName_hw5.EXT*, where *EXT* is an appropriate file extension (such as *zip* or *rar*). Upload it to Blackboard.