Assignment 5: Recursion

Due: Week 12. Check the course web site for the exact due date and time, which are campus-specific.

Web stuff: See the course web site for starter code, hints, and announcements about the assignment.

Purpose: To give practise writing recursive methods.

Overview: The following code is available on the web site:

- A class called `BinaryIntNode`, for nodes in a binary tree of integers. (A more general class, which allows any `Object` to be stored in a node, is usually a better design. We're restricting nodes to storing only integers because it allows you to focus on recursive algorithms, rather on casting and other Java technicalities.)
- An interface called `BinaryIntTree`.
- A class called `LinkedBinaryIntTree` that implements `BinaryIntTree` using `BinaryIntNodes`. The class contains a few methods that you will find useful when debugging and testing your code, along with a small `main()` method that shows you how to use them.

Your task: You are to write and test some recursive code:

- Several method bodies are missing from class `LinkedBinaryIntTree`. (In fact, they contain trivial bodies that allow the class to compile.) Implement these methods according to the specifications in the `BinaryIntTree` interface. Test your methods thoroughly.
- Although you will, of course, test all of your methods, you are to hand in testing only for method `numOccurrences`. Write a description of your testing strategy for `numOccurrences`, and then modify the `main()` method from `LinkedBinaryIntTree` so that it carries out this strategy. (Do not include here any testing of other methods.) Print your test results and annotate them, if appropriate, to make them easy to digest.

Be sure that you have read and understood the document "Software Testing" in the handbook, and have carefully reviewed the solutions to the tutorial exercises from week 10, on testing.

What to submit: Submit `LinkedBinaryIntTree.java` electronically. Remember that it's `main()` should be a test driver for the `numOccurrences` method and no others. Details on how to submit, including campus-specific requirements regarding file names and submit location will be provided on the different campus web sites.

Submit on paper a written description of your testing strategy for `numOccurrences`, along with your annotated test output. Staple the assignment cover sheet securely to these items. Do not use an envelope.