CS 2510 Exam 2 – Summer 2012

Name: _____

Student Id (last 4 digits): _____

- Write down the answers in the space provided.
- You may use all syntax of Java that we have studied in class.
- For tests you only need to provide the expression that computes the actual value, connecting it with an arrow to the expected value. For example `s.method() -> true` is sufficient.
- Remember that the phrase "design a class" or "design a method" means more than just providing a definition. It means to design them according to the **design recipe**. You are *not* required to provide a method template unless the problem specifically asks for one. However, be prepared to struggle if you choose to skip the template step.

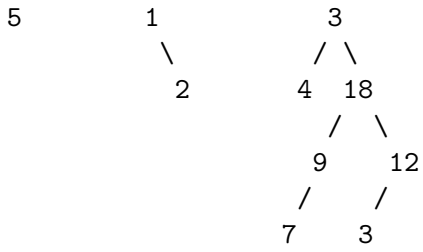
Good luck!

Score		30

30 Points

Problem 1

Binary trees are one of the most widely used data structures in computer science. Here are three examples of binary trees of numbers:



Nodes in a binary tree carry data, which in this case are numbers, and a node has a left and right subtree. Binary trees, like lists, may contain *any* number of elements, including 5, 8, 19, and 0.

A. Design a data definition for binary trees. It must adequately represent any possible binary tree.

B. Give class diagrams corresponding to the data definition from part A.

C. Design a `mirror` method that computes the mirror image of a binary tree. For example, the mirror image of the above trees would be: