

## Binary Search Tree Exercise

The following Java class definition for a binary tree will be used to answer the questions that follow. Unlike project 3, the following tree is not polymorphic. You may not add any variables (instance or static) to the class in order to implement the questions below.

```
public class BinarySearchTree <E extends Comparable<E>> {
    private class Node {
        E data;
        Node left, right;
    }
    Node root;
}
```

1. Define a constructor that creates an empty tree.
2. Define a method **void add(E val)** that adds the element to the proper location in the tree.
3. Define a recursive method **int numLeaves( )** that returns the number of leaves in the tree.
4. Define a recursive method **void print()** that prints the tree in descending order.
5. Define a recursive method **Set<E> leaves()** that returns a set with the leaf node values.
6. Define a recursive method **BinarySearchTree<E> copy()** that returns a copy (shallow copy) of the tree that has the same shape as the original tree.