Heap Exercise

1. Show the heap (tree) you will have after inserting the following values:

    80, 40, 30, 60, 81, 90, 100, 10

2. Show the heap (tree) you will have after removing the root element of the tree you generated in (1).

3. Show the heap (tree) you will have after removing the root element of the tree you generated in (2).

4. Is a binary search tree always a heap?

5. Is a heap always a binary search tree?

6. The following class definition will be used for the problems that follow:

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

a. Write a recursive method called **hasValueProperty** that returns true if the binary tree has the value property (parent less than or equal to children) associated with minheaps. Notice that the tree might not be a complete tree.
b. [This part is surprisingly difficult! Give it a try.] Write a recursive method called **isComplete** that returns true if the binary tree represents a complete binary tree (one that satisfies the shape property for heaps).