

(150 pts) due: December 15, 2013 11:59pm

Important Notes

- **This assignment is to be done on your own.** If you need help, see the instructor or TA.
- Please start the assignment as soon as possible and get your questions answered early.
- Read through this specification completely before you start.
- Some aspects of this specification are subject to change, in response to issues detected by students or the course staff.

1 Description

This assignment is for you to work on recursion and trees. There are four problems:

1. Given a binary tree containing digits from 0-9 only, each root-to-leaf path could represent a number. An example is the root-to-leaf path $1 \rightarrow 2 \rightarrow 3$ which represents the number 123. Find the total sum of all root-to-leaf numbers.

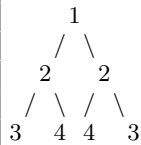
For example,



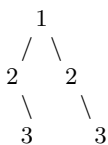
The root-to-leaf path $1 \rightarrow 2$ represents the number 12. The root-to-leaf path $1 \rightarrow 3$ represents the number 13. Return the sum = $12 + 13 = 25$.

2. Given a binary tree, check whether it is a mirror of itself (ie, symmetric around its center).

For example, this binary tree is symmetric:



But the following is not:



Bonus points if you could solve it both recursively and iteratively.

3. Given two arrays that represent the inorder and postorder traversal of a tree, construct the binary tree. You may assume that duplicates do not exist in the tree.

The interface of the methods is defined as follows:

```
public class TreeNode {
    int val;
    TreeNode left;
    TreeNode right;
    TreeNode(int x) { val = x; }
}

public class TreeUtil {
    public int sumNumbers(TreeNode root) {
        ...
    }

    public boolean isSymmetric(TreeNode root) {
        ...
    }

    public TreeNode buildTree(int [] inorder, int [] postorder) {
        ...
    }
}
```

2 Submission

Provide working code (no need for the JUnit tests) for the class and method required for this assignment (50pts each problem). Turn in a zip file named LastnameFirstname-Assignment8.zip, containing all your source code. The package name for the assignment must be edu.brynmawr.cs206.assignment8. Include the Javadoc tag @author in each class source file. **Do not turn in class files.**