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Project #2

Due Dates:  Monday, October 5 at 11:59pm

Submit:     eLearning

Late Policy:  -10 points per hour late

Instructions: This is an individual assignment.  Answers should be your own work.


Introduction:

   In this project you will modify the author's BinarySearchTree code
   to implement some new methods.


Description:

   Modify the author's BinarySearchTree code to implement the methods
   shown below.

   Each method is 10 points.


   a) nodeCount
        Recursively traverses the tree and returns the count of nodes.

   b) isFull
        Returns true if the tree is full.  A full tree has every node
          as either a leaf or a parent with two children.

   c) compareStructure
        Compares the structure of current tree to another tree and returns
          true if they match.

            For example, these two trees have the same structure:
                  5                10
                 / \              /  \
                3   8            5    15
               / \              / \
              1   4            2   7

   d) equals
        Compares the current tree to another tree and returns true
          if they are identical.

   e) copy
        Creates and returns a new tree that is a copy of the original tree.

   f) mirror
        Creates and returns a new tree that is a mirror image of the original tree.
        For example, for the tree on the left, the tree on the right is returned:

          100                    100
         /    \                 /    \
        50    150    -->      150    50
        /                              \
       40                              40
        \                              /
         45                           45

   g) isMirror
        Returns true if the tree is a mirror of the passed tree.

   h) rotateRight
        Performs a single rotation on the node having the passed value.
        If a RotateRight on 100 is performed:
```
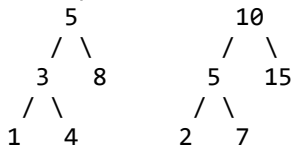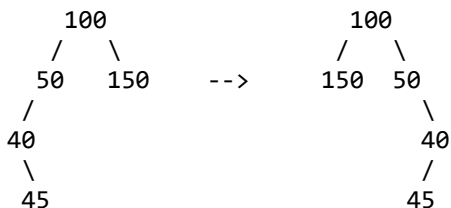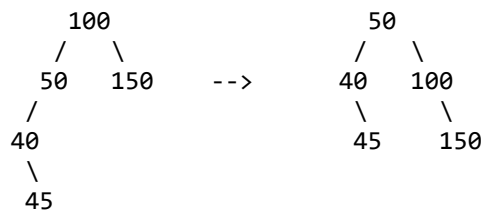
```
      100                    50
     /   \                  /   \
    50   150     -->       40   100
   /                         \     \
  40                         45    150
    \
    45
```

g) rotateLeft
   As above but left rotation.

i) printLevels - performs a level-by-level printing of the tree.

j) main - demonstrate in your main method that all of your new methods work.

Submit to eLearning:
   BinarySearchTree.java