

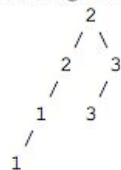
## Crux Assignment (Trees)

1. Implement Binary Search tree class. It should have the following functions.
  - a. insert
  - b. remove
  - c. search
  - d. size
  - e. isEmpty
2. For each node in a binary search tree, create a new duplicate node, and insert the duplicate as the left child of the original node.

So the tree...




is changed to...



Given a binary tree, check whether there are two nodes in it whose sum equals a given value.

4. Find LCA(Lowest Common Ancestor) of two elements in a Binary Tree. Read about LCA if you are having doubts about the definition.
5. Find LCA of two elements in a BST.
6. Given a Binary tree find the largest BST subtree.
7. Replace each node with the sum of all greater nodes in a given BST?

8. Given a tree and a node of tree, print all nodes which are at distance  $k$  from the given node.
9. Given a binary tree and a number  $k$ , print out all root to leaf paths where the sum of all nodes value is same as the given number.
10. Given a binary search tree and a int  $s$ , find pair of nodes in the BST which sum to  $s$ .
  - a. Find a solution for which time complexity is  $O(n)$  
  - b. Find a solution which uses maximum  $O(\log n)$  extra space.