AVL Trees

Double Rotation

An AVL tree must store, at each node, the height of the subtree rooted at that node. Here is an example of an AVL tree.

```
     D
    / \3
   B  F
  / \1   \
A C  E
```

Now, H is inserted. The resulting tree is unbalanced at F.

```
     D
    /4\
   B  F
  / \3  \
A C E
  / \   / \2
G H I
```

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We now try to rebalance by left rotation at F. The resulting tree is unbalanced at I.

We do a right rotation at I, but the tree is still unbalanced.
The solution is to do a *double rotation*. Starting over, from the second figure, we first do a right rotation at **I**

```
D  
B  
A  0
C  0

F  
E  0
G  2
I  1
H  0
J  0
```

Followed by a left rotation at **F**.

```
D  
B  3
A  0
C  0

G  2
F  1
I  1
E  0
H  0
J  0
```

The resulting tree is balanced.