Height Balance on BST
What tree makes you happier?

We define the **height balance** \( (b) \) of a BST to be:

We define a BST tree \( T \) to be **height balanced** if

What is the lowest node that is out of balance?

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**BST Rotations**

Every BST rotation will maintain two properties:
1. 
2. 

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**Example: Defining a Rotation**

Given a _______ rotation about 51, we can label 4 subtrees:
Implementing a left rotation:

![Implementing a left rotation diagram]

BST Rotation Summary:
1. Four kinds of rotations (L, R, LR, and RL)
2. All rotations are local
3. All rotations run in constant time, O(1)
4. BST property is maintained!

Overall Goal:

...and we call these trees:

AVL Trees:

![AVL Trees diagram]

Theorem: If an insertion occurred in subtrees \( t_3 \) or \( t_4 \) and a subtree was detected at \( t \), then a [________] rotation about \( t \) restores the balance of the tree.

CS 225 – Things To Be Doing:

| Exam #6 upcoming, lab_huffman due Sunday, MP4 due Monday after next |