CSDS 233 Spring Session 7

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2/21/2023

Disclosure: This is a supplement to class, not a replacement. This should not be your only study activity for exams, it should aid you in studying. I do not have the actual exam so questions here will differ from those on the exam.

Session Objectives:

1) Understand Balance and why its important
2) Understand how to insert in AVL trees
3) Understand AVL tree rotation

Practice Problems:

1) What's the difference between a Binary Tree, Binary Search Tree, and AVL tree?

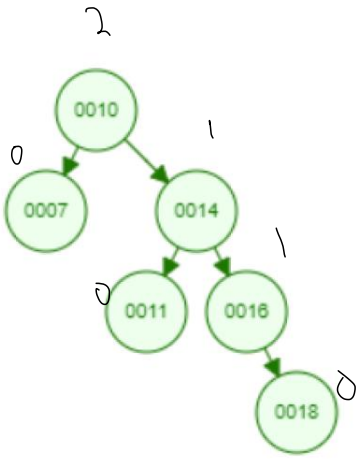
2) Fill in the table (this will be super useful)

Imbalance	**Rotation**
Left imbalance in left subtree	rotate right
Right imbalance in right subtree	rotate left
Right Imbalance in left subtree	right left
Left imbalance in right subtree	left right

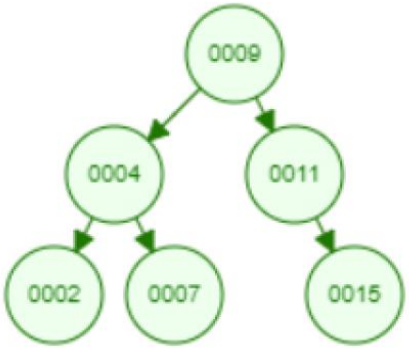
3) What is the general formula for balance (don't overthink this)

H right - H left

4) What is the balance at every point in this tree

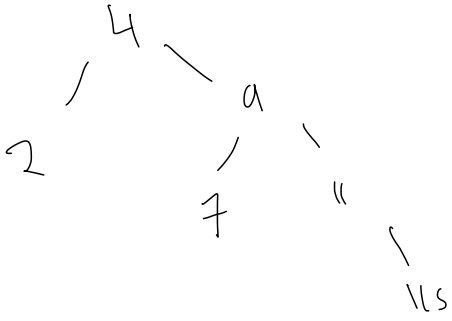


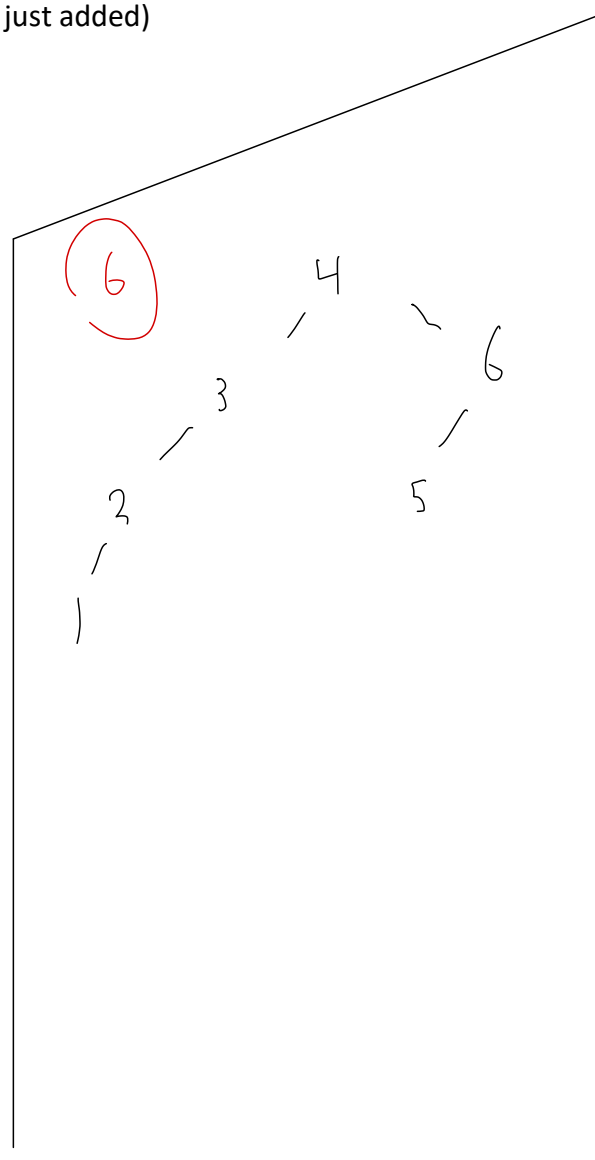
5) Draw the tree after you do the rebalance (assume 18 was just added)



a) Rotate 9 Left

b) Right rotate 9

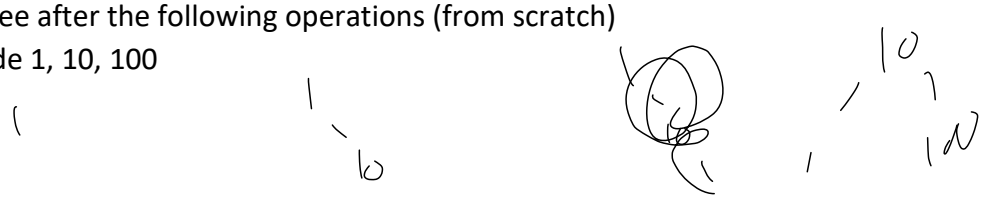




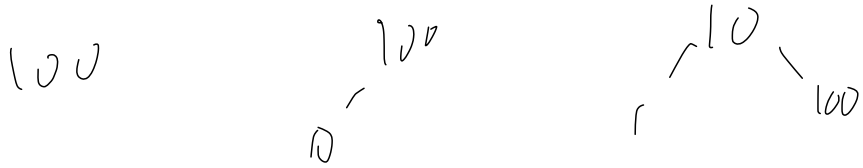
7

6) Draw the tree after the following operations (from scratch)

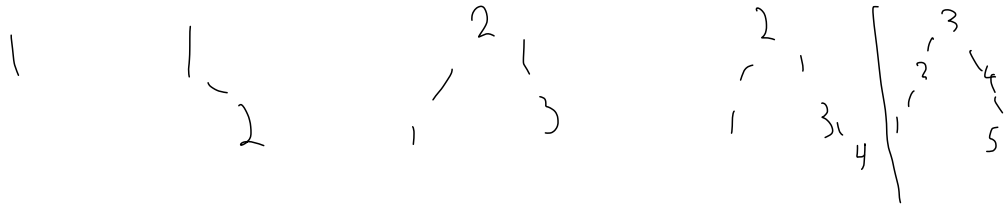
a) Add node 1, 10, 100



b) Add node 100, 10, 1



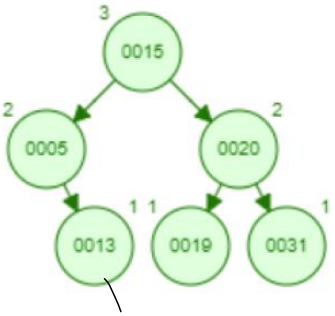
c) Add 1, 2, 3, 4,5

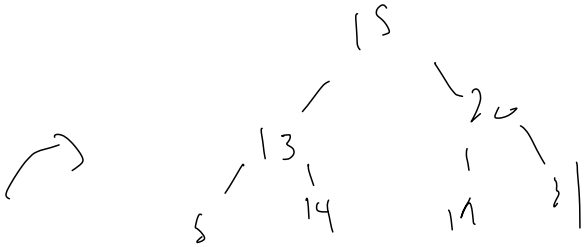


~~7) Make a list of steps to rotate an item left~~

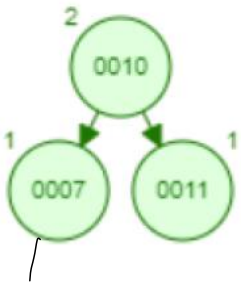
8) Draw the tree after the following operations

Add 14

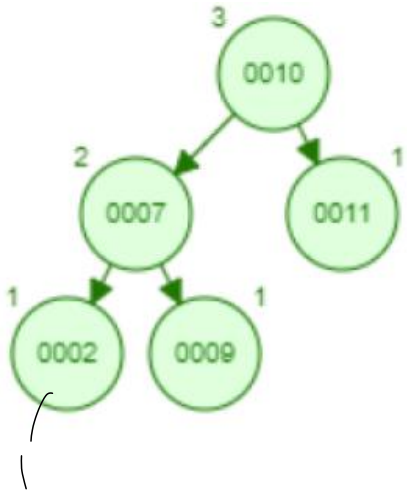


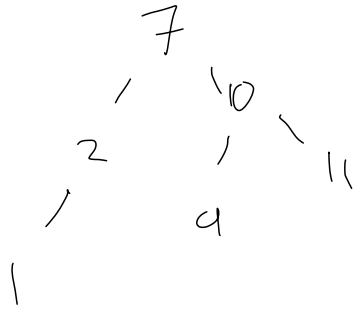


Add 2



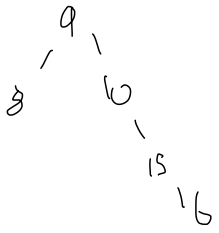
Add 1

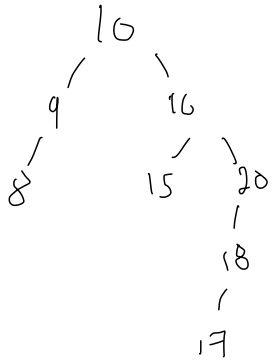


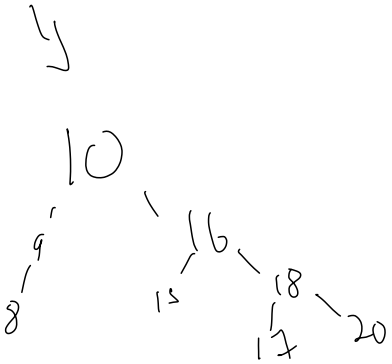


9) Draw the AVL tree by adding the following integers in the following order

10, 8, 9, 15, 16, 20, 18, 17,







Coding thing

https://leetcode.com/problems/balanced-binary-tree/