

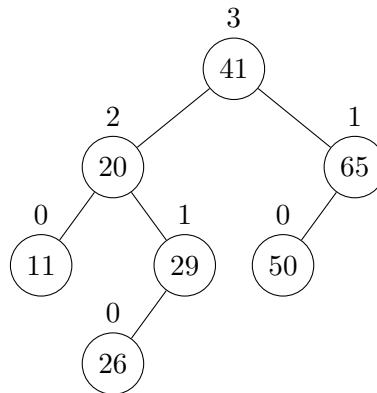
# Chapter 13 AVL Trees

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## 1 AVL trees

An AVL tree is a binary search tree that is height balanced: for each node  $x$ , the heights of the left and right subtrees of  $x$  differ by at most 1.

**height of node** is the length of the longest path from it down to the leaf, the height of the root node  $root.key$  is 41 in the following tree is 3. *we look at the max path down the tree*



Height of a node =  $\max \{ \text{height of left child, height of right child} \} + 1$

**AVL trees** require heights of left and right child of every node to differ by at most  $\pm 1$  so the absolute value of the height of the left sub-tree minus the height of the right sub-tree has to be less than or equal to 1

$$|h_l - h_r| \leq 1$$

for example given the following keys (30,20,10) there are 3! or 6 ways of rearranging these keys as following

30, 20, 10 height is n

