Recursive definition for AVL tree node height:

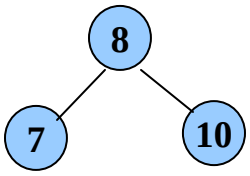
H[T] = -1 if T is an empty tree
H[T] = 0 if T is a tree with a single node
H[T] = max (H[T→left], H[T→right]) + 1

Notation:
H[T]: the height of a tree with root node T
T→left: the left child of the node T
T→right: the right child of the node T

Further Definitions:
The *height* of a node T is the height of the subtree rooted at the node T.

The *depth* of a node T is the height of the full tree minus the height of the subtree rooted at the node T

Example:

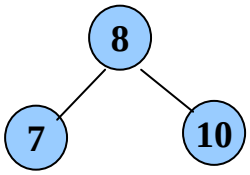


H[7] = 0
H[10] = 0
H[8] = max (H[7], H[10]) +1 = 1;

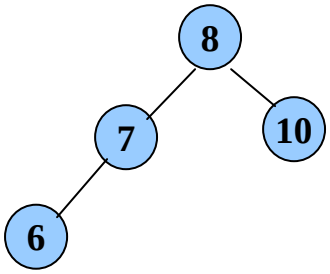
Depth of node 7 is H[8] – H[7] = 1 – 0 = 1;
Depth of node 10 is H[8] – H[10] = 1 – 0 = 1;
Depth of node 8 is H[8] – H[8] = 1 – 1 = 0;

AVL tree insertion single rotation.

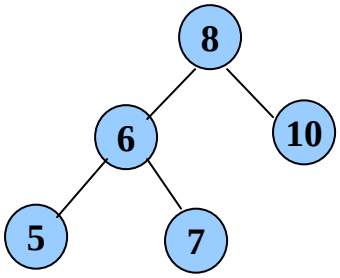
Insert 7:



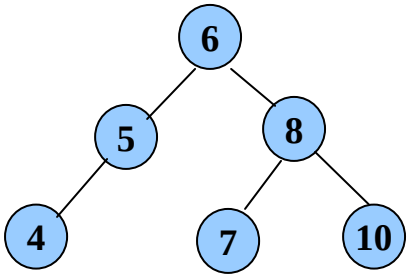
Insert 6



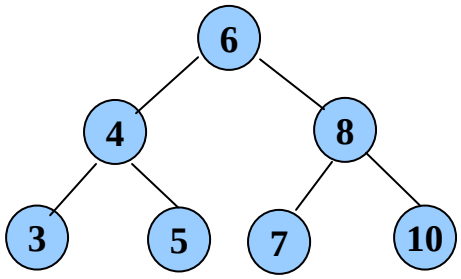
Insert 5:



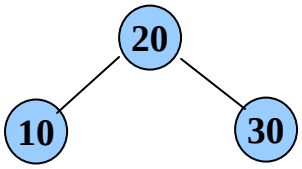
Insert 4:



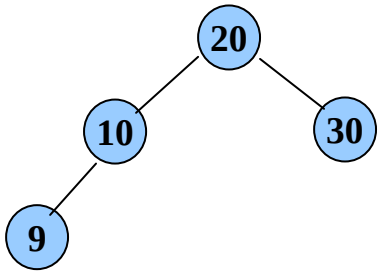
Insert 3:



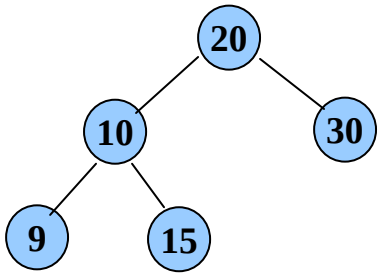
AVL tree insertion double rotation.



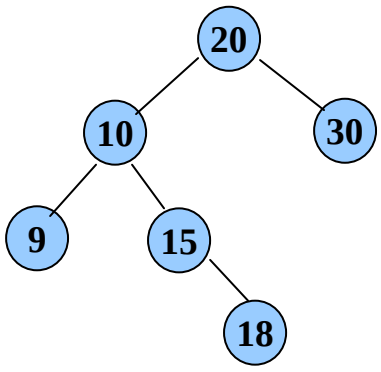
Insert 9:



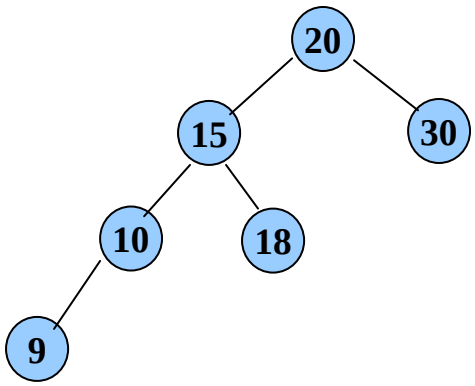
Insert 15:



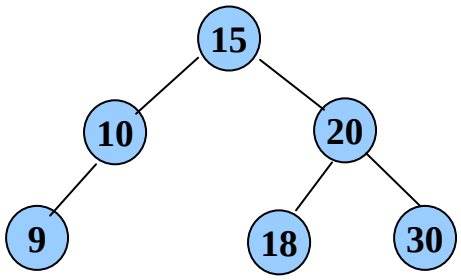
Insert 18:



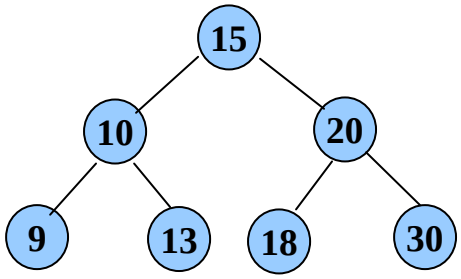
After left rotation at node 10:



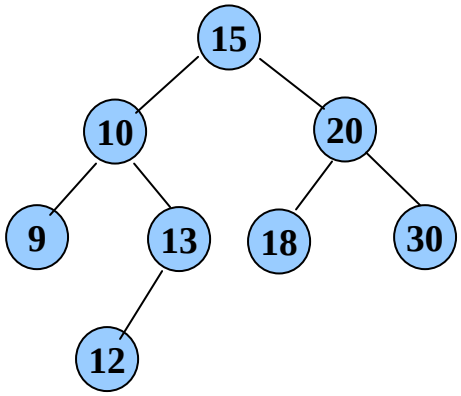
After right rotation at node 20 (root):



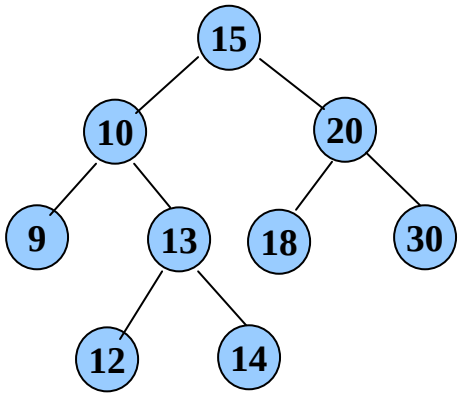
Insert 13



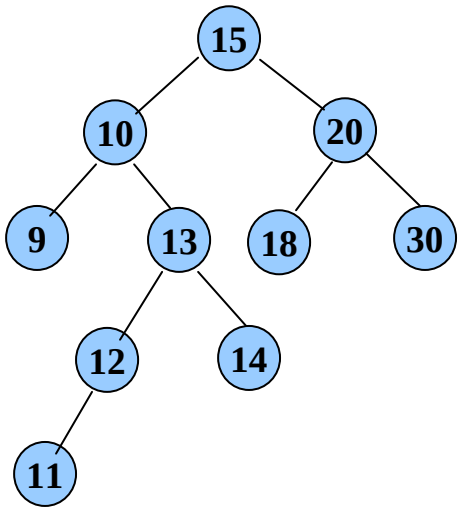
Insert 12



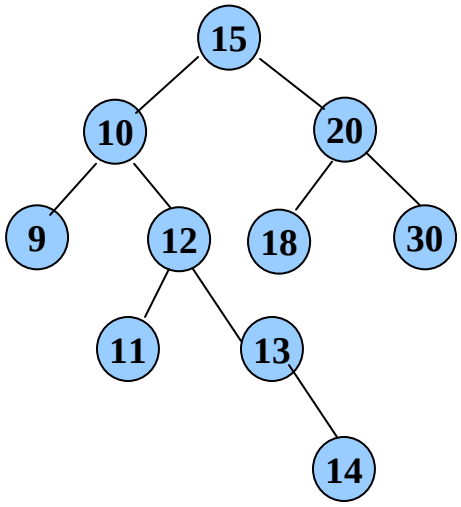
Insert 14



Insert 11:



After right rotation at node 13:



After left rotation at node 10(root):