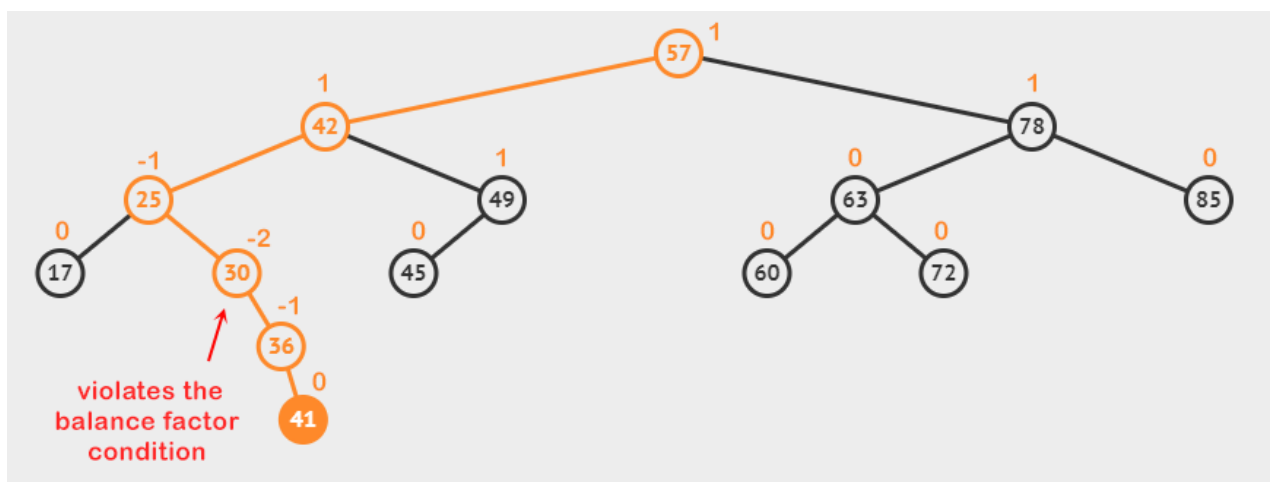


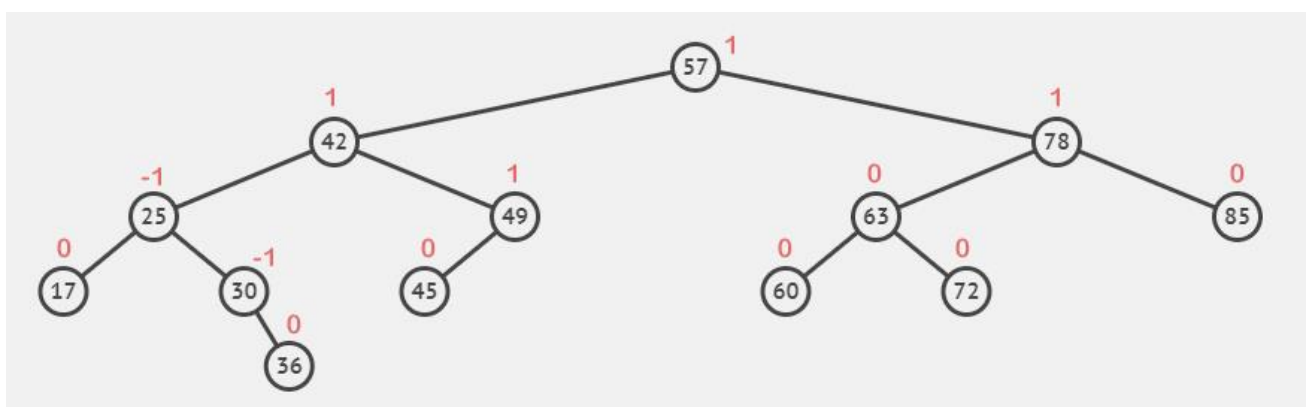
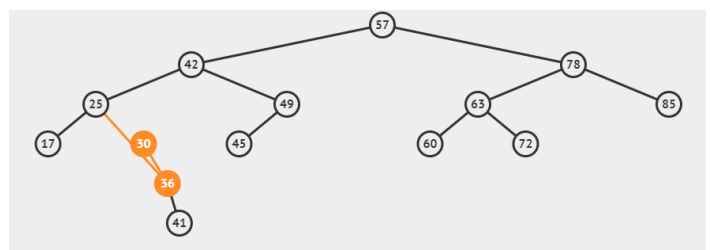
1. Insert 41

Step 1: Find the proper place to insert 41 to the tree and insert it, then recalculate the balance factor for each node in the path were taken to insert, we see that at node 30. $|BF(30)| > 2$ which violates the balance factor condition, therefore we are going to reconstruct tree (30).



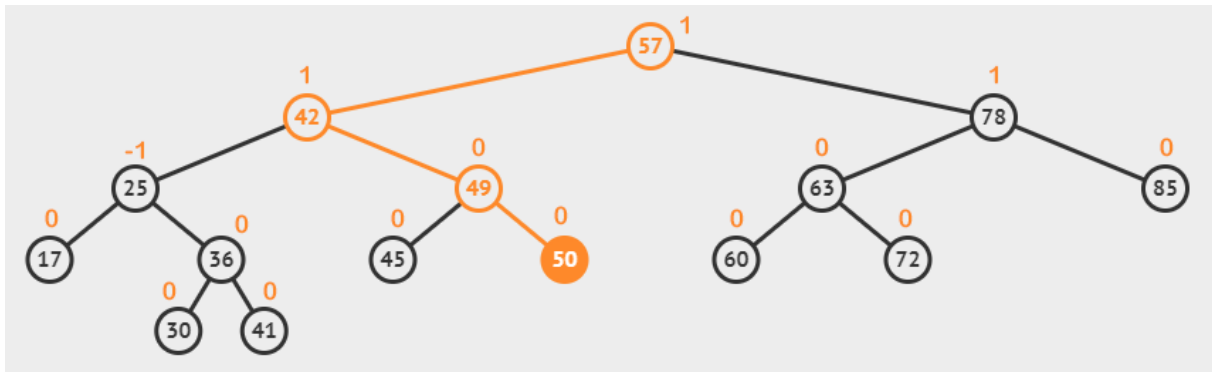
Step 2: We can obviously see that tree (30) is a right heavy, and the sign of the parent node is the same. Therefore, we do a left rotation. Let us denote the node 30 as X, node 25 as Y, and node 36 as Z. To do a left rotation, we set X as left sub-tree of Z, and set the right-subtree of Y to Z. (There is no left sub-tree for Z here so we don't have to worry about it).

Step 3: After insertion, we recalculate the balance for the remaining path, making sure it does not violate the balance factor condition.



2. Insert 50

Step 1: Find the proper place to insert 50 to the tree and insert it, then recalculate the balance factor for each node in the path were taken to insert.



Step 2: After recalculating balance factor for each node in path, we can see that none violates the balance factor condition, therefore there no rotations are needed to be done.

Final Tree:

