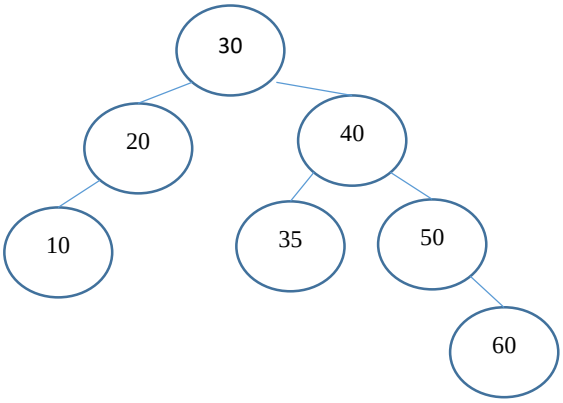
Nathan Tipton Assignment 4

1.

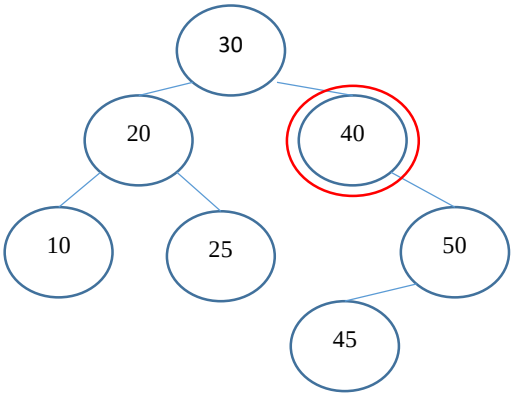
Binary and AVL Tree



Binary, 40 is unbalanced node

children heights

left=-1, right =1



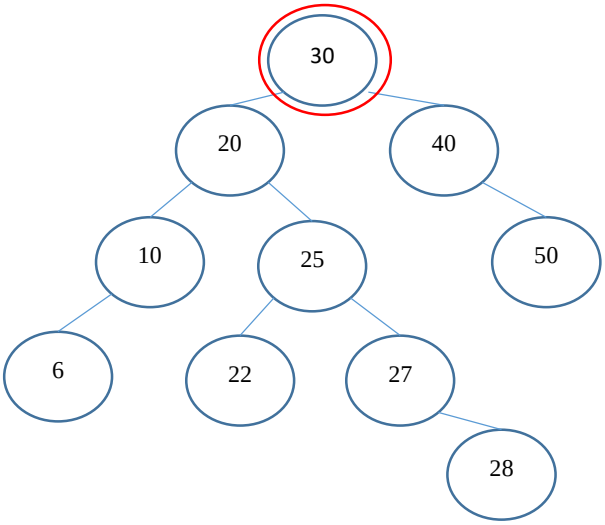
2.

Insert 28.

30 is lowest unbalanced node

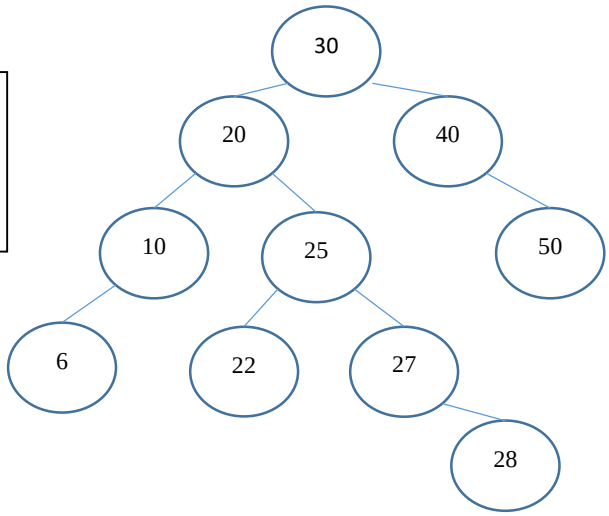
children heights

left=3, right =1

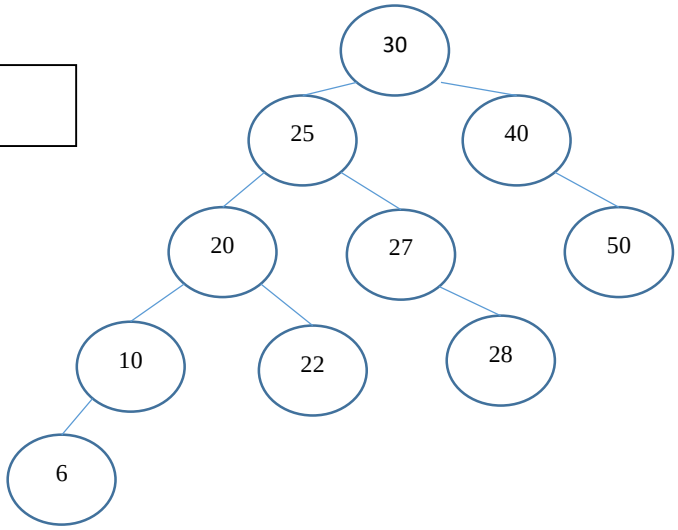


LR Case

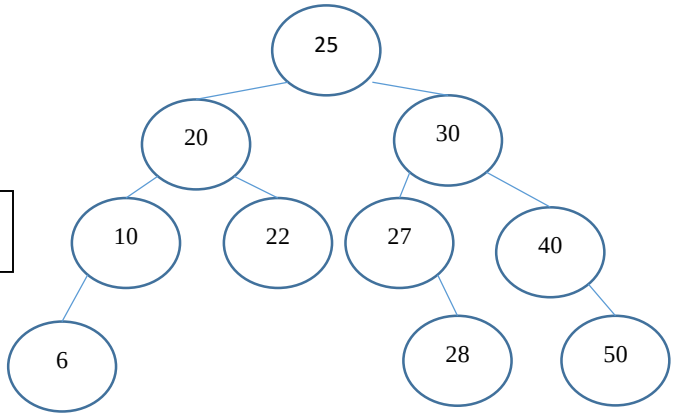
Left Right Double Rotation



Left Rotation

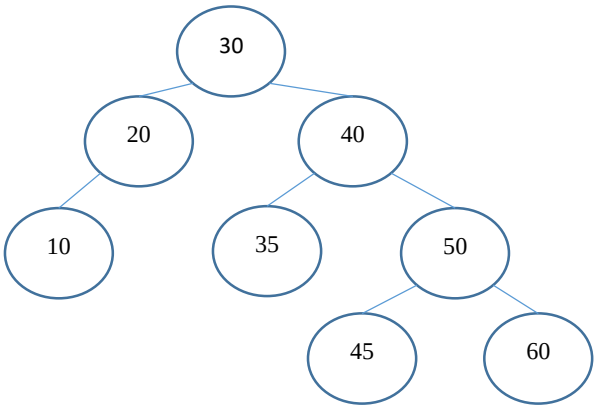


Right Rotation



3.

Insert 55

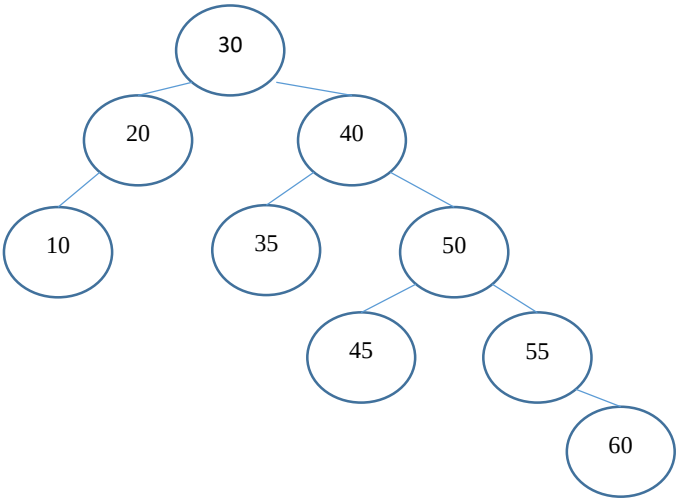


40 lowest unbalanced node

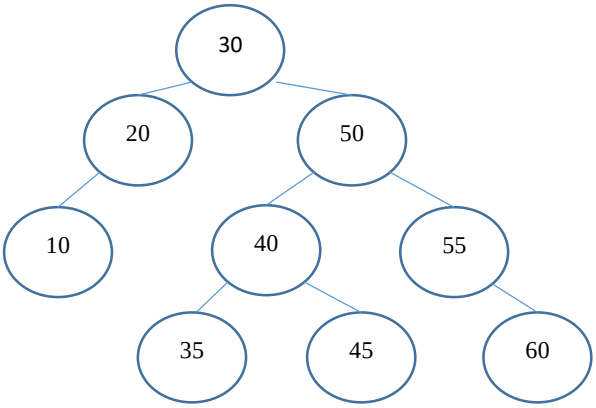
children heights

left=0, right = 2

RR case

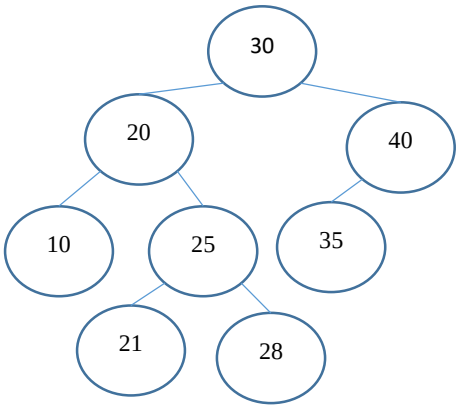


Left Rotation

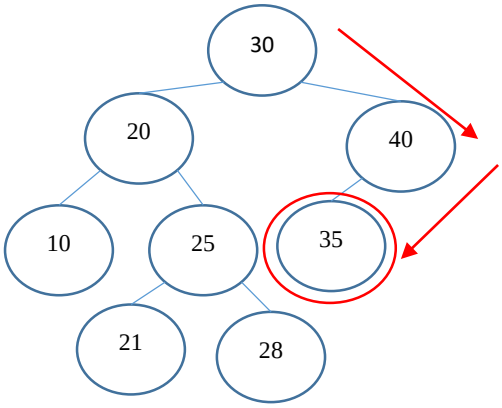


4.

Remove 30



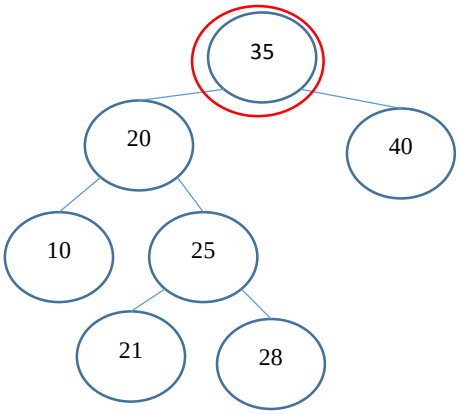
Replace 30 with smallest key in right subtree, 35.



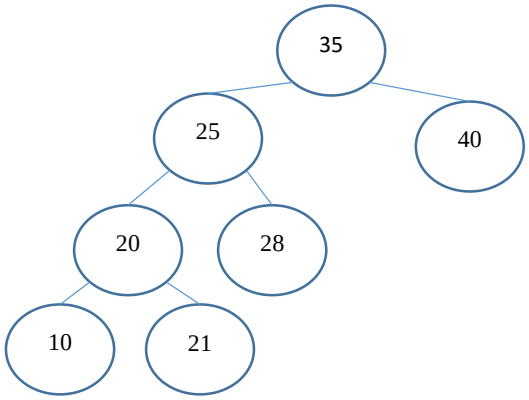
35 is unbalanced node

children heights

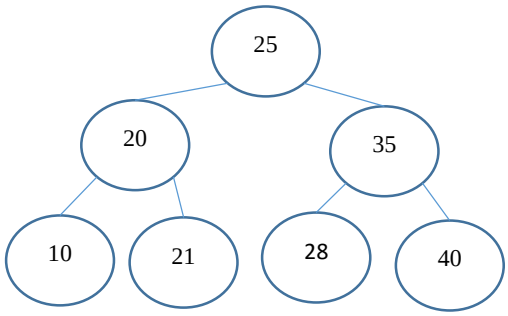
left=2, right=0



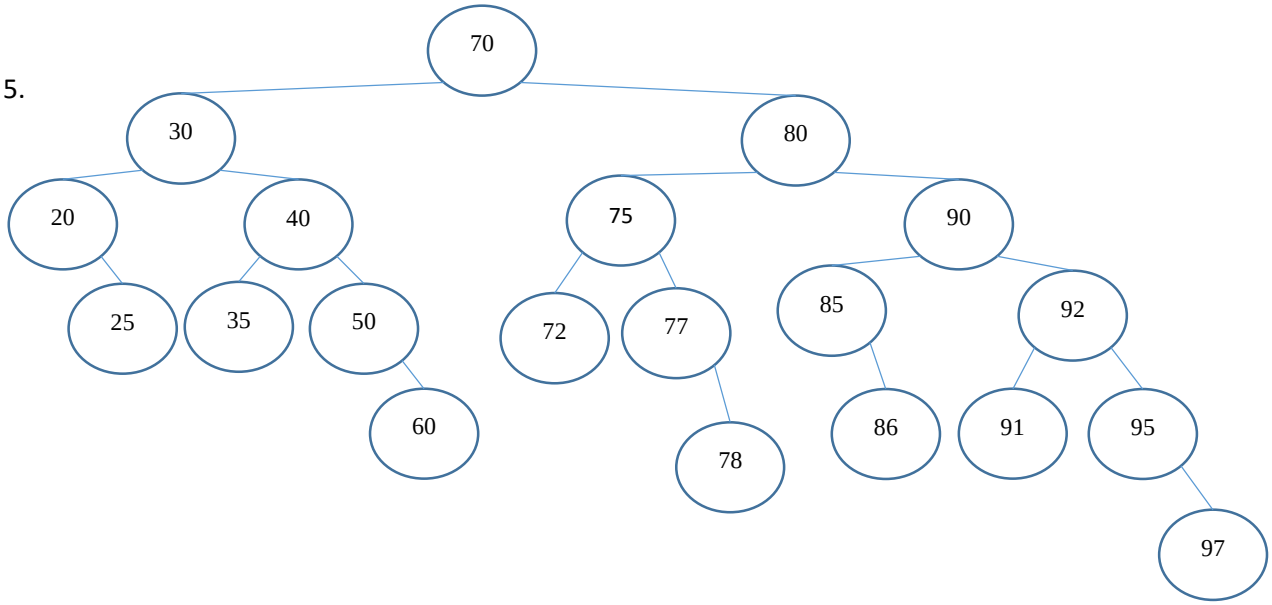
Left Rotation

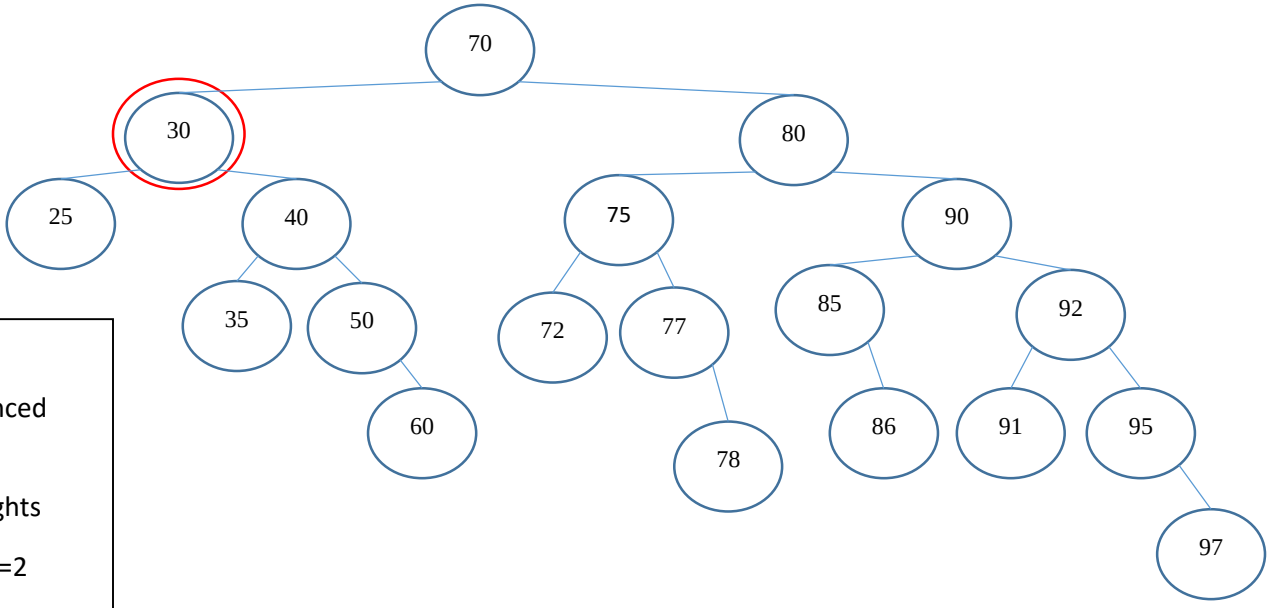


Right Rotation



5.





Remove 20

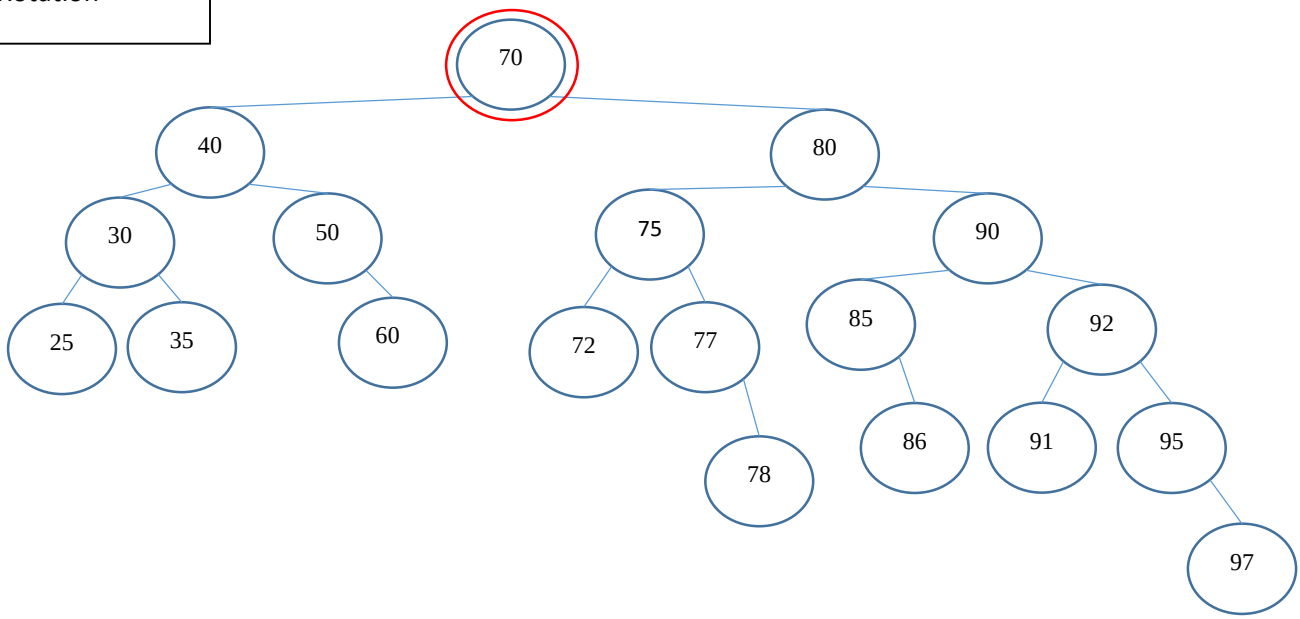
30 is unbalanced node

Children heights

Left=0, Right=2

RR Case

Left Rotation



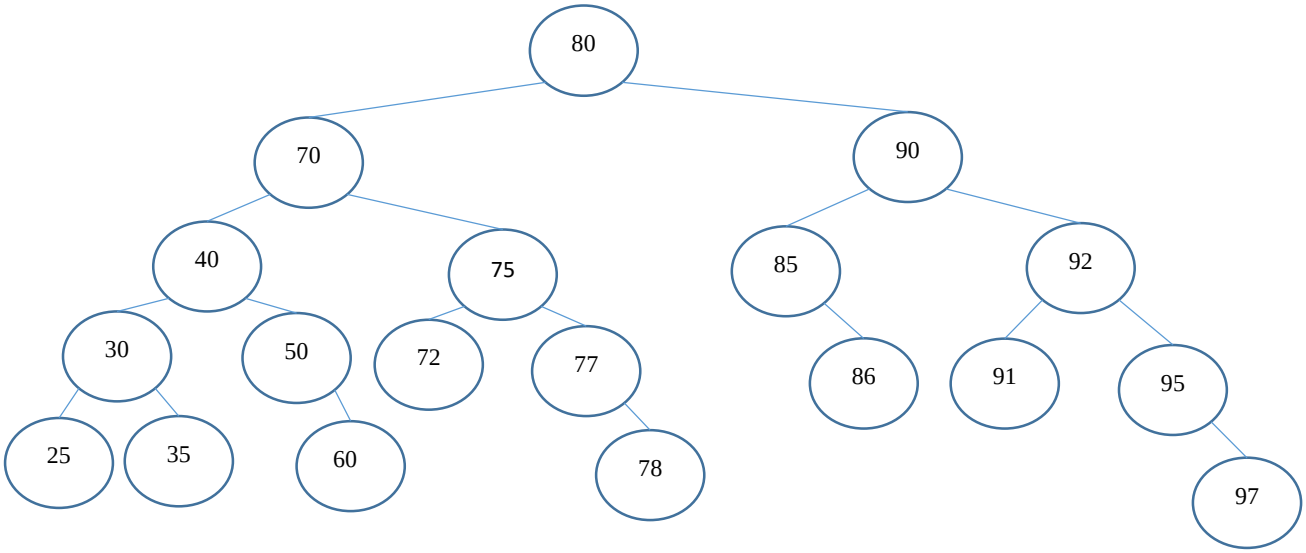
70 is unbalanced node

Children heights

Left=2, Right=4

RR Case

Left Rotation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