→ Adelson-Velskii and Landis

AVL Tree (Height Balanced Tree)

- BST
- Every node in the tree has a balance factor = {-1, 0, 1}

Balance factor = Height of left subtree − Height of right subtree.

$$\text{Balance factor} = |H(T^L) - H(T^R)| \leq 1$$

eg.

fig (i)

fig (ii)

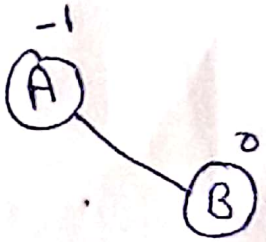


fig (iii)

D B C

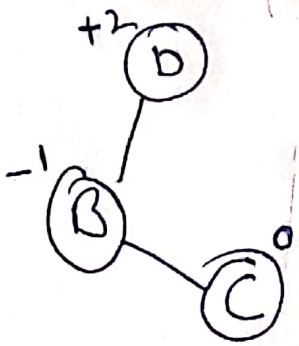


fig (iv)

A, B, C

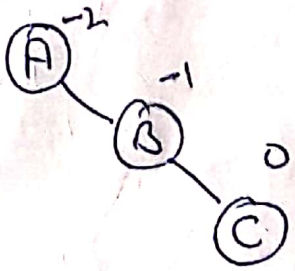


fig (v)

C, B, A

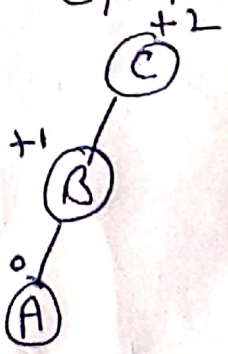


fig (vi)

X, Z, Y

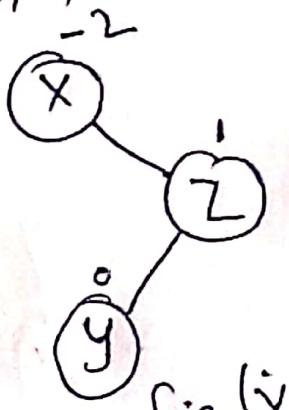
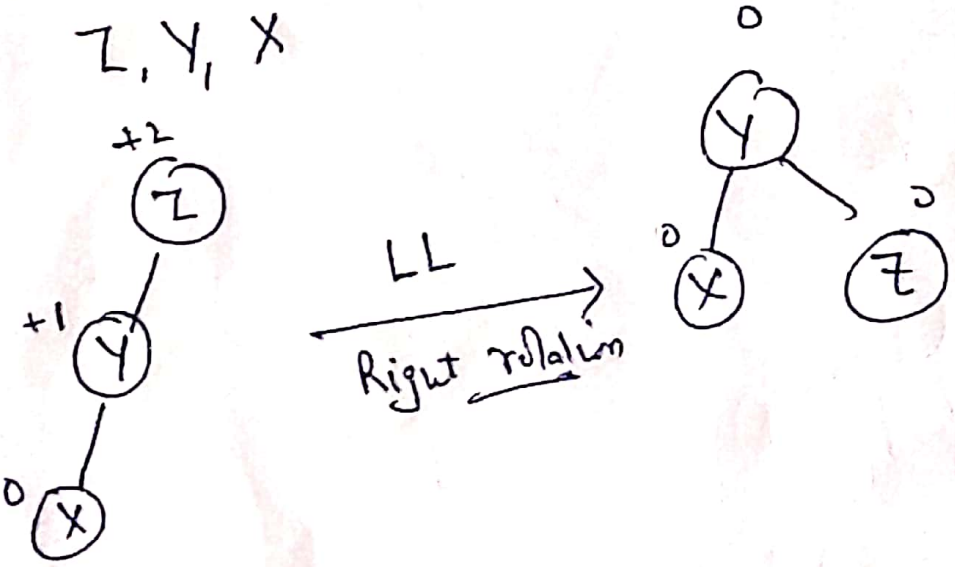


Fig (vii)

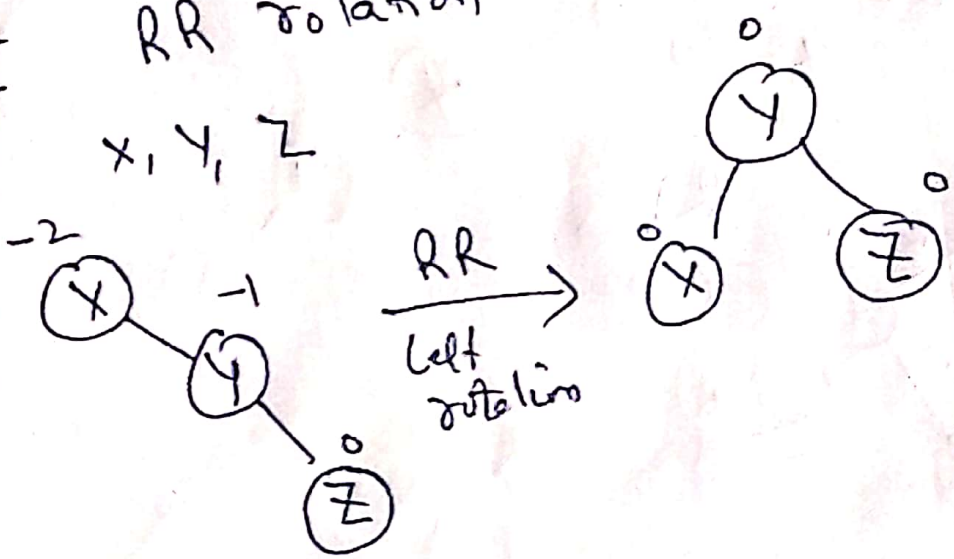
Case I LL Rotation

Z, Y, X



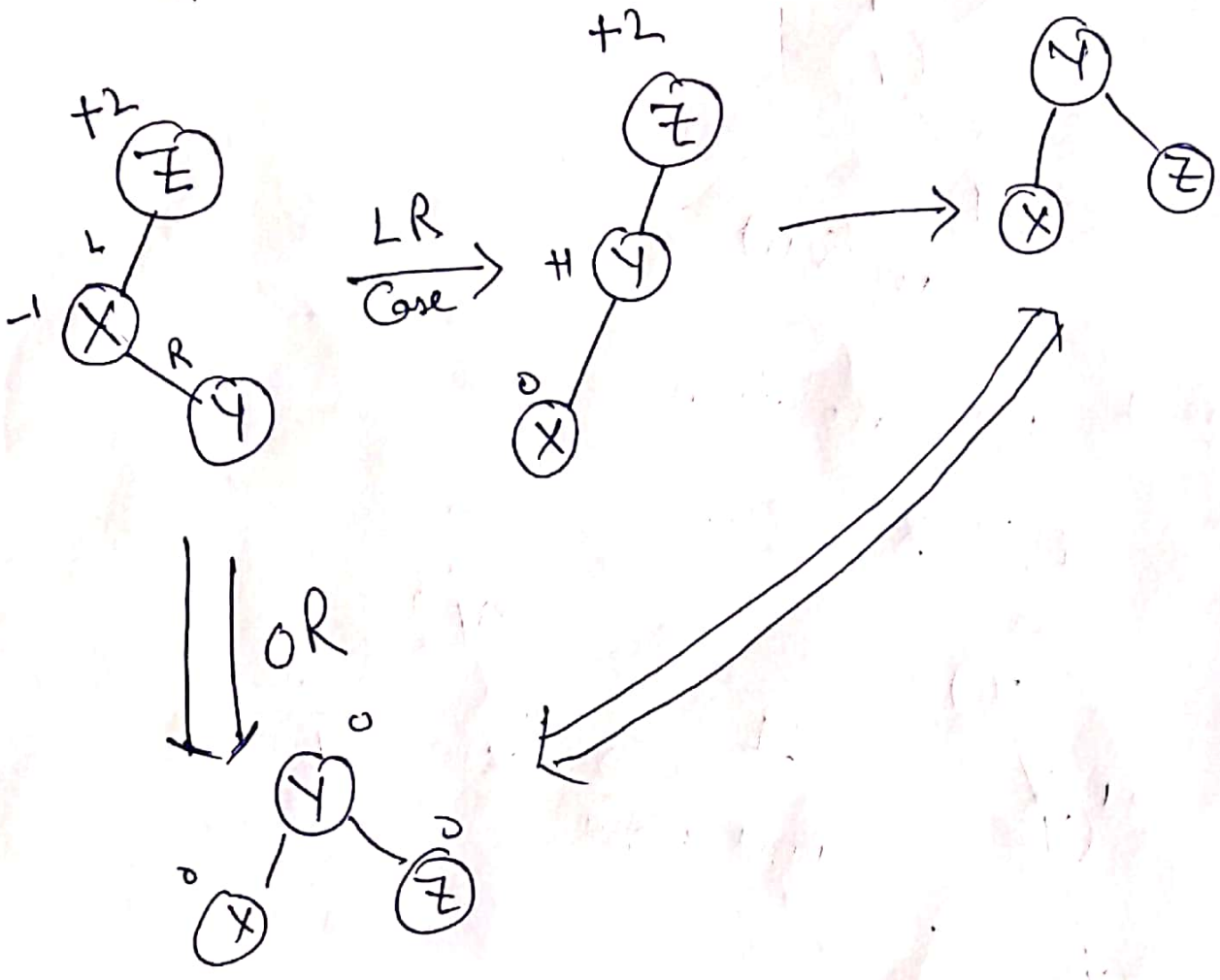
Case II RR rotation

X, Y, Z



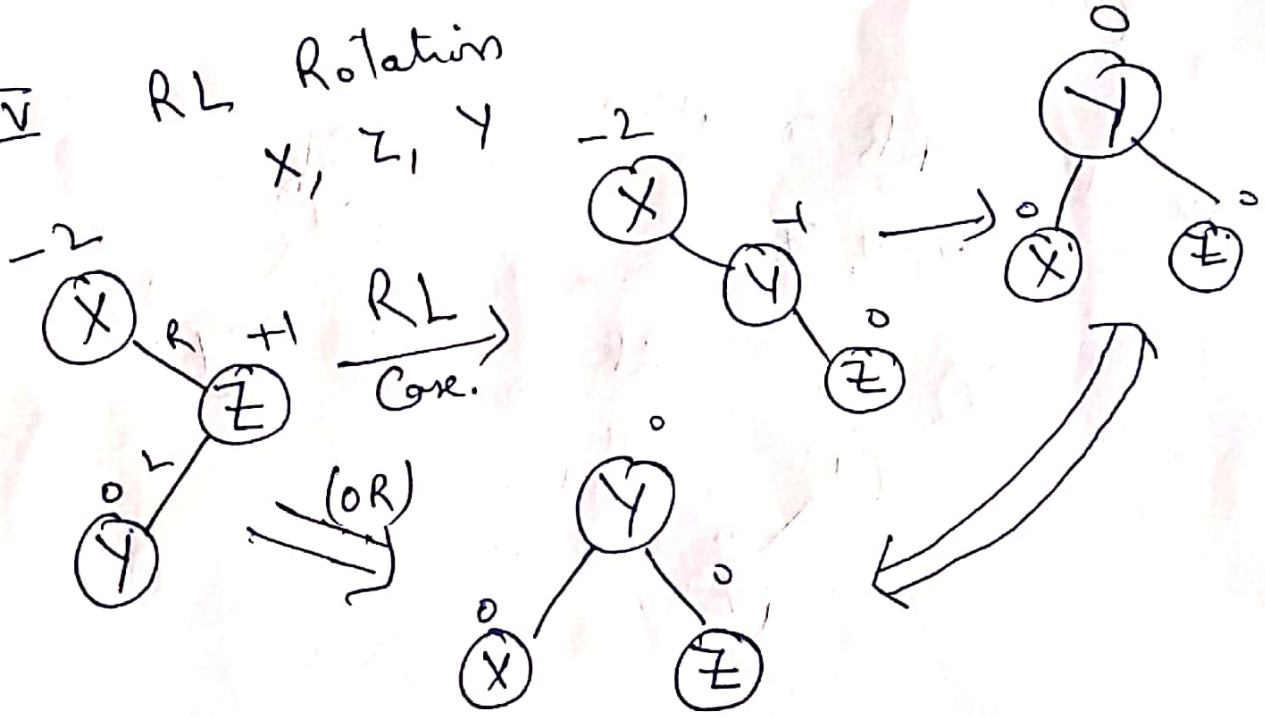
Case III LR rotation

Z, X, Y.



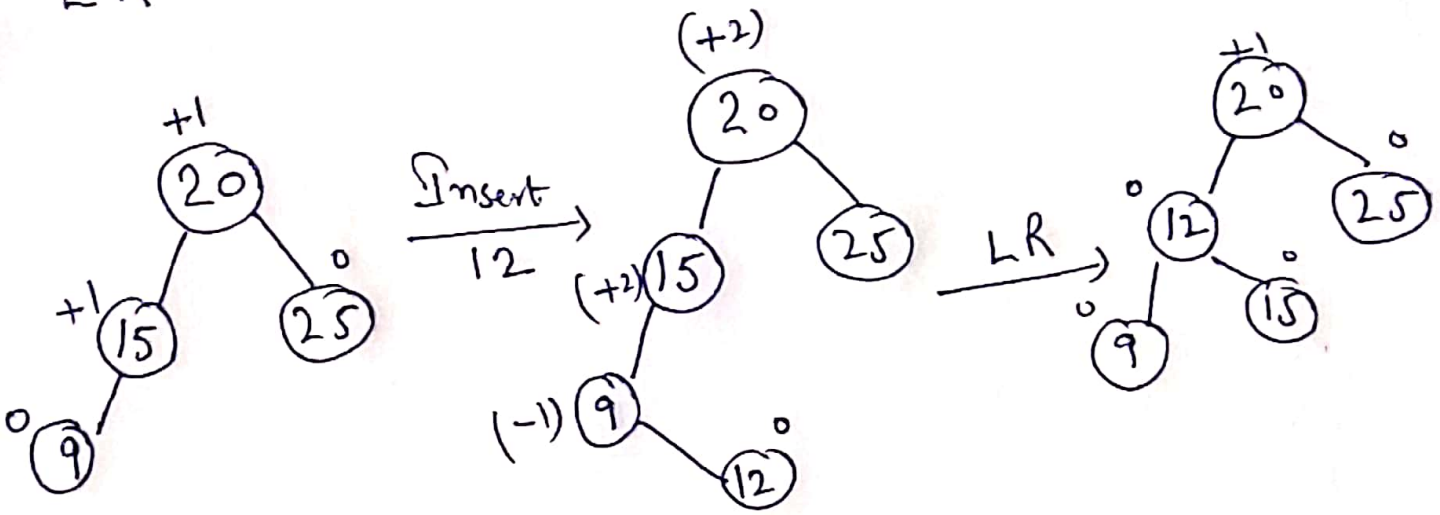
Case IV RL Rotation

X, Z, Y

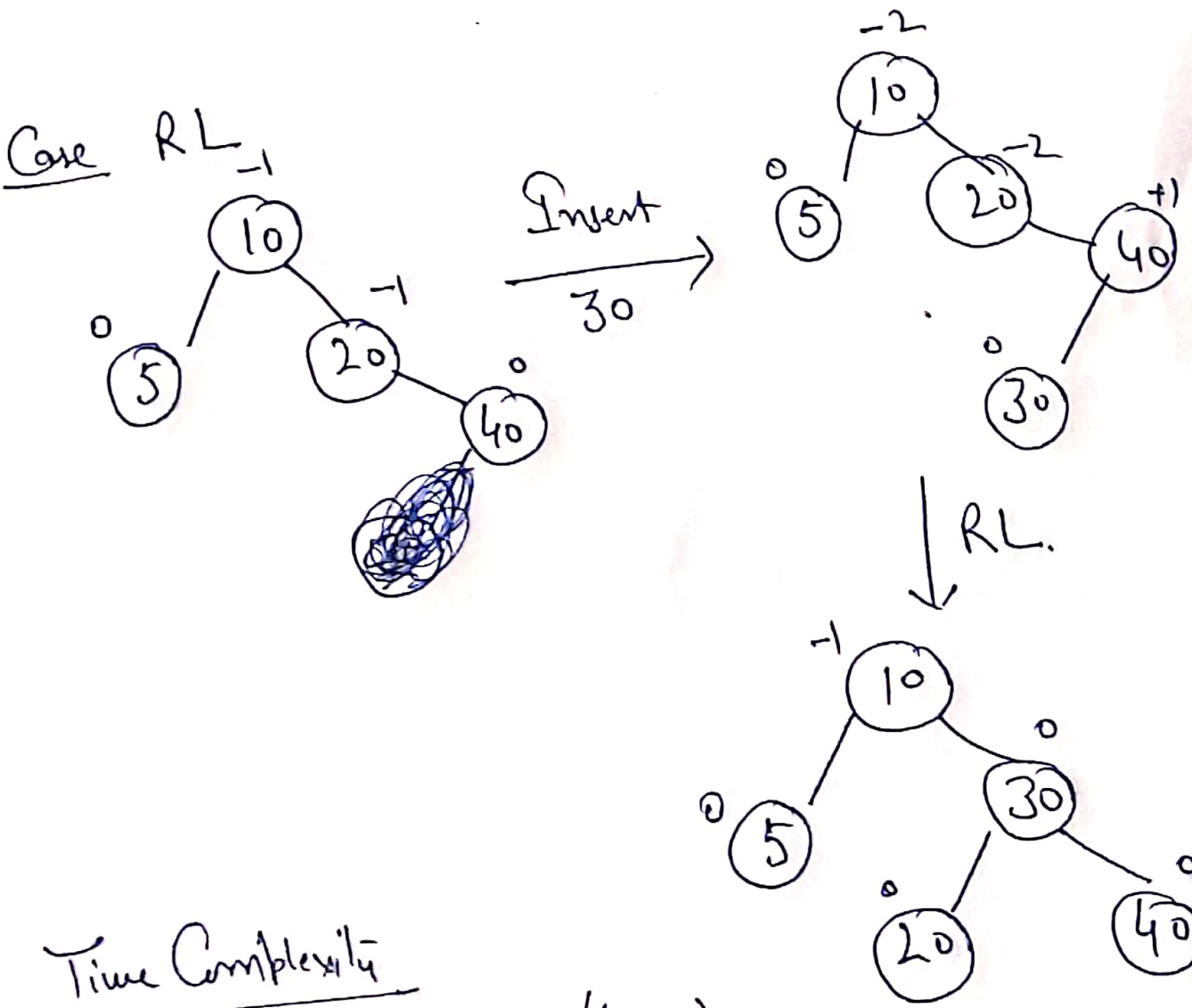


Case

LR



Case RL

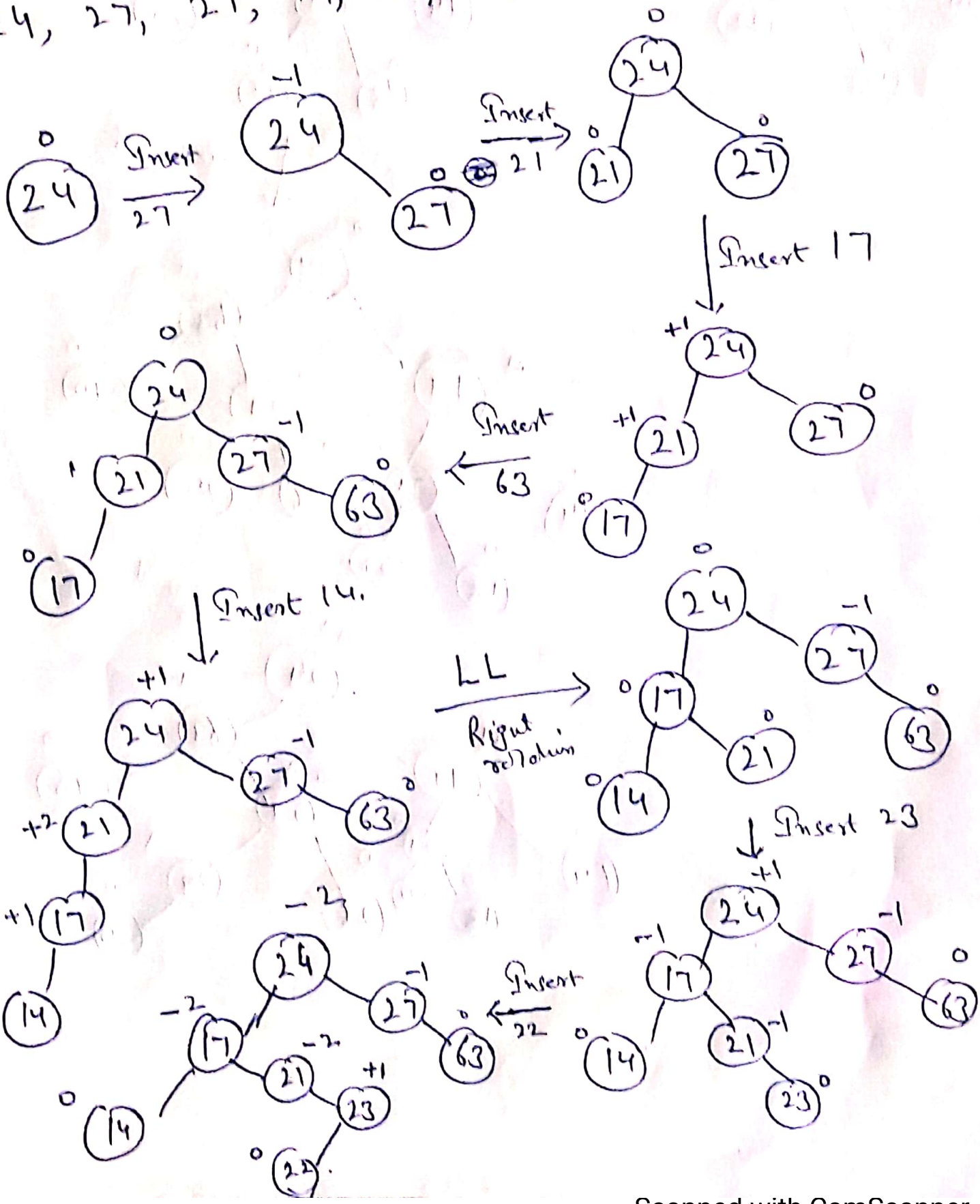


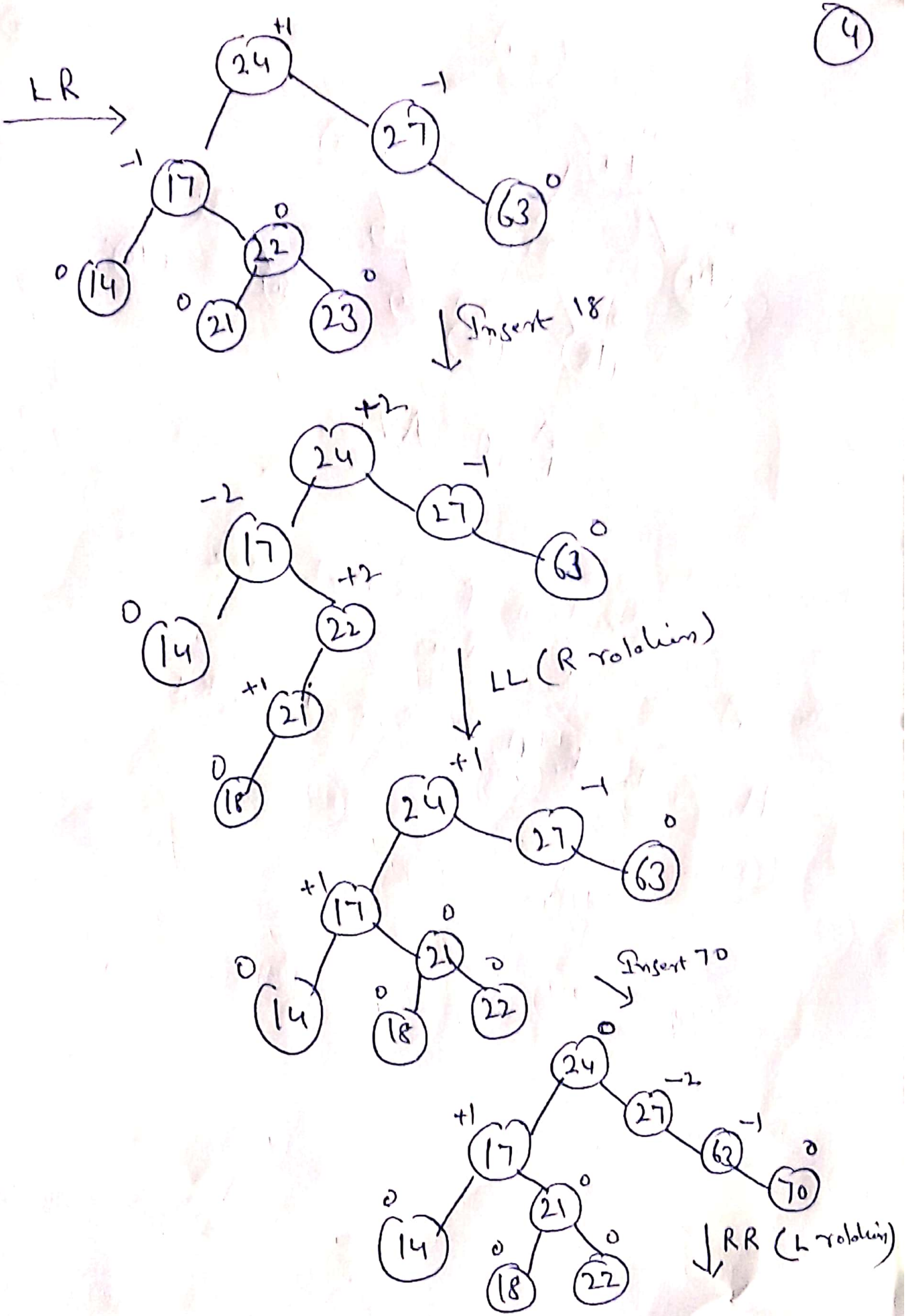
Time Complexity

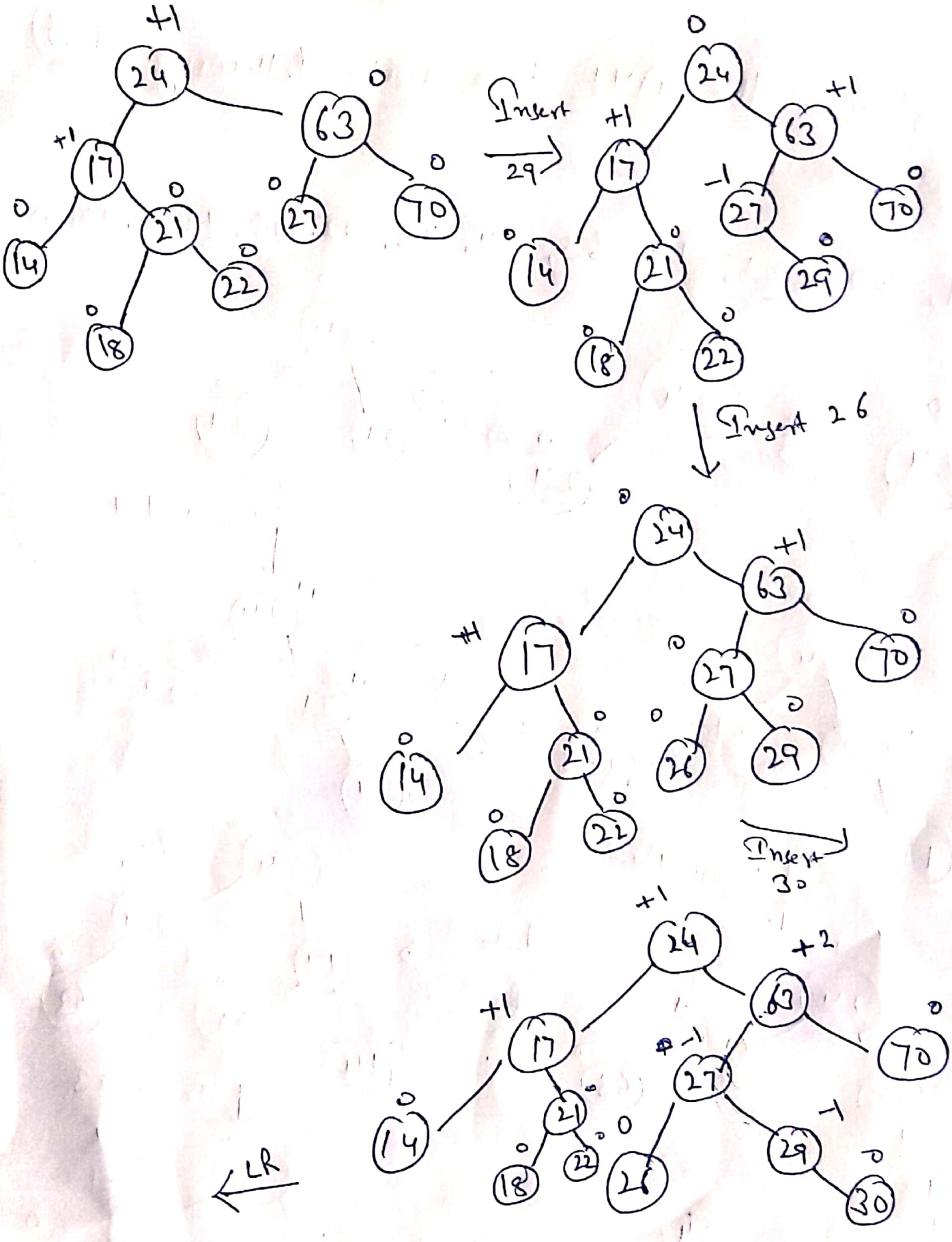
Insertion = O(log n)

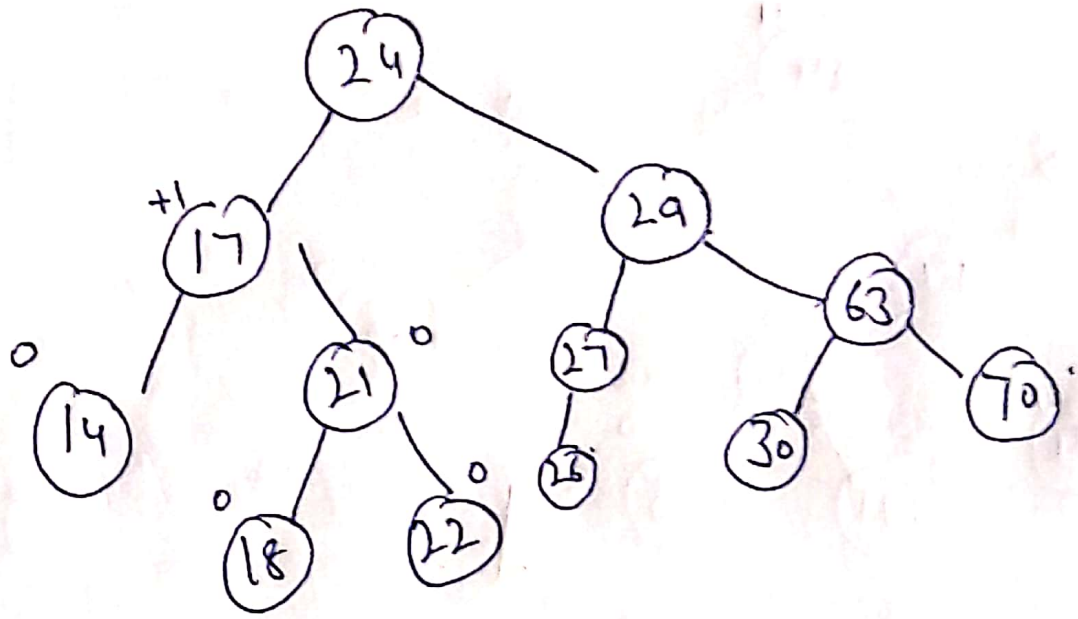
Construct the AVL tree with following elements

24, 27, 21, 17, 63, 14, 23, 22, 18, 70, 29, 26, 30









Final AVL

Assignment

Construction of an AVL tree with following set of values:

H, I, J, B, A, E, C, F, D, G, K, L