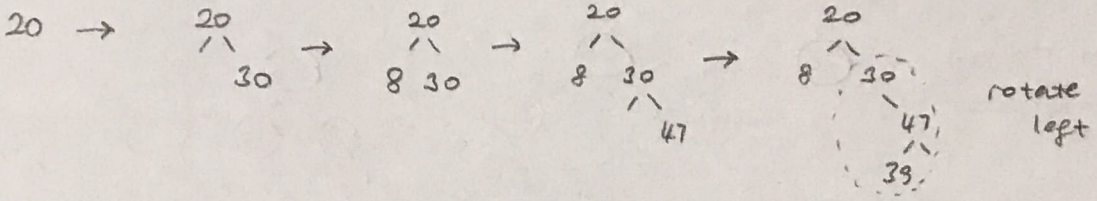
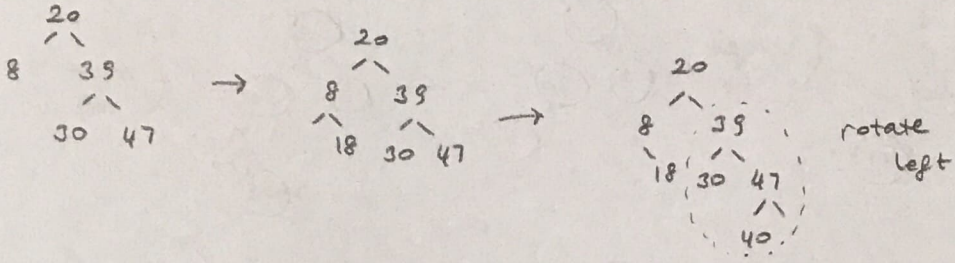
Elif KELEŞ
1610440 33

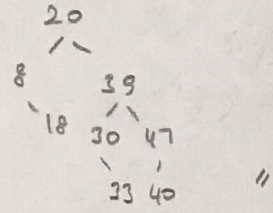
CSE 222 - HW#7

Q1) integers : 20, 30, 8, 47, 39, 18, 40, 33

AVL tree - insertion

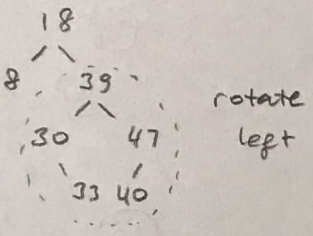


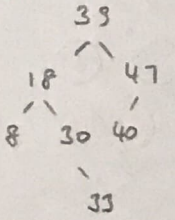




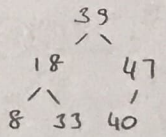
deletion

deleting 20 →
(Swap the root with biggest smaller element)

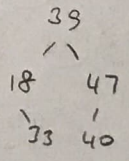




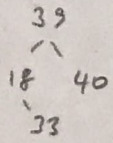
del. 30 →
(first swap with 33)



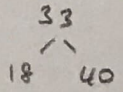
del. 8 →

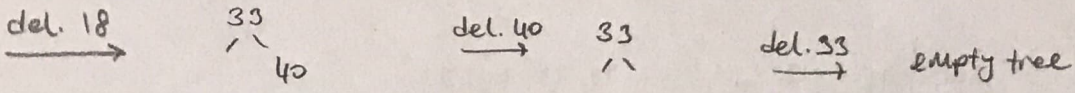


del. 47 →
(Swap it with it's child)

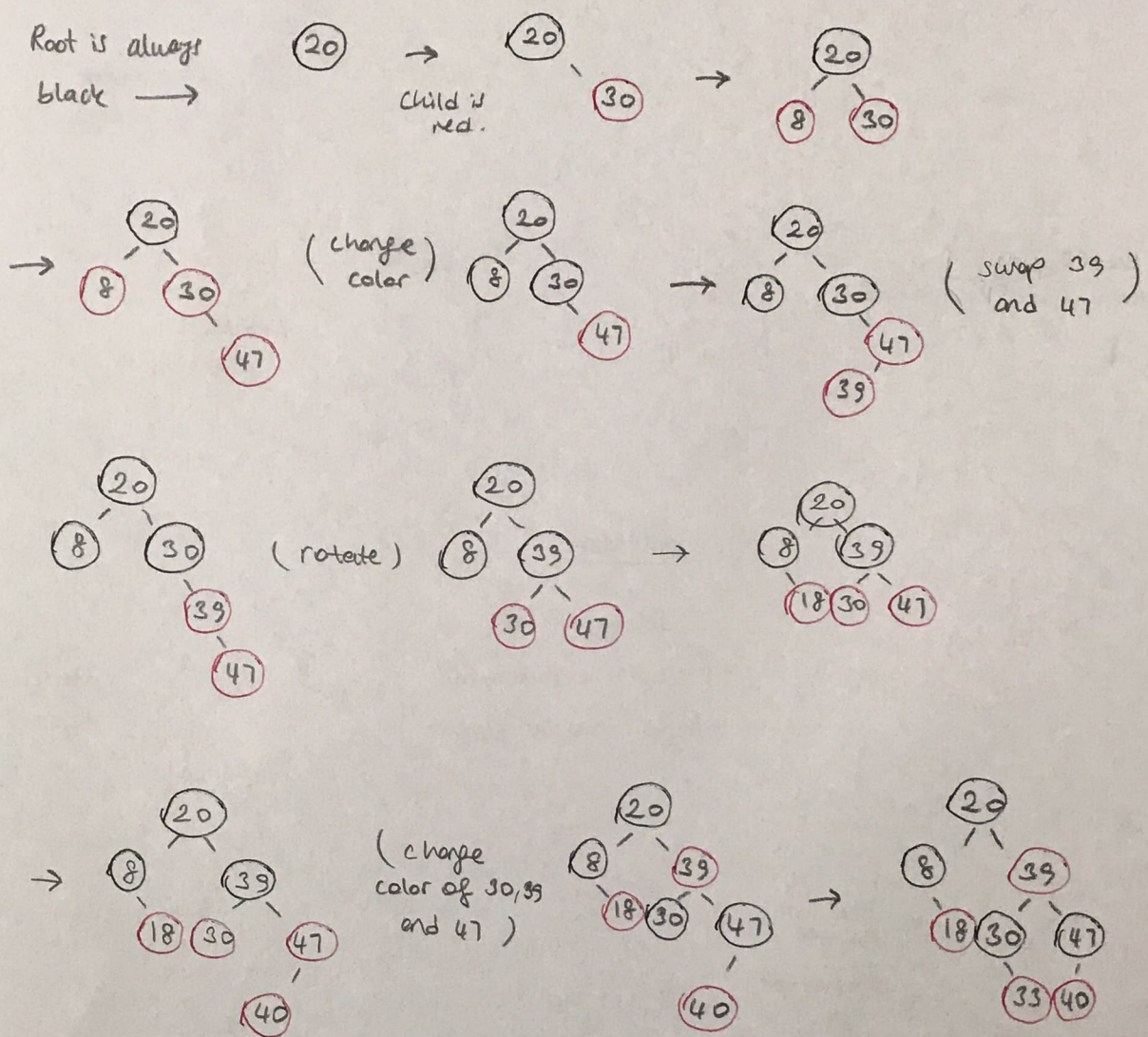


del. 39 →
(Swap it with 33)



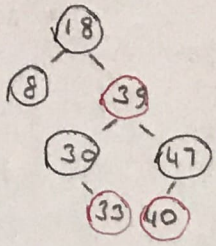


Red-Black Tree - insertion

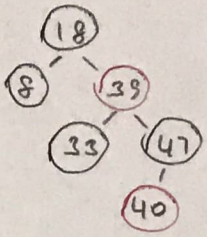


deletion

del. 20 → (swap it with 18)

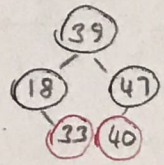


del. 30 → (swap with 33)

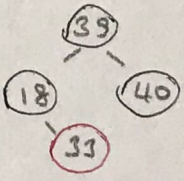


(rotate and change color)

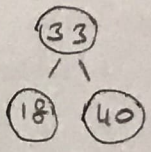
del. 8 →



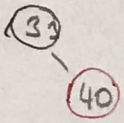
del. 47 → (swap it with 40)



del. 39 → (swap it with 33)



del. 18 →



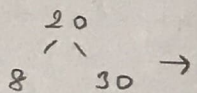
(change 40's color)

del. 40 →

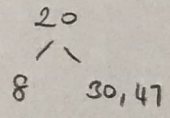
del. 33 → empty tree

2-3 tree - insertion

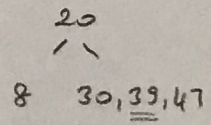
20 → 20, 30 →



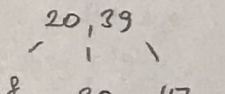
→



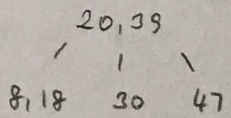
→



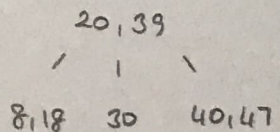
(take 39 beside 20, split node)



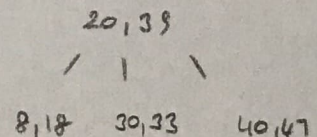
→



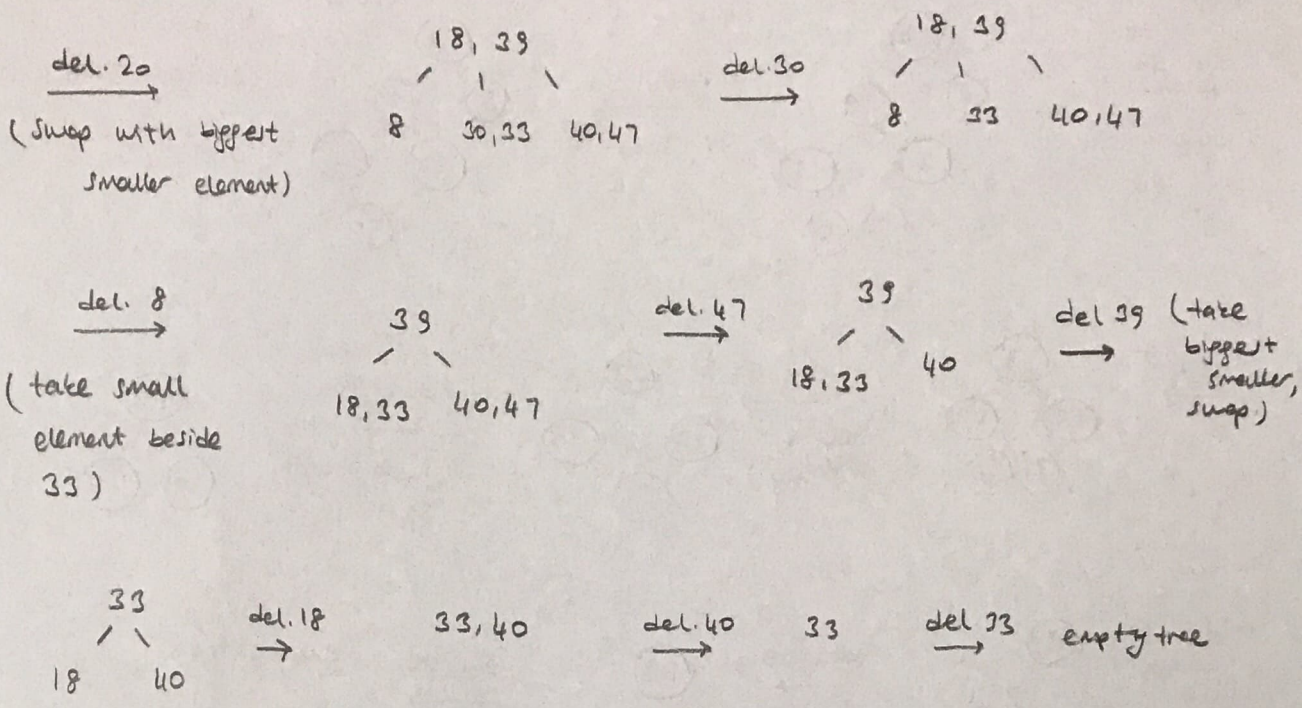
→



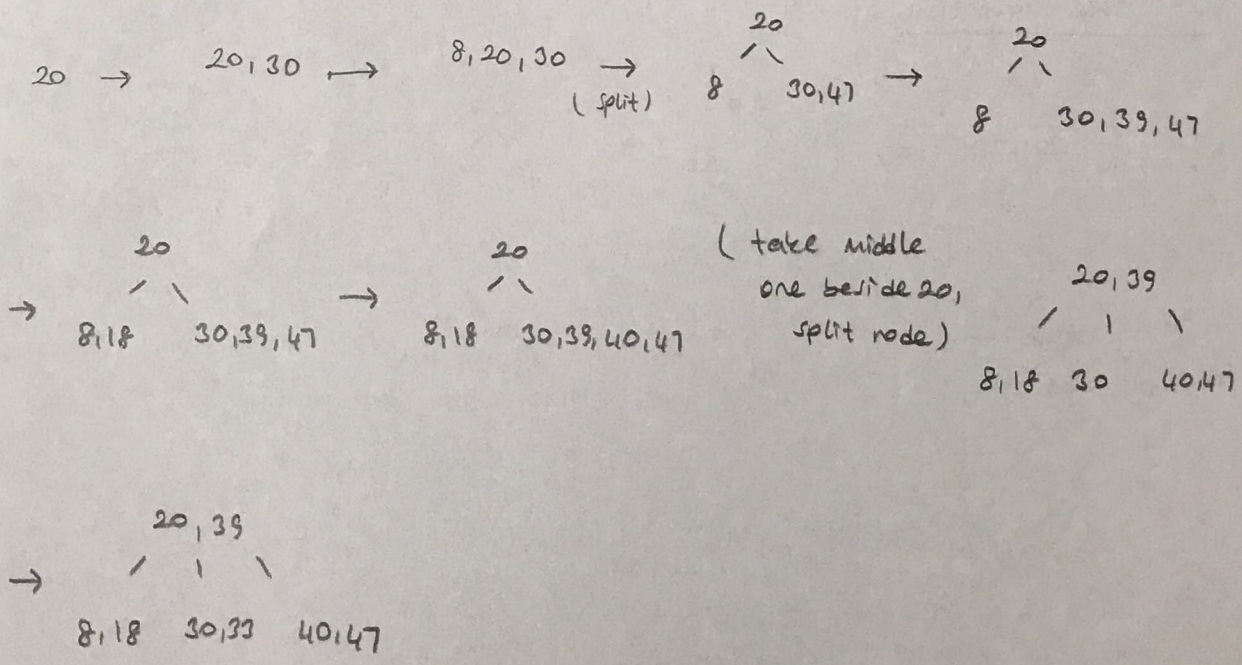
→



deletion

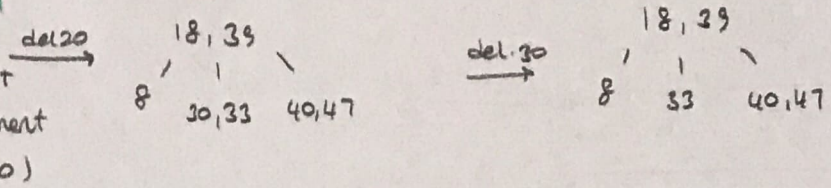


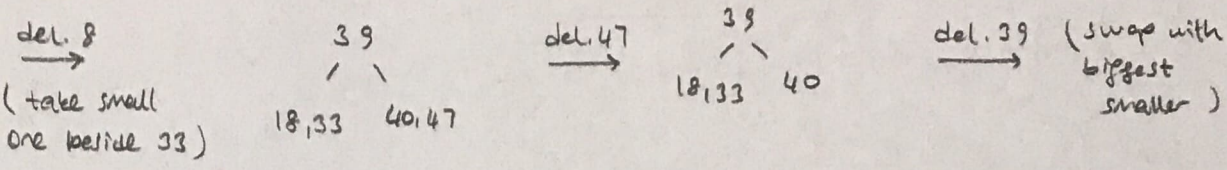
B-tree (order 4) - insertion

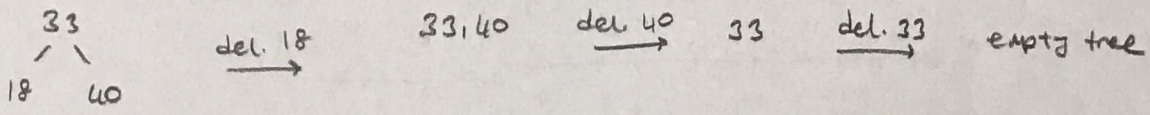


deletion

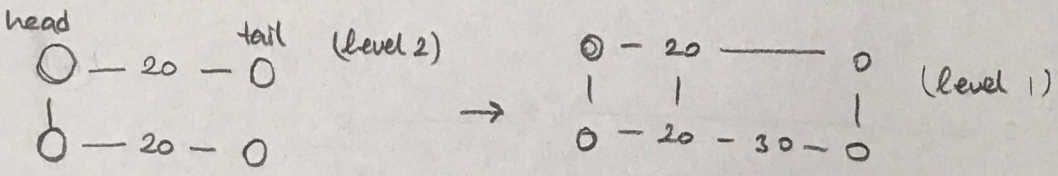
(take biggest smaller element swap with 20)

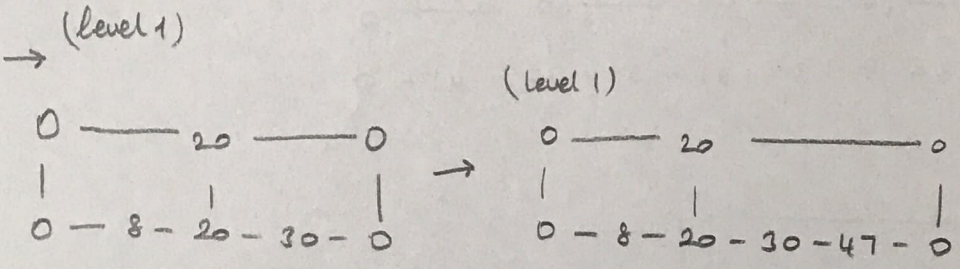


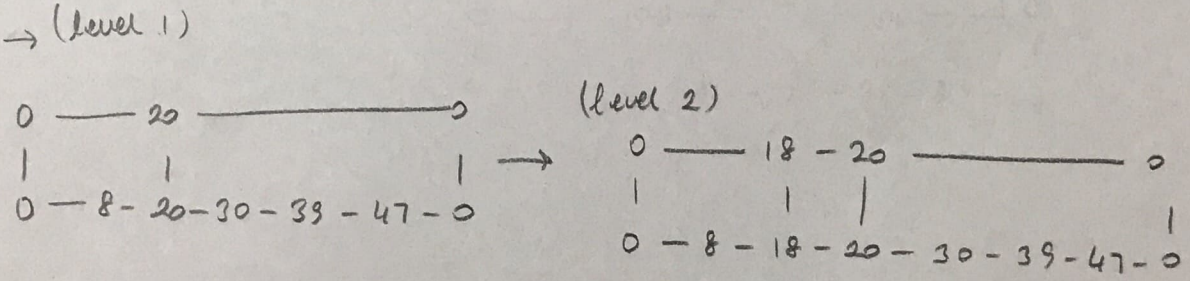




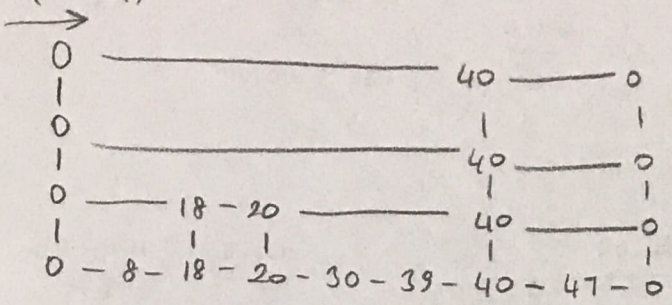
Skip list - insertion



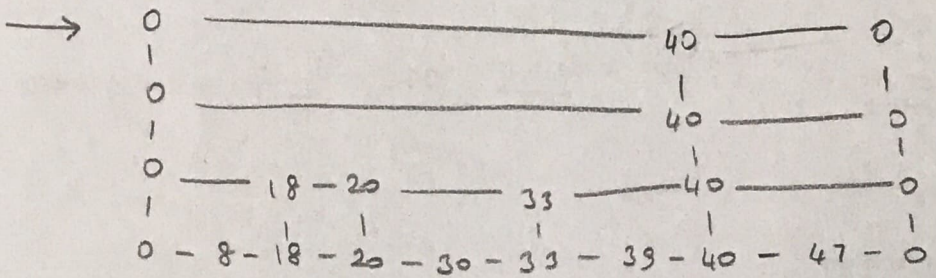




(level 4)

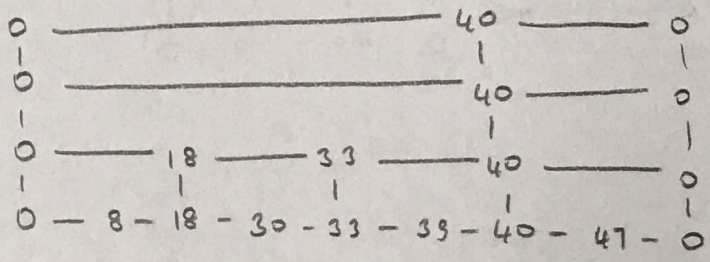


(level 4)

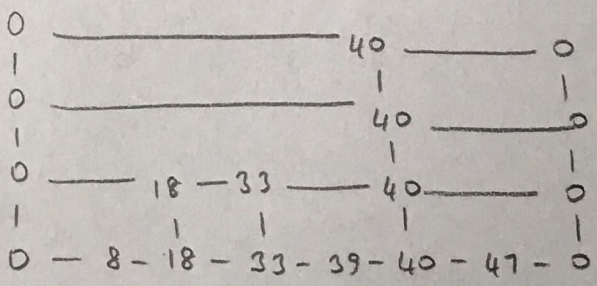


deletion

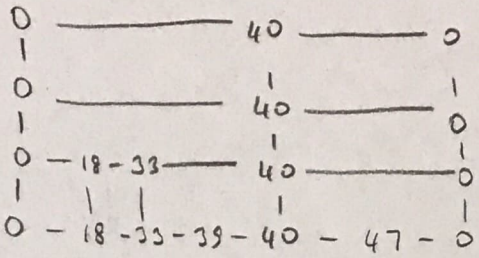
del. 20



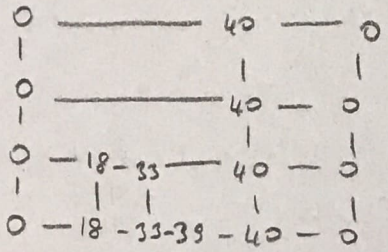
del. 30



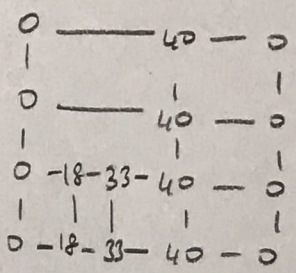
del. 8 →



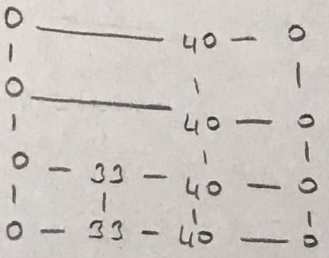
del. 47 →



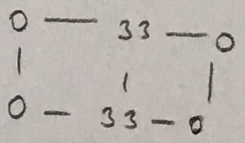
del. 39 →



del. 18 →



del. 40 →



del. 33 → empty list