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Trees - Part VI

Course on Data Structure

Pankaj Sharma • Lesson 26 • Aug 6, 2024

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CS & IT Engineering

Data Structure

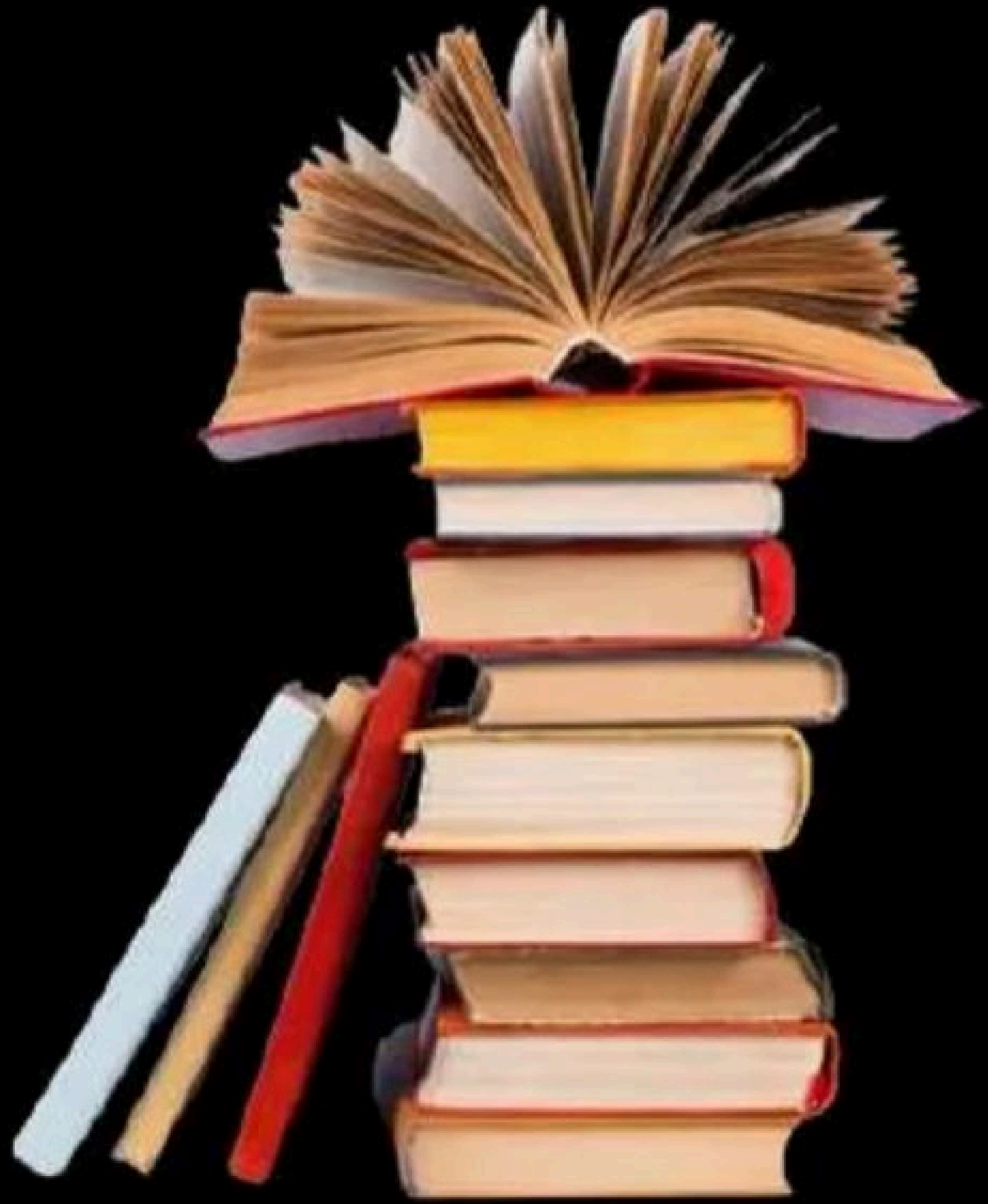
Tree

Lecture Number- 26

By- Pankaj Sir

Topics

to be covered



1. Tree-V

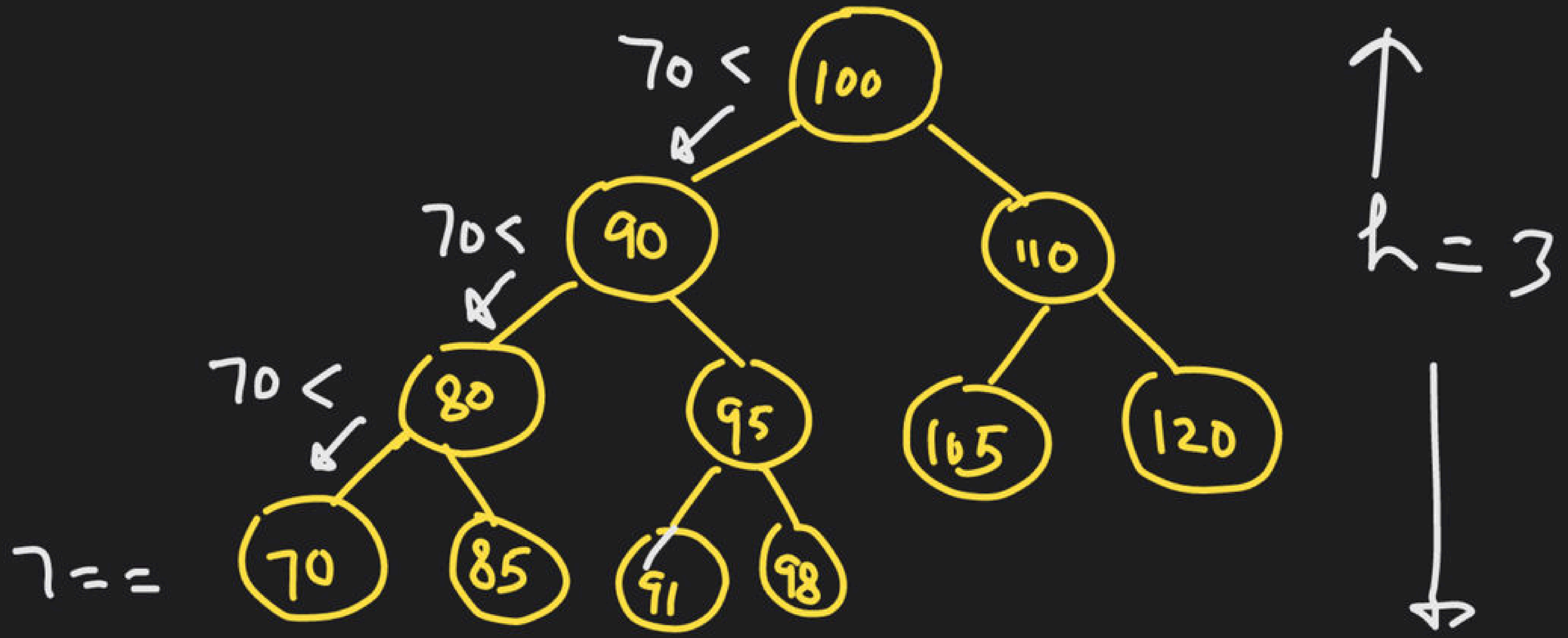
Search in a BST

Key = 70

#comp = 4

= h+1

= O(h)

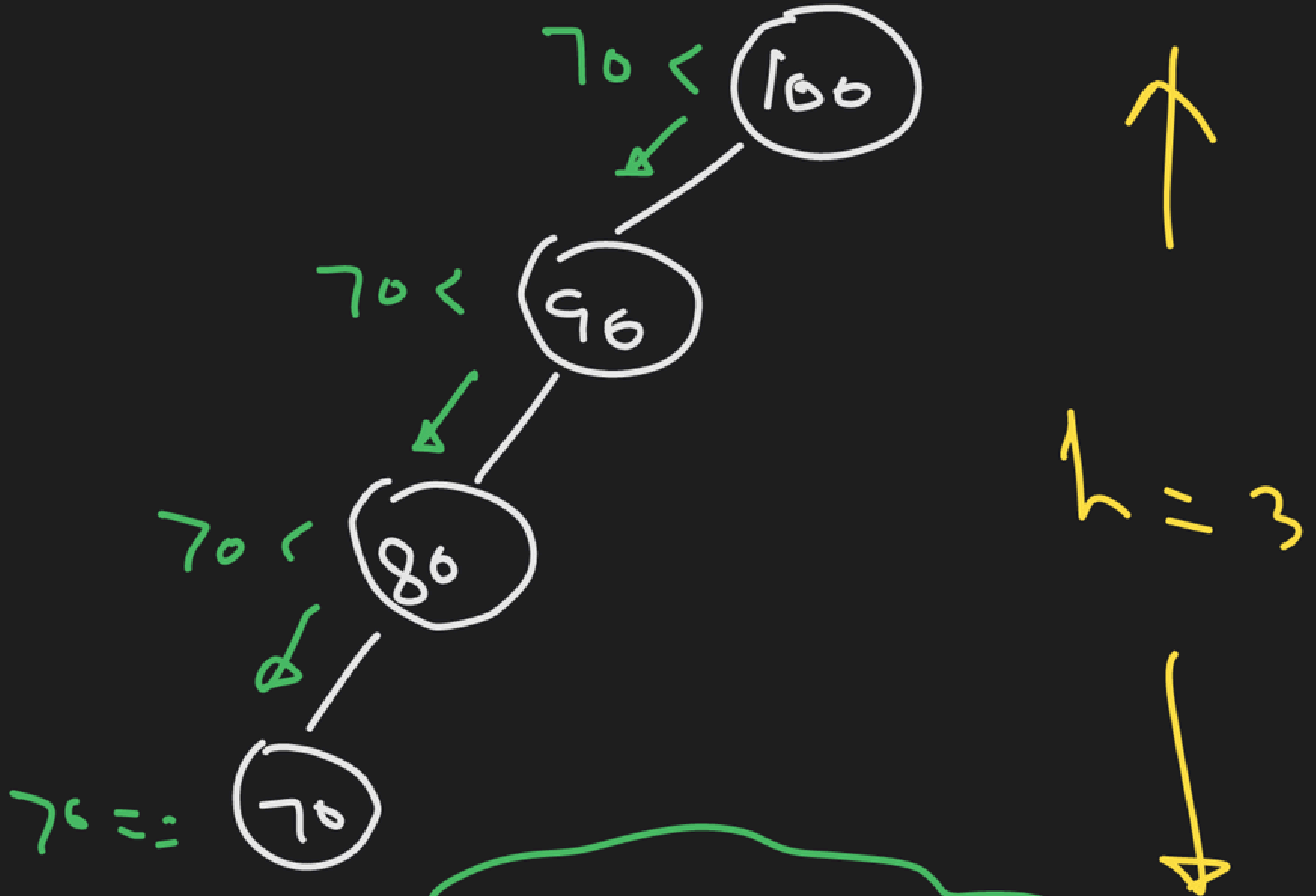


$\# \text{comp} = 4$

$= (h+1)$

$= O(h)$

$$\boxed{h \cong n}$$



Skewed tree

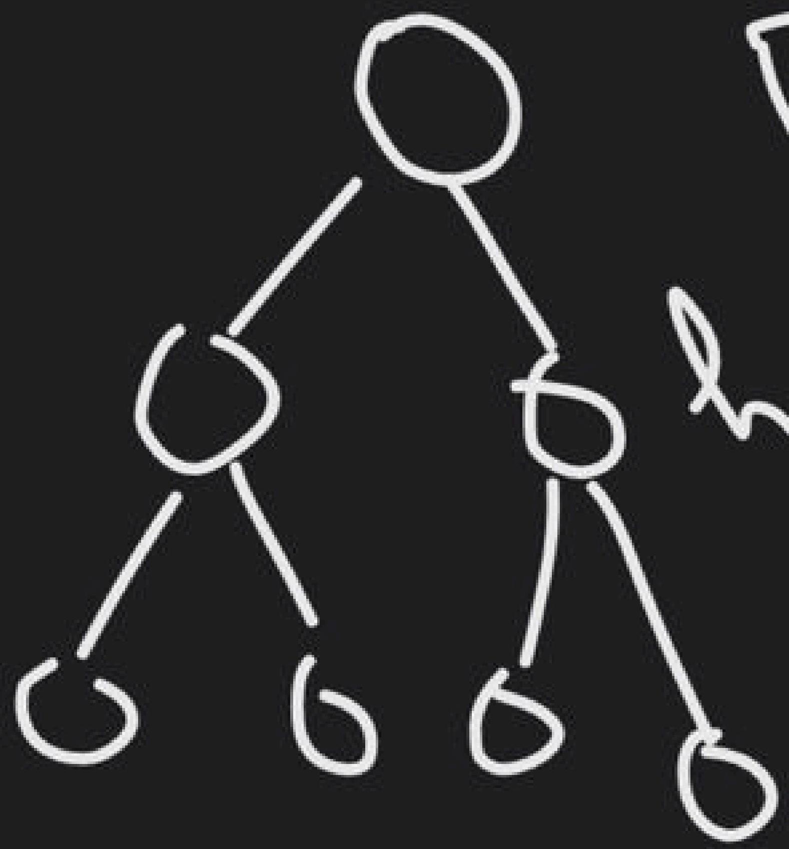
Search

↓

$O(h)$

FBT/CBT → $O(\log_2 n)$

Skewed → $O(n)$



FBT/CBT

$h \Rightarrow O(\log_2 n)$

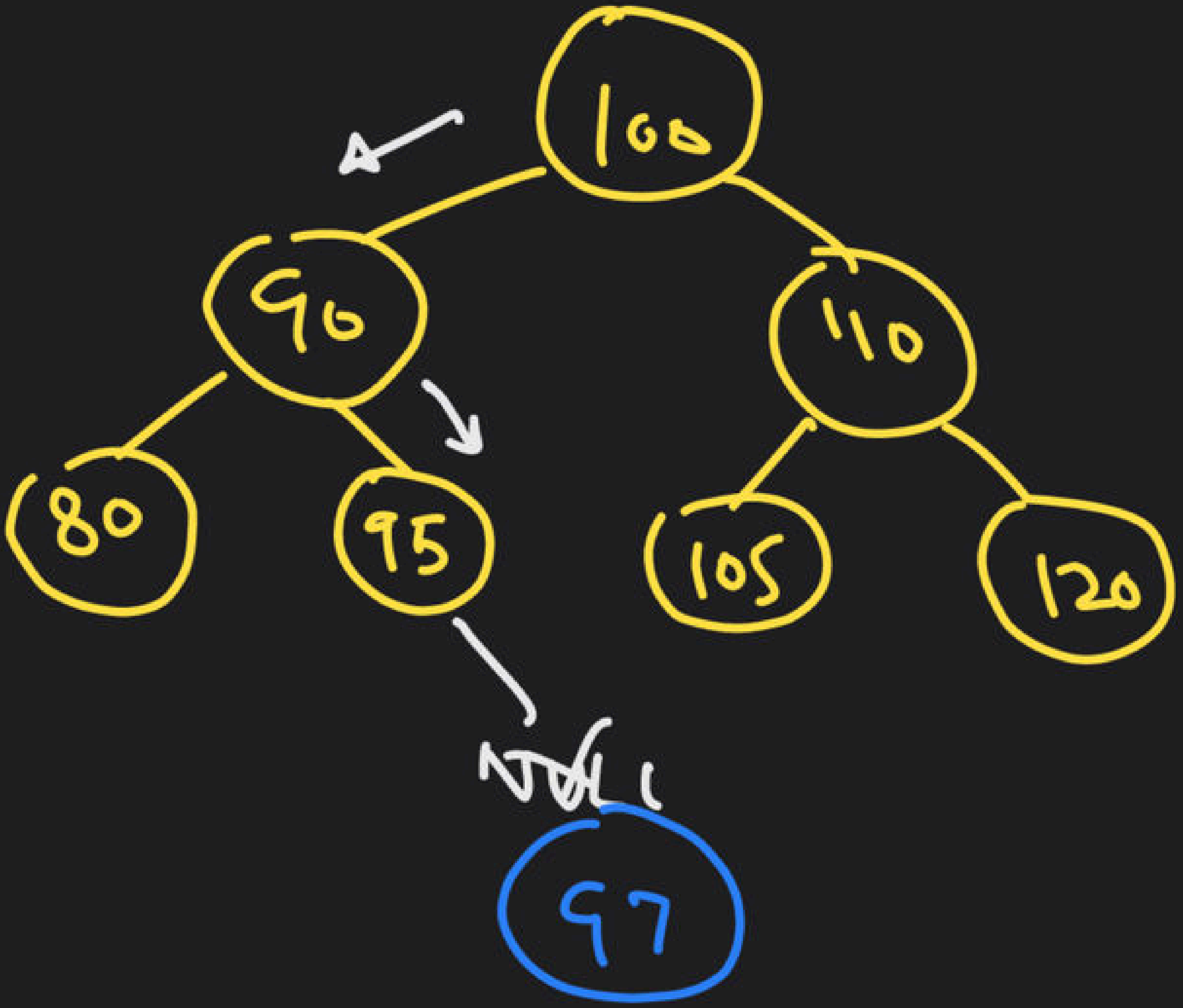
$\boxed{\text{Search} \Rightarrow O(n)}$

Insertion In a BST

insert : 97 → a) Search

Right of 95 Child

Complexity : O(n)



Deletion from a BST

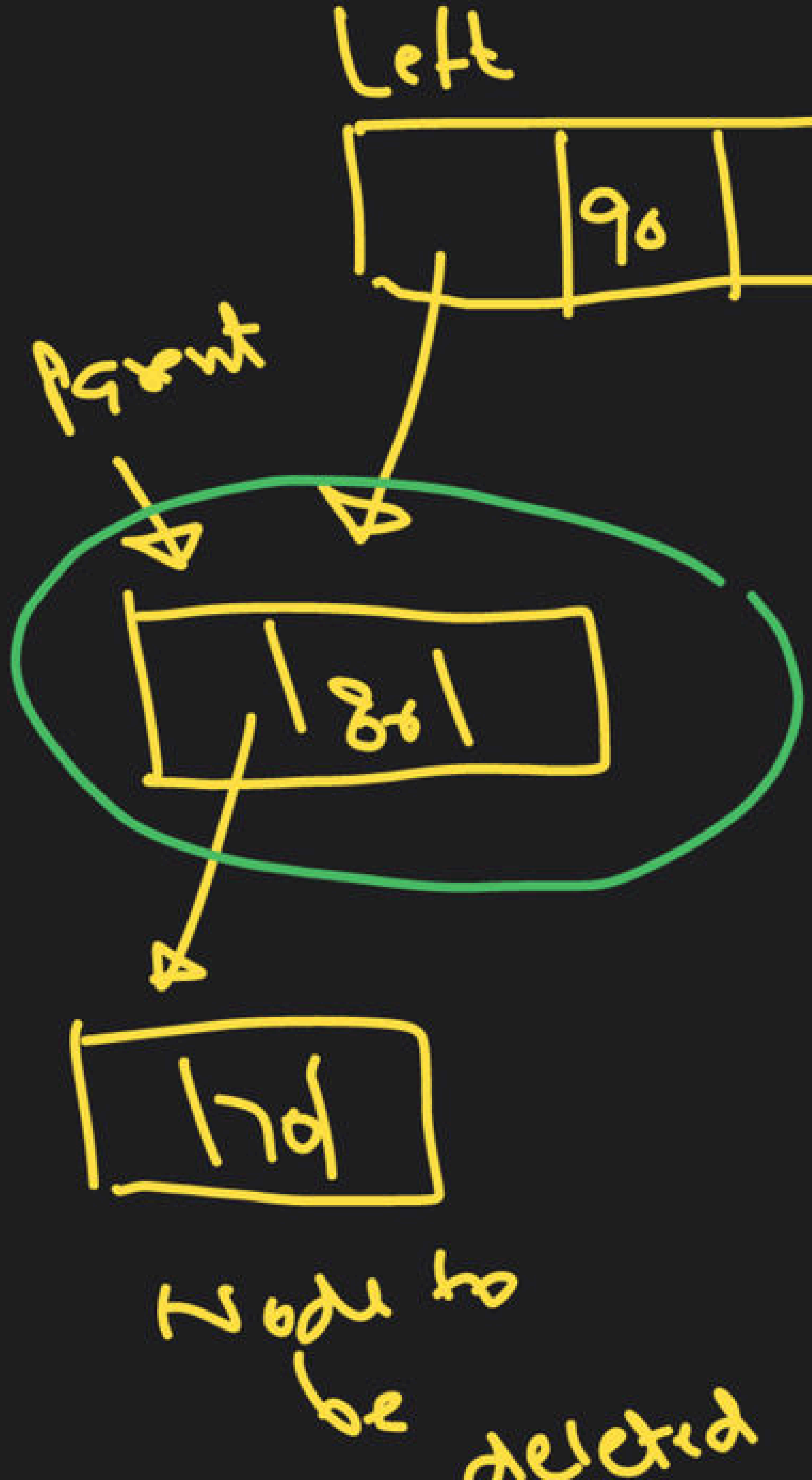
a) Delete a node with 0- child (leaf node)

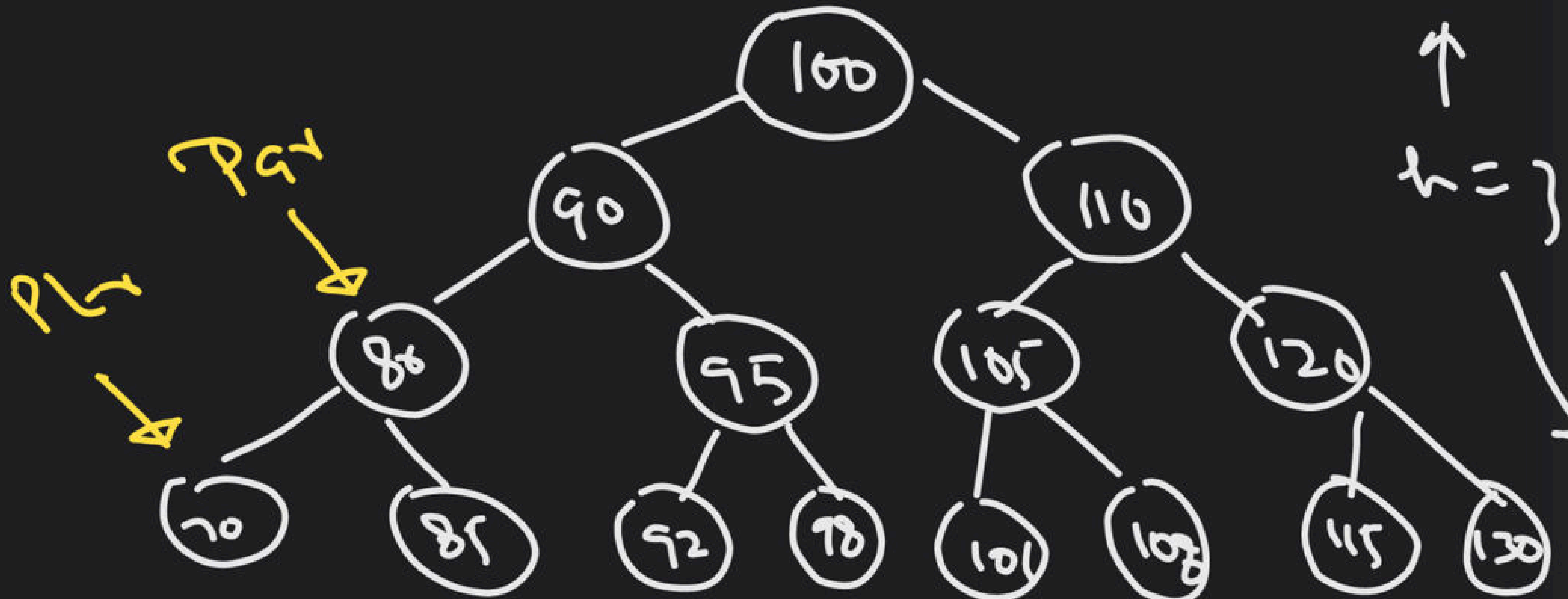
b) Delete a node with 1-child

c) Delete a node with 2-child

Deletion of leaf node

delete 70

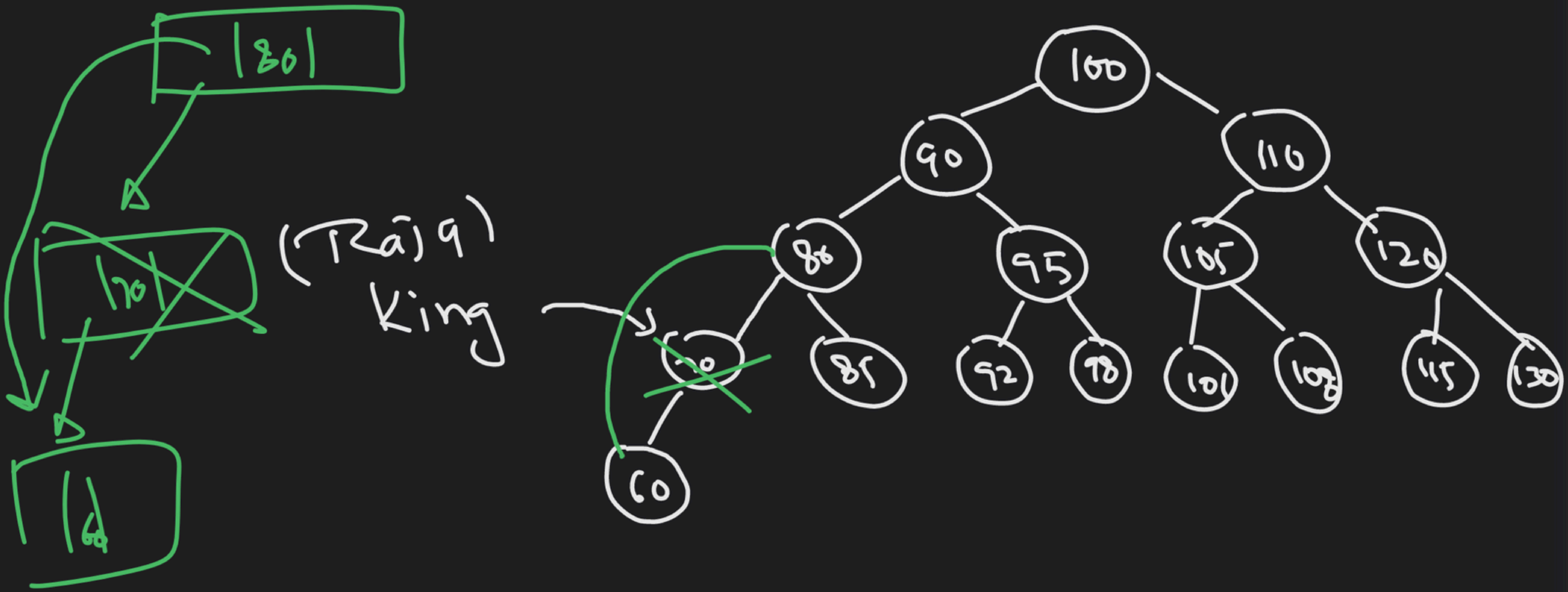


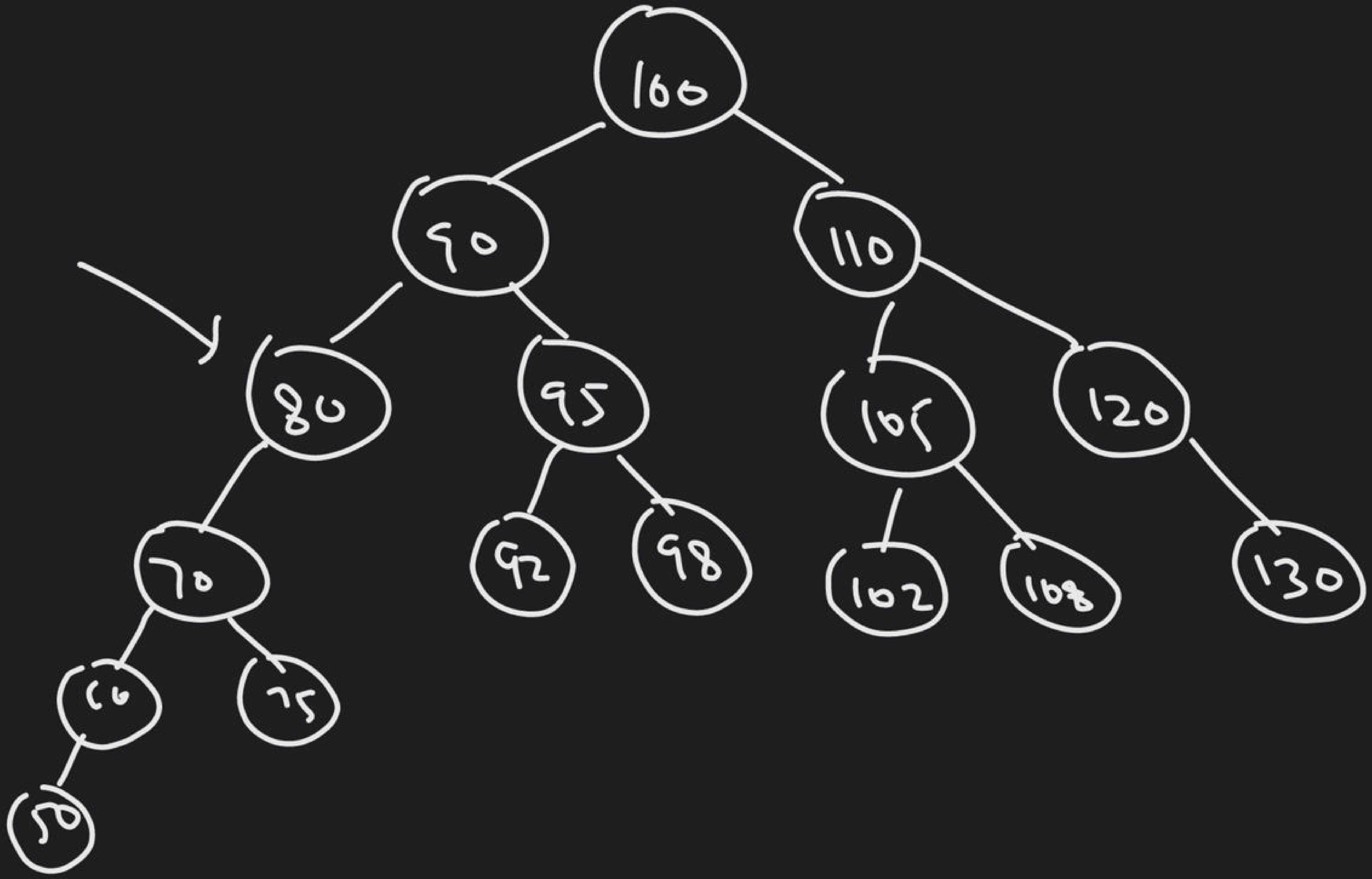


① we need to identify the parent pointer (of the node to be deleted), which is pointing to deleted node

② Set this parent pointer to NULL

Deletion of node with exaclly 1 child

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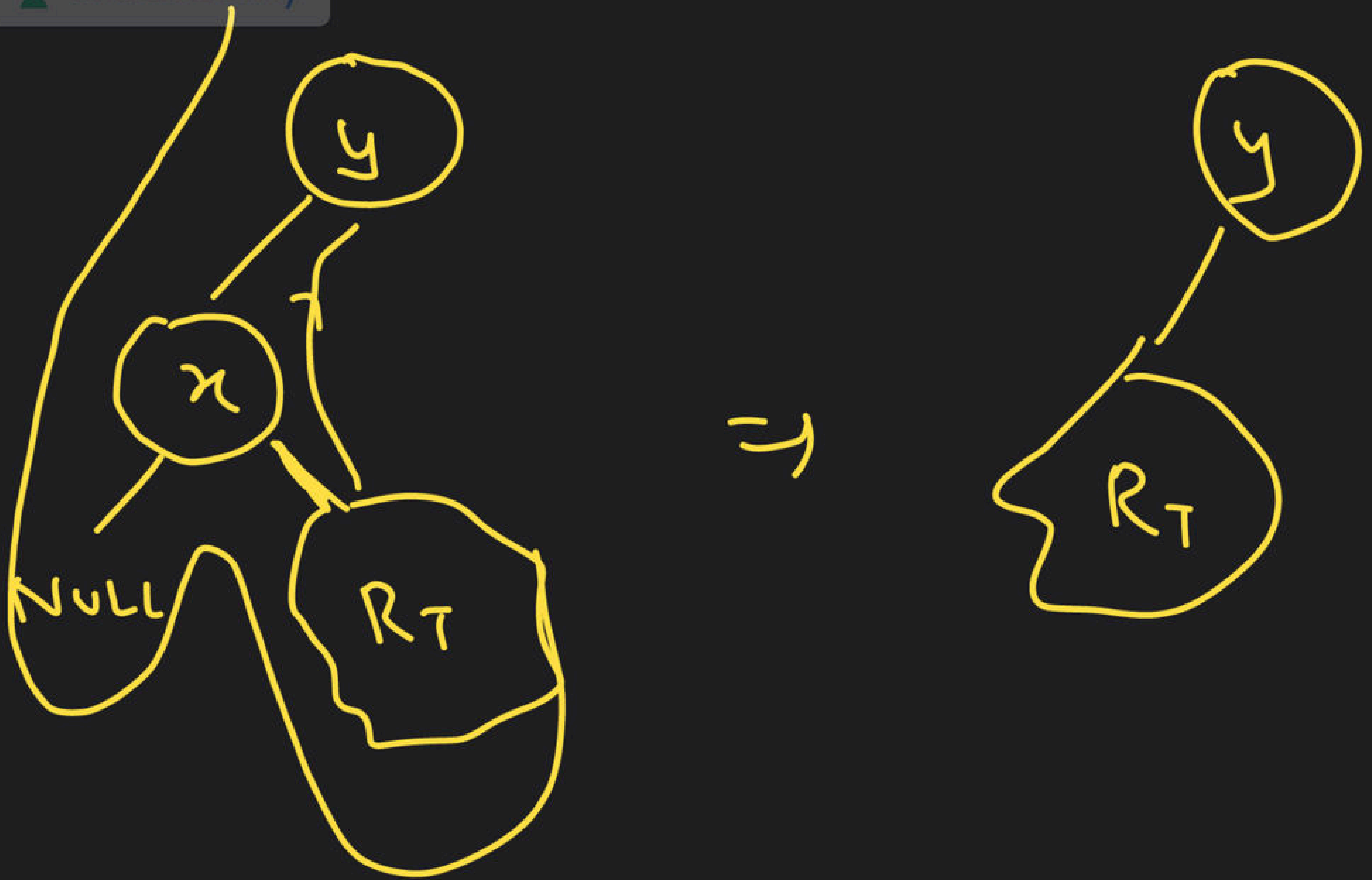
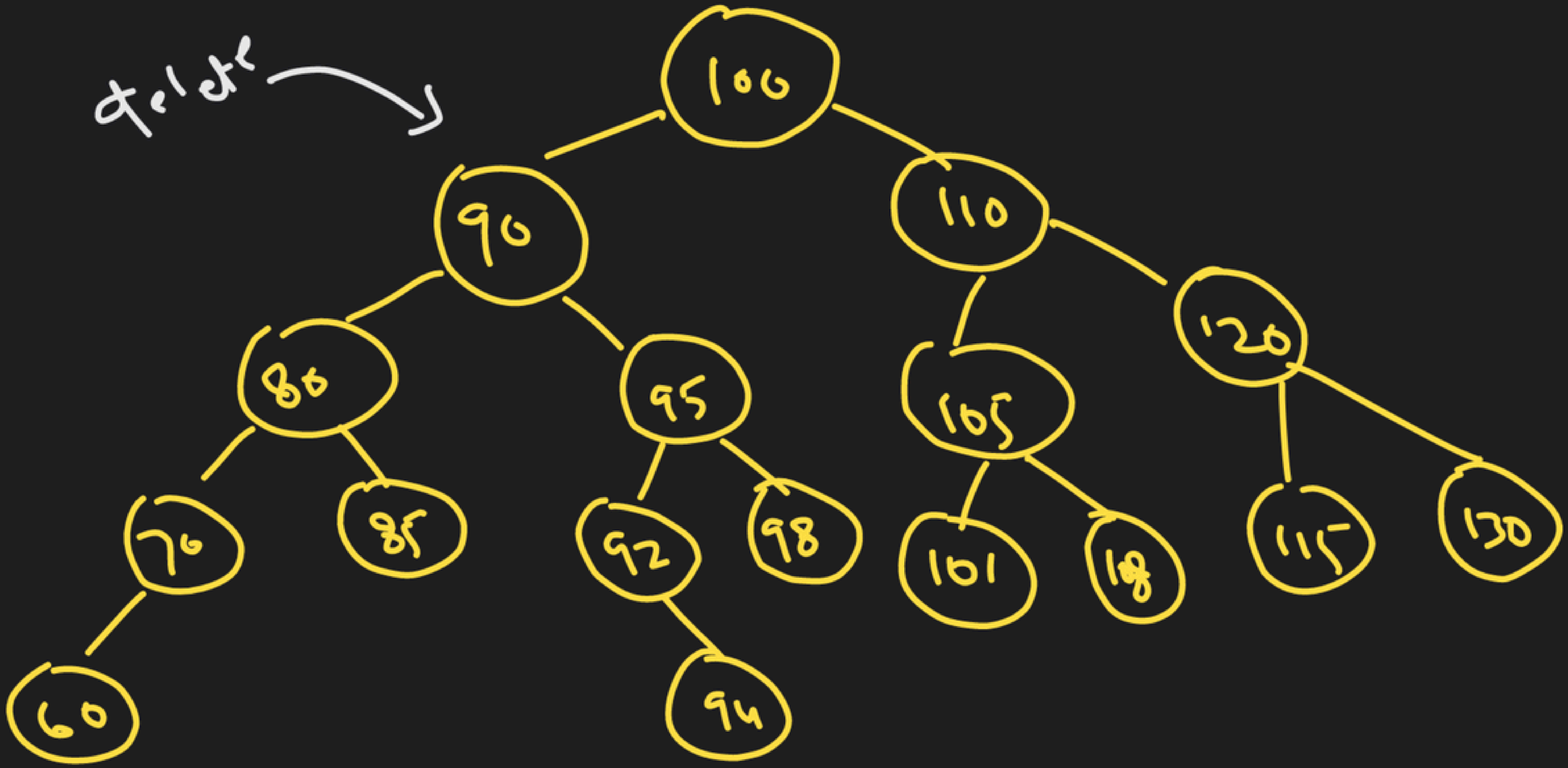
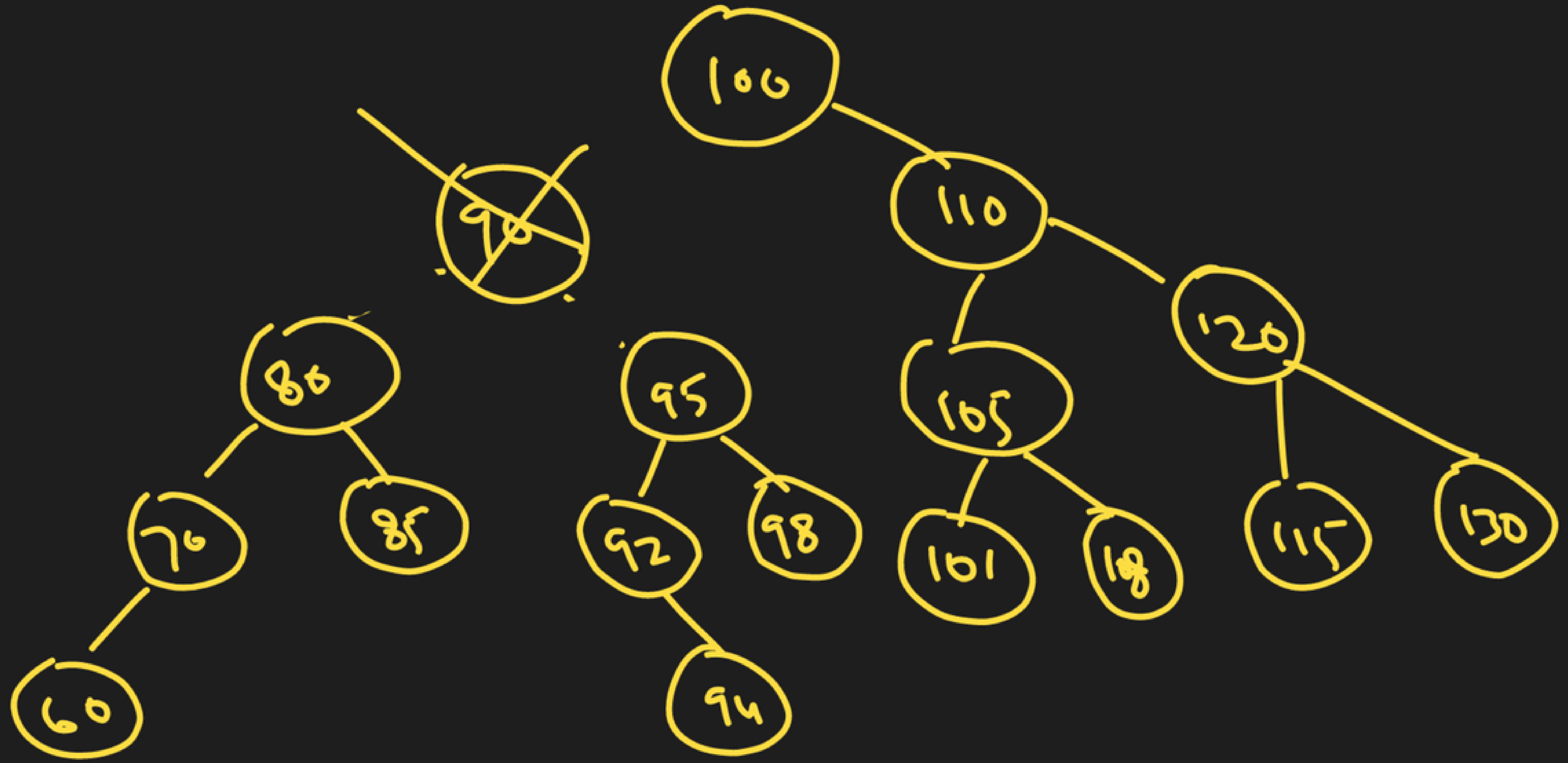


~~x~~, R_T, y

Deletion of node with 2-childs

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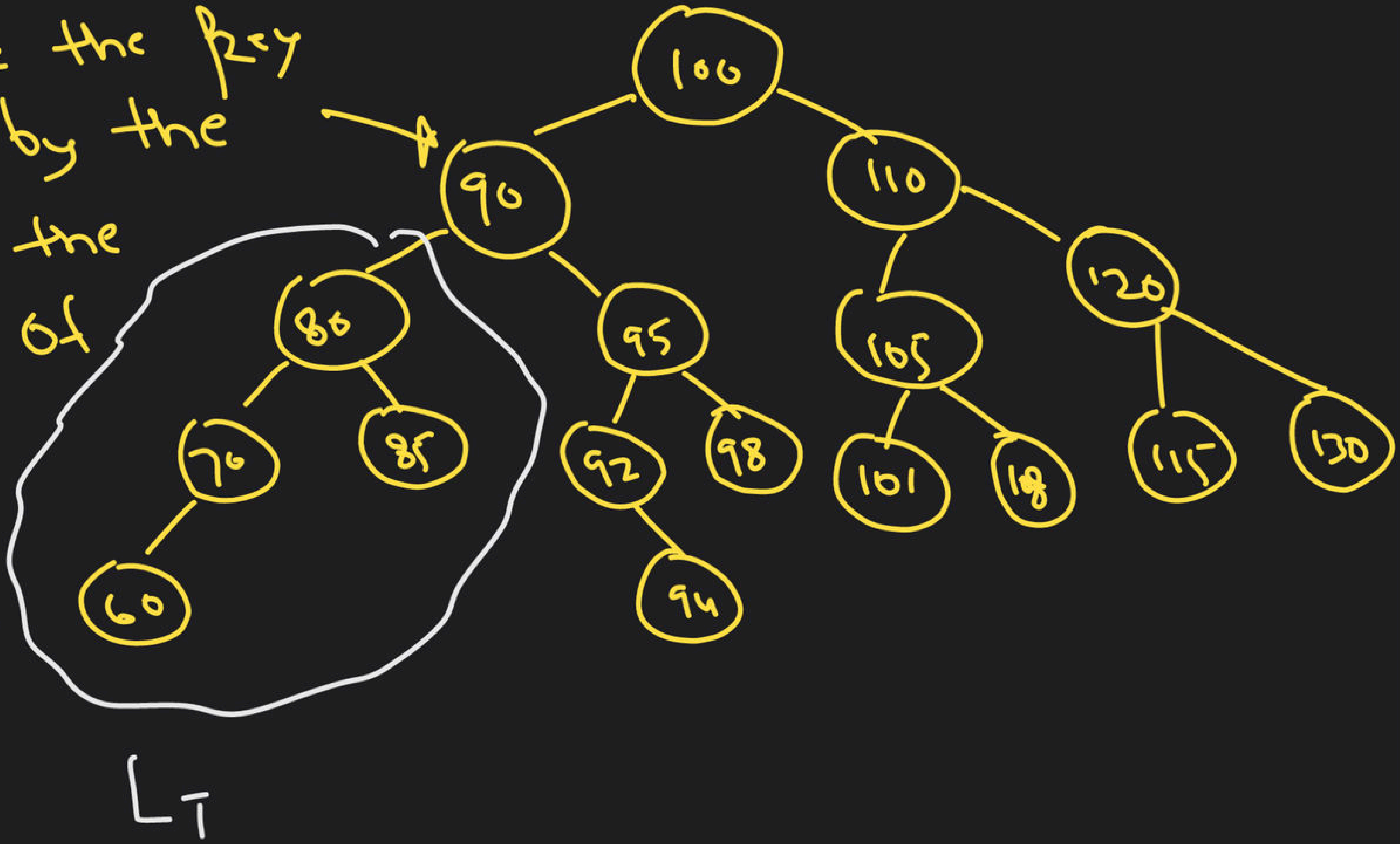
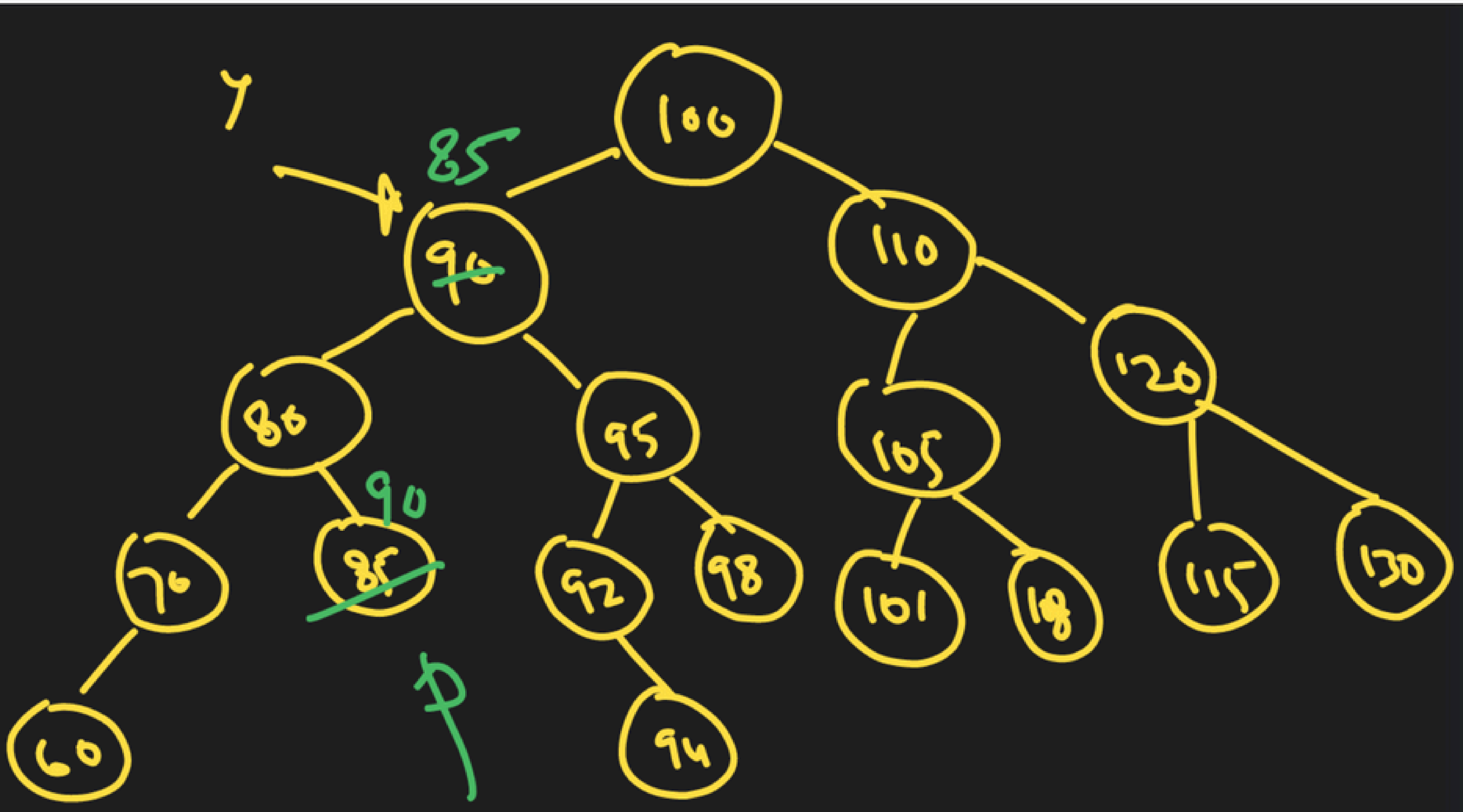
i) 1st way: Replace the key to be deleted by the largest key in the left subtree of node to be deleted & then perform deletion

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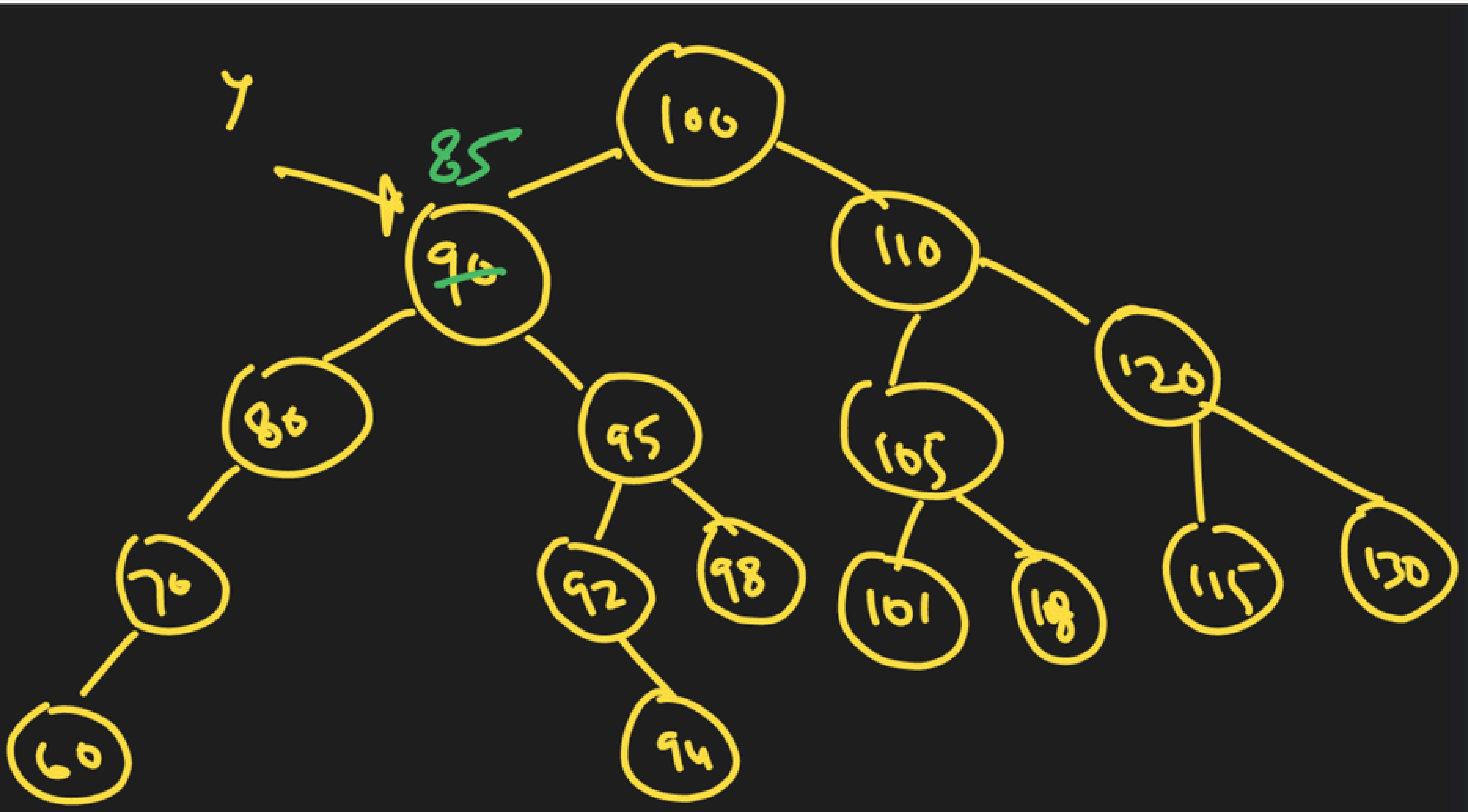
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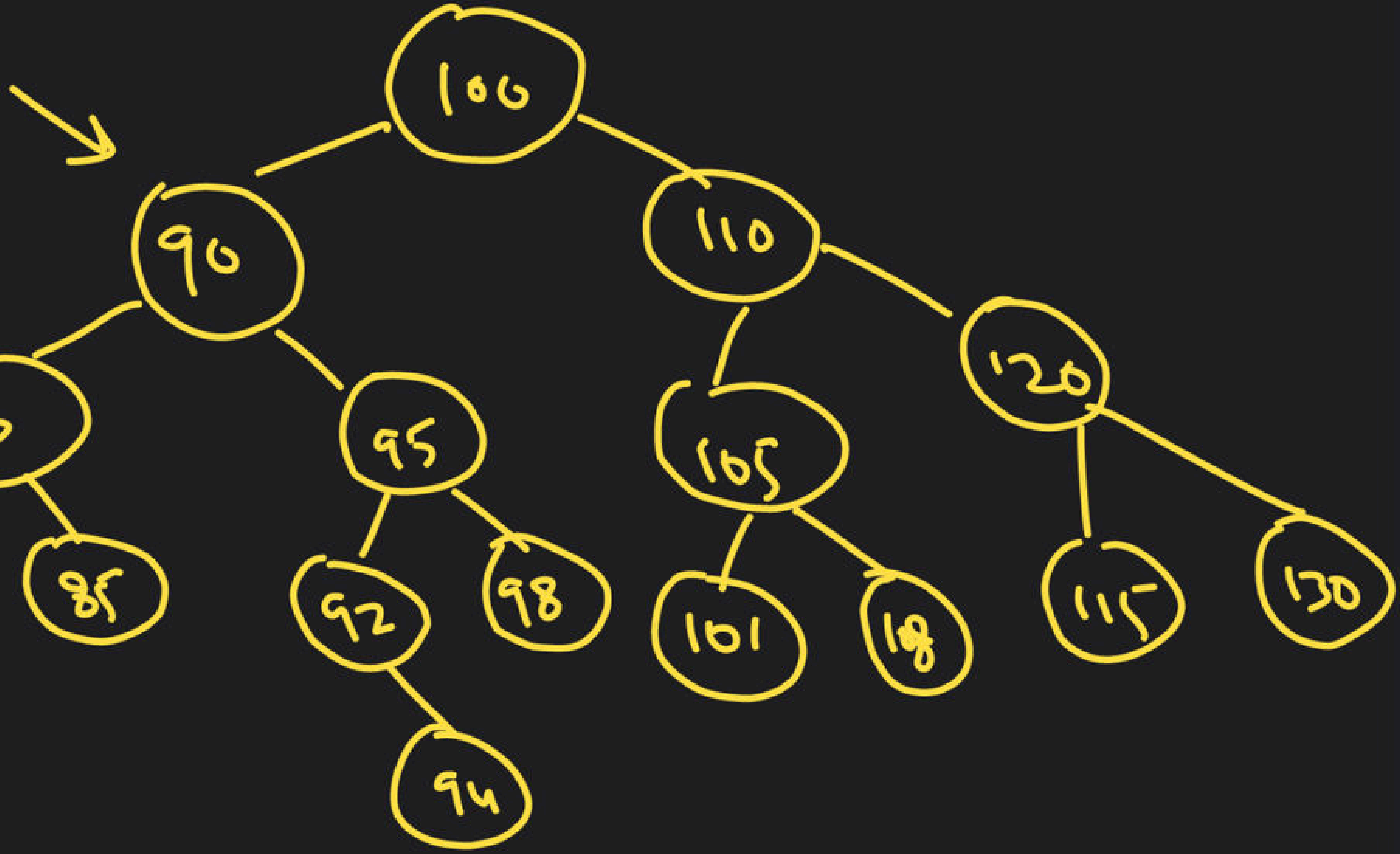
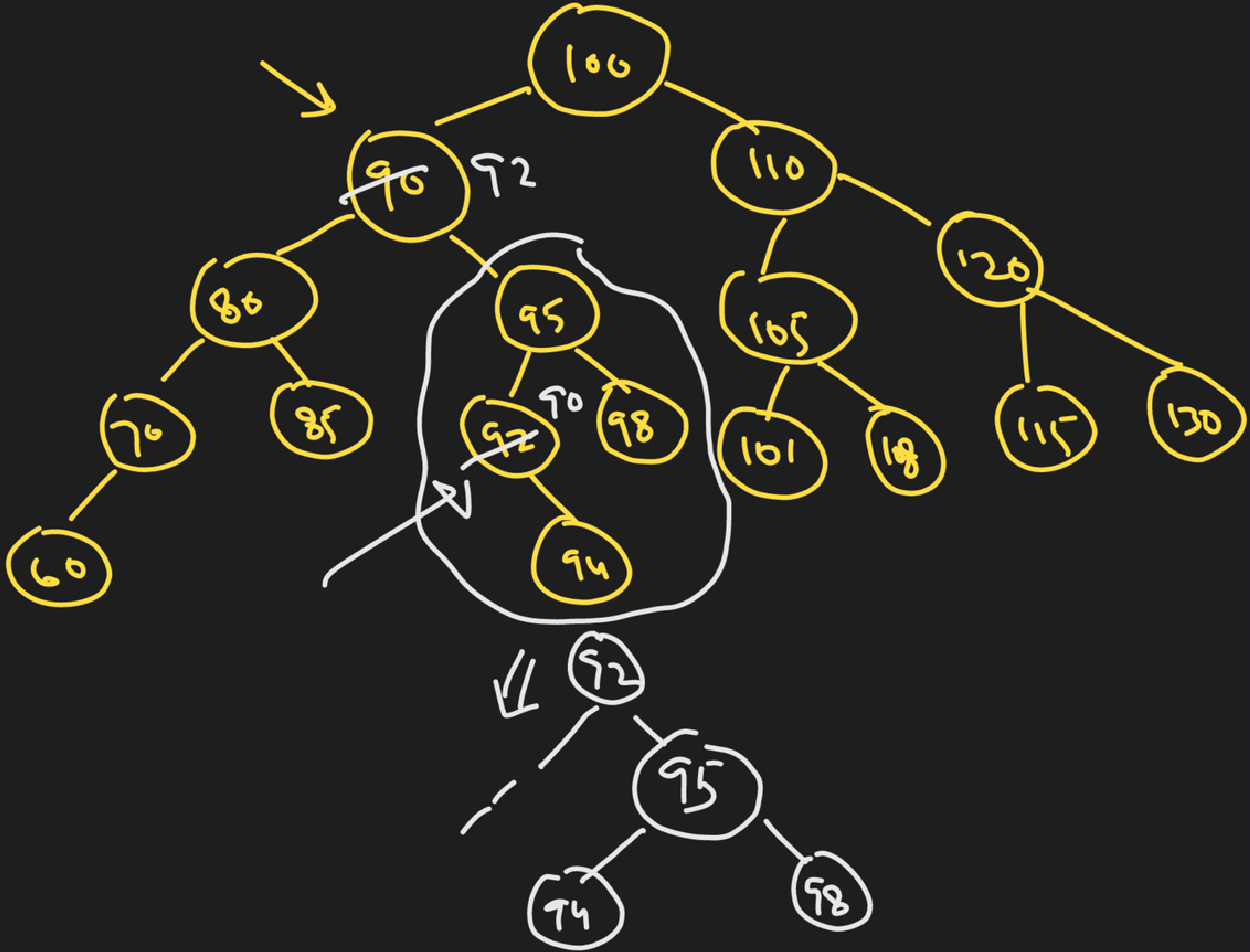
ii) Replace the key to be deleted by the smallest key in the right subtree of node to be deleted & then perform deletion

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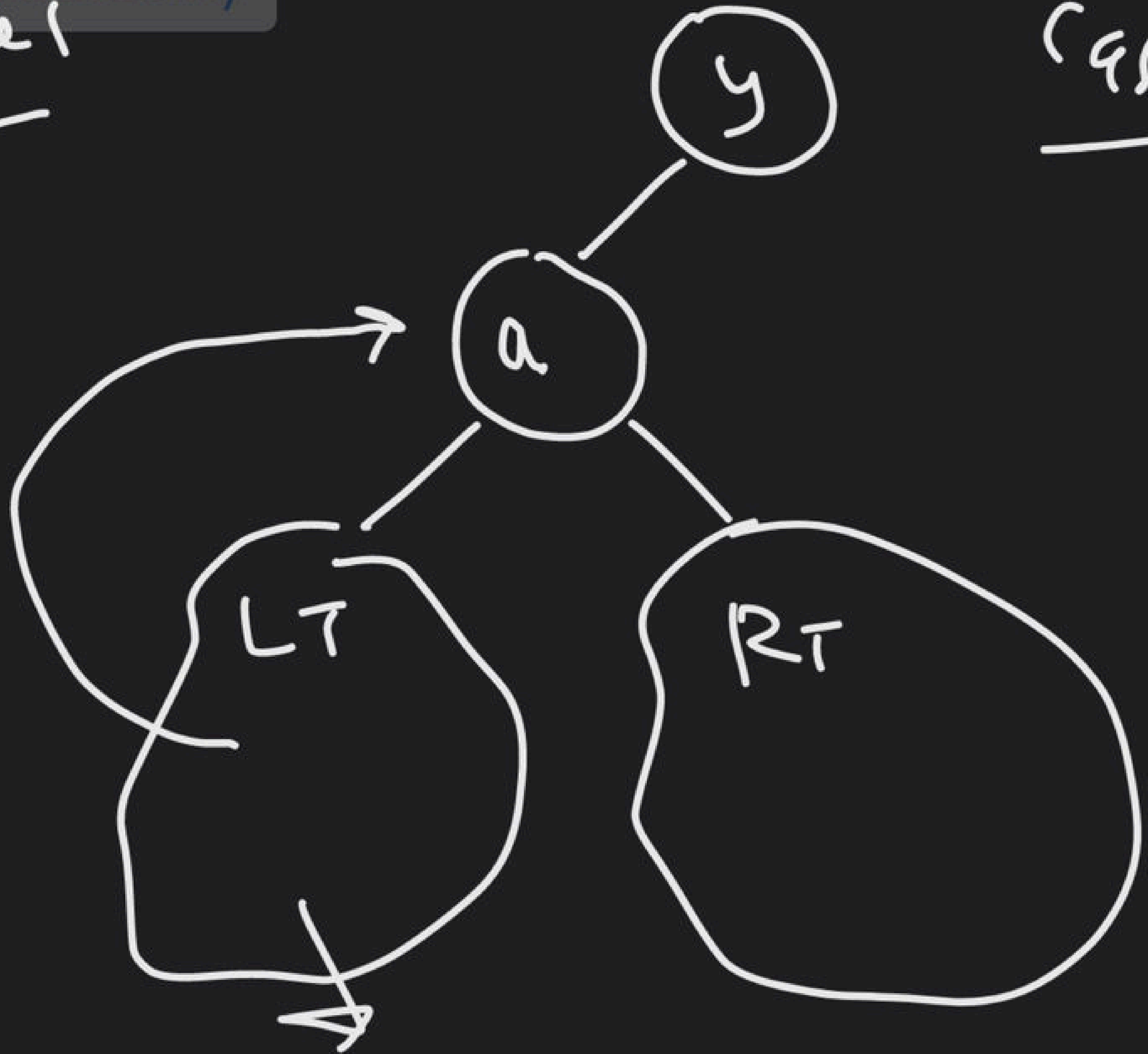
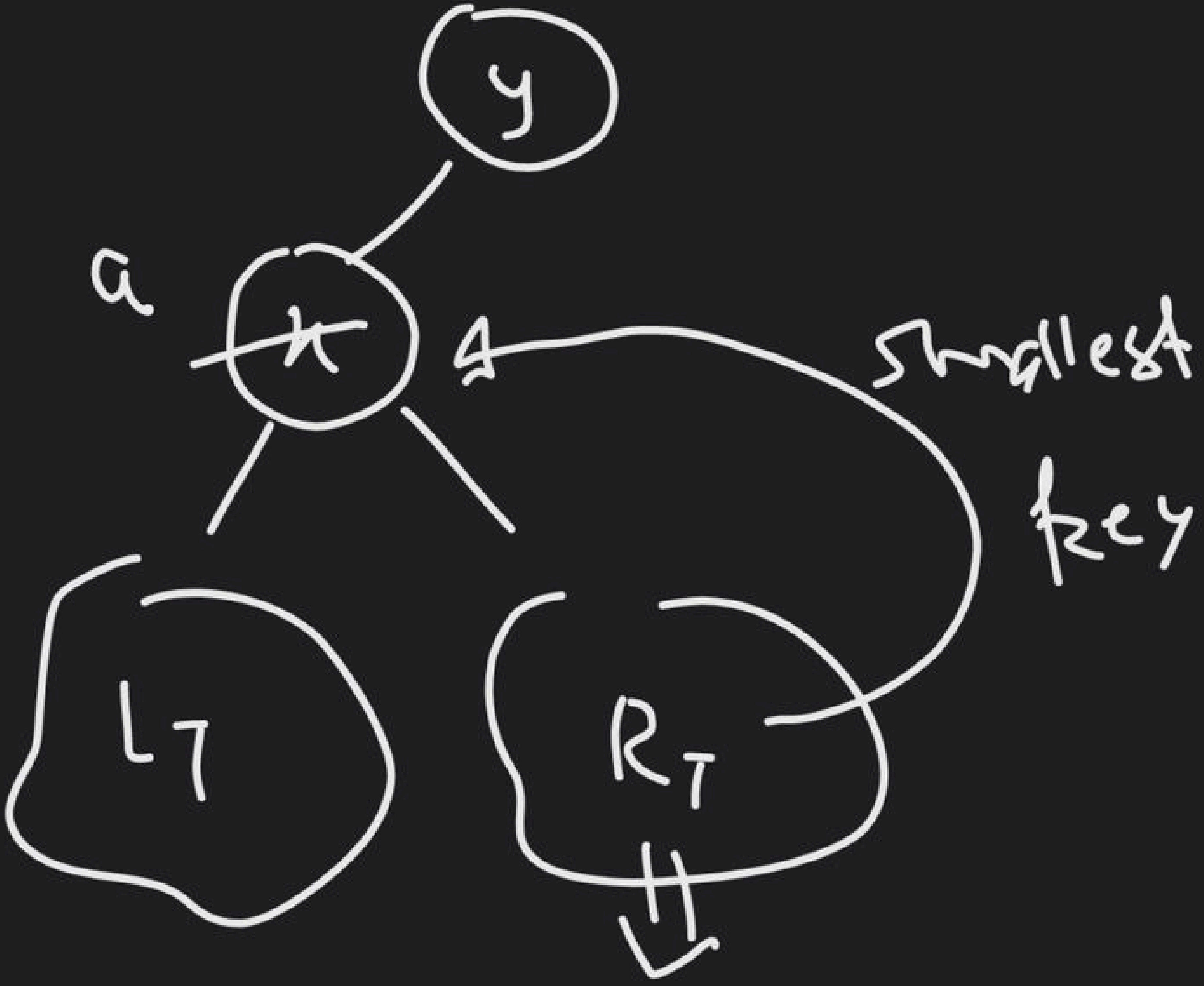
Case 1



Rem. keys are smaller than a

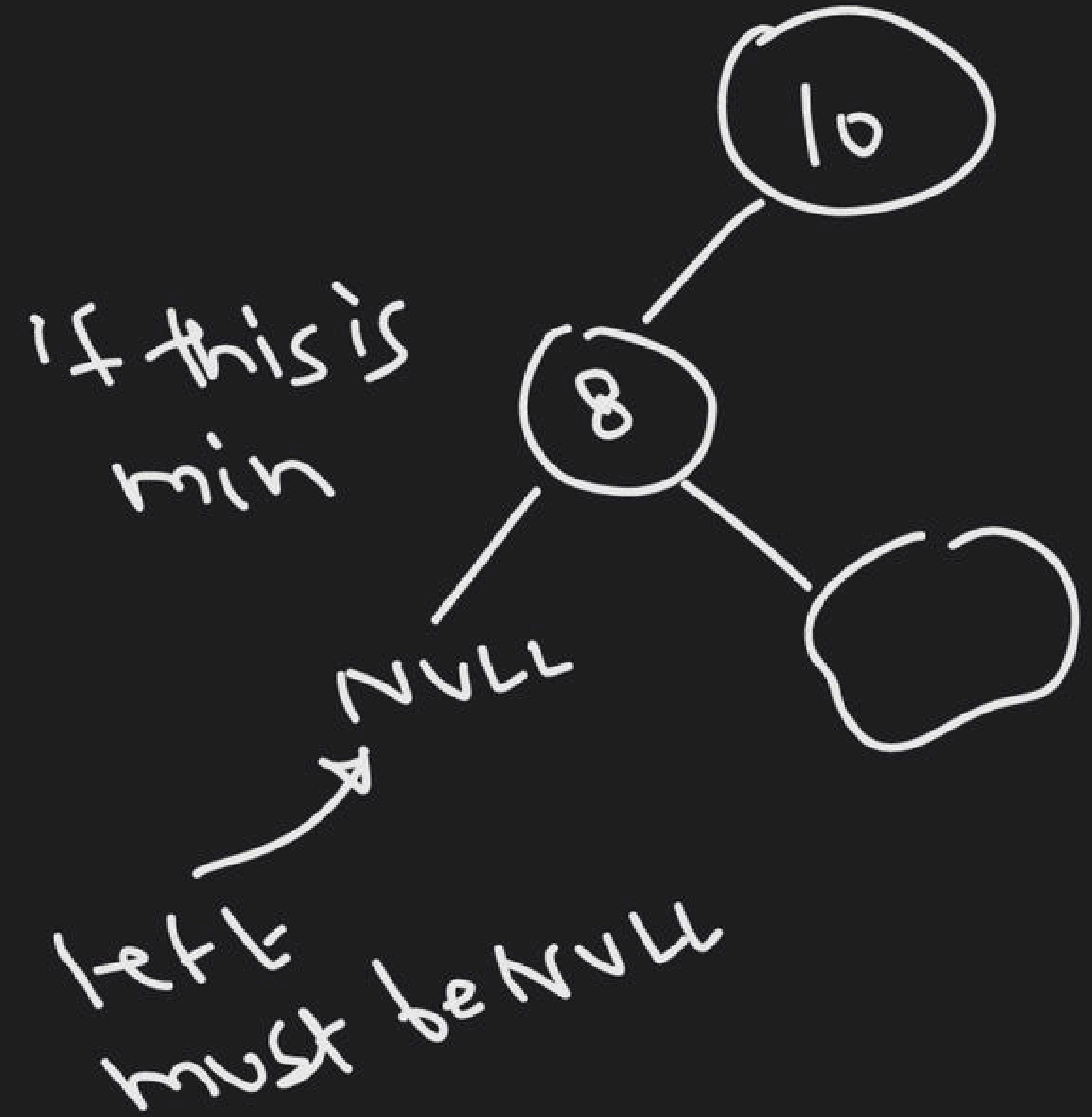
Case 2



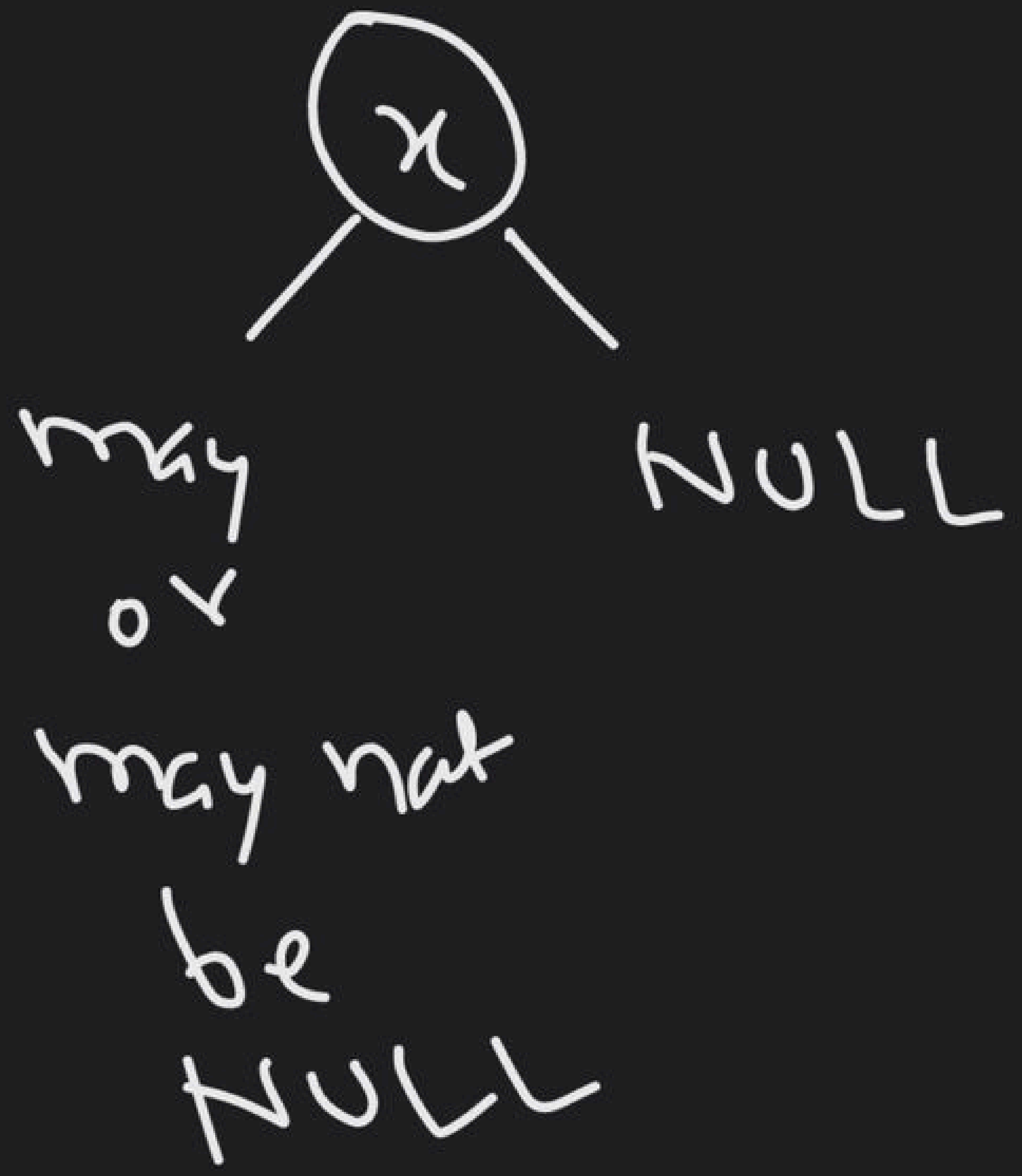
Remaining keys are greater than a

Node with min valve Can have 0 or 1 child

(No child or Only right child)



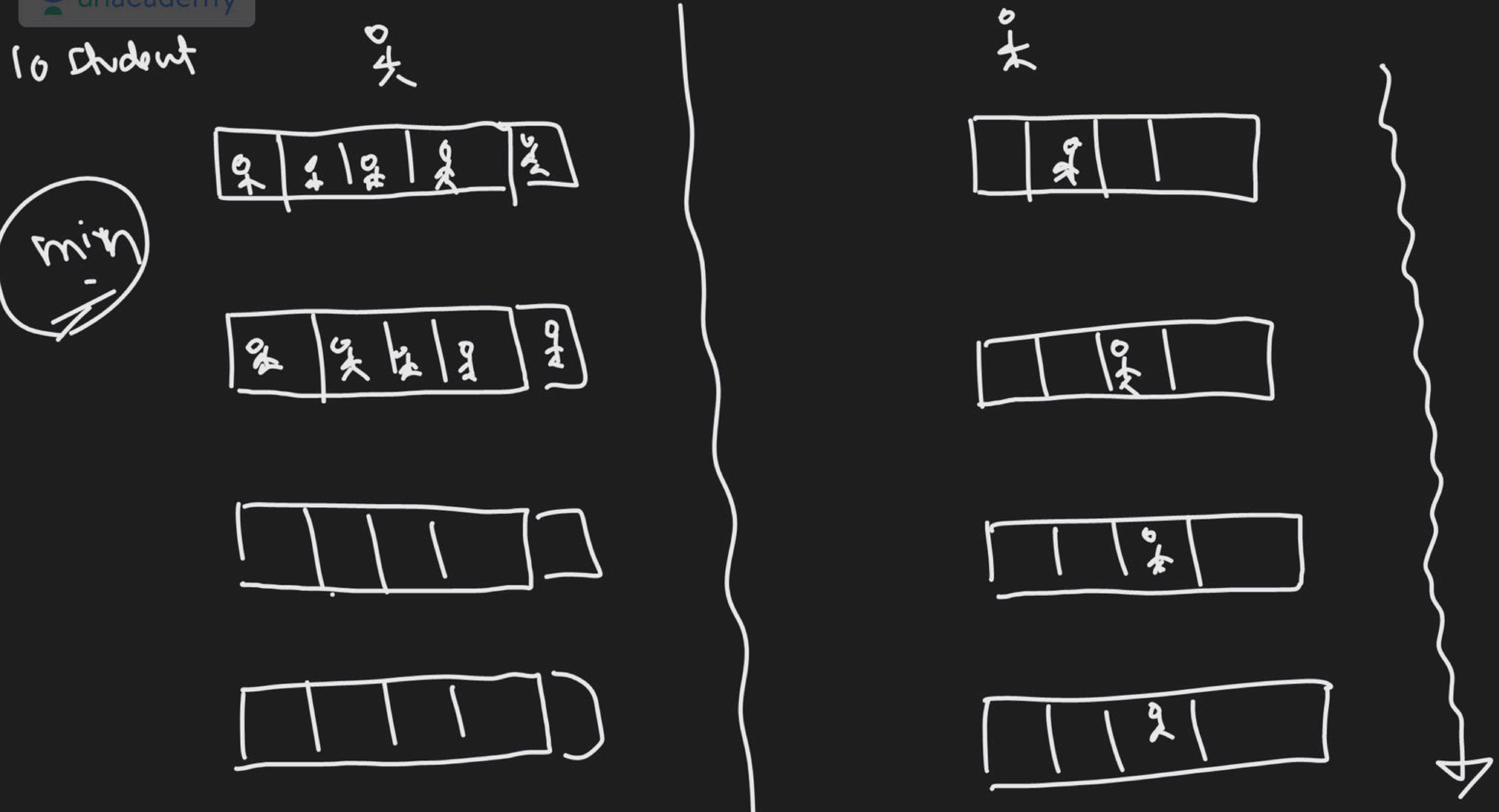
Node with max. value can have 0 or 1 child

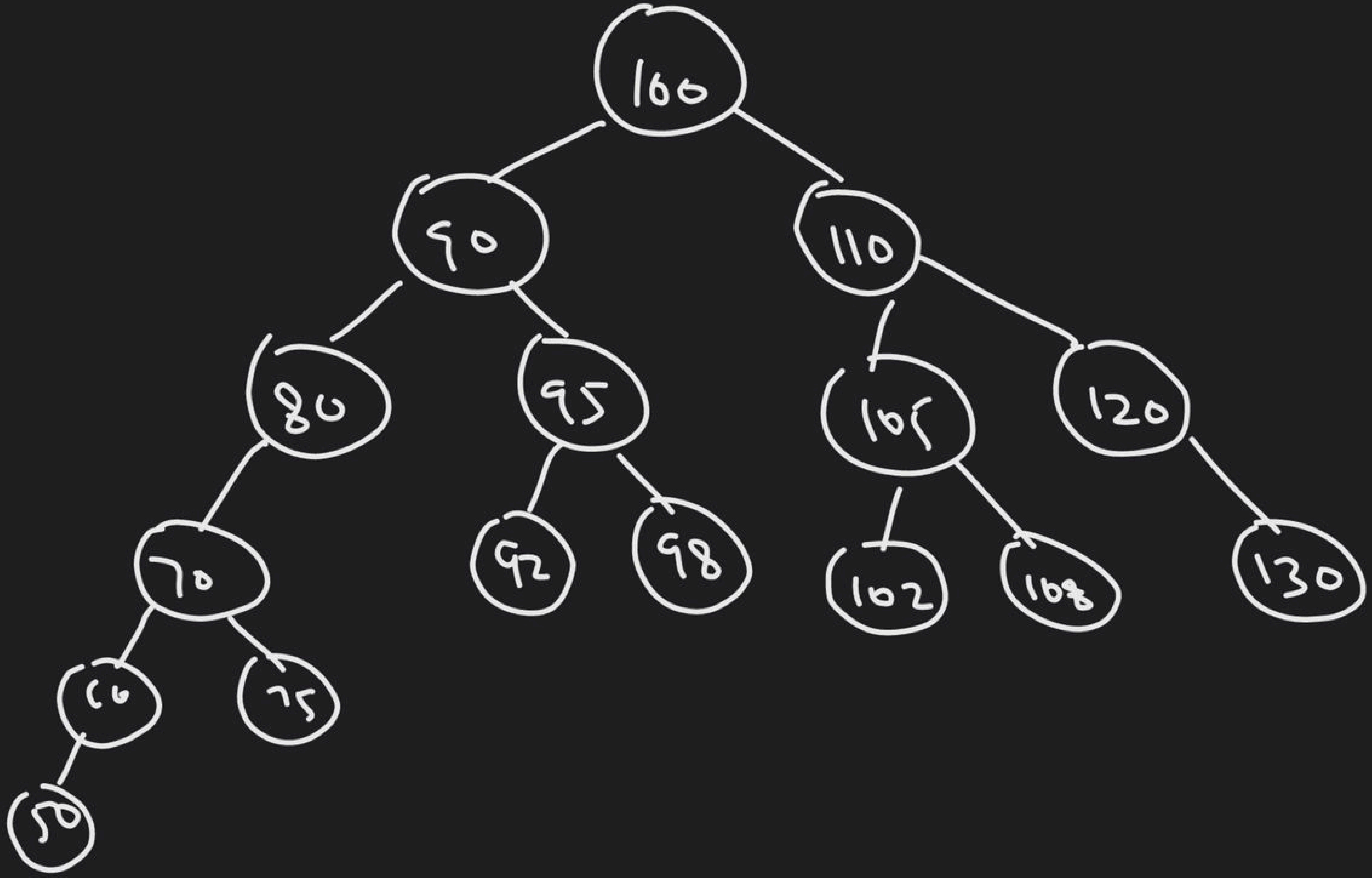


Deletion of node 2 -child → Converted into deletion of node with 0 or 1 child

BST

10 Student

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Balanced BST

10:30 → Coding ✓

5:30 → C

8:00 - Data Structure

YT →

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THANK YOU!

Here’s to a cracking journey ahead!