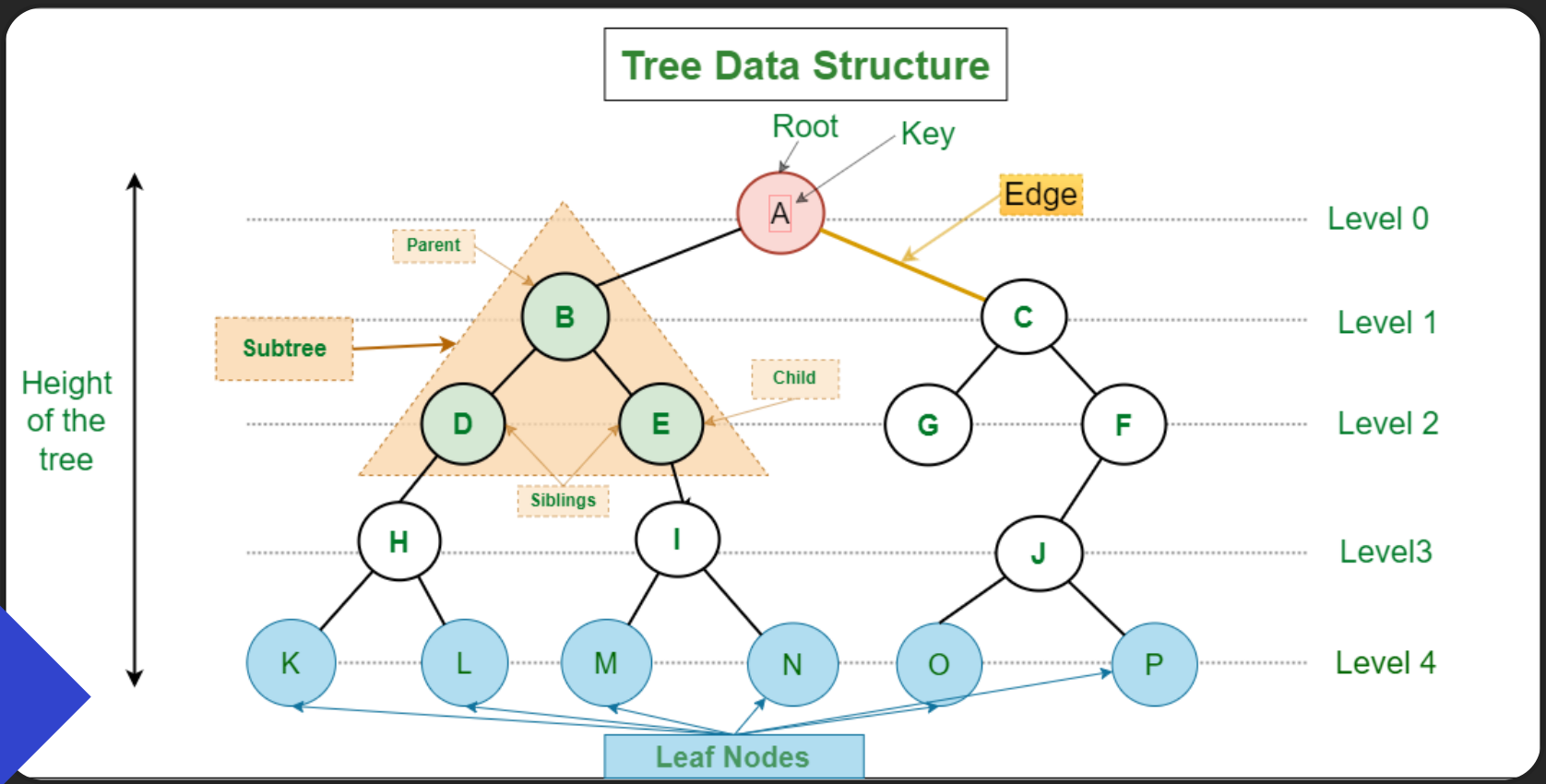
LEARNING GUIDE

TREE: DATA STRUCTURES & ALGORITHMS!



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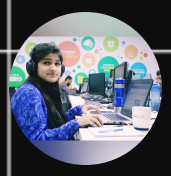
Tree

A tree is a nonlinear hierarchical data structure that consists of nodes connected by edges.

Tree Terminologies

Node: A node is an entity that contains a key or value and pointers to its child nodes.
External/leaf node: The last nodes of each path that do not contain a link/pointer to child nodes.
Internal node: Node that has at least 1 child node.
Edge: It is the link between any two nodes.
Root: It is the topmost node of a tree.



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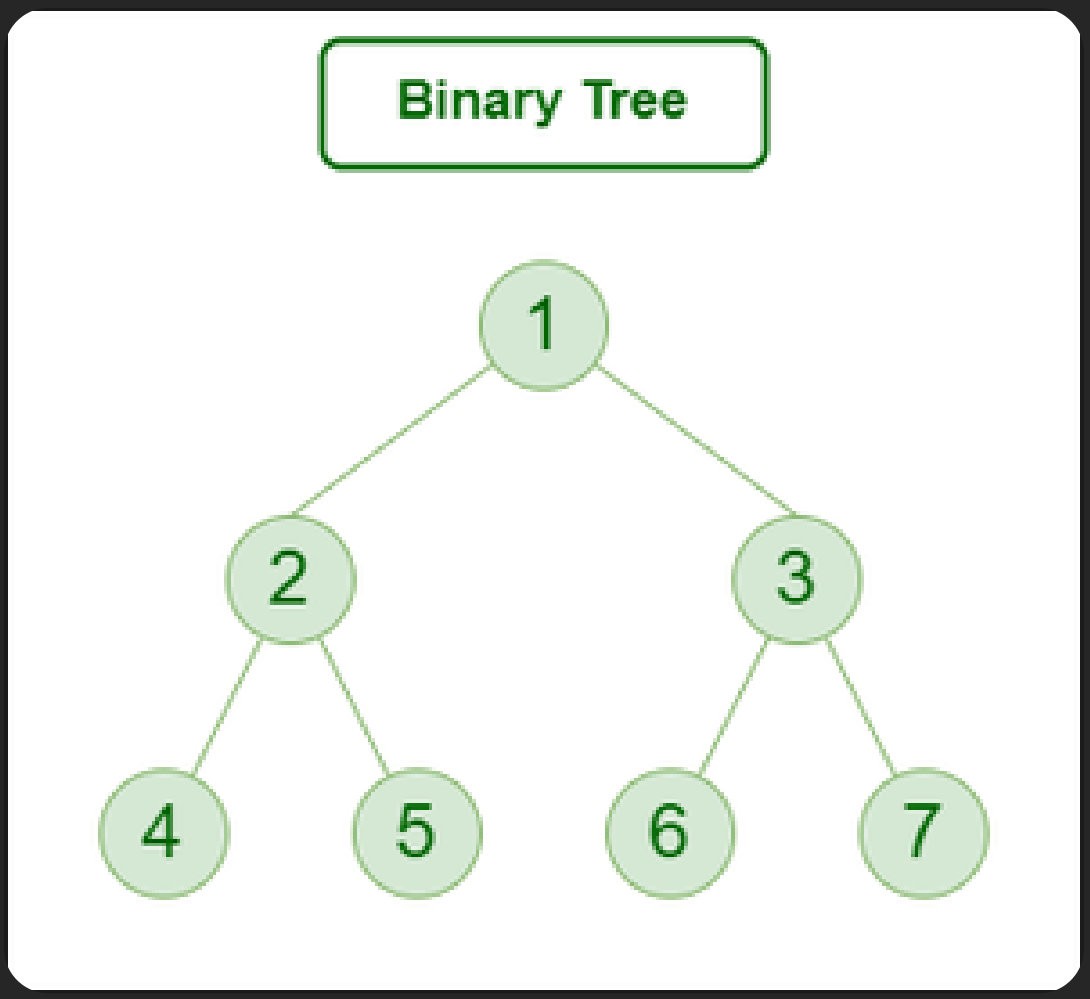
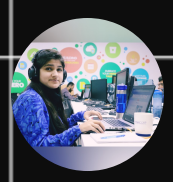
Binary Tree

A tree in which each node (parent) has at most two child nodes (left and right) is called a binary tree.
Example: Consider the tree below. Since each node of this tree has only 2 children, it can be said that this tree is a Binary Tree





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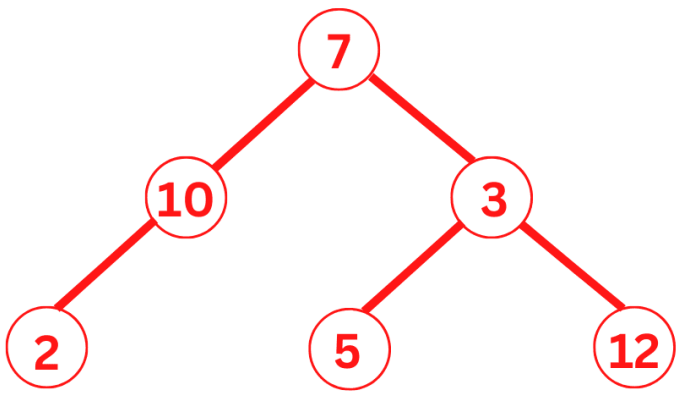
Binary Search Tree

A binary tree where the left child is less than or equal to the parent, and the right child is greater.

❌

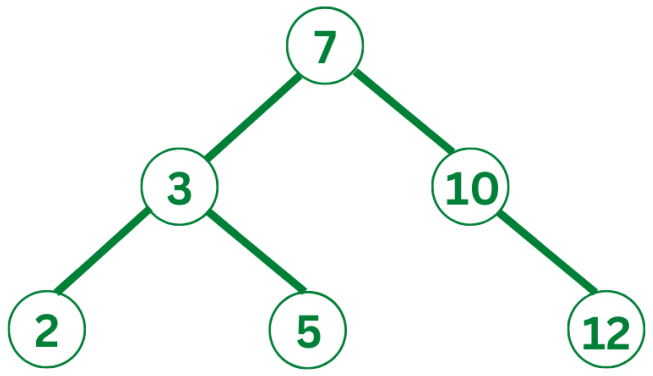
Not a binary search tree



This is just a binary tree

✅

Yes a binary search tree



all values to L (incl. L subtree) are < parent value

all values to R (incl. R subtree) are > parent value

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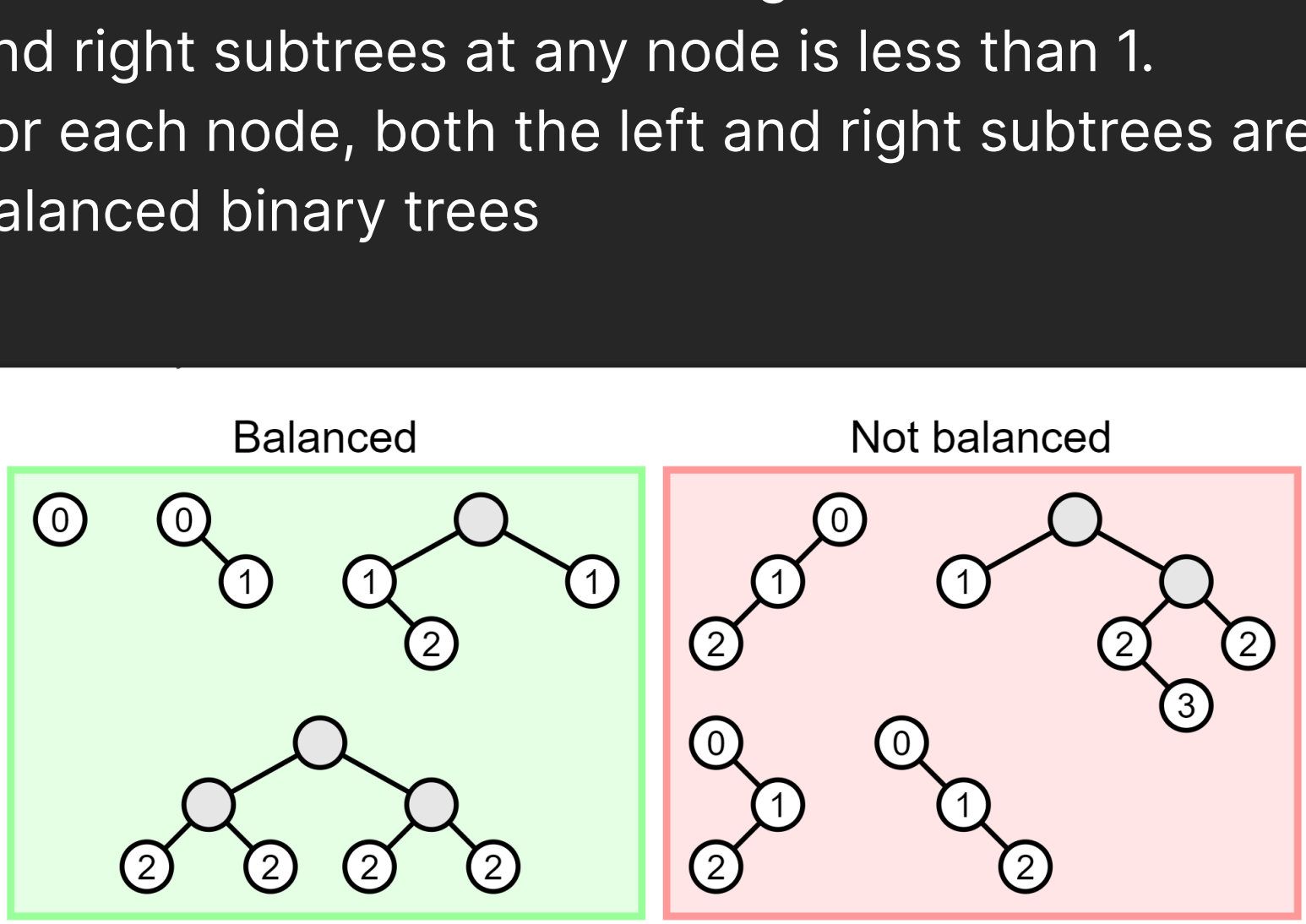
Balanced Binary Trees

A balanced binary tree will follow the following conditions:
The absolute difference in heights between the left and right subtrees at any node is less than 1.
For each node, both the left and right subtrees are balanced binary trees



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