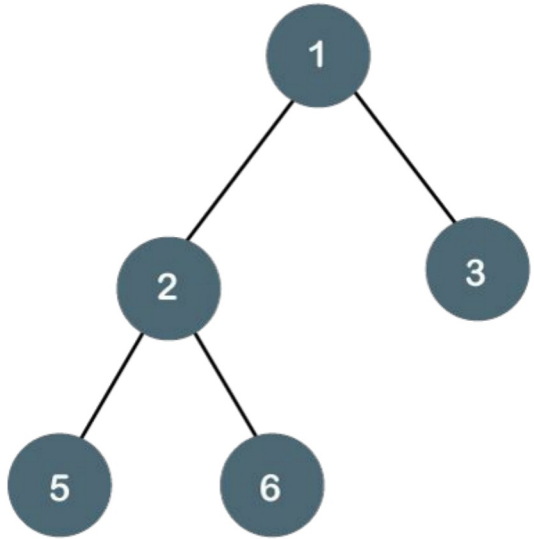
Introduction To Trees

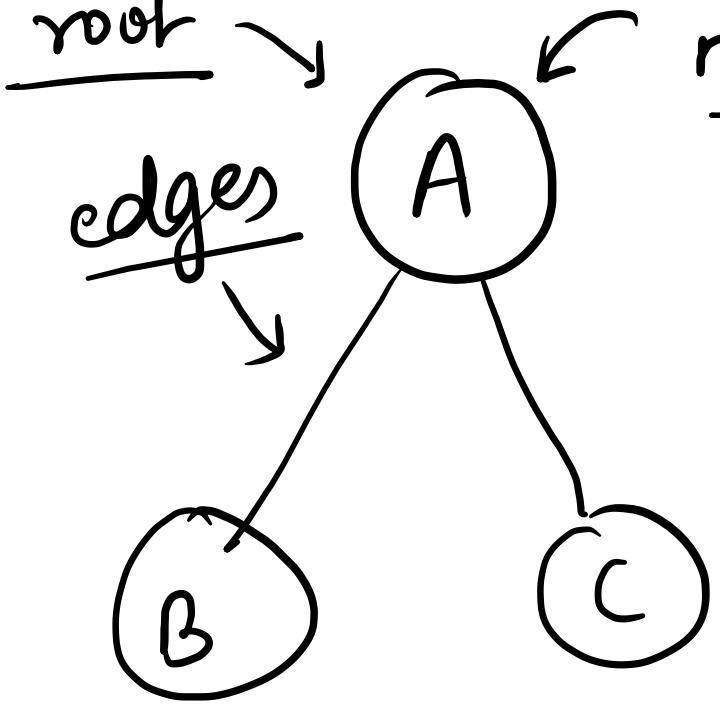
By Gladden Rumao



TREES

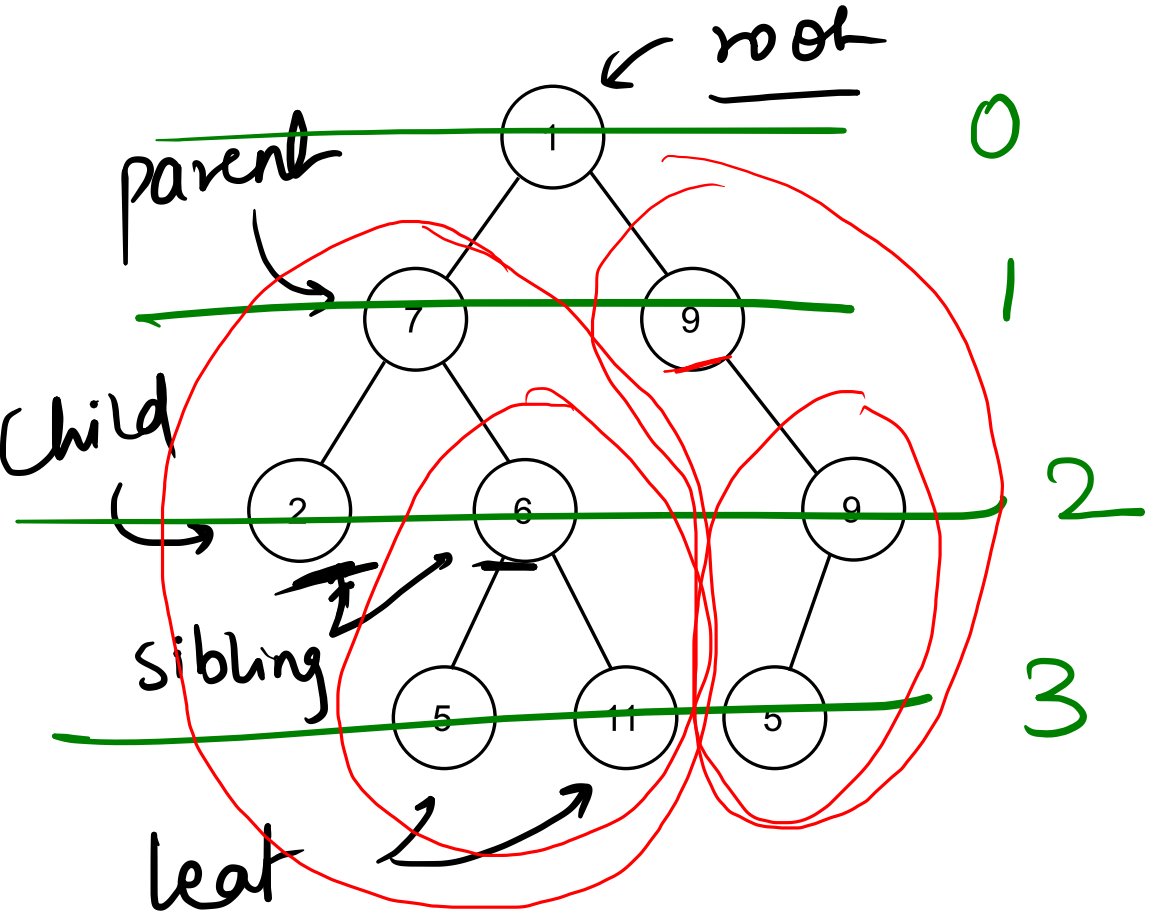
Non-linear data structure

hierarchical structure



Collection of Nodes connected by edges

Tree


root
parent
child
sibling
leaf
0
1
2
3
1
7
9
2
6
9
5
11
5

① Parent Node

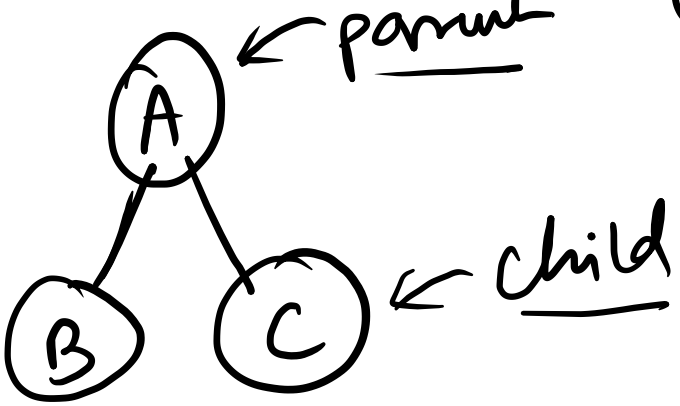
Predecessor of a Node

(Node having child node)

(2) Child Node

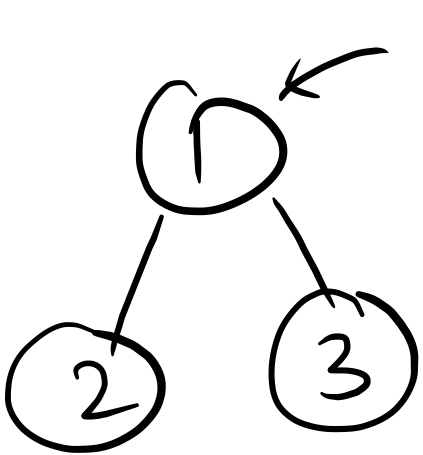
Successor of a Node

(Node having parent)



③ Root Node

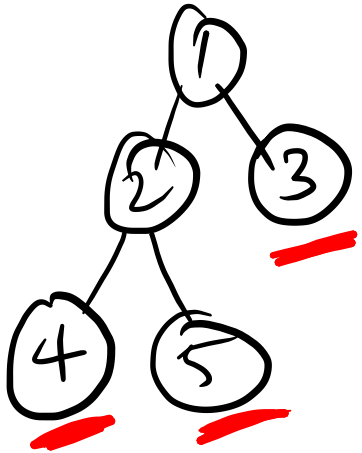
topmost Node of the Tree



(Root does not have parent)

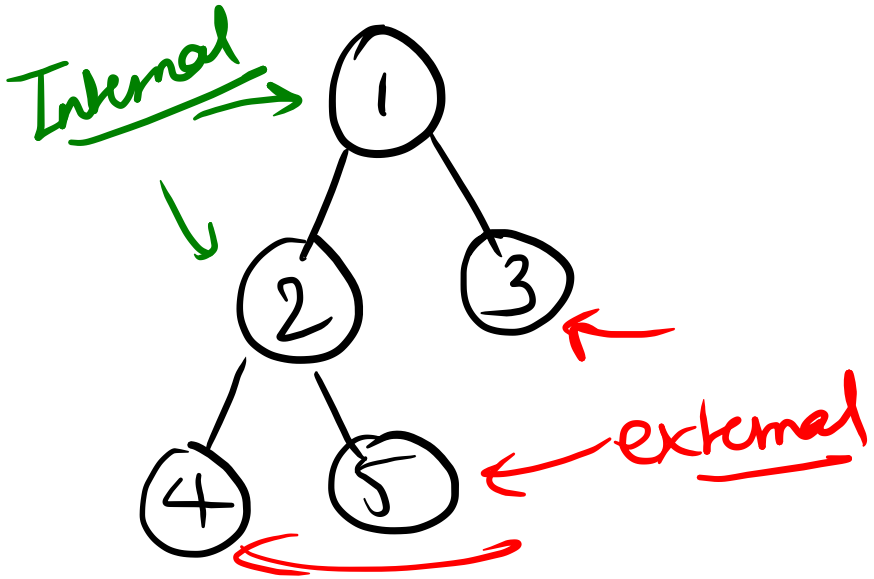
④ Leaf Node / External Node

→ Nodes which do not have child Nodes



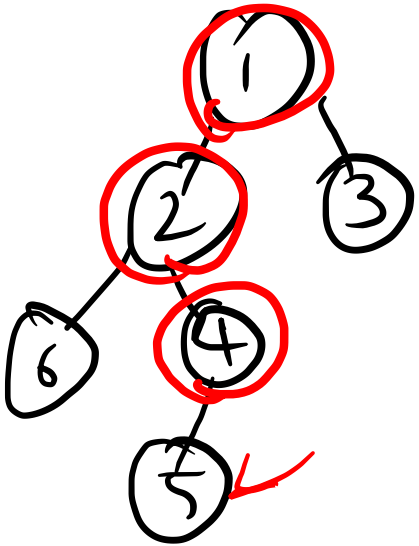
5 Internal Node

↳ Nodes having atleast one child



(6) Ancestor Node

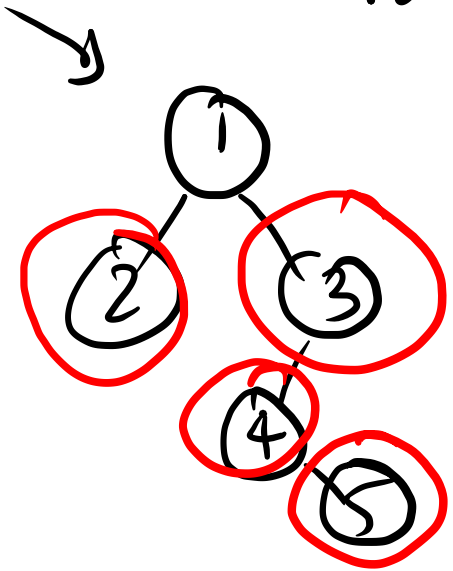
Any predecessor node on the path of the root to that Node.



(1), (2), (4) are ancestors of (5)

(7) Descendant

Any successor node on the path from leaf node to that Node



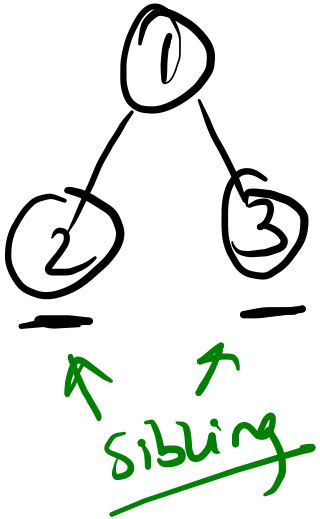
3, 4, 5

descendants of

1

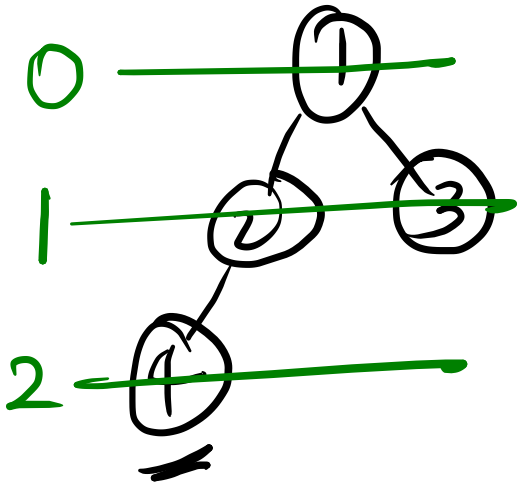
(8) Sibling

Nodes having same parent
(children of same parent)



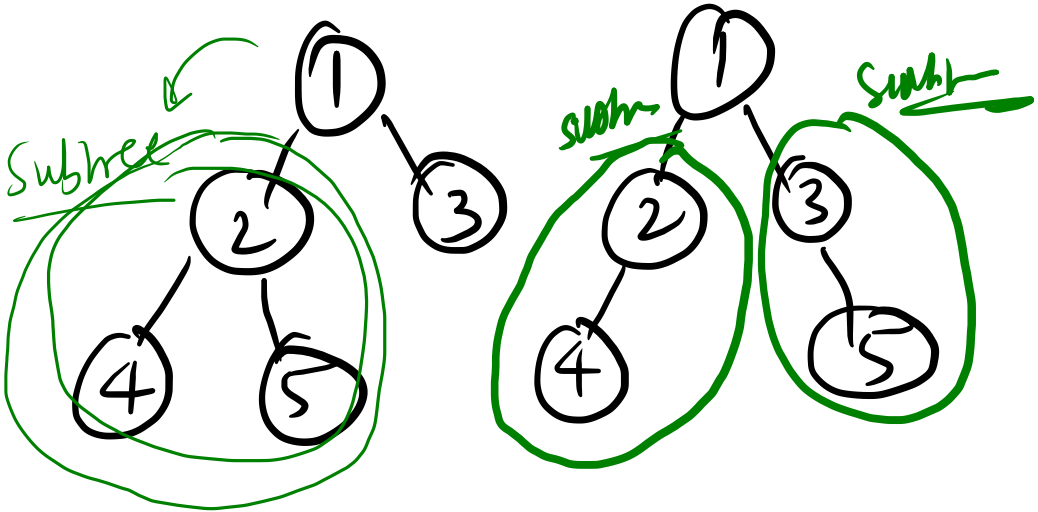
⑨ Level

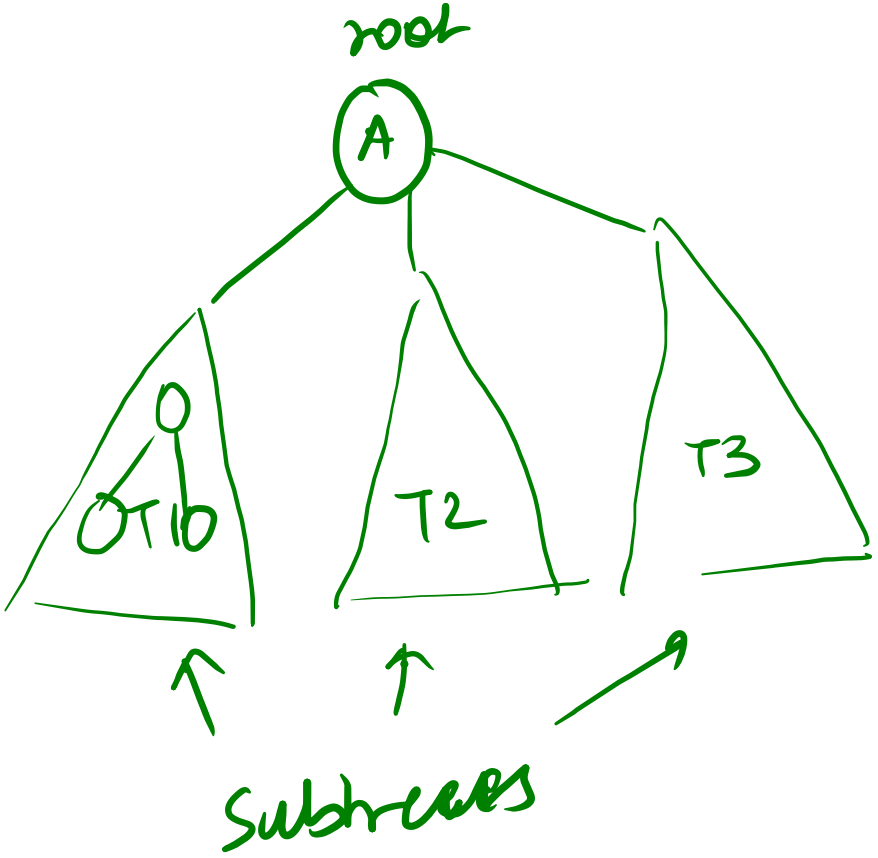
count of edges on the path from root to that node



10 Subtree → descendant

Child tree of node

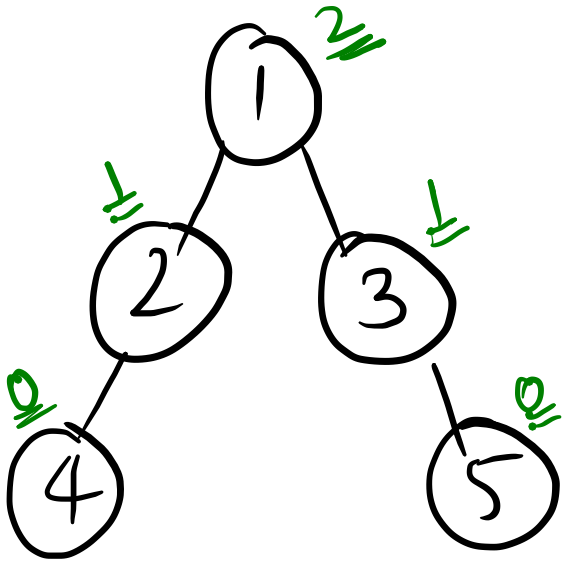


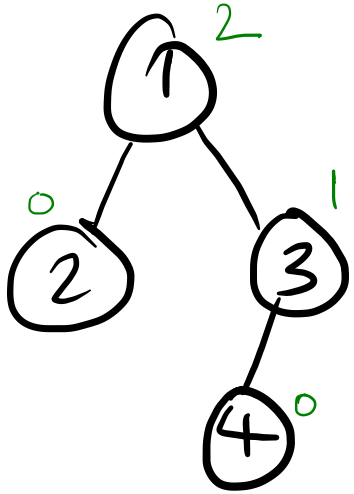

root
A
T1
T2
T3
subtrees

Binary Tree

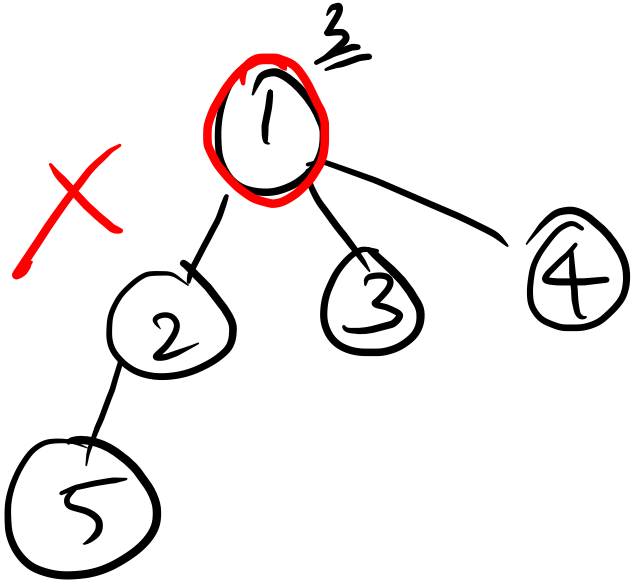
- Each node has maximum 2 child nodes

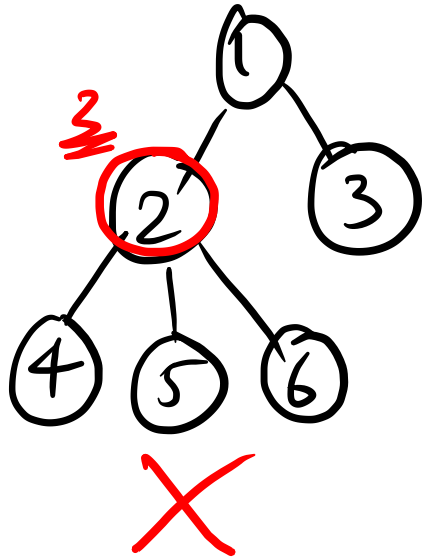
0, 1, 2





Binary Tree

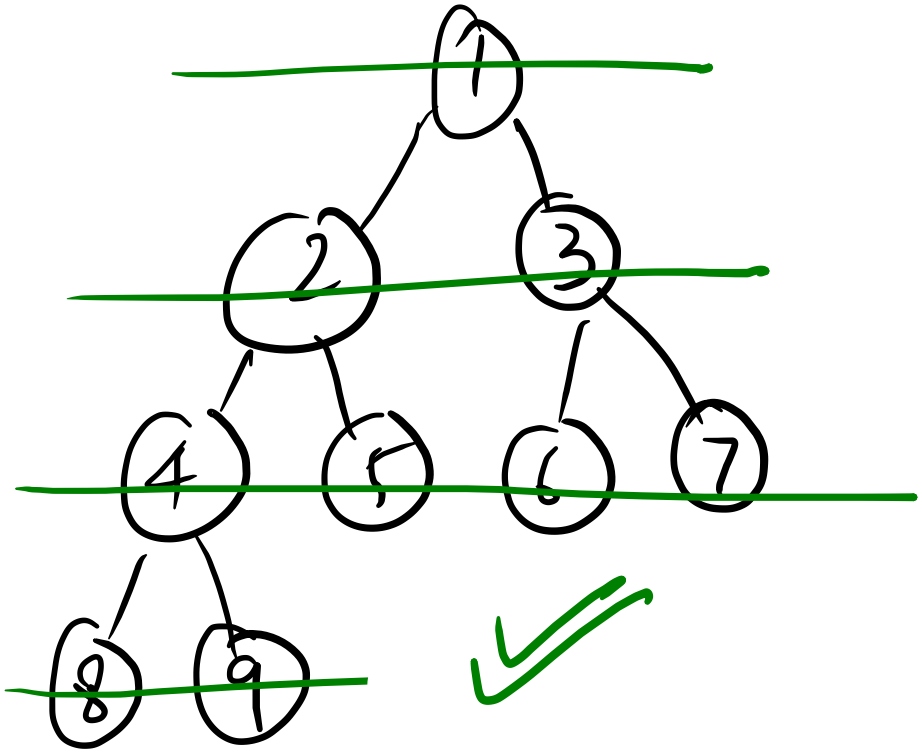




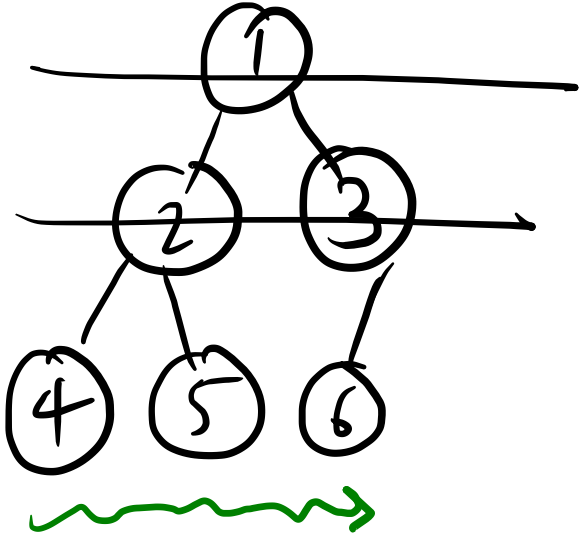
Not a Binary Tree

Complete Binary Tree

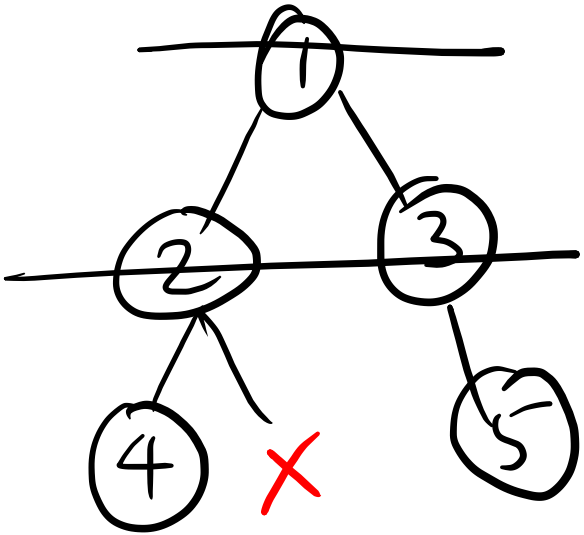
- All levels are completely filled except last one
- Nodes filled from left to right



CBT

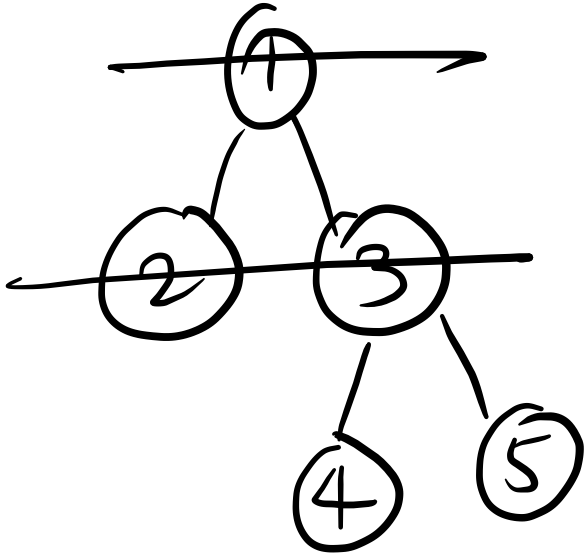


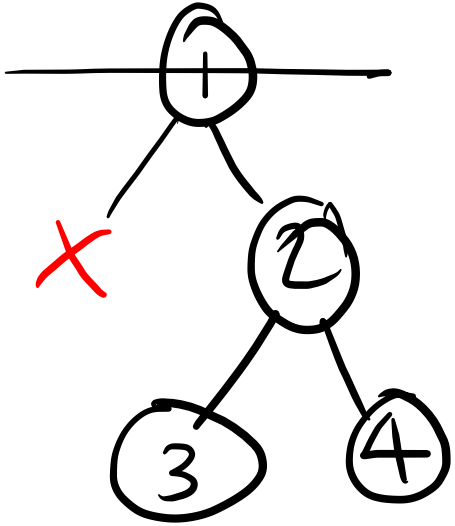
CBT



BT ✓

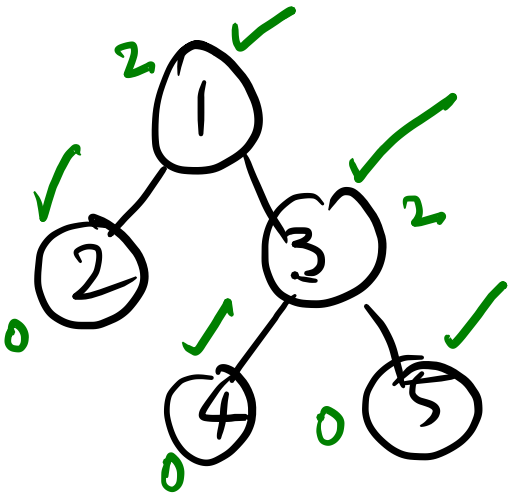
CBT X

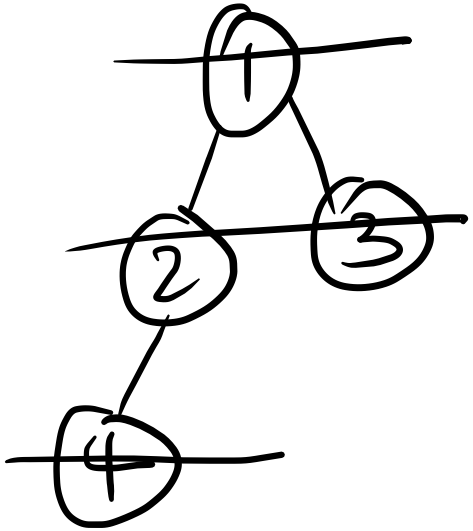

1
2
3
4
5


1
2
3
4

Full Binary Tree

All nodes have either 0 or 2 child nodes

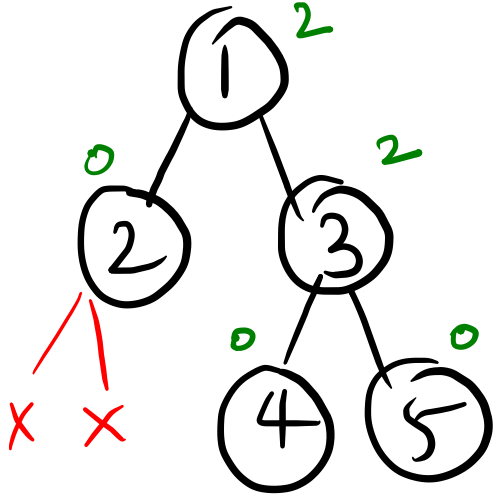




BT ✓

CBT ✓

FBT X



BT ✓

CBT X

FBT ✓

Binary Tree

Each node → maximum 2 child nodes

Complete Binary Tree

All levels except last completely filled
Nodes filled from left to right

Full Binary Tree

All nodes have 0 or 2 child nodes