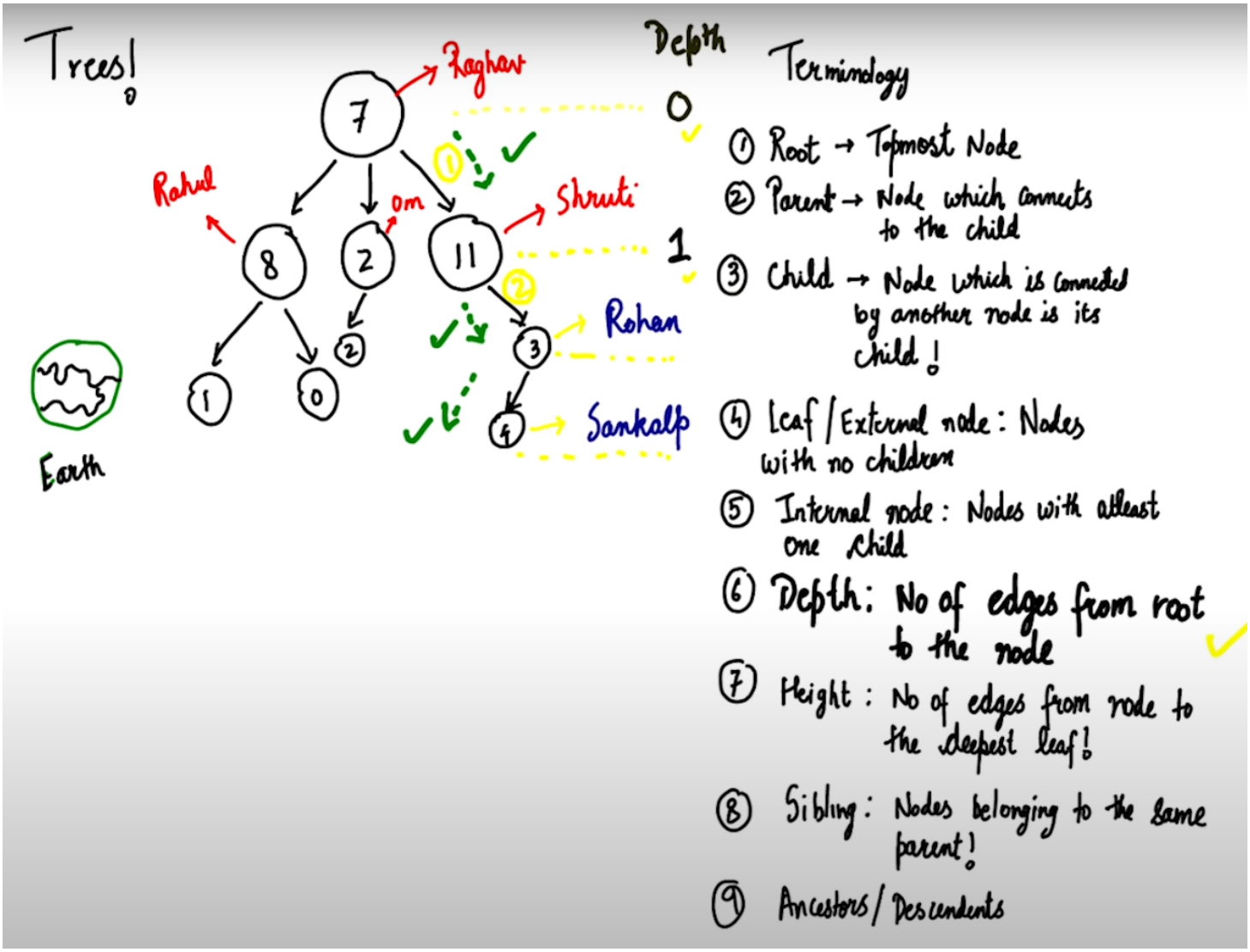
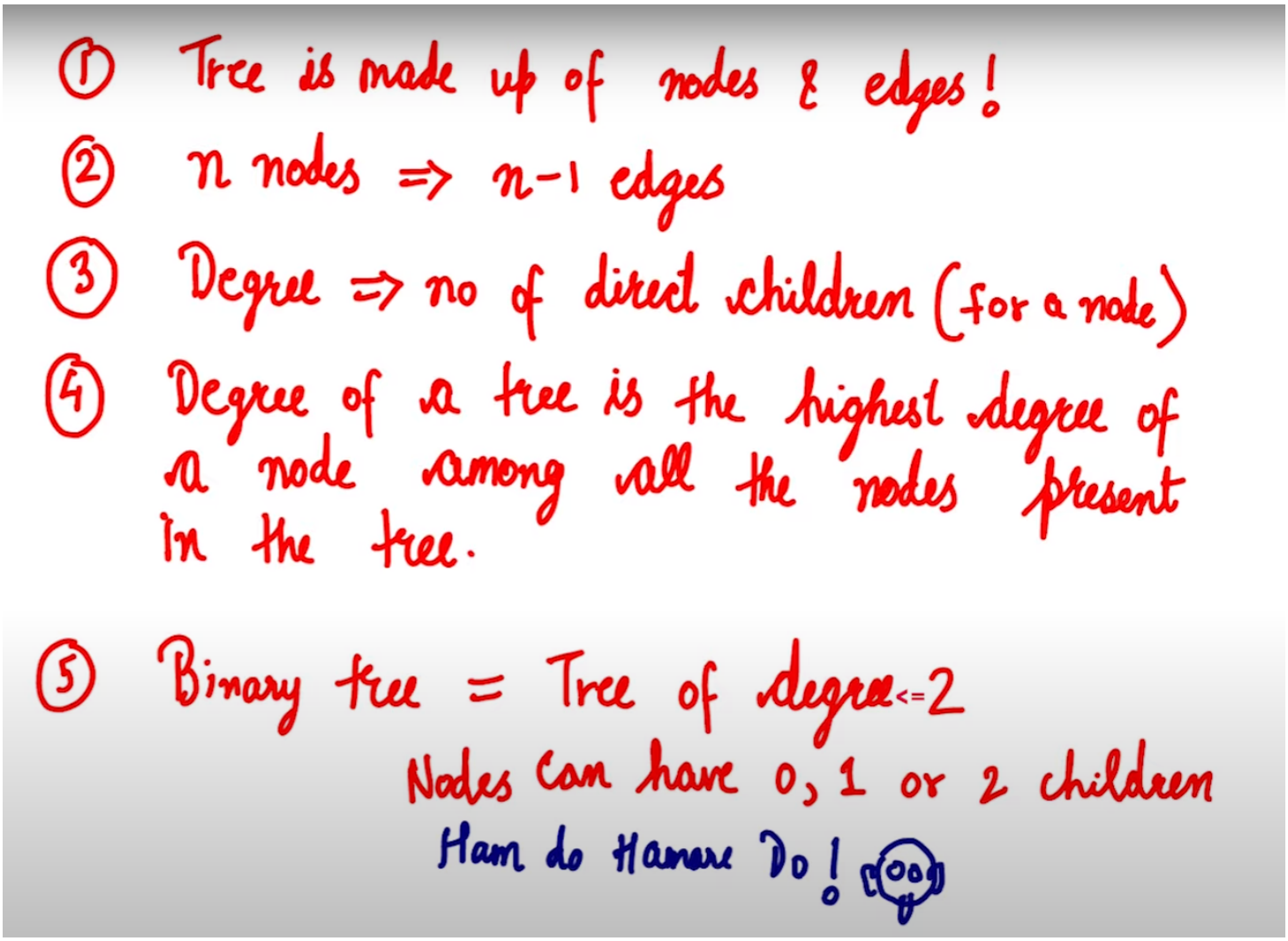
Trees

Terminologies for trees



Binary Tree

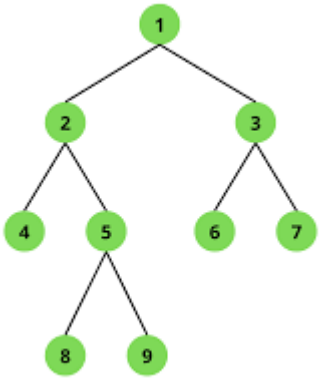
A binary tree is a type of tree which contains at most two node as child



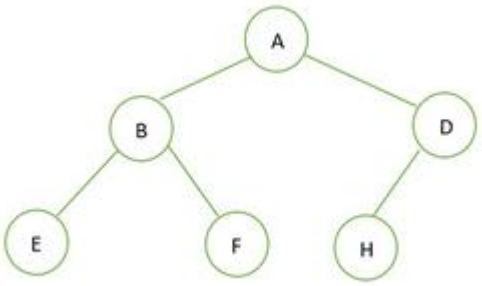
There are two types of Binary tree

Full or strict binary tree

Each node have either 0 or 2 child

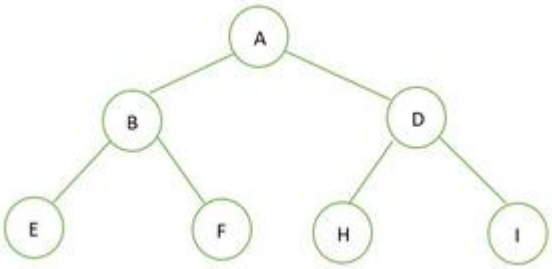


Non full binary tree

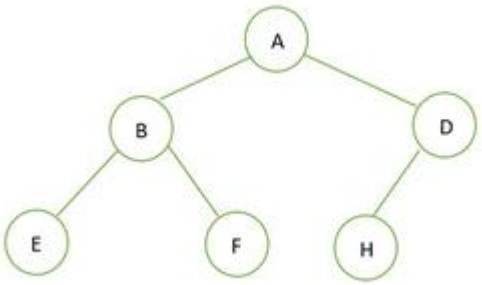


Perfect binary tree

All internal node have exactly two children and all leaf nodes are on same level

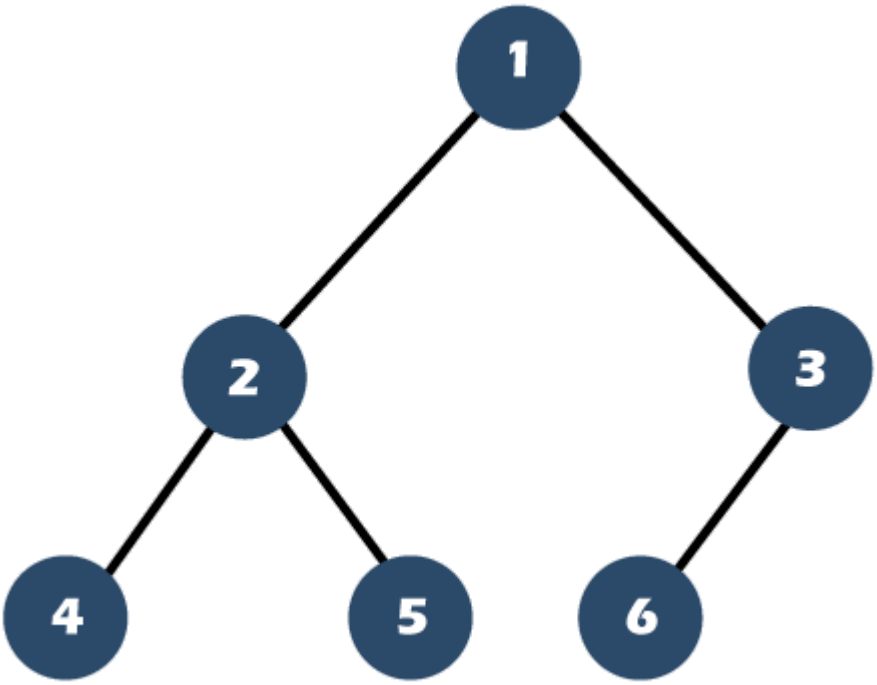


Non perfect binary tree



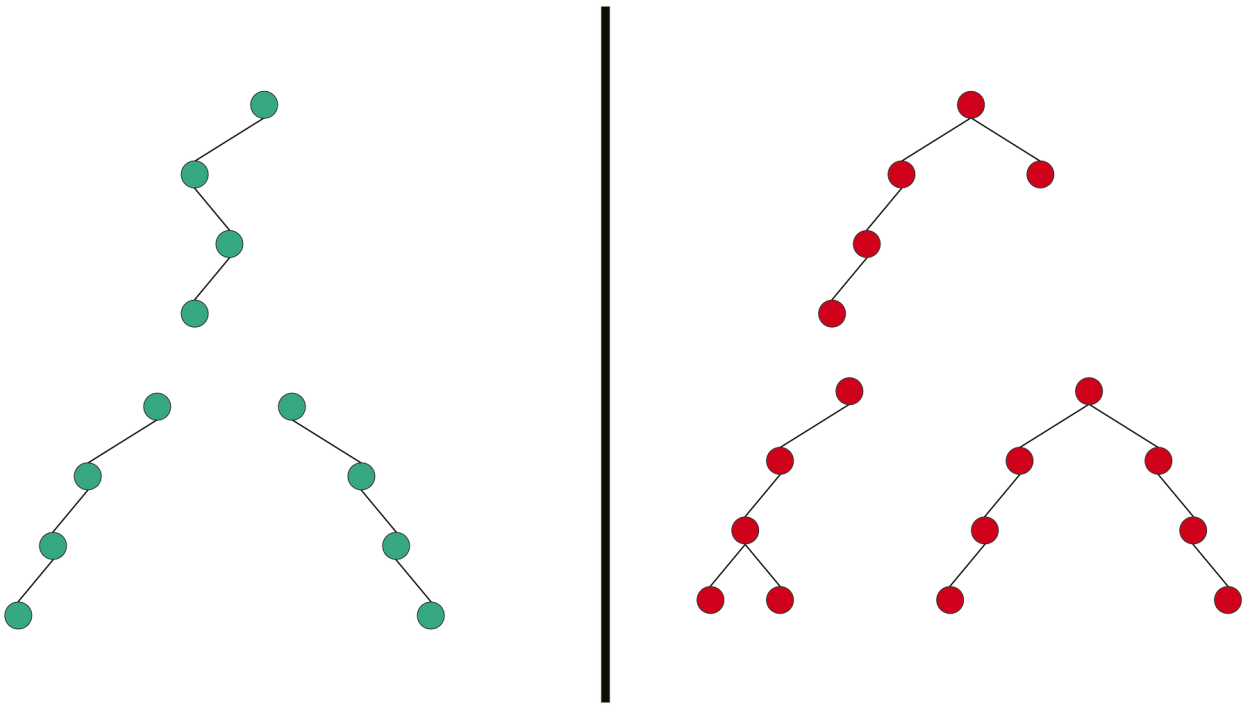
Complete binary tree

- All levels are completely filled except possibly last level
- Last level if not filled then it must be left aligned nodes



Degenerate tree

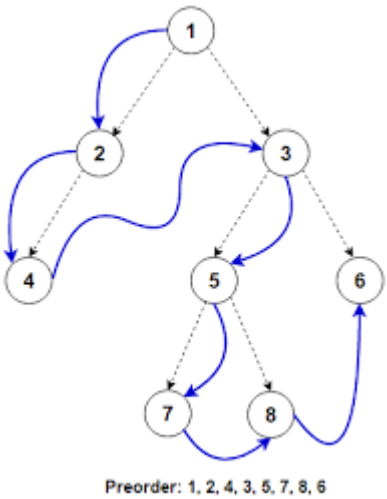
- Every Parent node has exactly one child
- it contains two sub type trees which are left skews and right skews
- left skews trees move on left side which shown in figure below the left side bottom green tree
- right skews trees move on right side which shown in figure below the right side bottom green tree



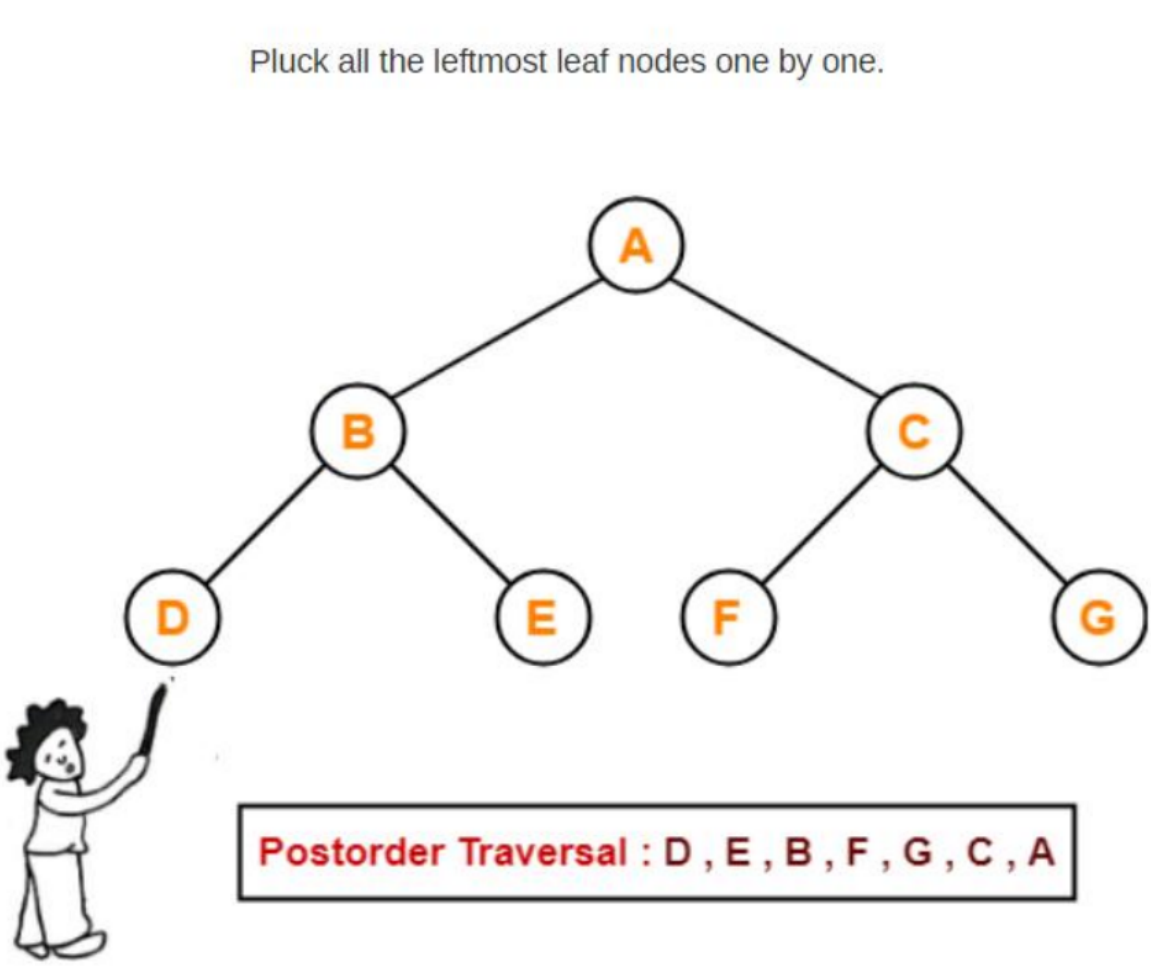
Traversal in binary tree

1. PreOrder (***root*** -> leftSubTree -> rightSubTree)
2. PostOrder (leftSubTree -> rightSubTree -> ***Root***)
3. InOrder (leftSubTree -> ***root*** -> rightSubTree)

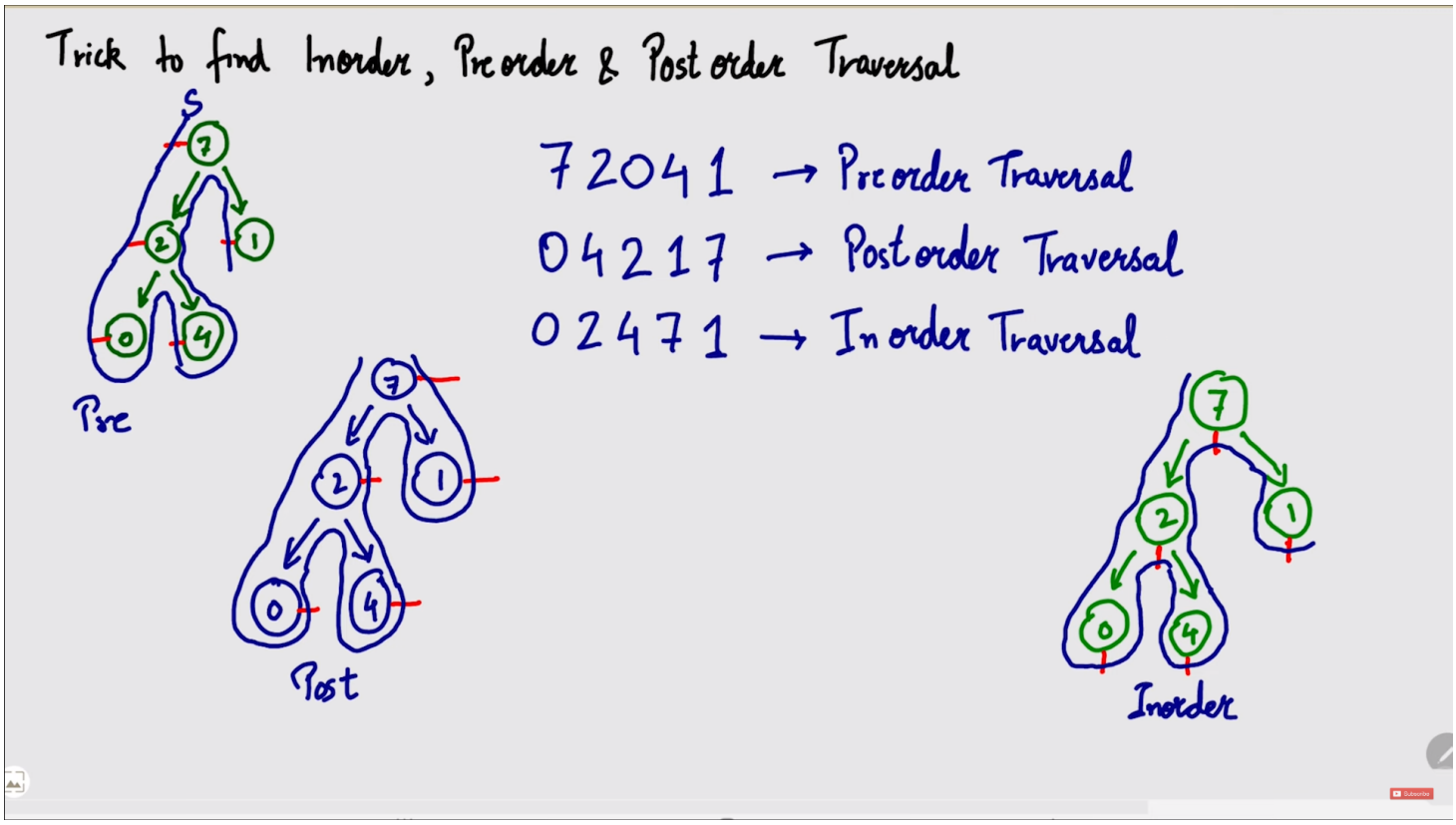
PreOrder Traversal



PostOrder Traversal



Tips to find preOrder,postOrder and inOrder



Binary search tree

It is a type of binary tree

Properties of BST

- All nodes of left sub tree are less than root node
- All nodes of right sub tree are greater than root node
- Left and right sub trees are also binary search trees
- There are no duplicate nodes