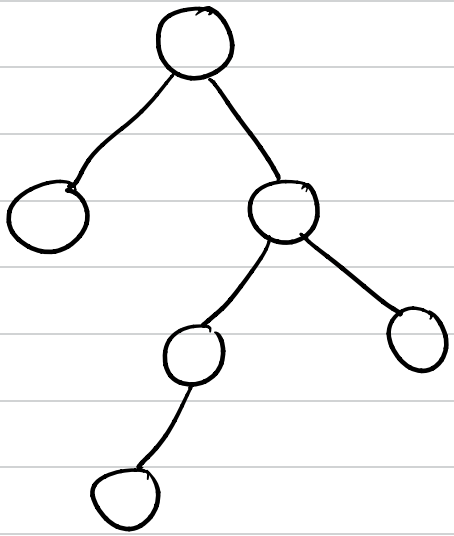
INTRODUCTION

A Binary tree is a hierchal data structure where data is stored in levels.

Eg :



Each ○ is a node. Topmost one is called as the root node. Each node can have at max two children and each node with 0 children is called a leaf.

The node right above a node is called as its parent whilst all the nodes above it are its ancestors

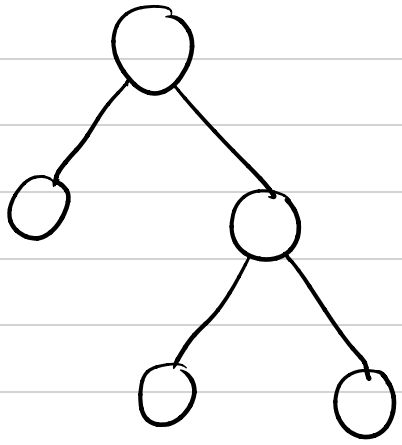
Standing at any node, considering it as a root, we get a subtree.

Types of Binary Trees

① Full Binary Tree

A binary tree where each node has either 0 children or 2 children

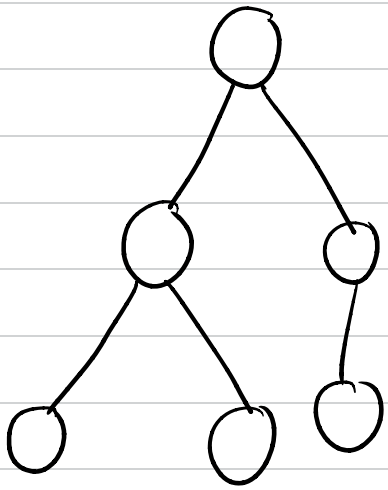
Eg :



② Complete Binary Tree

All levels are full except the last one, where all nodes are on the left side.

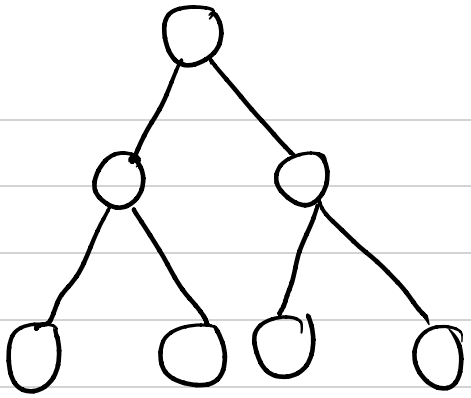
Eg :



③ Perfect Binary Tree

All the leaf nodes are at the same level

Eg :



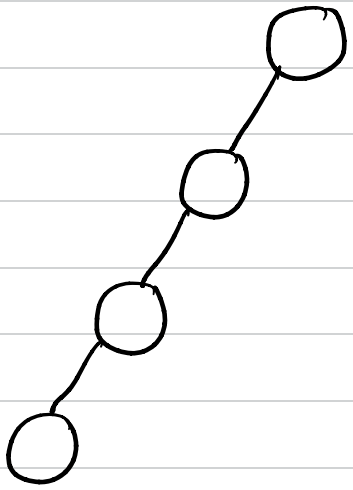
④ Balanced Binary Tree

Height of tree is at maximum $\log_2 N$ where N is number of nodes.

⑤ Degenerate Tree

A tree where each node only haves a single child.

Eg:



Representation

In C++ :

```
struct Node {
    int value;
    Node * left, right;
    Node(int v) {
```

```
        value = v;
        left = right = NULL;
    }
};
```