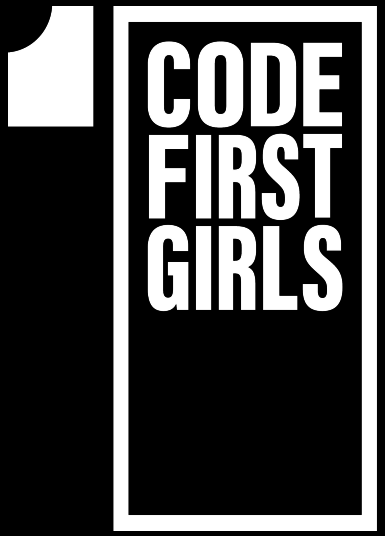
BINARY TREE DATA STRUCTURE

LESSON 18



NANODEGREE → ENGINEERING MODULE

AGENDA

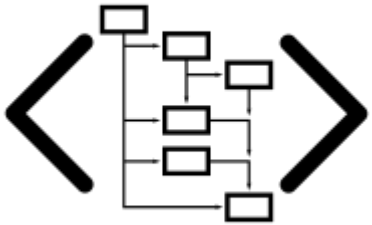
01 Introduction to Binary Trees

02 Types of Binary Trees

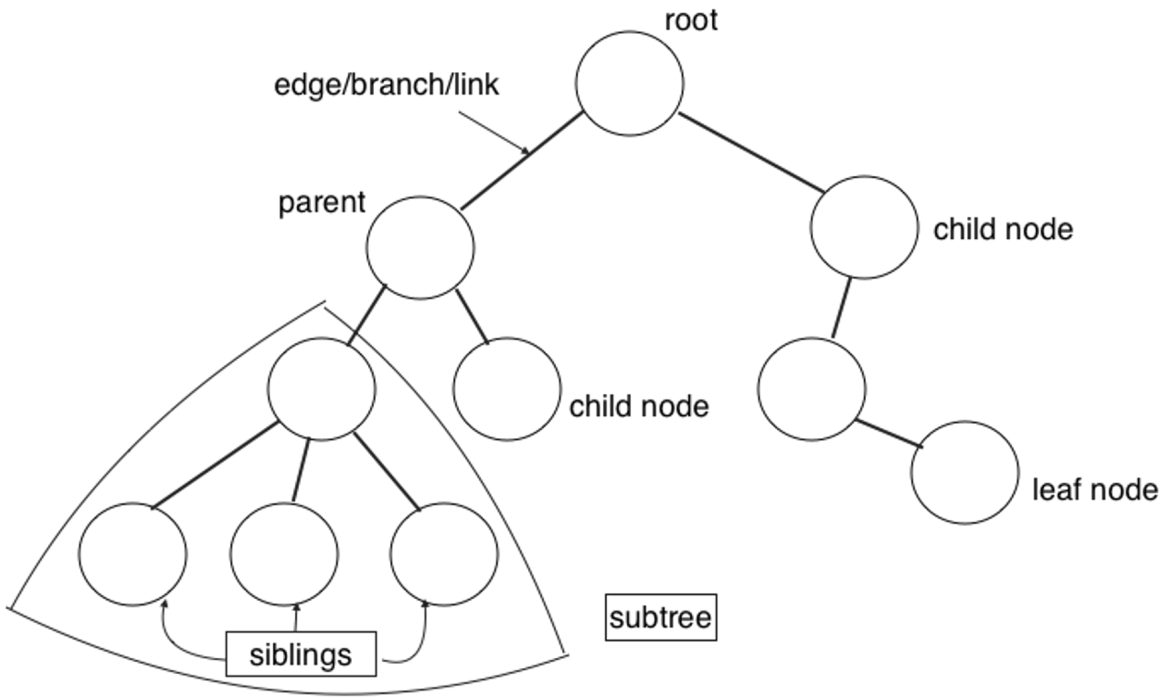
03 Practice and Exercises

BINARY TREE

INTRODUCTION

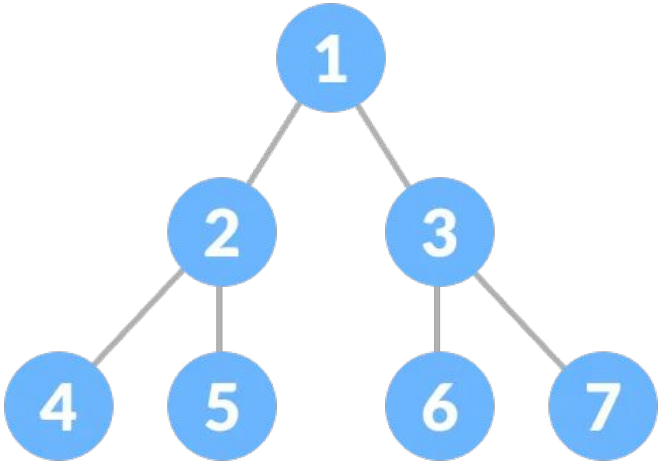


TREE DATA STRUCTURE



- **Trees** are types of data structures that represent nodes connected by edges.
- Each tree consists of a root node as the Parent node, and the left node and right node as Child nodes.

BINARY TREE



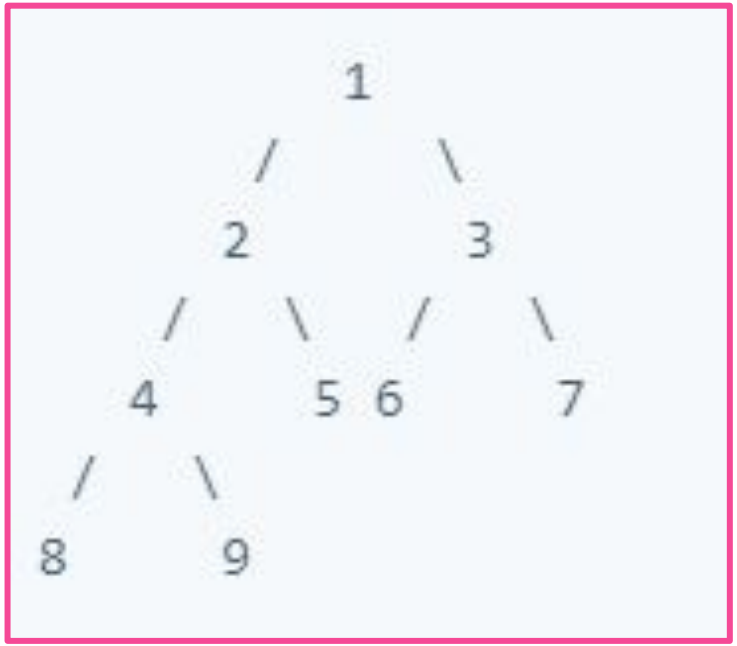
BT - is a tree whose elements have at most two children.

- **K-ary Tree -** a tree whose nodes have up to **k** child-nodes. A binary tree is a k-ary tree where k == 2.

PERFECT BINARY TREE

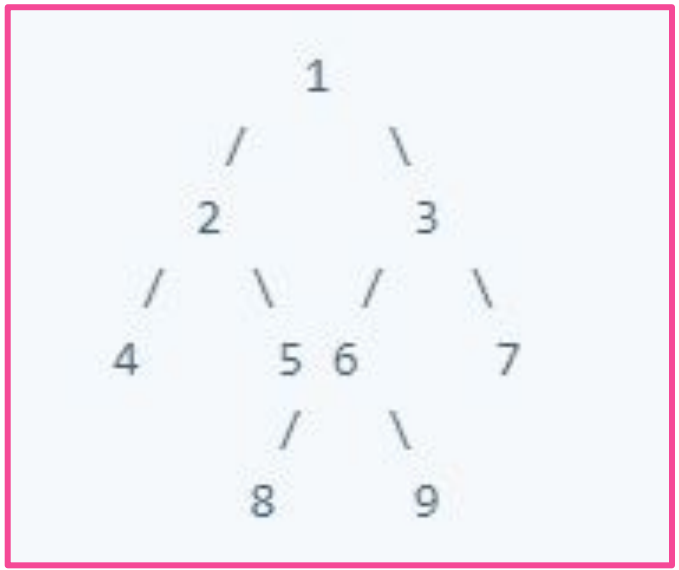
- Perfect Binary tree is a binary tree whose interior nodes all have two child nodes

COMPLETE BINARY TREE



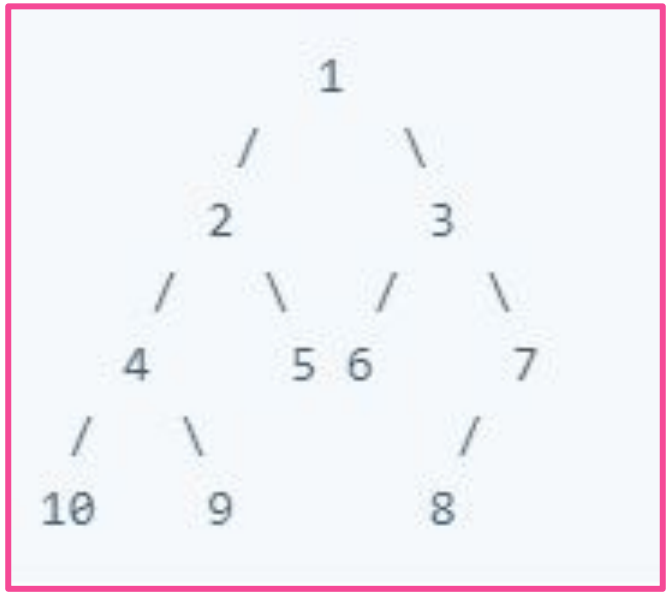
- A complete binary tree is a binary tree in which every level, except possibly the last, is completely filled, and all nodes are as far left as possible.

‘INCOMPLETE’ BINARY TREE



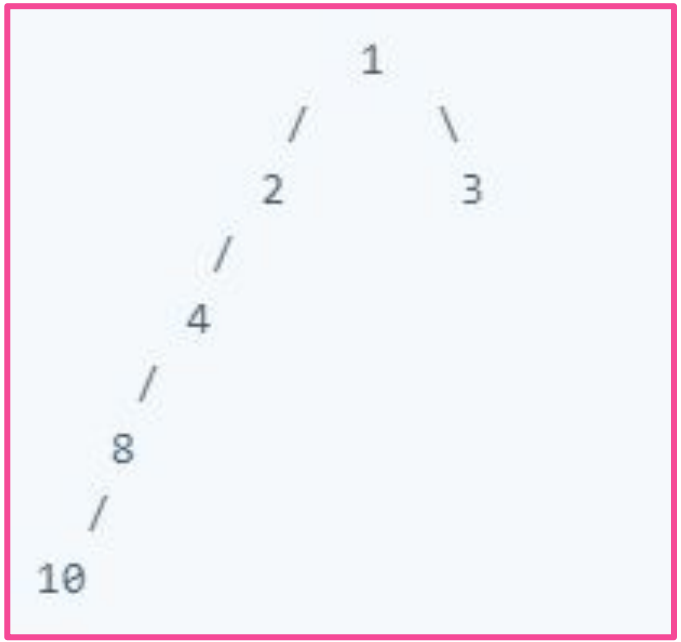
- This is an example of incomplete binary tree, because the nodes in its last level are not as far left as possible.

BALANCED BINARY TREE



- A binary tree in which the left and right subtrees of every node differ in height by no more than 1

IMBALANCED BINARY TREE



FULL BINARY TREE

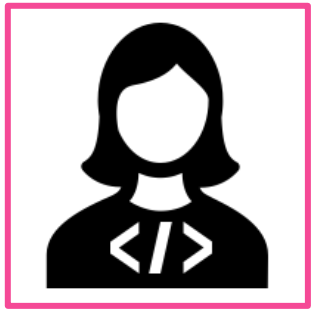
- A full binary tree (sometimes proper binary tree or 2-tree) is a tree in which every node other than the leaves has two children.

APPLICATION OF BINARY TREES

1. Manipulate hierarchical data.
2. Make information easy to search.
3. Manipulate sorted lists of data.
4. Compositing digital images for visual effects.
5. Router algorithms
6. Form of a multi-stage decision-making.

USAGE OF BT EXAMPLES

- Chess algorithms
- 3-D Video Games
- Filing and document storage in memory



DEMO & EXERCISES

1. Implementing BINARY TREES
2. EXERCISES & PRACTICE

THANK YOU!