Trees

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Trees

A **Tree** is a hierarchical data structure consisting of nodes.

Basic Terminologies:
- **Root**: The topmost node.
- **Parent and Child**: Nodes connected in a hierarchical manner.
- **Leaf**: A node with no children.
- **Depth and Height**: Depth is the number of edges from the root; height is the number of edges to the deepest node.

Types of Trees:
- **Binary Tree**: Each node has at most two children.
- **Threaded Binary Tree**: Uses extra pointers for traversal.
- **Binary Search Tree (BST)**: Left child < Parent < Right child.
- **AVL Tree**: A self-balancing BST.
- **Red-Black Tree**: A self-balancing BST with color properties.

Tree Traversals:
- **Inorder (Left-Root-Right)**
- **Preorder (Root-Left-Right)**
- **Postorder (Left-Right-Root)**