

## PROPERTIES

- **Root** – The topmost node of the tree.
- **Siblings** – Nodes that share the same parent.
- **Path** – A sequence of connected nodes from one to another.
- **Ancestor** – Any node along the path from a given node up to the root.
- **Descendant** – Any node that lies below a given node in the tree.
- **Subtree** – A tree formed by any node and all its descendants.
- **Height** – The longest path from a node down to a leaf.
- **Depth** – The number of edges from the root to a specific node.
- **Parent** – The node directly above a given node.
- **Children** – Nodes directly below a given node.
- **Leaf** – A node with no children.
- **Cousins** – Nodes at the same level with different parents.

### Favorite Property! ✨(Creative)

#### “The Ancestor’s Code”

In the vast structure of the binary tree, every node owed its existence to another. Deep at the top lived the Ancestor, the very first to make a choice: left or right. From that single decision, generations of nodes were born.

Each descendant carried a trace of that choice, the path that defined who they became. Some stood on the left, others on the right, but all were connected through the same root of origin.

And though the Ancestor watched silently from above, every traversal, every new branch, was a whisper of gratitude, proof that its legacy still flowed through the tree’s living code.

- Without the Ancestor, there would be no root, no path, and no structure—everything else in the tree exists because of this initial node. This makes the Ancestor not just a node, but the guiding principle behind the organization, inheritance, and flow of the tree.

**In short:** the Ancestor is the “source of truth” that defines all relationships and structures in the tree, which makes it logically essential and conceptually fascinating.