**Introduction to Tree Data Structure**

**Tree data structure** is a hierarchical structure that is used to represent and organize data in the form of parent child relationship. The following are some real world situations which are naturally a tree.

* Folder structure in an operating system.
* Tag structure in an HTML (root tag the as html tag) or XML document.

The topmost node of the tree is called the **root**, and the nodes below it are called the child nodes. Each node can have multiple child nodes, and these child nodes can also have their own child nodes, forming a recursive structure.

**Basic Terminologies In Tree Data Structure:**

* **Parent Node:** The node which is an immediate predecessor of a node is called the parent node of that node.**{B}** is the parent node of **{D, E}**.
* **Child Node:** The node which is the immediate successor of a node is called the child node of that node. Examples: **{D, E}** are the child nodes of **{B}.**
* **Root Node:** The topmost node of a tree or the node which does not have any parent node is called the root node. {A**}** is the root node of the tree. A non-empty tree must contain exactly one root node and exactly one path from the root to all other nodes of the tree.
* **Leaf Node or External Node:** The nodes which do not have any child nodes are called leaf nodes. **{I, J, K, F, G, H}** are the leaf nodes of the tree.
* **Ancestor of a Node:** Any predecessor nodes on the path of the root to that node are called Ancestors of that node.**{A,B}** are the ancestor nodes of the node**{E}**
* **Descendant:** A node x is a descendant of another node y if and only if y is an ancestor of x.
* **Sibling:** Children of the same parent node are called siblings.**{D,E}** are called siblings.
* **Level of a node:** The count of edges on the path from the root node to that node. The root node has level **0**.
* **Internal node:** A node with at least one child is called Internal Node.
* **Neighbour of a Node:** Parent or child nodes of that node are called neighbors of that node.
* **Subtree**: Any node of the tree along with its descendant.

**Why Tree is considered a non-linear data structure?**

The data in a tree are not stored in a sequential manner i.e., they are not stored linearly. Instead, they are arranged on multiple levels or we can say it is a hierarchical structure. For this reason, the tree is considered to be a [non-linear data structure](https://www.geeksforgeeks.org/difference-between-linear-and-non-linear-data-structures).

