HEAP DATA STRUCTURE

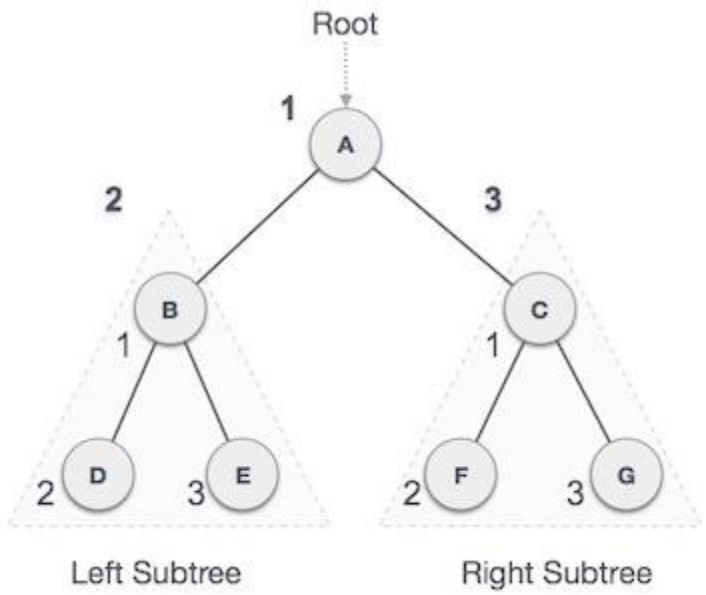
What are the Applications of trees?

Binary Search Tree, is a node-based binary tree data structure which has the following properties:

- The left subtree of a node contains only nodes with keys lesser than the node's key.
- The right subtree of a node contains only nodes with keys greater than the node's key.
- The left and right subtree each must also be a binary search tree.
  There must be no duplicate nodes.

What is pre-order tree traversal and how does it work?

In this traversal method, the root node is visited first, then the left subtree and finally the right subtree.



We start from **A**, and following pre-order traversal, we first visit **A** itself and then move to its left subtree **B**. **B** is also traversed pre-order. The process goes on until all the nodes are visited. The output of pre-order traversal of this tree will be −

A → B → D → E → C → F → G

Algorithm

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Until all nodes are traversed −
Step 1 − Visit root node.
Step 2 − Recursively traverse left subtree.
Step 3 − Recursively traverse right subtree.
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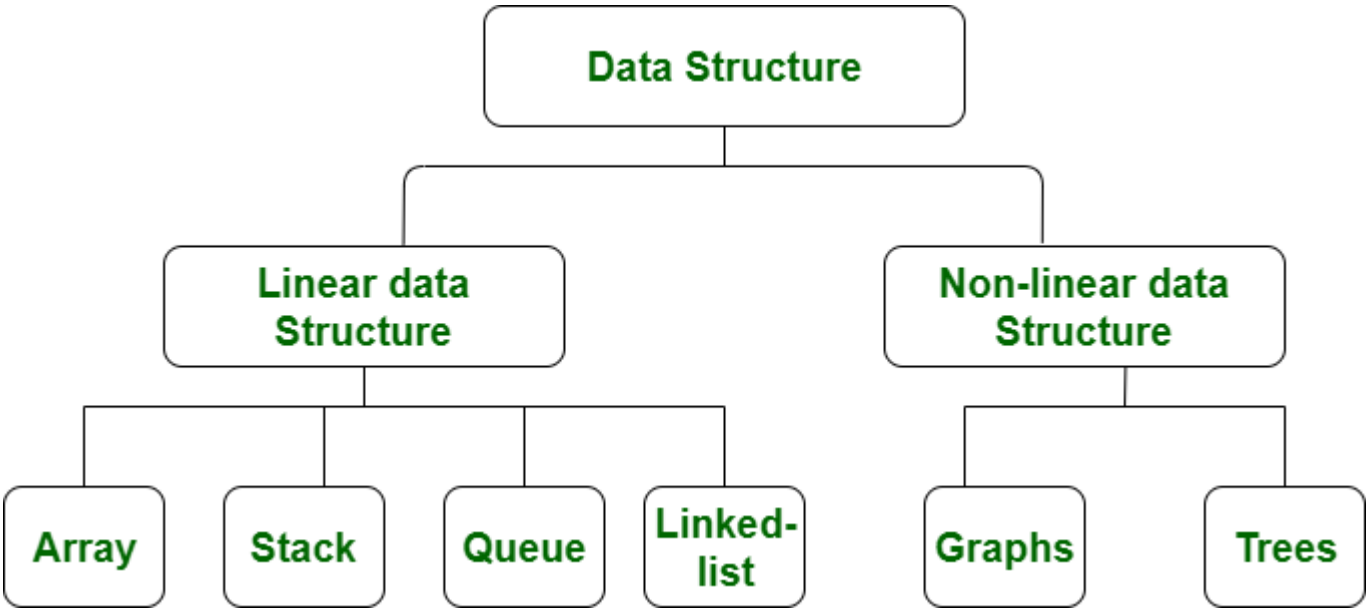
What is the problem with the Hanoi Tower?

Tower of Hanoi is a mathematical puzzle where we have three rods and n disks. The objective of the puzzle is to move the entire stack to another rod, obeying the following simple rules:

1. Only one disk can be moved at a time.
2. Each move consists of taking the upper disk from one of the stacks and placing it on top of another stack i.e. a disk can only be moved if it is the uppermost disk on a stack.
3. No disk may be placed on top of a smaller disk.

Can you explain the distinction between linear and nonlinear data structures?

The main difference between linear and non linear data structures is that **linear data structures arrange data in a sequential manner while nonlinear data structures arrange data in a hierarchical manner creating a relationship among the data elements**.



What is the distinction between a list and an array?

List	Array
Can consist of elements belonging to different data types.	Only consists of elements belonging to the same data type.
No need to explicitly import a module to use it.	Need to explicitly import a module for declaration.
Cannot directly handle arithmetic operations.	Can directly handle arithmetic operations.
Can be nested to contain different type of elements.	Must contain either all nested elements of same size.