Binary Trees

Summary:

A binary tree is a tree data structure where each node has at most two children, typically referred to as left and right.

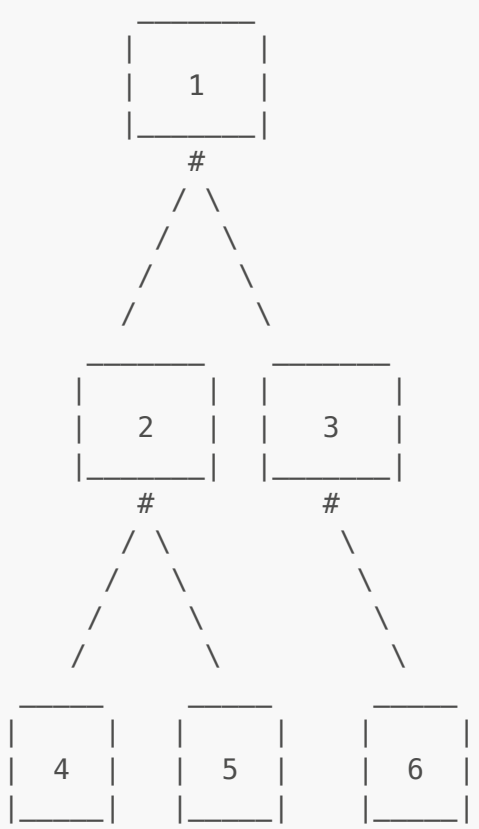
Definitions:

- **Node** : An element in a binary tree.
- **Root** : The top node in a binary tree, with no parent.
- **Leaf** : A node with no children.
- **Parent** : A node connected to its children.
- **Child** : A node connected to its parent.
- **Traversal** :
  - **Preorder** : Visit the root, then the left subtree, then the right subtree (1 2 4 5 3 6)
  - **Inorder** : Visit the left subtree, then the root, then the right subtree (4 2 5 1 3 6)
  - **Postorder** : Visit the left subtree, then the right subtree, then the root (4 5 2 6 3 1)

Example:

ASCII representation of a binary tree:

(Ascii Art)



Tricky Things to Remember:

- The maximum number of nodes in a binary tree of height h is

  $2^{h+1} - 1$.

- In a complete binary tree, every level is completely filled except for possibly the last level.