

Today - Lecture 9 - CS163

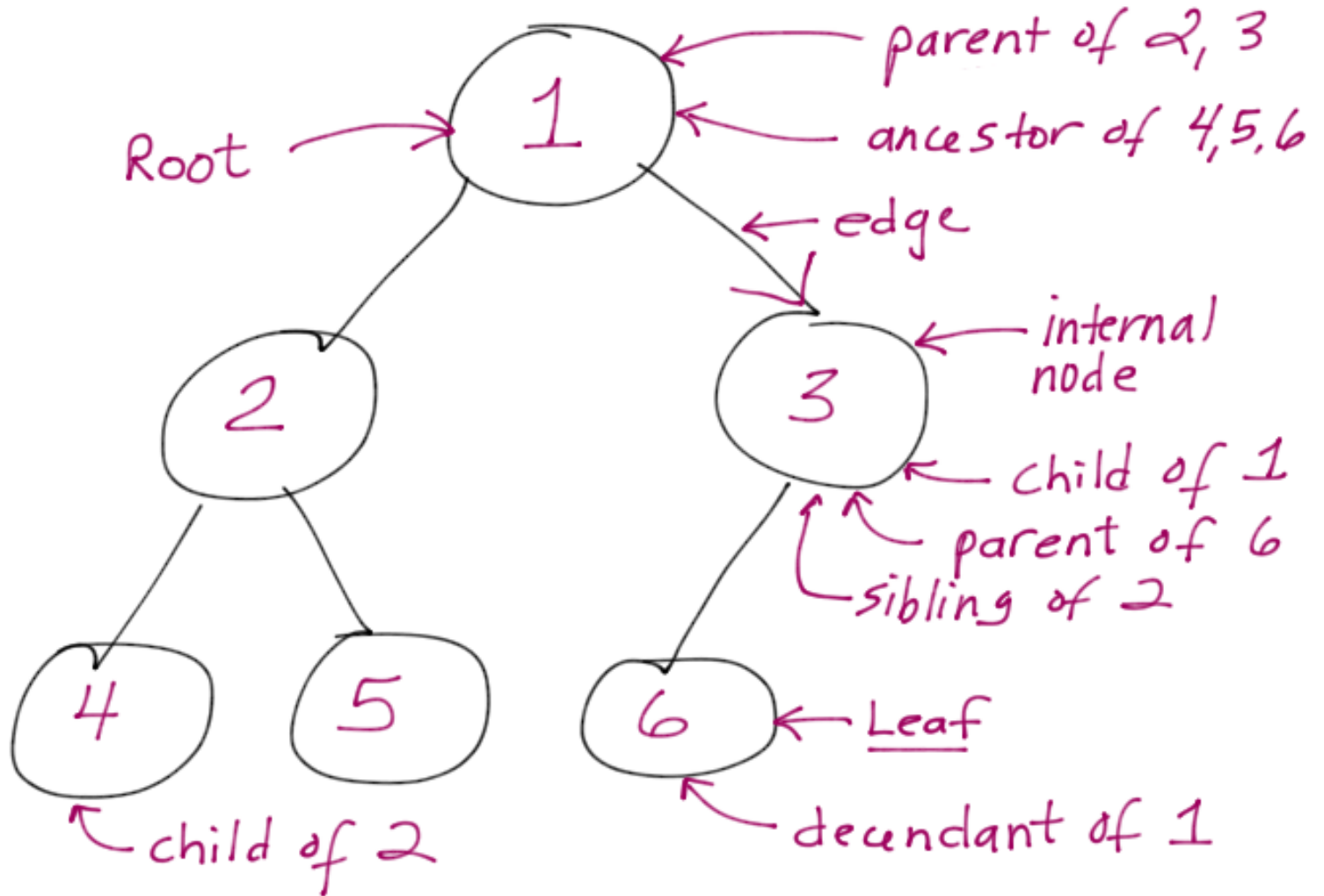
1) Topic #8 - Table ADT's implemented using trees

- terminology
- binary search trees
- traversal algorithms

2) Next: Remember how recursive solutions can be applied

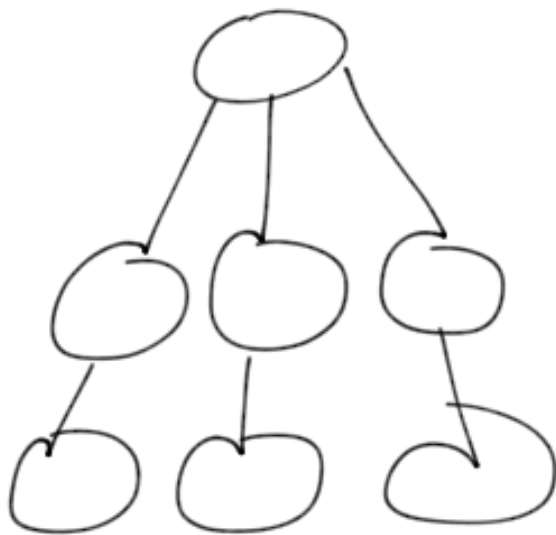
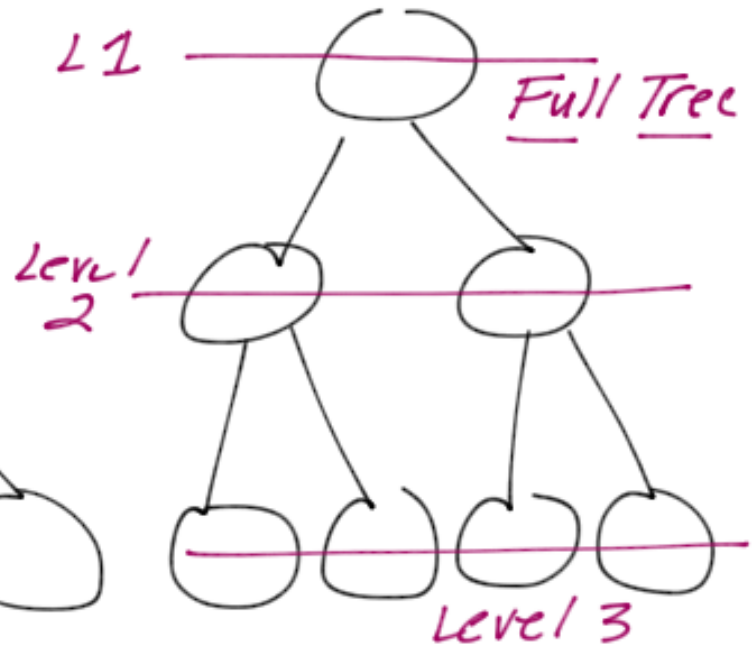
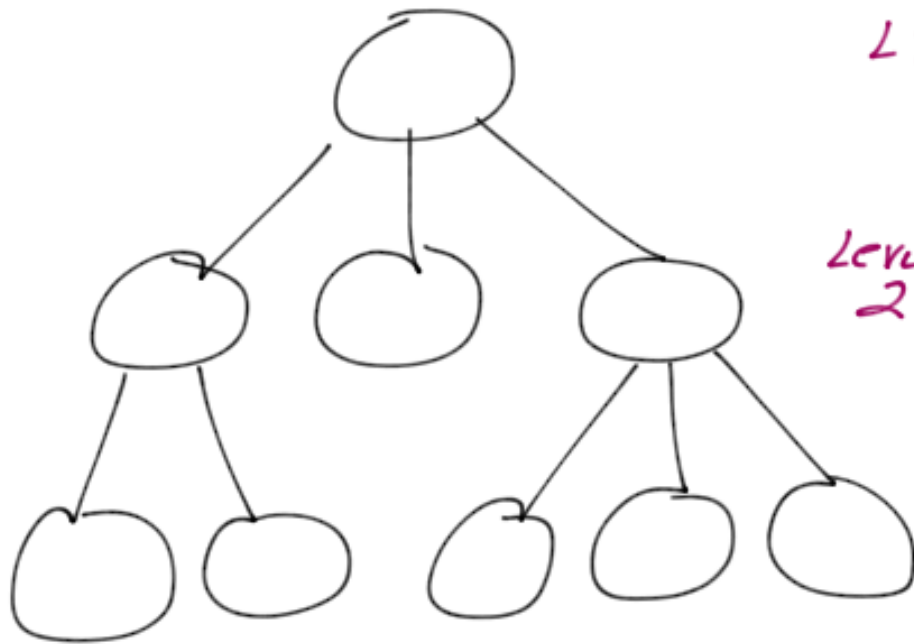
3) Make sure to Practice!

Review Terminology

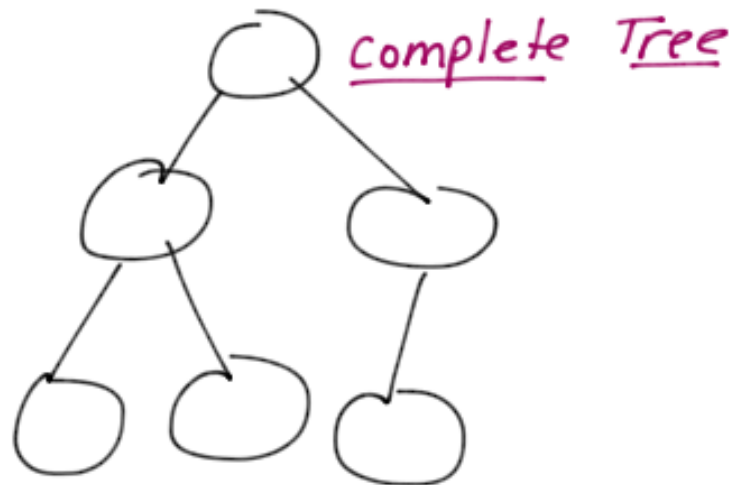


This tree represents a binary tree

What type of Trees?



NOT a binary tree



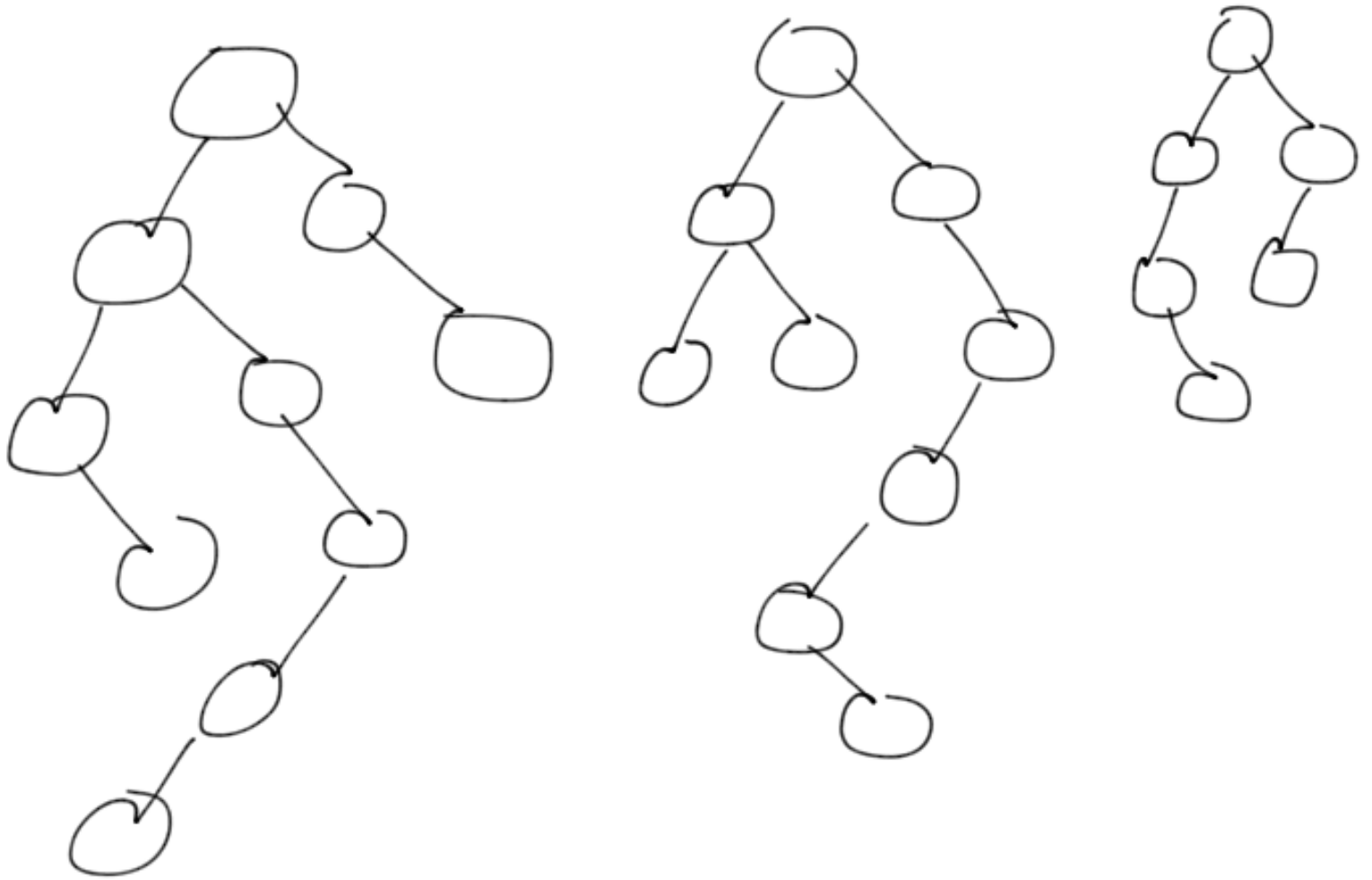
complete Tree

Binary tree

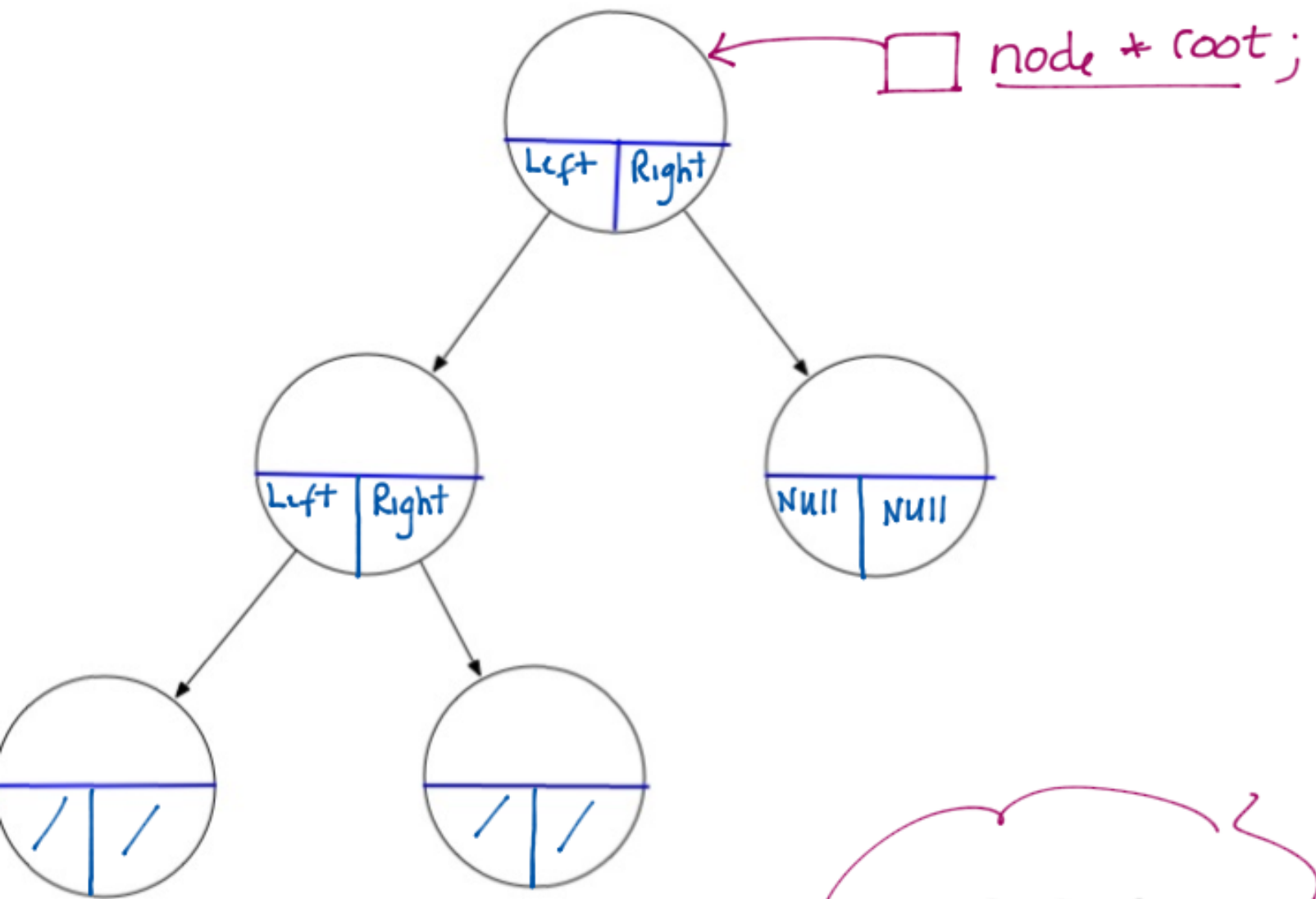
Full tree

Height of a Tree -

- is the **LONGEST** path from Root to leaf



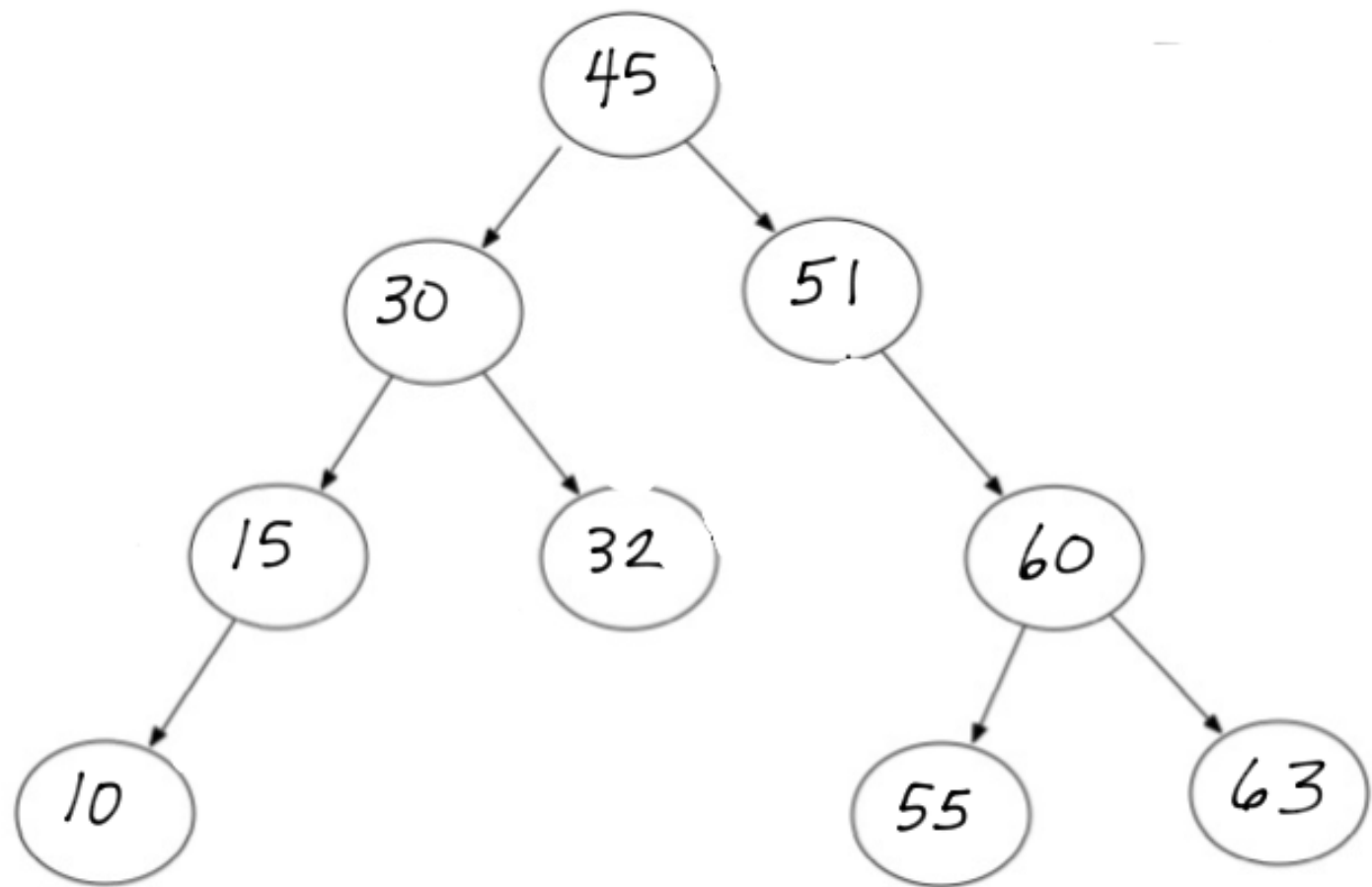
Implemented as a non-linear linked list



```
struct node
{
    student peer;
    node * left;
    node * right;
};
```

Traversal Algorithms (BST)

INORDER Traversal

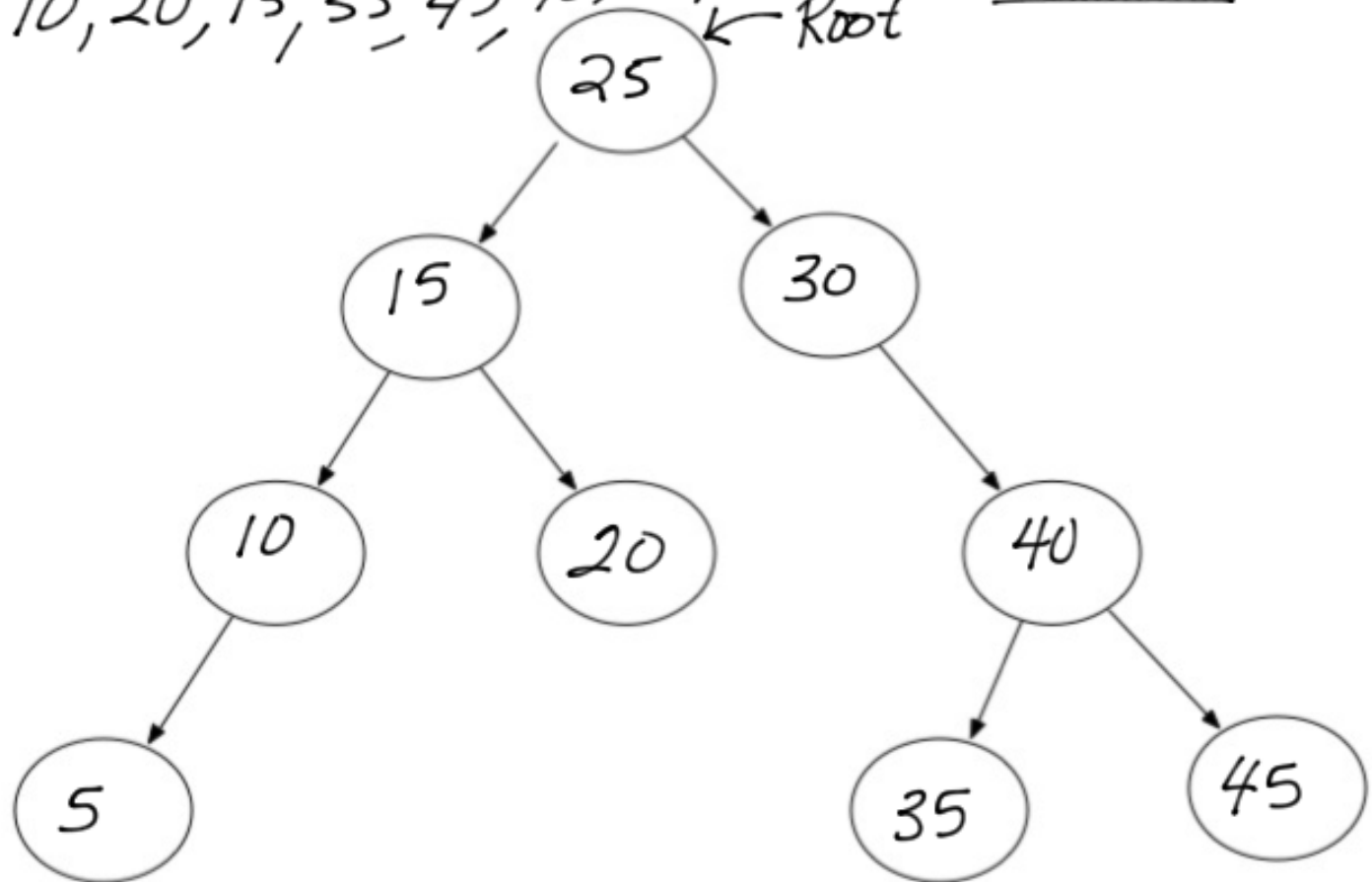


```
void traverse(node * root)
{
    if (root)
    {
        traverse(root->left);
        root->peer.display(); //cout << root->data
        traverse(root->right);
    }
}
```

Pre Order & Post Order Traversal

25, 15, 10, 5, 20, 30, 40, 35, 45 ← Pre Order


5, 10, 20, 15, 35, 45, 40, 30, 25 ← Post order



```
void traverse(node * root)
{
    if (root)
    {
        traverse(root->left);
        traverse(root->right);
        root->peer.display(); //cout << root->data
    }
}
```

Move the display!
for pre order!

Insertion Algorithm of a BST



binary search tree

* Always inserts at a Leaf!

* Commonly implemented using recursion

32 45 10 15 30 55 20 41 5

5 10 15 20 30 32 41 45 55