DIAMETER OF A BINARY TREE

Diameter of a binary tree is defined as the longest path in a binary tree which may or may not go through the root.

Problem asks us to return the diameter of a tree.

At each node, the length of a path is equal to sum of height of its left subtree and its right subtree. Bruteforce solution involves calculating this at each node and returning maximum of all.

Time Complexity is $O(N^2)$

Optimal Approach involves integrating this with our find height solution of O(N) complexity.

Pseudocode :

```
int height(Node* root, int d) {
    if (root == NULL) {
        return 0;
    }
    int l = height(root→left, d);
    int r = height(root→right, d);
    d = max(d, l + r) ;
    return 1 + max(l, r) ;
}

int diameterOfBinaryTree(Node * root) {
    int d = 0 ;
    height(root, d) ;
    return d ;
}
```