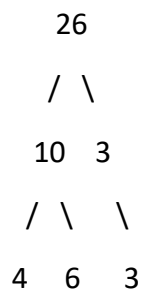
Root Equals Sum of Children in Binary Tree LeetCode

Return true *if the value of the root is equal to the **sum** of the values of its two children, or* false *otherwise*.

Example:



Output: The Binary tree is not a Sum tree

Approach 1: Recursive approach to check if a binary tree is a sum tree

- In the **sumTreeRecursive** function, you check if a binary tree is a sum tree using a recursive approach.
- A sum tree is a binary tree in which the value of each node is equal to the sum of the values of its left and right subtrees.
- The base cases check if the node is null or if it's a leaf node (no left and right children), in which case it's considered a sum tree.
- Recursively, you check the left and right subtrees and verify if the current node satisfies the sum tree property.
- If all conditions are met, you return **true**; otherwise, you return **false**.

Time Complexity: O(N), where N is the number of nodes in the binary tree. You visit each node once.

Space Complexity: O(H), where H is the height of the binary tree due to the function call stack.

Approach 2: Iterative approach using a queue to check if a binary tree is a sum tree

- In the **sumTreeIterative** function, you check if a binary tree is a sum tree using an iterative approach.
- You perform level-order traversal using a queue.
- At each node, you check if it satisfies the sum tree property (value equals the sum of its left and right children).

- If all nodes satisfy the property, the entire tree is considered a sum tree.

Time Complexity: O(N), where N is the number of nodes in the binary tree. You visit each node once.

Space Complexity: O(H), where H is the height of the binary tree due.

Approach 3: Optimized recursive approach to check if a binary tree is a sum tree

- In the **sumTreeOptimized** function, you check if a binary tree is a sum tree using an optimized recursive approach.
- A pair of values **(bool, int)** is returned from the helper function.
- The **bool** value indicates whether the subtree rooted at the current node is a sum tree.
- The **int** value represents the sum of all nodes in the subtree.
- The base cases are similar to Approach 1, but the optimized approach combines the checks for left and right subtrees and the current node's sum.

Time Complexity: O(N), where N is the number of nodes in the binary tree. You visit each node once.

Space Complexity: O(H), where H is the height of the binary tree due to the function call stack.