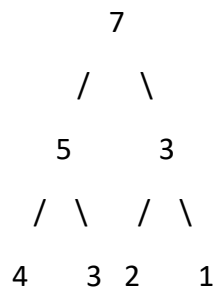


Check if the given Binary Tree a Max Heap [GFG](#)

Given a binary tree. The task is to check whether the given tree follows the **max heap** property or not.

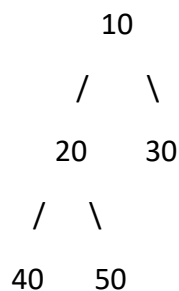
Note: Properties of a tree to be a max heap - Completeness and Value of node greater than or equal to its child.

Example 1:



Output: The Binary Tree is a Max Heap

Example 2:



Output: The Binary Tree is not a Max Heap

Approach 1: Function to check if the binary tree is a heap using the recursive approach

- **Function Purpose:** To check if the binary tree is a max heap using a recursive approach.
- **Explanation:**
 - Checks if the tree is complete and follows max heap properties recursively.
 - It checks if the value of each node is greater than its children and if the tree is complete.
- **Time Complexity:** $O(N)$, where N is the number of nodes in the tree.
- **Space Complexity:** $O(H)$, where H is the height of the tree.

Approach 2: Function to check if the binary tree is a heap using the iterative approach

- **Function Purpose:** To check if the binary tree is a max heap using an iterative approach.
- **Explanation:**
 - Performs level-order traversal to check if each node's value is greater than its children.
- **Time Complexity:** $O(N)$, where N is the number of nodes in the tree.
- **Space Complexity:** $O(N)$, where N is the number of nodes of the tree.

Approach 3: Function to check if the binary tree is a heap using an optimized approach

- **Function Purpose:** To check if the binary tree is a max heap using an optimized iterative approach.
- **Explanation:**
 - Checks if the tree is a complete max heap using an optimized approach.
- **Time Complexity:** $O(N)$, where N is the number of nodes in the tree.
- **Space Complexity:** $O(N)$, where N is the number of nodes of the tree.

Conclusion:

The "Recursive Approach" is a slightly more efficient and less space-consuming way to check if a binary tree is a max heap. The "Iterative Approach" and the "Optimized Iterative Approach" use level-order traversal and require more space to store the nodes at each level for the check.