Problem 3319: K-th Largest Perfect Subtree Size in Binary Tree

Problem Information

Difficulty: Medium
Acceptance Rate: 61.65%
Paid Only: No
Tags: Tree, Depth-First Search, Sorting, Binary Tree

Problem Description

You are given the `root` of a **binary tree** and an integer `k`.

Return an integer denoting the size of the `kth` **largest __ perfect binary** __ subtree, or `-1` if it doesn't exist.

A **perfect binary tree** is a tree where all leaves are on the same level, and every parent has two children.

Example 1:

Input: root = [5,3,6,5,2,5,7,1,8,null,null,6,8], k = 2

Output: 3

Explanation:

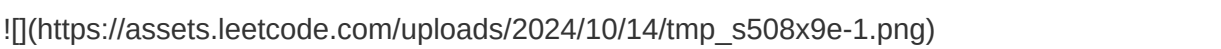
The roots of the perfect binary subtrees are highlighted in black. Their sizes, in non-increasing order are `[3, 3, 1, 1, 1, 1, 1, 1]`. The `2nd` largest size is 3.

Example 2:

Input: root = [1,2,3,4,5,6,7], k = 1

Output: 7

Explanation:



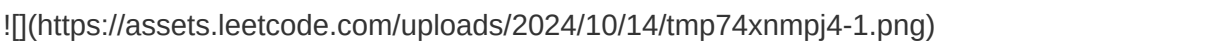
The sizes of the perfect binary subtrees in non-increasing order are `[7, 3, 3, 1, 1, 1, 1]`. The size of the largest perfect binary subtree is 7.

Example 3:

Input: root = [1,2,3,null,4], k = 3

Output: -1

Explanation:



The sizes of the perfect binary subtrees in non-increasing order are `[1, 1]`. There are fewer than 3 perfect binary subtrees.

Constraints:

* The number of nodes in the tree is in the range `[1, 2000]`. * `1 <= Node.val <= 2000` * `1 <= k <= 1024`

Code Snippets

C++:

```
/**
* Definition for a binary tree node.
* struct TreeNode {
* int val;
* TreeNode *left;
* TreeNode *right;
* TreeNode() : val(0), left(nullptr), right(nullptr) {}
```

```
* TreeNode(int x) : val(x), left(nullptr), right(nullptr) {}
* TreeNode(int x, TreeNode *left, TreeNode *right) : val(x), left(left),
right(right) {}
* };
*/
class Solution {
public:
int kthLargestPerfectSubtree(TreeNode* root, int k) {

}
};
```

Java:

```
/**
* Definition for a binary tree node.
* public class TreeNode {
* int val;
* TreeNode left;
* TreeNode right;
* TreeNode() {}
* TreeNode(int val) { this.val = val; }
* TreeNode(int val, TreeNode left, TreeNode right) {
* this.val = val;
* this.left = left;
* this.right = right;
* }
* }
*/
class Solution {
public int kthLargestPerfectSubtree(TreeNode root, int k) {

}
}
```

Python3:

```
# Definition for a binary tree node.
# class TreeNode:
# def __init__(self, val=0, left=None, right=None):
# self.val = val
# self.left = left
```

```
# self.right = right
class Solution:
def kthLargestPerfectSubtree(self, root: Optional[TreeNode], k: int) -> int:
```