549. Binary Tree Longest Consecutive Sequence II April 8, 2017 | 14.2K views

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Especially, this path can be either increasing or decreasing. For example, [1,2,3,4] and [4,3,2,1] are both

Given a binary tree, you need to find the length of Longest Consecutive Path in Binary Tree.

considered valid, but the path [1,2,4,3] is not valid. On the other hand, the path can be in the child-Parentchild order, where not necessarily be parent-child order.

Example 1:

```
Input:
         3
      2
Output: 2
Explanation: The longest consecutive path is [1, 2] or [2, 1].
```

### Input:

Example 2:

```
2
      1
        3
Output: 3
Explanation: The longest consecutive path is [1, 2, 3] or [3, 2, 1].
```

**Note:** All the values of tree nodes are in the range of [-1e7, 1e7].

### Find the length of Longest Consecutive Path in Binary Tree. The path can be both increasing or decreasing i,e [1,2,3,4] and [4,3,2,1] are both considered valid. The path can be child-Parent-child not necessarily parent-

child.

Summary

Solution

# Approach #1 Brute Force [Time Limit Exceeded]

# number of paths possible will be equal to number of pairs of nodes $\binom{N}{2}$ , where N is the number of nodes.

• Space complexity :  $O(n^3)$ .  $n^2$  paths each with O(n) nodes.

increasing or decreasing. In this way we can find maximum length increasing or decreasing sequence. **Complexity Analysis** 

Brute force solution of this problem is to find the path between every two nodes and check whether it is

We can easily see that in a tree there is exactly one unique path one from one node to another. So, the

ullet Time complexity :  $O(n^3)$ . Total possible number of paths are  $n^2$  and checking every path whether it is increasing or decreasing will take O(n) for one path.

## Algorithm

The following animation will make the process clear:

Approach #2 Single traversal [Accepted]

### incr represents the length of the longest incrementing branch below the current node including itself, and

We make use of a recursive function longestPath(node) which returns an array of the form [inr, dcr] for the calling node. We start off by assigning both inr and dcr as 1 for the current node. This is because the node itself always forms a consecutive increasing as well as decreasing path of length 1.

This solution is very simple. With every node, we associate two values/variables named inr and dcr, where

dcr represents the length of the longest decrementing branch below the current node including itself.

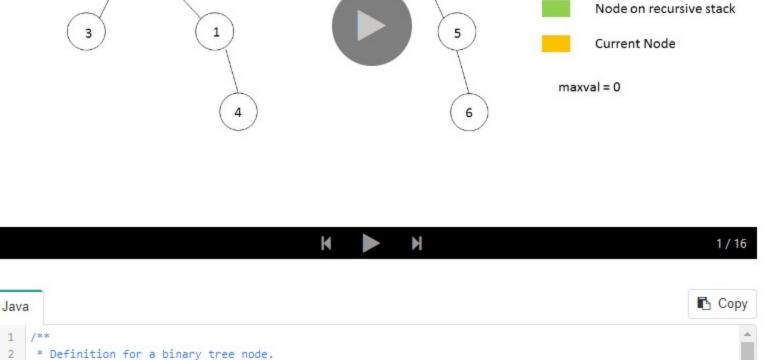
Then, we obtain the length of the longest path for the left child of the current node using

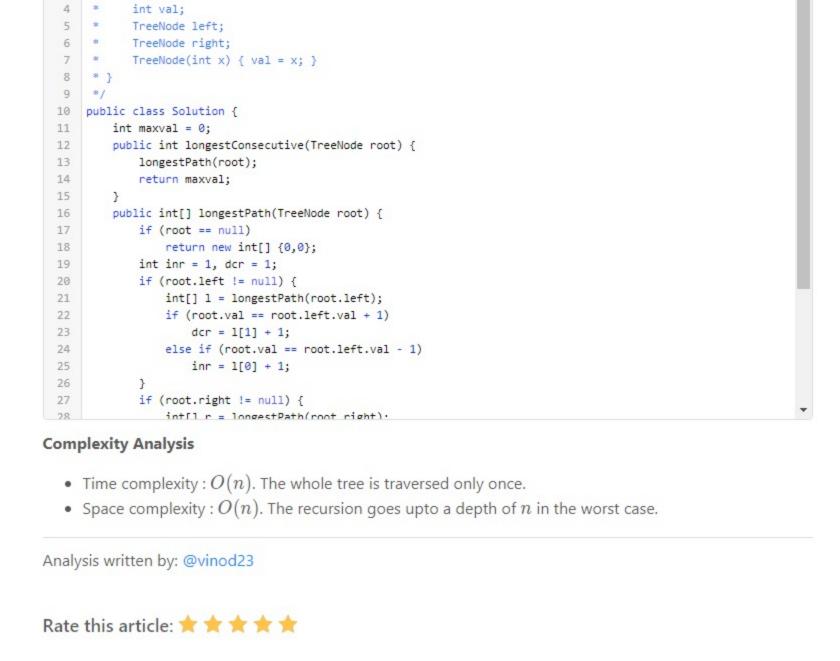
longestPath[root.left] . Now, if the left child is just smaller than the current node, it forms a decreasing sequence with the current node. Thus, the dcr value for the current node is stored as the left child's dcrvalue + 1. But, if the left child is just larger than the current node, it forms an incrementing sequence with the current node. Thus, we update the current node's inr value as  $left\_child(inr) + 1$ .

current node, we need to consider the maximum value out of the two values obtained from the left and the right child for both inr and dcr, since we need to consider the longest sequence possible. Further, after we've obtained the final updated values of inr and dcr for a node, we update the length of the longest consecutive path found so far as  $maxval = \max(inr + dcr - 1)$ .

Then, we do the same process with the right child as well. But, for obtaining the inr and dcr value for the

3





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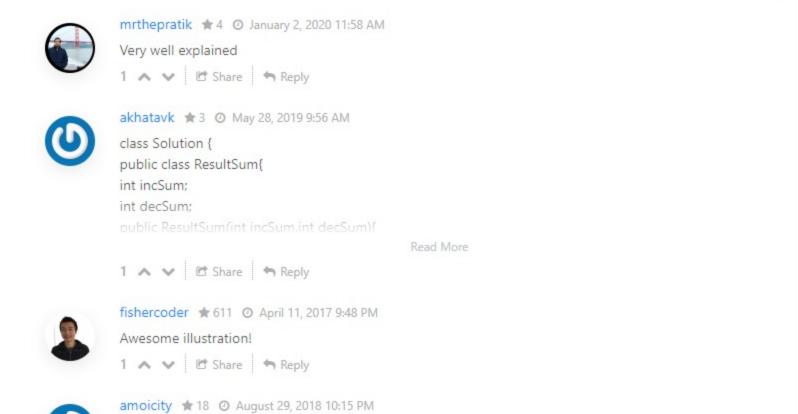
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\* public class TreeNode {





that does not use global variable please

0 A V C Share Reply SHOW 3 REPLIES bvarghese \* 0 \* February 28, 2018 10:13 AM @wierzba You can simply pass an array to the function and have it updated.

I have a question with the test case [1,2,3,4], why is the expected result is 2. Shouldn't it be 3, as the

Global variables are generally not acceptable in algo interviews, could you provide an implementation

Eg: public int longestConsecutive(TreeNode root) { int[] maxwal = new int[1]. Read More 0 A V & Share Share

jeshojiu 🛊 2 🗿 April 24, 2020 9:37 AM awesome explanation

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