

# Tree

Dec 28, 2018 12:06 AM, if — twice, just black it  
Finish these two page, 23 problems on 28. Fighting.

Pre-order

99

## Recover Binary Search Tree (/problems/recover-binary-search-tree)

def recoverTree(self, root):

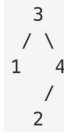
Two possibilities:

1. Two 错位
2. One 错位, as the example, 1 3 2 4

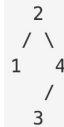
dislocation

6, 3, 4, 5, 2

Input: [3,1,4,null,null,2]



Output: [2,1,4,null,null,3]



constant space one pass solution

```
if cur.val < prev.val:
    if first == None:
        first = prev
    if first != None:
        second = cur
```

Dec 28, 2018 2:48 AM

105

## Construct Binary Tree from Preorder and Inorder Traversal

The solution didn't use recursion,

106

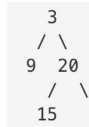
## Construct Binary Tree from Inorder and Postorder Traversal

(/problems/construct-binary-tree-from-inorder-and-postorder-traversal)

✓

111

## Minimum Depth of Binary Tree



return 2, BFS 遇到叶节点立即返回的做法

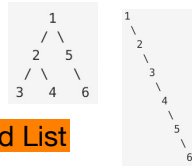
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```
if cur.left == None and cur.right == None:
    return height + 1
```

✓

114

## Flatten Binary Tree to Linked List



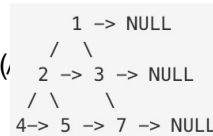
```
self.flatten(root.right)
self.flatten(root.left)
root.right = self.prev
root.left = None
self.prev = root
```

✓

117

## Populating Next Right Pointers in Each Node II

(/problems/populating-next-right-pointers-in-each-node-ii) Can skip



```
for i in range(size):
    cur = dq.popleft()
    if cur.left != None:
        dq.append(cur.left)
    if cur.right != None:
        dq.append(cur.right)
```

✓

124

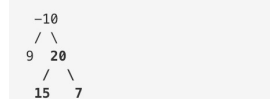
## Binary Tree Maximum Path Sum

Input: [1,2,3]



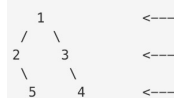
Output: 6

Input: [-10,9,20,null,null,15,7]



Output: 42

Input: [1,2,3,null,5,null,4]  
Output: [1, 3, 4]  
Explanation:



199

## Binary Tree Right Side View (/problems/binary-tree-right-side-view)

Can skip

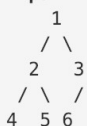
222

## Count Complete Tree Nodes (/problems/count-complete-tree-nodes)

In a complete binary tree every level, except possibly the last, is completely filled, and all nodes in the last level are as far left as possible. It can have between  $2^{h-1}$  and  $2^h$  nodes inclusive at the last level  $h$ .

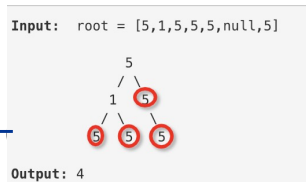
Utilize left depth and right depth, if they're same, return  $(1 \ll \text{leftDepth}) - 1$

Input:



Output: 6

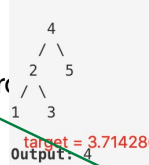
✓ 250 Count Unival Subtrees



255 Verify Preorder Sequence in Binary Search Tree

Input: [5,2,1,3,6]  
Output: true

✓ 272 Closest Binary Search Tree Value II (/problems/closest-binary-search-tree-value-ii) 📌



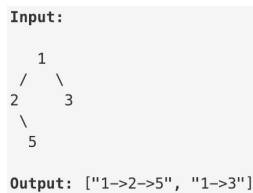
✓ 298 Binary Tree Longest Consecutive Sequence (/problems/binary-tree-longest-consecutive-sequence) 📌

Input: [10,5,15,1,8,null,7]

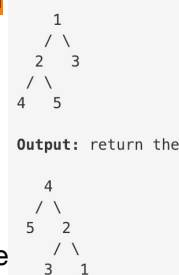


333 Largest BST Subtree (/problems/largest-bst-subtree) 📌

456 Binary Tree Upside Down



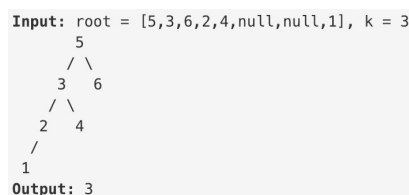
Input: [1,2,3,4,5]



Binary Tree Upside Down

✓ 257 Binary Tree Paths (/problems/binary-tree-paths) Can skip

✓ 236 Lowest Common Ancestor of a Binary Tree (/problems/lowest-common-ancestor-of-a-binary-tree)



✓ 297 Serialize and Deserialize Binary Tree (/problems/serialize-and-deserialize-binary-tree) The way use count Can skip

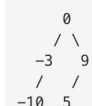
✓ 230 Kth Smallest Element in a BST

Basically preorder, can skip, two ways, count or just preorder traverse.

✓ 108 Convert Sorted Array to Binary Search Tree (/problems/convert-sorted-array-to-binary-search-tree) Can skip

Given the sorted array: [-10,-3,0,5,9], return any BST.

One possible answer is: [0,-3,9,-10,null,null,5]



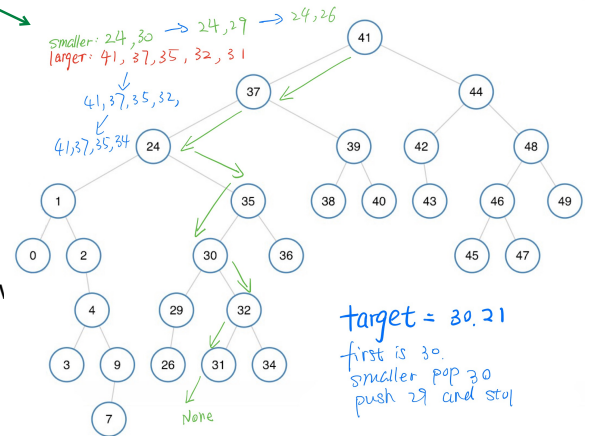
le-subtree

```
if len(preorder) == 0:
    return True
from collections import deque
```

```
dq = deque()
dq.append(preorder[0])
min_ = float('-inf')
```

```
for i in range(1, len(preorder)):
    if preorder[i] < min_:
        return False
```

```
while len(dq) > 0 and dq[-1] < preorder[i]:
    min_ = dq[-1]
    dq.pop()
dq.append(preorder[i])
return True
```



target = 30.21  
first is 30.  
smaller pop 30  
push 29 and stop

1. If root == none or root in (p,q) , then return root
2. If left and right both not none, then return root
3. If one of left or right is not none return that one
4. If they are both none, return none

✓ 285 Inorder Successor in BST Similar idea with 272, can skip.

✓ 366 Find Leaves of Binary Tree (/problems/find-leaves-of-binary-tree)

404 Sum of Left Leaves (/problems/sum-of-left-leaves)

437 Path Sum III (/problems/path-sum-iii)

449 Serialize and Deserialize BST (/problems/serialize-and-deserialize-bst)  
Similar idea as 255

450 Delete Node in a BST (/problems/delete-node-in-a-bst)

501 Find Mode in Binary Search Tree (/problems/find-mode-in-binary-search-tree)  
find all the mode(s) (the most frequently occurred element) in the given BST.

508 Most Frequent Subtree Sum (/problems/most-frequent-subtree-sum)

513 Find Bottom Left Tree Value (/problems/find-bottom-left-tree-value)

515 Find Largest Value in Each Tree Row (/problems/find-largest-value-in-each-tree-row)  
Output: [1, 3, 9]

536 Construct Binary Tree from String (/problems/construct-binary-tree-from-string)

543 Diameter of Binary Tree (/problems/diameter-of-binary-tree)  
The diameter of a binary tree is the length of the longest path between any two nodes in a tree.

538 Convert BST to Greater Tree (/problems/convert-bst-to-greater-tree)

every key of the original BST is changed to the original key plus sum of all keys greater than the original key in BST.

545 Boundary of Binary Tree (/problems/boundary-of-binary-tree)

549 Binary Tree Longest Consecutive Sequence II (/problems/binary-tree-longest-consecutive-sequence-ii)  
the path can be in the child-Parent-child order,

563 Binary Tree Tilt (/problems/binary-tree-tilt)

572 Subtree of Another Tree (/problems/subtree-of-another-tree)  
Same to same tree

582 Kill Process (/problems/kill-process)

606 Construct String from Binary Tree (/problems/construct-string-from-binary-tree)  
Output: 3

✓ 617 Merge Two Binary Trees (/problems/merge-two-binary-trees)

623 Add One Row to Tree (/problems/add-one-row-to-tree)

637 Average of Levels in Binary Tree (/problems/average-of-levels-in-binary-tree)

652 Find Duplicate Subtrees (/problems/find-duplicate-subtrees)  
following are two duplicate subtrees

653 Two Sum IV - Input is a BST (/problems/two-sum-iv-input-is-a-bst)

- 654 [Maximum Binary Tree \(/problems/maximum-binary-tree\)](/problems/maximum-binary-tree)
- 655 [Print Binary Tree \(/problems/print-binary-tree\)](/problems/print-binary-tree)
- 662 [Maximum Width of Binary Tree \(/problems/maximum-width-of-binary-tree\)](/problems/maximum-width-of-binary-tree)
- 663 [Equal Tree Partition \(/problems/equal-tree-partition\)](/problems/equal-tree-partition) 🔒
- 666 [Path Sum IV \(/problems/path-sum-iv\)](/problems/path-sum-iv) 🔒
- ✓ 669 [Trim a Binary Search Tree \(/problems/trim-a-binary-search-tree\)](/problems/trim-a-binary-search-tree)
- 671 [Second Minimum Node In a Binary Tree \(/problems/second-minimum-node-in-a-binary-tree\)](/problems/second-minimum-node-in-a-binary-tree)
- 684 [Redundant Connection \(/problems/redundant-connection\)](/problems/redundant-connection)
- 685 [Redundant Connection II \(/problems/redundant-connection-ii\)](/problems/redundant-connection-ii)
- 687 [Longest Univalue Path \(/problems/longest-univalue-path\)](/problems/longest-univalue-path)
- 742 [Closest Leaf in a Binary Tree \(/problems/closest-leaf-in-a-binary-tree\)](/problems/closest-leaf-in-a-binary-tree) 🔒
- 814 [Binary Tree Pruning \(/problems/binary-tree-pruning\)](/problems/binary-tree-pruning)
- 834 [Sum of Distances in Tree \(/problems/sum-of-distances-in-tree\)](/problems/sum-of-distances-in-tree)
- 863 [All Nodes Distance K in Binary Tree \(/problems/all-nodes-distance-k-in-binary-tree\)](/problems/all-nodes-distance-k-in-binary-tree)
- 865 [Smallest Subtree with all the Deepest Nodes \(/problems/smallest-subtree-with-all-the-deepest-nodes\)](/problems/smallest-subtree-with-all-the-deepest-nodes)
- 426 [Convert Binary Search Tree to Sorted Doubly Linked List \(/problems/convert-binary-search-tree-to-sorted-doubly-linked-list\)](/problems/convert-binary-search-tree-to-sorted-doubly-linked-list) 🔒
- 701 [Insert into a Binary Search Tree \(/problems/insert-into-a-binary-search-tree\)](/problems/insert-into-a-binary-search-tree)
- 700 [Search in a Binary Search Tree \(/problems/search-in-a-binary-search-tree\)](/problems/search-in-a-binary-search-tree)
- 590 [N-ary Tree Postorder Traversal \(/problems/n-ary-tree-postorder-traversal\)](/problems/n-ary-tree-postorder-traversal)
- 589 [N-ary Tree Preorder Traversal \(/problems/n-ary-tree-preorder-traversal\)](/problems/n-ary-tree-preorder-traversal)
- 429 [N-ary Tree Level Order Traversal \(/problems/n-ary-tree-level-order-traversal\)](/problems/n-ary-tree-level-order-traversal)
- 559 [Maximum Depth of N-ary Tree \(/problems/maximum-depth-of-n-ary-tree\)](/problems/maximum-depth-of-n-ary-tree)
- 431 [Encode N-ary Tree to Binary Tree \(/problems/encode-n-ary-tree-to-binary-tree\)](/problems/encode-n-ary-tree-to-binary-tree) 🔒
- 428 [Serialize and Deserialize N-ary Tree \(/problems/serialize-and-deserialize-n-ary-tree\)](/problems/serialize-and-deserialize-n-ary-tree) ?

- 872 [Leaf-Similar Trees \(/problems/leaf-similar-trees\)](/problems/leaf-similar-trees)
- 889 [Construct Binary Tree from Preorder and Postorder Traversal \(/problems/construct-binary-tree-from-preorder-and-postorder-traversal\)](/problems/construct-binary-tree-from-preorder-and-postorder-traversal)
- 894 [All Possible Full Binary Trees \(/problems/all-possible-full-binary-trees\)](/problems/all-possible-full-binary-trees)
- 897 [Increasing Order Search Tree \(/problems/increasing-order-search-tree\)](/problems/increasing-order-search-tree)
- 919 [Complete Binary Tree Inserter \(/problems/complete-binary-tree-inserter\)](/problems/complete-binary-tree-inserter)
- 951 [Flip Equivalent Binary Trees \(/problems/flip-equivalent-binary-trees\)](/problems/flip-equivalent-binary-trees)
- 958 [Check Completeness of a Binary Tree \(/problems/check-completeness-of-a-binary-tree\)](/problems/check-completeness-of-a-binary-tree)