Problem 971: Flip Binary Tree To Match Preorder Traversal

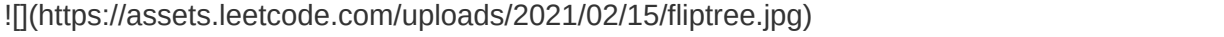
Problem Information

Difficulty: Medium
Acceptance Rate: 51.43%
Paid Only: No
Tags: Tree, Depth-First Search, Binary Tree

Problem Description

You are given the `root` of a binary tree with `n` nodes, where each node is uniquely assigned a value from `1` to `n`. You are also given a sequence of `n` values `voyage`, which is the **desired** [**pre-order traversal**](https://en.wikipedia.org/wiki/Tree_traversal#Pre-order) of the binary tree.

Any node in the binary tree can be **flipped** by swapping its left and right subtrees. For example, flipping node 1 will have the following effect:



Flip the **smallest** number of nodes so that the **pre-order traversal** of the tree **matches** `voyage`.

Return _a list of the values of all**flipped** nodes. You may return the answer in **any order**. If it is **impossible** to flip the nodes in the tree to make the pre-order traversal match _`voyage` _, return the list_`[-1]`.

Example 1:

Input: root = [1,2], voyage = [2,1] **Output:** [-1] **Explanation:** It is impossible to flip the nodes such that the pre-order traversal matches voyage.

Example 2:

Input: root = [1,2,3], voyage = [1,3,2] **Output:** [1] **Explanation:** Flipping node 1 swaps nodes 2 and 3, so the pre-order traversal matches voyage.

Example 3:

Input: root = [1,2,3], voyage = [1,2,3] **Output:** [] **Explanation:** The tree's pre-order traversal already matches voyage, so no nodes need to be flipped.

Constraints:

* The number of nodes in the tree is `n`. * `n == voyage.length` * `1 <= n <= 100` * `1 <= Node.val, voyage[i] <= n` * All the values in the tree are **unique**. * All the values in `voyage` are **unique**.

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:
vector<int> flipMatchVoyage(TreeNode* root, vector<int>& voyage) {

}
};
```

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 List<Integer> flipMatchVoyage(TreeNode root, int[] voyage) {

}
}
```

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 flipMatchVoyage(self, root: Optional[TreeNode], voyage: List[int]) ->
List[int]:
```