2313. Minimum Flips in Binary Tree to Get Result

Description

You are given the `root` of a **binary tree** with the following properties:

- **Leaf nodes** have either the value `0` or `1`, representing `false` and `true` respectively.
- **Non-leaf nodes** have either the value `2`, `3`, `4`, or `5`, representing the boolean operations `OR`, `AND`, `XOR`, and `NOT`, respectively.

You are also given a boolean `result`, which is the desired result of the **evaluation** of the `root` node.

The evaluation of a node is as follows:

- If the node is a leaf node, the evaluation is the **value** of the node, i.e. `true` or `false`.
- Otherwise, **evaluate** the node's children and **apply** the boolean operation of its value with the children's evaluations.

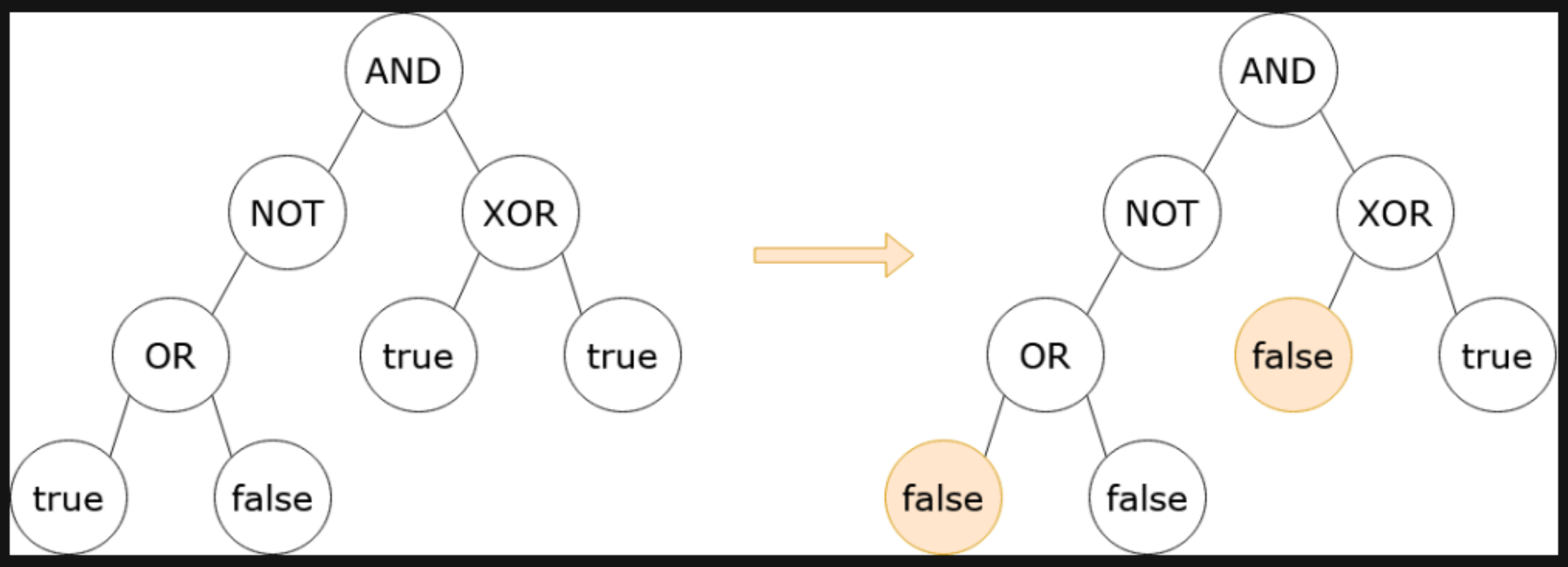
In one operation, you can **flip** a leaf node, which causes a `false` node to become `true`, and a `true` node to become `false`.

Return *the minimum number of operations that need to be performed such that the evaluation of* `root` *yields* `result`. It can be shown that there is always a way to achieve `result`.

A **leaf node** is a node that has zero children.

Note: `NOT` nodes have either a left child or a right child, but other non-leaf nodes have both a left child and a right child.

Example 1:



```
Input: root = [3,5,4,2,null,1,1,1,0], result = true
Output: 2
Explanation:
It can be shown that a minimum of 2 nodes have to be flipped to make the root of the tree
evaluate to true. One way to achieve this is shown in the diagram above.
```

Example 2:

```
Input: root = [0], result = false
Output: 0
Explanation:
The root of the tree already evaluates to false, so 0 nodes have to be flipped.
```

Constraints:

- The number of nodes in the tree is in the range $[1, 10^5]$.
- `0 <= Node.val <= 5`
- `OR`, `AND`, and `XOR` nodes have `2` children.
- `NOT` nodes have `1` child.
- Leaf nodes have a value of `0` or `1`.
- Non-leaf nodes have a value of `2`, `3`, `4`, or `5`.