Problem 3004: Maximum Subtree of the Same Color

Problem Information

Difficulty: Medium
Acceptance Rate: 57.61%
Paid Only: Yes
Tags: Array, Dynamic Programming, Tree, Depth-First Search

Problem Description

You are given a 2D integer array `edges` representing a tree with `n` nodes, numbered from `0` to `n - 1`, rooted at node `0`, where `edges[i] = [ui, vi]` means there is an edge between the nodes `vi` and `ui`.

You are also given a **0-indexed** integer array `colors` of size `n`, where `colors[i]` is the color assigned to node `i`.

We want to find a node `v` such that every node in the subtree of `v` has the **same** color.

Return _the size of such subtree with the**maximum** number of nodes possible._

Example 1:

Input: edges = [[0,1],[0,2],[0,3]], colors = [1,1,2,3] **Output:** 1 **Explanation:** Each color is represented as: 1 -> Red, 2 -> Green, 3 -> Blue. We can see that the subtree rooted at node 0 has children with different colors. Any other subtree is of the same color and has a size of 1. Hence, we return 1.

Example 2:

Input: edges = [[0,1],[0,2],[0,3]], colors = [1,1,1,1] **Output:** 4 **Explanation:** The whole tree has the same color, and the subtree rooted at node 0 has the most number of nodes which is 4. Hence, we return 4.

Example 3:

Input: edges = [[0,1],[0,2],[2,3],[2,4]], colors = [1,2,3,3,3] **Output:** 3 **Explanation:** Each color is represented as: 1 -> Red, 2 -> Green, 3 -> Blue. We can see that the subtree rooted at node 0 has children with different colors. Any other subtree is of the same color, but the subtree rooted at node 2 has a size of 3 which is the maximum. Hence, we return 3.

Constraints:

* `n == edges.length + 1` * `1 <= n <= 5 * 104` * `edges[i] == [ui, vi]` * `0 <= ui, vi < n` * `colors.length == n` * `1 <= colors[i] <= 105` * The input is generated such that the graph represented by `edges` is a tree.

Code Snippets

C++:

```
class Solution {
public:
int maximumSubtreeSize(vector<vector<int>>& edges, vector<int>& colors) {

}
};
```

Java:

```
class Solution {
public int maximumSubtreeSize(int[][] edges, int[] colors) {

}
}
```

Python3:

```
class Solution:
def maximumSubtreeSize(self, edges: List[List[int]], colors: List[int]) ->
int:
```