Problem 1519: Number of Nodes in the Sub-Tree With the Same Label

Problem Information

Difficulty: Medium
Acceptance Rate: 55.23%
Paid Only: No
Tags: Hash Table, Tree, Depth-First Search, Breadth-First Search, Counting

Problem Description

You are given a tree (i.e. a connected, undirected graph that has no cycles) consisting of `n` nodes numbered from `0` to `n - 1` and exactly `n - 1` `edges`. The **root** of the tree is the node `0`, and each node of the tree has **a label** which is a lower-case character given in the string `labels` (i.e. The node with the number `i` has the label `labels[i]`).

The `edges` array is given on the form `edges[i] = [ai, bi]`, which means there is an edge between nodes `ai` and `bi` in the tree.

Return _an array of size`n`_ where `ans[i]` is the number of nodes in the subtree of the `ith` node which have the same label as node `i`.

A subtree of a tree `T` is the tree consisting of a node in `T` and all of its descendant nodes.

Example 1:

Input: n = 7, edges = [[0,1],[0,2],[1,4],[1,5],[2,3],[2,6]], labels = "abaedcd" **Output:** [2,1,1,1,1,1,1] **Explanation:** Node 0 has label 'a' and its sub-tree has node 2 with label 'a' as well, thus the answer is 2. Notice that any node is part of its sub-tree. Node 1 has a label 'b'. The sub-tree of node 1 contains nodes 1,4 and 5, as nodes 4 and 5 have different labels than node 1, the answer is just 1 (the node itself).

Example 2:

Input: n = 4, edges = [[0,1],[1,2],[0,3]], labels = "bbbb" **Output:** [4,2,1,1] **Explanation:** The sub-tree of node 2 contains only node 2, so the answer is 1. The sub-tree of node 3 contains only node 3, so the answer is 1. The sub-tree of node 1 contains nodes 1 and 2, both have label 'b', thus the answer is 2. The sub-tree of node 0 contains nodes 0, 1, 2 and 3, all with label 'b', thus the answer is 4.

Example 3:

Input: n = 5, edges = [[0,1],[0,2],[1,3],[0,4]], labels = "aabab" **Output:** [3,2,1,1,1]

Constraints:

* `1 <= n <= 105` * `edges.length == n - 1` * `edges[i].length == 2` * `0 <= ai, bi < n` * `ai != bi` * `labels.length == n` * `labels` is consisting of only of lowercase English letters.

Code Snippets

C++:

```
class Solution {
public:
vector<int> countSubTrees(int n, vector<vector<int>>& edges, string labels) {

}
};
```

Java:

```
class Solution {
public int[] countSubTrees(int n, int[][] edges, String labels) {

}
}
```

Python3:

```
class Solution:
def countSubTrees(self, n: int, edges: List[List[int]], labels: str) ->
List[int]:
```