2652. Count Number of Possible Root Nodes

Difficulty : Hard

https://leetcode.com/problems/count-number-of-possible-root-nodes

Alice has an undirected tree with `n` nodes labeled from `0` to `n - 1`. The tree is represented as a 2D integer array `edges` of length `n - 1` where `edges[i] = [a_i, b_i]` indicates that there is an edge between nodes a_i and b_i in the tree.

Alice wants Bob to find the root of the tree. She allows Bob to make several **guesses** about her tree. In one guess, he does the following:

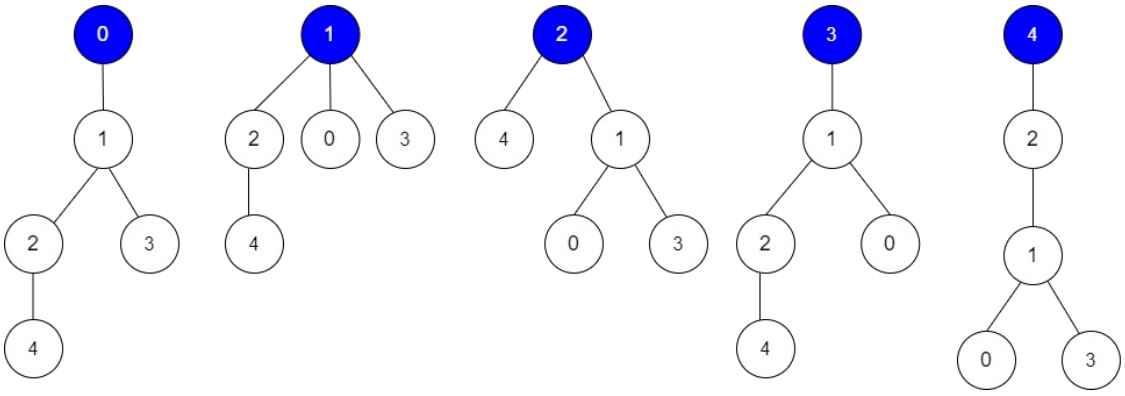
- Chooses two **distinct** integers `u` and `v` such that there exists an edge `[u, v]` in the tree.
- He tells Alice that `u` is the **parent** of `v` in the tree.

Bob's guesses are represented by a 2D integer array `guesses` where `guesses[j] = [u_j, v_j]` indicates Bob guessed u_j to be the parent of v_j.

Alice being lazy, does not reply to each of Bob's guesses, but just says that **at least** `k` of his guesses are `true`.

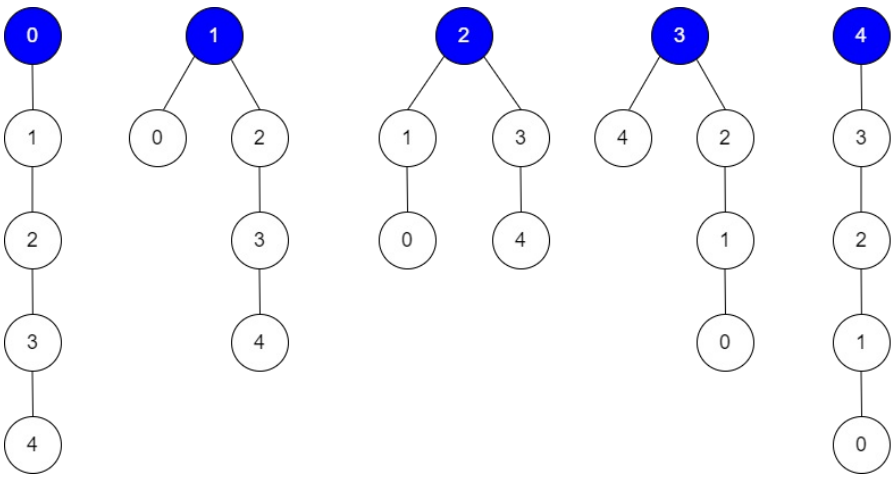
Given the 2D integer arrays `edges`, `guesses` and the integer `k`, return *the **number of possible nodes** that can be the root of Alice's tree*. If there is no such tree, return `0`.

Example 1:




```
Input: edges = [[0,1],[1,2],[1,3],[4,2]], guesses = [[1,3],[0,1],[1,0],[2,4]], k = 3
Output: 3
Explanation:
Root = 0, correct guesses = [1,3], [0,1], [2,4]
Root = 1, correct guesses = [1,3], [1,0], [2,4]
Root = 2, correct guesses = [1,3], [1,0], [2,4]
Root = 3, correct guesses = [1,0], [2,4]
Root = 4, correct guesses = [1,3], [1,0]
Considering 0, 1, or 2 as root node leads to 3 correct guesses.
```

Example 2:



Input: edges = [[0,1],[1,2],[2,3],[3,4]], guesses = [[1,0],[3,4],[2,1],[3,2]], k = 1
Output: 5
Explanation:
Root = 0, correct guesses = [3,4]
Root = 1, correct guesses = [1,0], [3,4]
Root = 2, correct guesses = [1,0], [2,1], [3,4]
Root = 3, correct guesses = [1,0], [2,1], [3,2], [3,4]
Root = 4, correct guesses = [1,0], [2,1], [3,2]
Considering any node as root will give at least 1 correct guess.

Constraints:

- edges.length == n - 1
- 2 <= n <= 10^5
- 1 <= guesses.length <= 10^5
- 0 <= a_i, b_i, u_j, v_j <= n - 1
- a_i != b_i
- u_j != v_j
- edges represents a valid tree.
- guesses[j] is an edge of the tree.
- guesses is unique.
- 0 <= k <= guesses.length