Recurrent on a Tree

The sequence f of numbers is defined as :-

$$f(i) = \begin{cases} 1 & i = 0 \\ 1 & i = 1 \\ f(i-1) + f(i-2) & i \geq 2 \end{cases}$$

You are given a tree with n vertices. Every vertex v contains a number c_v. Let the function $g(v, u)$, where v and u are vertices of the tree, be the sum of numbers, written on the vertices on the path between vertices u and v. You have to calculate a number $\sum_{v \in V, u \in V} f(g(v, u))$ modulo $10^9 + 7$, where V — is the set of all vertices of the tree.

Input Format

The first line of input contains one integer n, denoting the number of vertices in the given tree.
The next $n - 1$ lines contain a pairs of integers x and y, denoting an edge between vertices x and y.
The next line contains n space-separated integers, where i^{th} integer denotes the number c_i, that was written on the vertex i.

Constraints

- $2 \leq n \leq 2 \times 10^5$
- $0 \leq c_i \leq 10^5$

Output Format

On a single line print one integer denoting the required sum modulo $(10^9 + 7)$.

Sample Input 0

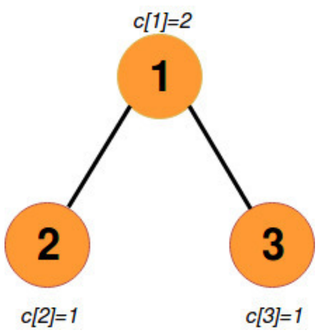
```
3
1 2
1 3
2 1 1
```

Sample Output 0

```
26
```

Explanation 0

There are following paths in the tree:



Summing over all $(u, v) \in V$, we get.

- $g(1, 1) = 2$, so $f(2) = 2$
- $g(2, 2) = 1$, so $f(1) = 1$
- $g(3, 3) = 1$, so $f(1) = 1$
- $g(1, 2) = 2 + 1 \Rightarrow 3$, so $f(3) = 3$
- $g(2, 1) = 1 + 2 \Rightarrow 3$, so $f(3) = 3$
- $g(1, 3) = 2 + 1 \Rightarrow 3$, so $f(3) = 3$
- $g(3, 1) = 2 + 1 \Rightarrow 3$, so $f(3) = 3$
- $g(2, 3) = 1 + 2 + 1 \Rightarrow 4$, so $f(4) = 5$
- $g(3, 2) = 1 + 2 + 1 \Rightarrow 4$, so $f(4) = 5$

All in all, answer for the problem is $2 + 1 + 1 + 3 \times 2 + 3 \times 2 + 5 \times 2 = 26$.