



CTU Open Contest 2026

Park

`park.(c|cpp|py), Park.(java|kt)`

Míša was walking through a park and saw a beautiful tree – an undirected acyclic connected simple graph. He noticed many squirrels running around the tree. He was observing their behavior and noticed that they like to run along some paths more than others. Using his mathematical skills, he found out the formula that decides how much the squirrels like each path.

First, he noticed that the tree has N vertices and each of them has a unique beauty value from 1 to N . He then defined the popularity of a path as its length (number of edges in the path) multiplied by the maximum beauty value over all vertices in the path.

Formally, let b_v denote the beauty value of vertex v . The popularity of a path visiting vertices $p_1, p_2, \dots, p_k$ is

$$(k - 1) \cdot \max(b_{p_1}, b_{p_2}, \dots, b_{p_k}).$$

Míša wants to know the total popularity of all paths in the tree, that is, the sum of popularities of the paths between all unordered pairs of distinct vertices (a path and its reverse are counted only once). Help him compute it quickly. Since the value can be large, output it modulo $10^9 + 7$.

Input Specification

The first line contains one integer N ($1 \leq N \leq 10^5$), the number of vertices.

The second line contains N space-separated integers $b_1, b_2, \dots, b_N$, the beauty values of vertices $1, 2, \dots, N$. In other words, b_i is the beauty value of vertex i . The values $b_1, b_2, \dots, b_N$ form a permutation of $1, 2, \dots, N$.

Each of the following $N - 1$ lines contains two space-separated integers u and v ($1 \leq u, v \leq N$, $u \neq v$), describing an edge between vertices u and v . The edges are guaranteed to form a tree.

Output Specification

Output a single integer: the total popularity of the tree, that is, the sum of the popularities of the paths over all unordered pairs of distinct vertices, taken modulo $10^9 + 7$.

Sample Input 1

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

Output for Sample Input 1

```
11
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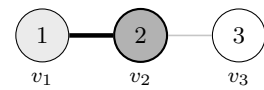
Sample Input 2

6
4 1 6 2 5 3
1 2
2 3
3 4
3 5
5 6

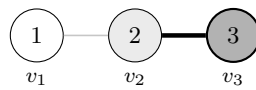
Output for Sample Input 2

183

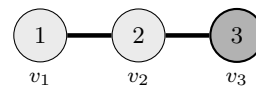
In the first sample, the tree is made of a path $v_1 - v_2 - v_3$ with beauty values $b = (1, 2, 3)$. It contains three paths which contribute their popularity as shown below; bold edges trace each path and the shaded vertex carries the largest beauty on it.



$$\{1, 2\} : 1 \cdot \max(1, 2) = 2$$



$$\{2, 3\} : 1 \cdot \max(2, 3) = 3$$



$$\{1, 3\} : 2 \cdot \max(1, 2, 3) = 6$$

$$\text{Total popularity} = 2 + 3 + 6 = 11$$