E. Alternating Tree

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Given a tree with n nodes numbered from 1 to n. Each node i has an associated value V_i.

If the simple path from u_1 to u_m consists of m nodes namely $u_1 \rightarrow u_2 \rightarrow u_3 \rightarrow \ldots u_{m-1} \rightarrow u_m$, then its alternating function $A(u_1, u_m)$ is defined as $A(u_1, u_m) = m\sum i=1(-1)^{i+1} \cdot V_{u_i}$. A path can also have 0 edges, i.e. $u_1 = u_m$.

Compute the sum of alternating functions of all unique simple paths. Note that the paths are directed: two paths are considered different if the starting vertices differ or the ending vertices differ. The answer may be large so compute it modulo $10^9 + 7$.

Input

The first line contains an integer n ($2 \leq n \leq 2 \cdot 10^5$) — the number of vertices in the tree.

The second line contains n space-separated integers $V_1, V_2, \ldots, V_n$ ($-10^9 \leq V_i \leq 10^9$) — values of the nodes.

The next $n - 1$ lines each contain two space-separated integers u and v (1\leq u, v\leq n, u \neq v) denoting an edge between vertices u and v. It is guaranteed that the given graph is a tree.

Output

Print the total sum of alternating functions of all unique simple paths modulo 10^{9}+7.

Examples

input

```
4
-4 1 5 -2
1 2
1 3
1 4
```

output

```
40
```

input

```
8
-2 6 -4 -4 -9 -3 -7 23
8 2
2 3
1 4
6 5
7 6
4 7
5 8
```

output

```
4
```

Note

Consider the first example.

A simple path from node 1 to node 2: 1 \rightarrow 2 has alternating function equal to A(1,2) = 1 \cdot (-4)+(-1) \cdot 1 = -5.

A simple path from node 1 to node 3: 1 \rightarrow 3 has alternating function equal to A(1,3) = 1 \cdot (-4)+(-1) \cdot 5 = -9.

A simple path from node 2 to node 4: 2 \rightarrow 1 \rightarrow 4 has alternating function A(2,4) = 1 \cdot (1)+(-1) \cdot (-4)+1 \cdot (-2) = 3.

A simple path from node 1 to node 1 has a single node 1, so A(1,1) = 1 \cdot (-4) = -4.

Similarly, A(2, 1) = 5, A(3, 1) = 9, A(4, 2) = 3, A(1, 4) = -2, A(4, 1) = 2, A(2, 2) = 1, A(3, 3) = 5, A(4, 4) = -2, A(3, 4) = 7, A (4, 3) = 7, A(2, 3) = 10, A(3, 2) = 10. So the answer is (-5) + (-9) + 3 + (-4) + 5 + 9 + 3 + (-2) + 2 + 1 + 5 + (-2) + 7 + 7 + 10 + 10 = 40.

Similarly A(1,4)=-2, A(2,2)=1, A(2,1)=5, A(2,3)=10, A(3,3)=5, A(3,1)=9, A(3,2)=10, A(3,4)=7, A(4,4)=-2, A(4,1)=2, A(4,2)=3 , A(4,3)=7 which sums upto 40.