Matrix Tree

Sevenkplus has a rooted tree with N vertices. The vertices are labeled from 1 to N. 1 is the root of the tree. Each vertex v has a weight W_v.
He forms a $N \times N$ matrix M from the tree. M is defined by

$$M(x, y) = W_{lca(x,y)}$$

where $lca(x, y)$ is the lowest common ancestor of vertex x and vertex y.
He wants to calculate the determinant of M.

Input Format
First line contains the number of vertices, N.
Second line contains N numbers, $W_1\ W_2\ \cdots\ W_N$ separated by a space.
This is followed by $N - 1$ lines. Each line contains two numbers x, y, denoting that there is an edge between x and y.

Output Format
Output one line, the determinant of M modulo $(10^9 + 7)$.

Constraints
$1 \leq N \leq 10^5$
$\forall i, 0 \leq W_i \leq 10^9$.

Sample Input

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

Sample Output

```
2
```

Explanation

$$M = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & 1 \\ 1 & 1 & 3 \end{bmatrix}$$

Then,

$$|M| = 1 \times \begin{bmatrix} 2 & 1 \\ 1 & 3 \end{bmatrix} - 1 \times \begin{bmatrix} 1 & 1 \\ 1 & 3 \end{bmatrix} + 1 \times \begin{bmatrix} 1 & 2 \\ 1 & 1 \end{bmatrix}$$

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Hence $|M| = (1 \times 5) - (1 \times 2) + (1 \times -1) = 2$

Timelimits
Timelimits for this challenge is given here