Task Nestabilnost

The wood on the far bank of the river, which an hour before had glowed in the May sunshine, had now grown dim, had blurred and dissolved. What remains is a single giant tree, a tree with N nodes...

Ivan watched the tree from his room numbered 119. It was firmly rooted at the node labeled 1. Upon closer inspection, he noticed that each node had a corresponding number a_i written on it. Suddenly, a thought popped into his head - the definition of a *k-good subtree*. Firstly, a *subtree* of the given tree is defined as any connected subset of the tree nodes. For an integer k ($1 \leq k \leq N$), a subtree is said to be k-good if for every edge of the form (u, v), where u is the parent of v, it holds that $a_v = (a_u + 1) \bmod k$, and additionally, for each node v of the subtree, it must hold that $a_v < k$. Furthermore, for each $k = 1, 2, \ldots, N$, a number $f(k)$ is given, representing the *natural instability* of k-good trees.

After turning once more he realized that he was actually floating beside the tree with a magic saw in his right hand. Ivan decided to cut some of the branches of the tree, and then choose an integer k_i for each of the subtrees that remain after cutting, such that each of the corresponding subtrees is k_i-good. A *cut* consists of a choice of edges to be cut, along with the numbers k_i such that the mentioned condition is satisfied. The *instability* of a cut is defined as the sum of all $f(k_i)$ over all of the subtrees of the cut. Help Ivan determine the smallest possible instability of a cut.

Input

The first line contains a positive integer N, the number of nodes in the tree.

The second line contains N integers, the i-th of which is a_i ($0 \leq a_i \leq N - 1$).

The third line contains N integers, the k-th of which is $f(k)$ ($1 \leq f(k) \leq 10^9$).

The following $N - 1$ lines contain the description of the tree. The i-th line contains the numbers u_i and v_i ($1 \leq u_i, v_i \leq N, u_i \neq v_i$), representing an edge between the nodes u_i and v_i.

Output

In the only line output the minimum possible instability of a cut.

Scoring

In all subtasks, it holds that $1 \leq N \leq 300\,000$.

Subtask	Points	Constraints
1	12	$N \leq 5\,000$, the tree forms a chain starting at node 1
2	20	$N \leq 300\,000$, the tree forms a chain starting at node 1
3	7	$N \leq 20$
4	22	$N \leq 5\,000$
5	39	No additional constraints.

Example

input

```
7
2 3 0 3 2 0 0
6 8 2 9 9 9 9
1 2
2 3
1 4
4 5
5 6
5 7
```

output

```
11
```

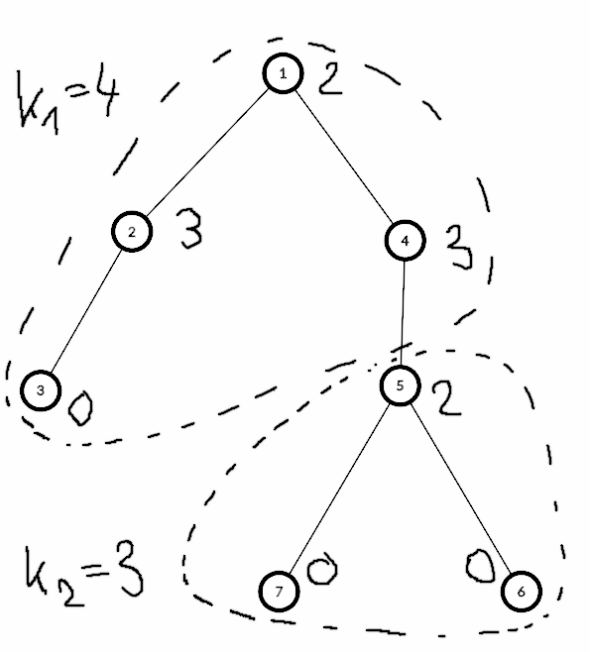
input

```
7
2 3 0 3 2 0 0
6 8 2 9 9 9 1
1 2
2 3
1 4
4 5
5 6
5 7
```

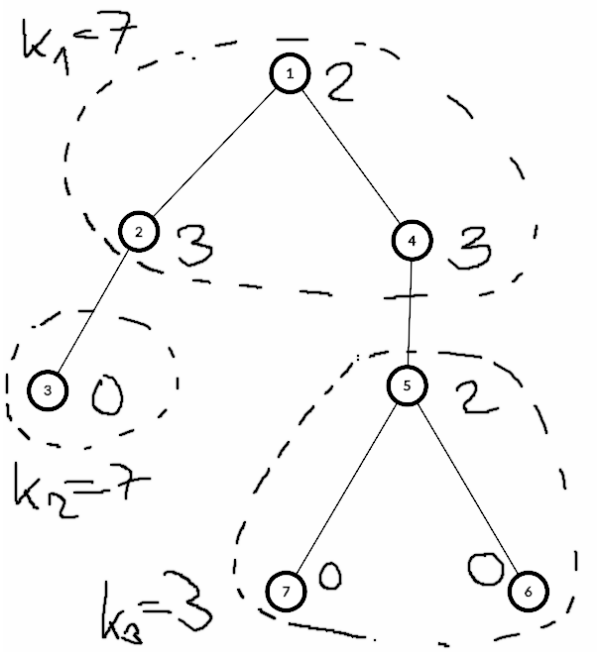
output

```
4
```

Clarification of the examples



(a) The optimal cut from the first example



(b) The optimal cut from the second example