Werewolves

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	512 megabytes

You are given a colored tree on n nodes, node i has color c_i. As a reminder, a tree on n nodes is a connected graph with $n-1$ edges.

Compute the number of connected subgraphs of this tree, for which there exists some color (majority color), such that **strictly more than half** of the nodes of this subgraph have this color.

Since the answer can be quite large, compute it modulo 998 244 353.

Input

The first line of input contains one integer n ($1 \le n \le 3000$) — the number of nodes in the tree.

The second line contains n integers $c_1\ c_2\ \ldots\ c_n$ ($1 \le c_i \le n$) — the colors of the nodes.

The i-th of next $n-1$ lines contains 2 integers u_i, v_i ($1 \le u_i, v_i \le n$, $u_i \neq v_i$), representing the edge (u_i, v_i) of the tree. It is guaranteed that the given graph is a tree.

Output

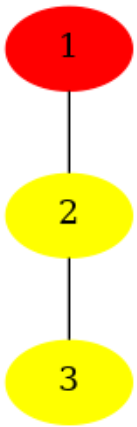
Print a single integer — answer to the problem modulo 998 244 353.

Examples

standard input	standard output
3 2 3 3 1 2 2 3	5
4 1 1 3 3 1 2 1 3 1 4	8

Note

In the following pictures, we use blue for color 1, red for color 2, and yellow for color 3. The first example looks as follows:



The tree has a total of 6 non-empty connected subgraphs: 3 of size 1, 2 of size 2 and 1 of size 3, the latter

in fact being the whole tree. All such subgraphs of sizes 1 and 3 have a majority color. For those of size 2 only the subgraph induced by vertices 1 and 2 does not have a majority color (red and yellow both appear equally often in it). Therefore, there are $6 - 1 = 5$ connected subgraphs with a majority color.

The second example looks as follows, and it has 8 connected subgraphs with a majority color: