

Tree and Subgraph Problem

Input file: standard input
Output file: standard output
Time limit: 1 second
Memory limit: 1024 megabytes

Given an unrooted tree containing n nodes, where each node has a color represented by a positive integer c_i for the i -th node.

Assume that S and T are sets of nodes in the tree. An **ordered pair** (S, T) is considered valid if all the following conditions are met:

- Both S and T are non-empty sets;
- All nodes in S have the same color, and all nodes in T have the same color;
- The **subgraph** $\text{sub}(S)$ of the set of nodes S is defined as the **smallest connected subgraph** of the tree that contains the set of nodes S , and similarly for $\text{sub}(T)$. It is required that $\text{sub}(S)$ and $\text{sub}(T)$ do not intersect, meaning they have no common nodes or edges.

Determine the number of all valid ordered pairs (S, T) modulo 998244353. It should be noted that if $S \neq T$, then the ordered pair (S, T) is considered different from the ordered pair (T, S) .

Input

This problem contains multiple test cases. The first line of input contains an integer T ($1 \leq T \leq 10^4$), representing the number of test cases.

For each test case:

The first line contains an integer n ($1 \leq n \leq 2 \times 10^5$), representing the number of nodes in the unrooted tree.

The second line contains n integers c_1, c_2, \dots, c_n ($1 \leq c_i \leq n$), representing the color of each node.

The next $n - 1$ lines each contain two integers u, v ($1 \leq u, v \leq n, u \neq v$), representing the edges of the tree. It is guaranteed that these $n - 1$ edges form a tree structure.

The data guarantees that the total sum of n across all test cases does not exceed 2×10^5 .

Output

For each test case, output a single line containing an integer, representing the number of ordered pairs modulo 998244353.

Example

standard input	standard output
3	2
2	54
1 1	42
1 2	
5	
1 1 1 2 2	
1 2	
2 3	
3 4	
4 5	
5	
1 2 1 2 1	
1 2	
1 3	
2 4	
2 5	