Forestry

Input file:	`standard input`
Output file:	`standard output`
Time limit:	4 seconds
Memory limit:	1024 megabytes

You are given a tree T with N vertices and $N-1$ edges. The vertices are numbered from 1 to N, and the edges are numbered from 1 to $N-1$. Edge i ($1 \leq i \leq N-1$) connects vertices U_i and V_i. Additionally, an integer A_v is written on vertex v ($1 \leq v \leq N$).

There are 2^{N-1} ways to choose some of the edges of the tree. For each choice, **the score** is defined as follows:

- Let G be the graph obtained by removing the unselected edges from T. For each connected component of G, consider the minimum value of the integers written on its vertices, and sum those minimum values. The sum is the score.

Find the sum of the scores over all choices modulo 998244353.

Input

The input is given from Standard Input in the following format:

```
N
A₁ A₂ ⋯ Aₙ
U₁ V₁
U₂ V₂
⋮
Uₙ₋₁ Vₙ₋₁
```

$$
\begin{array}{l}
N \\
A_1 \ A_2 \ \cdots \ A_N \\
U_1 \ V_1 \\
U_2 \ V_2 \\
\vdots \\
U_{N-1} \ V_{N-1}
\end{array}
$$

- All values in the input are integers.
- $2 \leq N \leq 3 \times 10^5$
- $1 \leq A_i \leq 10^9$ ($1 \leq i \leq N$)
- $1 \leq U_i, V_i \leq N$ ($1 \leq i \leq N-1$)
- The given graph is a tree.

Output

Output the answer.

Examples

standard input	standard output
4 1 2 3 4 1 2 2 4 3 2	44
5 3 5 6 5 1 4 1 2 3 3 5 1 3	154