Problem F. Function On Trees

Input file:	*standard input*
Output file:	*standard output*
Time limit:	4 seconds
Memory limit:	1024 mebibytes

You are given two trees t_1 and t_2. Each tree consists of N vertices. In each tree, the vertices are numbered from 1 to N, and the root is vertex 1.

Let p_i and q_i be the sets of vertex numbers belonging to the subtree rooted at vertex i in trees t_1 and t_2, respectively.

You are also given a sequence of integers $a_1, a_2, \ldots, a_N$.

Define $m_i = \max\{a_k \mid k \in p_i \cap q_i\}$.

Write a program to compute $m_1, m_2, \ldots, m_N$.

Input

The first line of input contains a single integer n ($1 \le n \le 250\,000$).

The second line contains n integers $a_1, a_2, \ldots, a_n$ ($1 \le a_i \le 10^9$).

The following $n - 1$ lines describe the edges of tree t_1, with each line containing two vertex numbers u and v connected by an edge ($1 \le u, v \le n$; $u \ne v$).

The following $n - 1$ lines describe the edges of tree t_2, with each line containing two vertex numbers u and v connected by an edge ($1 \le u, v \le n$; $u \ne v$).

It is guaranteed that t_1 and t_2 are trees.

Output

Output n lines with numbers $m_1, m_2, \ldots, m_n$, one per line.

Example

standard input	*standard output*
6 7 10 5 14 8 100 4 5 1 5 5 6 1 2 3 6 1 4 2 4 1 5 3 6 4 6	100 10 5 14 8 100