B. Alyona and a tree

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Alyona has a tree with n vertices. The root of the tree is the vertex 1. In each vertex Alyona wrote an positive integer, in the vertex i she wrote a_i. Moreover, the girl wrote a positive integer to every edge of the tree (possibly, different integers on different edges).

Let's define $dist(v, u)$ as the sum of the integers written on the edges of the simple path from v to u.

The vertex v controls the vertex u ($v \neq u$) if and only if u is in the subtree of v and $dist(v, u) \leq a_u$.

Alyona wants to settle in some vertex. In order to do this, she wants to know for each vertex v what is the number of vertices u such that v controls u.

Input

The first line contains single integer n ($1 \leq n \leq 2 \cdot 10^5$).

The second line contains n integers $a_1, a_2, ..., a_n$ ($1 \leq a_i \leq 10^9$) — the integers written in the vertices.

The next $(n - 1)$ lines contain two integers each. The i-th of these lines contains integers p_i and w_i ($1 \leq p_i \leq n$, $1 \leq w_i \leq 10^9$) — the parent of the $(i + 1)$-th vertex in the tree and the number written on the edge between p_i and $(i + 1)$.

It is guaranteed that the given graph is a tree.

Output

Print n integers — the i-th of these numbers should be equal to the number of vertices that the i-th vertex controls.

Examples

input
5 2 5 1 4 6 1 7 1 1 3 5 3 6

output
1 0 1 0 0

input
5 9 7 8 6 5 1 1 2 1 3 1 4 1

output
4 3 2 1 0

Note

In the example test case the vertex 1 controls the vertex 3, the vertex 3 controls the vertex 5 (note that is doesn't mean the vertex 1 controls the vertex 5).