

Coprime Pairs

Input file: **standard input**
Output file: **standard output**
Time limit: 2 seconds
Memory limit: 1024 megabytes

You are given a tree with n vertices numbered from 1 to n , rooted at vertex 1. Vertex i has a positive integer a_i written on it.

For every vertex x , count the unordered pairs of distinct vertices u and v in the subtree of x such that $\gcd(a_u, a_v) = 1$.

The subtree of x includes x and all its descendants; $\gcd$ denotes the greatest common divisor.

Input

The first line contains an integer n ($1 \leq n \leq 10^5$), the number of vertices.

The second line contains n integers $a_1, a_2, \dots, a_n$ ($1 \leq a_i \leq 10^5$).

Each of the next $n - 1$ lines contains two integers u_i and v_i ($1 \leq u_i, v_i \leq n$, $u_i \neq v_i$), the endpoints of an edge. The edges form a tree. They may be listed in any order; vertex numbers do not specify the parent-child relationship.

Output

Print the answer for each vertex from 1 to n , one per line.

Examples

standard input	standard output
8 6 1 10 1 15 7 6 14 1 2 1 3 2 4 2 5 3 6 6 7 6 8	18 3 2 0 0 1 0 0
3 6 10 15 1 2 2 3	0 0 0
4 1 1 1 1 1 3 3 2 2 4	6 1 3 0

Note

In the first example, the subtree of vertex 2 has values 1, 1, 15, so all three pairs qualify. The subtrees of vertices 3 and 6 have two and one suitable pairs, respectively.

In the second example, $\gcd(6, 10, 15) = 1$, but no pair of values is coprime.

In the third example, the subtree sizes are 4, 2, 3, 1; every pair of distinct vertices qualifies.