G. GCD Counting

time limit per test: 4.5 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

You are given a tree consisting of n vertices. A number is written on each vertex; the number on vertex i is equal to a_i.

Let's denote the function g(x, y) as the greatest common divisor of the numbers written on the vertices belonging to the simple path from vertex x to vertex y (including these two vertices).

For every integer from 1 to $2 \cdot 10^5$ you have to count the number of pairs (x, y) ($1 \le x \le y \le n$) such that g(x, y) is equal to this number.

Input

The first line contains one integer n — the number of vertices ($1 \le n \le 2 \cdot 10^5$).

The second line contains n integers $a_1, a_2, ..., a_n$ ($1 \le a_i \le 2 \cdot 10^5$) — the numbers written on vertices.

Then n − 1 lines follow, each containing two integers x and y ($1 \le x, y \le n, x \ne y$) denoting an edge connecting vertex x with vertex y. It is guaranteed that these edges form a tree.

Output

For every integer i from 1 to $2 \cdot 10^5$ do the following: if there is no pair (x, y) such that $x \le y$ and g(x, y) = i, don't output anything. Otherwise output two integers: i and the number of aforementioned pairs. You have to consider the values of i in ascending order.

See the examples for better understanding.

Examples

input
3 1 2 3 1 2 2 3

output
1 4 2 1 3 1

input
6 1 2 4 8 16 32 1 6 6 3 3 4 4 2 6 5

output
1 6 2 5 4 6 8 1

```
16 2
32 1
```

input

```
4
9 16 144 6
1 3
2 3
4 3
```

output

```
1 1
2 1
3 1
6 2
9 2
16 2
144 1
```