Problem M. Reduction and Growth

Time limit: 2 seconds
Memory limit: 1024 megabytes

Consider two positive integer variables a and b. We define a "*reduction*" operation: $D(a, b)$ means changing the value of variable a to $\frac{a}{\gcd(a,b)}$, while the value of b remains unchanged. Here, $\gcd(a, b)$ denotes the greatest common divisor of a and b. For example, if $a = 6$ and $b = 10$, then after calling $D(a, b)$ once, the value of a becomes 3, while b remains 10.

Consider a tree with positive integer vertex weights, where the vertex weight of node i is c_i. We define a "*chain reduction*" operation on the tree: $T_{u,v}(a)$. Here, u and v are two nodes in the tree, and a is a positive integer variable. Let's assume that the simple path from u to v in the tree visits the nodes $x_1, x_2, \ldots, x_k$ (where $1 \le k$, $x_1 = u$, and $x_k = v$). The operation $T_{u,v}(a)$ means performing the $D(a, c_{x_i})$ operation in order from $i = 1$ to k, that is, using the vertex weights along the path to reduce the value of variable a sequentially.

Consider a tree R that initially has only one vertex, labeled 1, with a vertex weight of c_1. To grow it into a tree with n nodes, you need to perform $n - 1$ growth operations. In the i-th operation, three integers a_i, u_i, v_i are given, where u_i and v_i are guaranteed to be nodes currently in the tree, and a_i is an integer variable. You need to first perform a *chain reduction* operation $T_{u_i,v_i}(a_i)$, and then add a new node to the tree: this new node is labeled $i + 1$, its weight c_{i+1} is the value of a_i after the *chain reduction*, and it is connected to node v_i.

Finally, please output the vertex weights of each node as the answer.

Input

The first line contains two positive integers n and c_1 ($1 \le n \le 2 \times 10^5$, $1 \le c_1 \le 10^6$), representing the need to grow a tree with n nodes, where the weight of the first node is currently c_1.

From the second to the n-th line, the i-th line contains three positive integers a_i, u_i, v_i ($1 \le u_i, v_i < i$, $1 \le a_i \le 10^6$), indicating that the i-th node is grown, connected to node v_i, and its weight c_i is the result of performing the $T_{u_i,v_i}(a_i)$ operation on a_i.

Output

Output one line containing n positive integers, separated by spaces, representing the weights $c_1, c_2, \ldots, c_n$

Example

standard input	standard output
5 10 6 1 1 2 2 2 35 1 2 84 3 4	10 3 2 7 2