Problem F. Top Cluster

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

Top Cluster is a useful data structure for maintaining data on a tree. Using Top Cluster, we can do range queries efficiently.

Lovely EMmm likes data structure technologies very much. She is learning Top Cluster now, and she is trying to solve a data structure problem. Can you write a program to solve the problem together with EMmm?

In the problem, you will be given a tree with n vertices, labeled by $1, 2, \ldots, n$. The value of the i-th vertex is a non-negative integer w_i. **All the values are pairwise distinct.**

You will then be given q queries. In the i-th query, you will be given two integers x_i and k_i ($1 \le x_i \le n$, $0 \le k_i \le 10^{15}$), and you need to find the value of $\operatorname{mex}(\{w_u \mid \operatorname{dist}(u, x_i) \le k_i \wedge 1 \le u \le n\})$.

Here, $\operatorname{dist}(u, v)$ denotes the length of the shortest path from vertex u to vertex v. In mathematics, the **mex** ("**m**inimum **ex**cluded value") of a set is the smallest non-negative integer that does not belong to the set.

EMmm is good at solving mex problems. She found that when all the values are pairwise distinct, the problem above is equivalent to finding the smallest non-negative integer that either occurred outside the given range, which means $\operatorname{dist}(x_i, u) > k_i$, or never occurred in the whole tree. However, she can't go any further. Can you help her solve the problem?

Input

The first line of the input contains two integers n and q ($1 \le n, q \le 5 \cdot 10^5$) denoting the number of vertices and the number of queries.

The second line contains n integers $w_1, w_2, \ldots, w_n$ ($0 \le w_i \le 10^9$) denoting the values of the vertices. **It is guaranteed that all the values are pairwise distinct.**

Each of the next $n - 1$ lines contains three integers u_i, v_i and ℓ_i ($1 \le u_i, v_i \le n$, $u_i \ne v_i$, $1 \le \ell_i \le 10^9$) denoting a two-way edge between vertices u_i and v_i with length ℓ_i. It is guaranteed that the input forms a tree.

Each of the next q lines contains two integers x_i and k_i ($1 \le x_i \le n$, $0 \le k_i \le 10^{15}$) denoting the i-th query.

Output

For each query, print a single line containing an integer: the mex value that you found.

Example

standard input	*standard output*
5 4 3 9 0 1 2 1 2 10 3 1 4 3 4 3 3 5 2 3 0 1 0 4 6 4 7	1 0 3 4