F. Trees and XOR Queries Again

time limit per test: 6.5 seconds
memory limit per test: 512 megabytes

You are given a tree consisting of n vertices. There is an integer written on each vertex; the i-th vertex has integer a_i written on it.

You have to process q queries. The i-th query consists of three integers x_i, y_i and k_i. For this query, you have to answer if it is possible to choose a set of vertices $v_1, v_2, \ldots, v_m$ (possibly empty) such that:

- every vertex v_j is on the simple path between x_i and y_i (endpoints can be used as well);
- $a_{v_1} \oplus a_{v_2} \oplus \cdots \oplus a_{v_m} = k_i$, where $\oplus$ denotes the bitwise XOR operator.

Input

The first line contains one integer n ($2 \le n \le 2 \cdot 10^5$).

The second line contains n integers $a_1, a_2, \ldots, a_n$ ($0 \le a_i \le 2^{20} - 1$).

Then $n - 1$ lines follow. Each of them contains two integers u and v ($1 \le u, v \le n; u \ne v$) denoting an edge of the tree.

The next line contains one integer q ($1 \le q \le 2 \cdot 10^5$) — the number of queries.

Then q lines follow. The i-th of them contains three integers x_i, y_i and k_i ($1 \le x_i, y_i \le n; 0 \le k_i \le 2^{20} - 1$).

Output

For each query, print `YES` if it is possible to form a set of vertices meeting the constraints. Otherwise, print `NO`.

You can print each letter in any case.

Example

input Copy

```
4
0 1 2 10
2 1
3 2
4 2
8
3 3 0
3 4 1
3 4 7
1 3 1
1 3 2
1 3 10
1 4 10
1 4 11
```

output Copy

```
YES
YES
NO
YES
YES
NO
YES
YES
```

Educational Codeforces Round 159 (Rated for Div. 2)

Finished

Practice

→ Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

→ Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

→ Submit?

Language: GNU G++20 13.2 (64 bit, win

Choose file: Choose File No file chosen

Submit

→ Last submissions

Submission	Time	Verdict
284435763	Oct/05/2024 13:04	Accepted
284434813	Oct/05/2024 12:57	Accepted
284434316	Oct/05/2024 12:54	Memory limit exceeded on test 84
284427312	Oct/05/2024 12:07	Accepted
284427214	Oct/05/2024 12:07	Wrong answer on test 1
284425543	Oct/05/2024 11:56	Accepted
284423855	Oct/05/2024 11:45	Accepted
284361338	Oct/04/2024 22:08	Accepted
284361104	Oct/04/2024 22:06	Accepted
284358633	Oct/04/2024 21:42	Accepted

→ Problem tags

data structures dfs and similar divide and conquer graphs implementation math trees *2400

No tag edit access

→ Contest materials