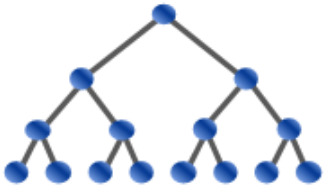

USACO 2019 February Contest, Gold
Problem 1. Cow Land

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Contest has ended.

Log in to allow submissions in analysis mode

English (en)

Cow Land is a special amusement park for cows, where they roam around, eat delicious grass, and visit different cow attractions (the roller cowster is particularly popular).

There are a total of N different attractions ($2 \leq N \leq 10^5$). Certain pairs of attractions are connected by pathways, $N-1$ in total, in such a way that there is a unique route consisting of various pathways between any two attractions. Each attraction i has an integer enjoyment value e_i, which can change over the course of a day, since some attractions are more appealing in the morning and others later in the afternoon.

A cow that travels from attraction i to attraction j gets to experience all the attractions on the route from i to j. Curiously, the total enjoyment value of this entire route is given by the bitwise XOR of all the enjoyment values along the route, including those of attractions i and j.

Please help the cows determine the enjoyment values of the routes they plan to use during their next trip to Cow Land.

INPUT FORMAT (file cowland.in):

The first line of input contains N and a number of queries Q ($1 \leq Q \leq 10^5$). The next line contains $e_1 \ldots e_N$ ($0 \leq e_i \leq 10^9$). The next $N-1$ lines each describe a pathway in terms of two integer attraction IDs a and b (both in the range $1 \ldots N$). Finally, the last Q lines each describe either an update to one of the e_i values or a query for the enjoyment of a route. A line of the form "1 i v" indicates that e_i should be updated to value v, and a line of the form "2 i j" is a query for the enjoyment of the route connecting attractions i and j.

In test data worth at most 50% of points, there will be no changes to the values of the attractions.

OUTPUT FORMAT (file cowland.out):

For each query of the form "2 i j", print on a single line the enjoyment of the route from i to j.

SAMPLE INPUT:

```
5 5
1 2 4 8 16
1 2
1 3
3 4
3 5
2 1 5
1 1 16
2 3 5
2 1 5
2 1 3
```

SAMPLE OUTPUT:

```
21
20

4
20
```

Problem credits: Charles Bailey

Contest has ended. No further submissions allowed.

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