

Xor

2022/2023 SEASON – FOURTH ROUND



Agent 007700 has a tree with n vertices and a root vertex with number 1. In each vertex there is a value - x_1, x_2, \dots, x_n . Unfortunately for him, the DoS (Department of Security) agent Bozhil gained access to it with the aim of sabotage. Events of 2 types occur:

- (1) *Update* with parameters *node* and *value*. Then agent Bozhil changes x_{node} and its values becomes equal to *value*
- (2) *Query* with parameter *node*. Then agent 007700 wants to find the bitwise “excluding or” (xor) value of the values x of *node* and all its direct and indirect ancestors.

Input

The first line of the file **xor.in** contains the numbers n and q . The next line contains n numbers - x_1, x_2, \dots, x_n – the values of the vertices. The next $n - 1$ lines contain 2 natural numbers each - u, v – the edges of the tree. The next q lines contain 2 numbers each - *type and node*

If *type* = 1, then the query type is *Update* and the line contains a third number *value*

If *type* = 2, then the query type is *Query*

Output

For each query of type 2, print on a new line in the **xor.out** file the answer for that query.

Constraints

$$1 \leq n \leq 20\,000$$

$$1 \leq q \leq 50\,000$$

$$1 \leq x_i, value \leq 10^9$$

$$1 \leq type \leq 2$$

$$1 \leq node \leq n$$

Time limit: 0.7 sec.

Memory limit: 256 MB.

Sample test

Input (xor.in)	Output (xor.out)
4 3	15
1 2 4 8	0

Xor

2022/2023 SEASON – FOURTH ROUND



1 2	
2 3	
3 4	
2 4	
1 2 5	
2 3	