Problem J. Notebook

Input file:	*standard input*
Output file:	*standard output*
Time limit:	1 second
Memory limit:	128 mebibytes

Ivan is writing down numbers in his notebook. In the beginning he has a set of integers S written down. Afterwards, he may write down new numbers in his notebook, by using the following operations:

- If he has the number x written, he may write down $2x$.
- If he has the number x written, and x is divisible by 2, he may write down $\frac{x}{2}$.
- If he has the **distinct** numbers x and y written, he may write down $x \text{xor} y$.

Denote by $f(S)$ the minimal number Ivan can write down in his notebook for the starting set S.

You are given an array of length N and Q queries where you have to perfortm one of the following operations:

- Change the value of the $a[x]$ to y.
- Find the value of $f(\{a[L], a[L+1], \cdots, a[R]\})$.

Input

In the first line of input is the numbers N ($N \leq 100000$): the length of the array.

In the second line of input is N integers $a[1], a[2], \cdots, a[N]$ ($0 < a[i] < 2^{62}$), the elements of a.

In the thirst line of input is the number Q ($Q \leq 100000$): the number of queries.

The following Q lines describe the queires. A query can either be of the format "$1xy$" meaning set $a[x]$ ($1 \leq x \leq N$) to y ($0 < y < 2^62$), or of the format "$2lr$" meaning find the value of $f(\{a[L], a[L+1], \cdots, a[R]\})$ ($1 \leq L \leq R \leq N$).

Output

For every query of type two print the value of $f(\{a[L], a[L+1], \cdots, a[R]\})$ in a single line.

Example

standard input	standard output
3 3 5 15 3 2 1 3 1 2 11 2 1 2	3 1