When GCD meets XOR

Time limit: 0.6s **Memory limit:** 512M

After learning prefix sum array and prefix max array, Roger wanted to try some more complicated prefix arrays, such as prefix GCD and XOR. More specifically, given an array of n positive integers $a_0, a_1, \ldots, a_{n-1}$, Roger wants to write a program to support the following two types of operations:

- `1 i x`: change a_i ($0 \leq i \leq n-1$) to x ($1 \leq x \leq 10^9$).
- `2 x`: output the minimal index p ($0 \leq p \leq n-1$) such that $\gcd(a_0, a_1, \ldots, a_p) \times \mathrm{xor}(a_0, a_1, \ldots, a_p) = x$, where $\gcd$ is greatest common factor and xor is bitwise XOR. If there is no such index p, output -1.

Input Specification

The first line consists of an integer n ($1 \leq n \leq 10^5$), the number of elements in the array.

The second line consists of n positive integers a_i ($1 \leq a_i \leq 10^9$). **Note that the array is 0-indexed.**

The third line consists of an integer q, ($1 \leq q \leq 10^4$), the number of operations.

The next q lines consist of q operations as described above. For each type 1 operation, $0 \leq i \leq n-1$ and $1 \leq x \leq 10^9$. For each type 2 operation, $0 \leq x \leq 10^{18}$.

Output Specification

Output the minimal index p for each type 2 operation. If there is no such index, output -1.

Sample Input

```
10
1353600 5821200 10752000 1670400 3729600 6844320 12544000 117600 59400 640
10
1 7 20321280
2 162343680
2 1832232960000
1 0 92160
2 1234567
2 3989856000
2 833018560
1 3 8600
1 5 5306112
2 148900352
```

Sample Output

```
6
0
-1
2
8
8
```