Problem L. Square

Father Study loves math very much.

Given a sequence of integers $a_1, a_2, ..., a_n$, Father Study wants to calculate another sequence of integers $t_1, t_2, ..., t_n$ satisifing

- For each i $(1 \le i \le n)$, $t_i > 0$.
- For each i $(1 \le i < n)$, $a_i \times t_i \times a_{i+1} \times t_{i+1}$ is a square number. (In mathematics, a square number or perfect square is an integer that is the square of an integer, in other words, it is the product of some integer with itself.)
- $\prod_{i=1}^{n} t_i$ is minimized.

Please help Father Study to calculate the answer — the minimum value of $\prod_{i=1}^{n} t_i$. Because the answer is too large, please output the answer modulo 1000000007.

Input

The first line contains a single integer n $(1 \le n \le 100000)$.

The second line contains n integers $a_1, a_2, ..., a_n$ $(1 \le a_i \le 1000000)$ separated by single spaces.

Output

Output one integer – the answer modulo 1000000007.

Example

standard input	standard output
3 2 3 6	6