E. Ehab's REAL Number Theory Problem

difficulty: 2600
time limit per test: 3 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

You are given an array a of length n that has a special condition: every element in this array has at most 7 divisors. Find the length of the shortest non-empty subsequence of this array product of whose elements is a perfect square.

A sequence a is a subsequence of an array b if a can be obtained from b by deletion of several (possibly, zero or all) elements.

Input

The first line contains an integer n $(1 \le n \le 10^5)$ — the length of a.

The second line contains n integers $a_1, a_2, \ldots, a_n$ $(1 \le a_i \le 10^6)$— the elements of the array a.

Output

Output the length of the shortest non-empty subsequence of a product of whose elements is a perfect square. If there are several shortest subsequences, you can find any of them. If there's no such subsequence, print "-1".

Examples

input
3
1 4 6
output
1

input
4
2 3 6 6
output
2

input
3
6 15 10
output
3

input
4
2 3 5 7
output
-1

Note

In the first sample, you can choose a subsequence [1].
In the second sample, you can choose a subsequence [6,6].
In the third sample, you can choose a subsequence [6,15,10].
In the fourth sample, there is no such subsequence.

1325E Ehab's REAL Number Theory Problem
brute force, dfs and similar, graphs, number theory, shortest paths
https://codeforces.com/contest/1325/problem/E
github.com/andy489