E. On the Bench

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

A year ago on the bench in public park Leha found an array of n numbers. Leha believes that permutation p is right if for all $1 \le i < n$ condition, that $a_{p_i} \cdot a_{p_{i+1}}$ is not perfect square, holds. Leha wants to find number of right permutations modulo $10^9 + 7$.

Input

First line of input data contains single integer n ($1 \le n \le 300$) — length of the array.

Next line contains n integers $a_1, a_2, \ldots, a_n$ ($1 \le a_i \le 10^9$) — found array.

Output

Output single integer — number of right permutations modulo $10^9 + 7$.

Examples

input
3 1 2 4

output
2

input
7 5 2 4 2 4 1 1

output
144

Note

For first example:

$[1, 2, 4]$ — right permutation, because 2 and 8 are not perfect squares.

$[1, 4, 2]$ — wrong permutation, because 4 is square of 2.

$[2, 1, 4]$ — wrong permutation, because 4 is square of 2.

$[2, 4, 1]$ — wrong permutation, because 4 is square of 2.

$[4, 1, 2]$ — wrong permutation, because 4 is square of 2.

$[4, 2, 1]$ — right permutation, because 8 and 2 are not perfect squares.