

CCO Preparation Test 3 P1 - Primitive Pythagorean Pairs

Time limit: 0.6s **Memory limit:** 128M

Do you know the Pythagorean theorem? Definitely yes. Do you know Pythagorean triples? Maybe not. Do you know primitive Pythagorean pairs? Definitely not, because Bruce has not defined it yet! Let's start from Pythagorean triples. A **Pythagorean triple** consists of three positive integers a , b , and c , such that $a^2 + b^2 = c^2$. If a and b are also coprime, the pair (a, b) is named a **primitive Pythagorean pair**, like $(3, 4)$. Bruce will tell you how to generate primitive Pythagorean pairs. Given two positive integers m and n ($m > n$), if m and n are coprime and $m - n$ is odd, a primitive Pythagorean pair (a, b) can be calculated by $a = m^2 - n^2$ and $b = 2 \times m \times n$. There are an infinite number of primitive Pythagorean pairs.

Now Bruce has N cards, each of which has a positive integer v_i ($1 \leq i \leq N$). He wants to pick up a number of cards so that there are no primitive Pythagorean pairs among the selected cards. Could you please help Bruce to get the total number of different selections? Two selections are different if and only if one card is in one selection, but is not in the other selection. Bruce has to select **at least one card** in each selection.

Constraints

For all subtasks:

$$1 \leq N \leq 1\,000\,000$$

Subtask 1 [30%]

$$1 \leq v_i \leq 3\,000$$

Subtask 2 [30%]

$$1 \leq v_i \leq 200\,000$$

Subtask 3 [40%]

$$20\,000 \leq v_i \leq 1\,000\,000$$

Input Specification

The first line of input will consist of one integer, N , the number of cards Bruce has.

The second line of input will consist of N positive integers $v_1, v_2, \dots, v_N$, where v_i is the value of card i ($1 \leq i \leq N$).

Output Specification

Output one integer, the number of different selections modulo $10^9 + 7$.

Sample Input

4

5 12 35 5

Sample Output

8

Explanation of Output for Sample Input

There are two primitive Pythagorean pairs $(5, 12)$ and $(12, 35)$. So, there are 8 different selections: $\{5\}$, $\{12\}$, $\{35\}$, $\{5\}$, $\{5, 35\}$, $\{35, 5\}$, $\{5, 5\}$, $\{5, 35, 5\}$.