IOI '05 P3 - Mean Sequence

Time limit: 2.5s **Memory limit:** 16M

Consider a nondecreasing sequence of integers $s_1, \ldots, s_{n+1}$ ($s_i \leq s_{i+1}$ for $1 \leq i \leq n$). The sequence $m_1, \ldots, m_n$ defined by $m_i = \frac{1}{2}(s_i + s_{i+1})$, for $1 \leq i \leq n$, is called the mean sequence of sequence $s_1, \ldots, s_{n+1}$. For example, the mean sequence of sequence $1, 2, 2, 4$ is the sequence $1.5, 2, 3$. Note that elements of the mean sequence can be fractions. However, this task deals with mean sequences whose elements are integers only.

Given a nondecreasing sequence of n integers $m_1, \ldots, m_n$, compute the number of nondecreasing sequences of $n + 1$ integers $s_1, \ldots, s_{n+1}$ that have the given sequence $m_1, \ldots, m_n$ as mean sequence.

Task

Write a program that:

- reads from the standard input a nondecreasing sequence of integers,
- calculates the number of nondecreasing sequences, for which the given sequence is mean sequence,
- writes the answer to the standard output.

Input

The first line of the standard input contains one integer n $(2 \leq n \leq 5\,000\,000)$. The remaining n lines contain the sequence $m_1, \ldots, m_n$. Line $i + 1$ contains a single integer m_i $(0 \leq m_i \leq 1\,000\,000\,000)$. You can assume that in 50% of the test cases $n \leq 1\,000$ and $0 \leq m_i \leq 20\,000$.

Output

Your program should write to the standard output exactly one integer — the number of nondecreasing integer sequences, that have the input sequence as the mean sequence.

Sample Input

```
3
2
5
9
```

Sample Output

```
4
```

Explanation for Sample Output

Indeed, there are four nondecreasing integer sequences for which $2, 5, 9$ is the mean sequence. These sequences are:

- $2, 2, 8, 10$,
- $1, 3, 7, 11$,
- $0, 4, 6, 12$,
- $-1, 5, 5, 13$.