

IOI05 Mean Sequence

Consider a nondecreasing sequence of integers s_1, \dots, s_{n+1} ($s_i \leq s_{i+1}$ for $1 \leq i \leq n$). The sequence m_1, \dots, m_n defined by $m_i = 1/2 (s_i + s_{i+1})$, for $1 \leq i \leq n$, is called the mean sequence of sequence s_1, \dots, 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, \dots, m_n , compute the number of nondecreasing sequences of $n+1$ integers s_1, \dots, s_{n+1} that have the given sequence m_1, \dots, 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, \dots, 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 $0 \leq m_i \leq 620\,000$.

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.

Example

For the input data:

3
2
5
9

the correct result is:

4

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.

Note: For now there are only 17 not very big test cases, remaining ones will be added in a month, all submissions will be rejudged.