ALGERIAN OLYMPIAD IN INFORMATICS
& EUREKA NHSM CLUB

The first AOI College Cup

December 14^{th}, 2024

Task 5 - Scales
This task is worth 100 points

Task 5 - Scales

Time limit per test : 1 seconds
Memory limit per test : 256 megabytes

A beaver had a brilliant idea to earn some extra money: he will make and sell wooden scales. He bought a large plank that he can cut into pieces, from which he can make a bunch of scales, but something went wrong!
The plank does not have the same density everywhere, making some points heavier. Specifically, the weight at position i is a_i. As a result, the scale is not in balance.
But the beaver is not easily discouraged and has a solution: If he cuts the plank cleverly into pieces, he can ensure that each piece is still in balance.
A piece $(x_1, x_2, \ldots, x_n)$ is in balance if the sum of the weight multiplied by the distance to the center is 0, that is:

$$\sum_{i=1}^{n}(i-m)\cdot x_i = 0,$$

where m is the center of the piece. As you would expect, the center of a piece, starting at i and ending at j, is $m = \frac{1}{2}(i+j)$.
For example, the following planks are in balance:

1	3	1

$$(1-2)\cdot 1 + (2-2)\cdot 3 + (3-2)\cdot 1 = 0$$

1	2	2	1

$$(1-2.5)\cdot 1 + (2-2.5)\cdot 2 + (3-2.5)\cdot 2 + (4-2.5)\cdot 1 = 0$$

1	5	2	2

$$(1-2.5)\cdot 1 + (2-2.5)\cdot 5 + (3-2.5)\cdot 2 + (4-2.5)\cdot 2 = 0$$

How many ways can he cut the plank into pieces so that each piece is in balance? Give the answer modulo 10^9+7.

Input
The input consists of:

- One line with an integer n ($2 \le n \le 5000$).
- One line with $a_1, a_2, \ldots, a_n$, where a_i is the weight at position i ($1 \le a_i \le 10^9$).

Output
Output the number of ways to cut the plank into balanced pieces, modulo 10^9+7.

Subtasks

Your program will be tested against several test cases grouped in subtasks. In order to obtain the score of a subtask, your program needs to correctly solve all of its test cases

1. For 10 points: the weight is the same everywhere ($a_1 = a_2 = \ldots = a_n$).
2. For 10 points: $n \le 10$.
3. For 25 points: $n \le 500$.
4. For 55 points: no extra restrictions.

Examples

Input	Output
4 1 2 2 1	3

Input	Output
6 1 2 2 5 1 1	6

Example 1:

The possible ways to cut the plank are:

1	2	2	1
1	2	2	1
1	2	2	1

Example 2:

The possible ways to cut the plank are:

1	2	2	5	1	1
1	2	2	5	1	1
1	2	2	5	1	1
1	2	2	5	1	1
1	2	2	5	1	1
1	2	2	5	1	1