

Problem E. Gacha 101

- Time Limit: 2 sec

Problem Statement

For each $i = 1, 2, \dots, N$, there are A_i balls with i written on them. These are put into a box and mixed up. The string variable s consists of initially N “0”s. Balls are taken out of the box one by one (uniformly at random and independently). When a ball with i written on it is drawn, the i -th character of s is changed to “1” (it remains unchanged if it was already “1”). Find the probability, modulo 998,244,353, of having a point during this process that s contains “101” as a contiguous substring.

Input

The input consists of a single test case of the following format.

$$\begin{array}{l} N \\ A_1 \ A_2 \ \dots \ A_N \end{array}$$

The first line consists of an integer N between 1 and 200,000, inclusive. The second line consists of N positive integers A_1, A_2, \dots, A_N . For each i ($1 \leq i \leq N$), A_i represents the number of balls i written. And they satisfy $\sum_{1 \leq i \leq N} A_i < 998,244,353$.

Output

Output in a line the probability modulo 998,244,353.

Note

- How to find the probability modulo 998,244,353
 - It can be proved that the sought probability is always a rational number. Additionally, the constraints of this problem guarantee that if the sought probability is represented as an irreducible fraction $\frac{y}{x}$, then x is not divisible by 998,244,353. Here, there is a unique $0 \leq z < 998,244,353$ such that $y \equiv xz \pmod{998,244,353}$, so report this z .

| Sample Input 1 | Sample Output 1 |
|---------------------------|-----------------|
| 3 1 2 3 | 465847365 |
| Sample Input 2 | Sample Output 2 |
| 10 3 1 4 1 5 9 2 6 5 3 | 488186016 |