

Problem B. Bit Operation

Input file: *standard input*
Output file: *standard output*
Time limit: 2 seconds
Memory limit: 1024 mebibytes

You are given an integer array A of length N , consisting of 0's and 1's. Let a be initially the array A . You are going to perform the following operation $N - 1$ times.

- Let n be the current length of a . Choose an integer i ($1 \leq i \leq n - 1$) and delete the i -th and the $(i + 1)$ -th elements of a . Then, by letting x and y be the deleted elements, insert either $x \& y$ or $x | y$ to the position of the deleted elements. Here $x \& y$ and $x | y$ denote the bit-AND and bit-OR operations, respectively.

There are $2^{N-1} \times (N - 1)!$ ways to perform the operations. Count the number of ways that result in a single value of 1, modulo 998244353.

Input

The first line contains an integer N ($1 \leq N \leq 10^6$).

The second line contains integers A_1, A_2, \dots, A_N ($0 \leq A_i \leq 1$).

Output

Print the answer.

Examples

standard input	standard output
3 0 1 0	2
5 1 1 1 1 1	384
7 0 1 1 0 1 0 1	25515