Problem E. Expected Symmetry

Time limit:	1.5 seconds
Memory limit:	1024 mebibytes

You are given a binary string $s_1 s_2 \dots s_{2n}$ of length $2n$.

Let's consider following process. Firstly, select an integer k uniformly at random from 1 to n. Now consider prefix $s_1 s_2 \dots s_{2k}$ of the string s. If it has a symmetry point i ($1 \le i \le k$) such that $s_i = s_{2k-i+1}$, then the process ends immediately. Otherwise, for each i ($1 \le i \le 2k$), the element s_i independently changes its value with probability of $\frac{1}{2}$. After that the process repeats by choosing the next value of k.

Notice that the choice of k is independent at different steps of the process. The events of changing/not changing for bits are also independent between each other.

You should calculate the expected number of steps this process takes to end, including the step at which the process ends.

It can be proven that the answer can be represented as an irreducible fraction $\frac{p}{q}$. You should output $p \cdot q^{-1}$ modulo 998 244 353.

Input

The first line contains a single integer n ($n \in \{10, 10^7\}$).

The second line contains bitwise string of length $2n$: $s_1 s_2 \dots s_{2n}$.

Output

Output a single integer — the expected number of steps modulo 998 244 353.

Example

standard input	standard output
10 01010000111101010000	222017723

Note

Since the input in this problem is large, we recommend you not to use std::string and std::cin for your C++ implementation.