# Cyclic Substrings

| | |
|---|---|
| Input file: | `standard input` |
| Output file: | `standard output` |
| Time limit: | 2 seconds |
| Memory limit: | 1024 megabytes |

Mr. Ham is interested in strings, especially palindromic strings. Today, he finds a string $s$ of length $n$.

For the string $s$ of length $n$, he defines its *cyclic substring* from the $i$-th character to the $j$-th character ($1 \le i, j \le n$) as follows:

- If $i \le j$, the cyclic substring is the substring of $s$ from the $i$-th character to the $j$-th character. He denotes it as $s[i..j]$.
- If $i > j$, the cyclic substring is $s[i..n] + s[1..j]$, where $+$ denotes the concatenation of two strings. He also denotes it as $s[i..j]$.

For example, if $s = \texttt{12345}$, then $s[2..4] = \texttt{234}$, $s[4..2] = \texttt{4512}$, and $s[3..3] = \texttt{3}$.

A string $t$ is *palindromic* if $t[i] = t[n - i + 1]$ for all $i$ from 1 to $n$. For example, `1221` is palindromic, while `123` is not.

Given the string $s$, there will be many cyclic substrings of $s$ which are palindromic. Denote $P$ as the set of all **distinct** cyclic substrings of $s$ which are palindromic, $f(t)(t \in P)$ as the number of times $t$ appears in $s$ as a cyclic substring, and $g(t)(t \in P)$ as the length of $t$. Mr. Ham wants you to compute

$$\sum_{t \in P} f(t)^2 \times g(t)$$

The answer may be very large, so you only need to output the answer modulo 998 244 353.

## Input

The first line contains a number $n$ ($1 \le n \le 3 \times 10^6$), the length of the string $s$.

The second line contains a string $s$ of length $n$. Each character of $s$ is a digit.

## Output

Output a single integer, denoting the sum modulo 998 244 353.

## Examples

| standard input | standard output |
|---|---|
| 5<br>01010 | 39 |
| 8<br>66776677 | 192 |

## Note

In the sample, the palindromic cyclic substrings of $s$ are:

- $s[1..1] = s[3..3] = s[5..5] = \texttt{0}$.
- $s[2..2] = s[4..4] = \texttt{1}$.
- $s[5..1] = \texttt{00}$.

- $s[1..3] = s[3..5] = \texttt{010}$.
- $s[2..4] = \texttt{101}$.
- $s[4..2] = \texttt{1001}$.
- $s[1..5] = \texttt{01010}$.

The answer is $3^2 \times 1 + 2^2 \times 1 + 1^2 \times 2 + 2^2 \times 3 + 1^2 \times 3 + 1^2 \times 4 + 1^2 \times 5 = 39$.