

# Eirt Eht Esrever

Input file: *standard input*  
Output file: *standard output*  
Time limit: 5 seconds  
Memory limit: 1024 mebibytes

Vasya plays with his favourite string  $s$  of length  $n$ . He has a sequence of his favourite numbers, each of the numbers being a rational number  $n_i/d_i \in [0, 1]$ . For each  $i$  from 1 to  $n$ , Vasya takes a string equal to the prefix of  $s$  of size  $i$ , reverses it with probability  $1 - n_i/d_i$  and puts the resulting string into a set. He then builds a *trie* (see Notes for the definition) on strings from the set. He asks you to calculate the expected number of vertices in the resulting trie.

## Input

The first line of the input contains an integer  $n$ , the length of the string ( $1 \leq n \leq 2 \cdot 10^5$ ). The second line of the input contains a string  $s$  of length  $n$  consisting of lowercase English letters. The third line contains exactly  $|s|$  integers  $p_i$  ( $0 \leq p_i < 998\,244\,353$ ), where  $p_i$  is equal to  $n_i d_i^{-1} \pmod{998\,244\,353}$ .

## Output

Output a single integer — the answer to the problem modulo 998 244 353. That is, if the expected number of vertices is equal to the irreducible fraction  $a/b$ , you should print  $ab^{-1} \pmod{998\,244\,353}$ . It can be proven that the answer is rational, and that if the answer in the irreducible form is  $a/b$ , then  $b$  is not divisible by 998 244 353 under the constraints of this problem.

## Examples

<i>standard input</i>	<i>standard output</i>
2 aa 324 435	3
2 ab 499122177 499122177	499122180
6 wordle 23 45 67 89 87 65	376824090
7 abacaba 0 1 598946612 332748118 598946612 1 0	266198508
6 banana 0 0 0 0 0 0	16
7 trytrie 1 1 1 1 1 1 1	8

## Note

In the first example the set will always consist of two strings, **a** and **aa**, and thus the number of vertices in the trie will always be equal to 3.

In the second example the the set will either be  $\{\mathbf{a}, \mathbf{ab}\}$  or  $\{\mathbf{a}, \mathbf{ba}\}$ , each with probability  $1/2$ . The expected number of vertices will be equal to 3.5.

A *trie* built on a collection of distinct strings  $s_1, \dots, s_n$  is a special rooted tree with letters written on the edges and some of the vertices being marked. This tree has the following properties:

- All leaves are marked.
- There are exactly  $n$  marked vertices.
- No two edges going down from one vertex have the same letter written on them.
- The set of strings obtained by writing down the letters on the paths from the root to the marked vertices coincides with  $\{s_1, \dots, s_n\}$ .