C. Mahmoud and a Message

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Mahmoud wrote a message s of length n. He wants to send it as a birthday present to his friend Moaz who likes strings. He wrote it on a magical paper but he was surprised because some characters disappeared while writing the string. That's because this magical paper doesn't allow character number i in the English alphabet to be written on it in a string of length more than a_i. For example, if $a_1 = 2$ he can't write character 'a' on this paper in a string of length 3 or more. String "aa" is allowed while string "aaa" is not.

Mahmoud decided to split the message into some non-empty substrings so that he can write every substring on an independent magical paper and fulfill the condition. The sum of their lengths should be n and they shouldn't overlap. For example, if $a_1 = 2$ and he wants to send string "aaa", he can split it into "a" and "aa" and use 2 magical papers, or into "a", "a" and "a" and use 3 magical papers. He can't split it into "aa" and "aa" because the sum of their lengths is greater than n. He can split the message into single string if it fulfills the conditions.

A substring of string s is a string that consists of some consecutive characters from string s, strings "ab", "abc" and "b" are substrings of string "abc", while strings "acb" and "ac" are not. Any string is a substring of itself.

While Mahmoud was thinking of how to split the message, Ehab told him that there are many ways to split it. After that Mahmoud asked you three questions:

- How many ways are there to split the string into substrings such that every substring fulfills the condition of the magical paper, the sum of their lengths is n and they don't overlap? Compute the answer modulo $10^9 + 7$.
- What is the maximum length of a substring that can appear in some valid splitting?
- What is the minimum number of substrings the message can be spit in?

Two ways are considered different, if the sets of split positions differ. For example, splitting "aa|a" and "a|aa" are considered different splittings of message "aaa".

Input

The first line contains an integer n ($1 \le n \le 10^3$) denoting the length of the message.

The second line contains the message s of length n that consists of lowercase English letters.

The third line contains 26 integers $a_1, a_2, ..., a_{26}$ ($1 \le a_x \le 10^3$) — the maximum lengths of substring each letter can appear in.

Output

Print three lines.

In the first line print the number of ways to split the message into substrings and fulfill the conditions mentioned in the problem modulo $10^9 + 7$.

In the second line print the length of the longest substring over all the ways.

In the third line print the minimum number of substrings over all the ways.

Examples

input
3 aab 2 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
output

```
3
2
2
```

input

```
10
abcdeabcde
5 5 5 5 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
```

output

```
401
4
3
```

Note

In the first example the three ways to split the message are:

- `a|a|b`
- `aa|b`
- `a|ab`

The longest substrings are "`aa`" and "`ab`" of length 2.

The minimum number of substrings is 2 in "`a|ab`" or "`aa|b`".

Notice that "`aab`" is not a possible splitting because the letter '`a`' appears in a substring of length 3, while $a_1 = 2$.