Baltic OI '04 P4 - Repeats

Time limit: 4.0s **Memory limit:** 512M

Baltic Olympiad in Informatics: 2004 Day 2, Problem 1

A string s is called a (k, l)-repeat if s is obtained by concatenating $k \geq 1$ times some seed string t with length $l \geq 1$. For example, the string `abaabaabaaba` is a $(4, 3)$-repeat with `aba` as the seed string. That is, the seed string `aba` is 3 characters long, and the whole string s is obtained by repeating it 4 times.

You are given a string u. Find one (k, l)-repeat s that occurs as a substring within u with a k as large as possible.

Constraints

$1 \leq n \leq 5 \times 10^4$

u only consists of `a` or `b`.

Input Specification

The first line of input contains one integer n: the length of the input string u.

The next n lines describe the string u. Each line contains one character (either `a` or `b`).

Output Specification

Output three integers, each on its own line. They report the (k, l)-repeat your program found as follows:

1. The first line consists of the repeat count k that is maximized.
2. The second line consists of the length l of the seed string that is repeated k times.
3. The third and final line consists of the position p $(1 \leq p \leq n)$ at which the (k, l)-repeat starts.

If there are multiple solutions with the same k, your program can output any one of them.

Sample Input

```
17
b
a
b
b
a
b
a
a
b
a
a
b
a
a
b
a
b
```

Sample Output

```
4
3
5
```

Sample Explanation

A $(4, 3)$-repeat is found starting at the 5^{th} character of the input string (which is line 6 of the input file).

The underlined substring s of `babbabaabaabaabab` shows the $(4, 3)$-repeat. No substring of u has more than 4 repeats.