

String And Substring

Description

You are given a string s and an integer m , your task is to solve two problems:

1. Find a longest string t , so that t is a substring of s , and appears at least m times in s .
The definition of substring is a sequence of consecutive characters in a string.
For example, $s = baaaababababbababbab$, $m = 3$, then the answer would be $babab$, since there is no other substring of s is longer than $babab$ and appears at least 3 times in string s .
2. Find a longest string r , such that r is a prefix of s and a suffix of s . In other words, r is the beginning of the string s and the end of the string s . To make it more challenging, string r also need to be able to be located somewhere inside the string s , that is, it is neither beginning, nor its end.
For example, $s = abcdabcabc$, the answer is abc , because it appears at positions 0 (prefix), 4 (neither prefix nor suffix), 7 (suffix), which meets the requirements.

Input Format

The input contains several test cases. Each test case consists of a line with an integer m ($m \geq 1$), the minimum number of repetitions, followed by a line containing a string s . All characters in s are lowercase characters from 'a' to 'z'. The last test case is denoted by $m = 0$ and must not be processed.

Output Format

For each test case, you need to print two lines of answers:

For problem 1, if there is no solution, output "none" without the quotes; otherwise, print two integers in a line, separated by a space. The first integer denotes the maximum length of a substring appearing at least m times; the second integer is the right most possible starting position of such a substring.

For problem 2, print the string that meets the requirements. If a suitable string does not exist, then print "Just a legend" without the quotes.

Limit

$$1 \leq \text{length}(s), m \leq 10^5$$

Sample inputs

```
3
abcdabcabc
4
abcdabcabc
3
abcdabcabcd
1
aaaaaaa
2
btcbtcetheth
0
```

Sample outputs

```
3 7
abc
none
abc
3 7
Just a legend
7 0
aaaaa
3 9
Just a legend
```

較大的測資

[sample input and output \(https://drive.google.com/drive/folders/1XVZERkgQCPu3b3hsl52pTXpJ5AoeY_vJ?usp=sharing\)](https://drive.google.com/drive/folders/1XVZERkgQCPu3b3hsl52pTXpJ5AoeY_vJ?usp=sharing).

Hint

[Rolling Hash \(http://fcrh.logdown.com/posts/592025-about-rolling-hash\)](http://fcrh.logdown.com/posts/592025-about-rolling-hash).

Hash collision

Binary search