Pordenone Hill Sign (stringstreak)

Edoardo is trying to build a "customized" version of the Hollywood sign: same massive size but different text! The sign is going to be used on the hill of his small town in Italy, Pordenone.

He managed to buy a sign S, but he would like to modify its letters in an optimal way so that the sign ends up having a substring repeating a same letter which is as long as possible.

Figure 1: The famous "Hollywood" sign.

In order to change such a large wooden sign, Edoardo is asking for his *Falegname Di Fiducia*'s help. The rate charged by the *FDF* is quite peculiar: he will charge 2^{j-i+1} euro to change the letters of each contiguous substring $S[i \dots j]$ in the sign. For example, if the sign was `aaxyaa` and Edoardo wanted to change the substring $S[3 \dots 4]$ from `xy` to `aa`, he would have to pay $2^2 = 4$ euro.

Asking the *FDF* to change one character at a time is not allowed: Edoardo must choose which characters he wants to change, and then the *FDF* will charge him according to the contiguous substrings selected.

After spending his money to buy the sign, Edoardo is left with B euro in his budget. Help him find an optimal way to change the sign so that the budget is not exceeded and **the length of the longest substring** which can be formed by the same character repeated is maximal.

> ☞ Among the attachments of this task you may find a template file `stringstreak.*` with a sample incomplete implementation.

Input

The first line contains a string S, the sign. The second line contains a number B, the budget.

Output

You need to write a single line with an integer: the unique integer that solves this task.

Constraints

- $1 \leq |S| \leq 100\,000$, where $|S|$ is the length of the string.
- $1 \leq B \leq 10^9$.

Scoring

Your program will be tested against several test cases grouped in subtasks. In order to obtain the score of a subtask, your program needs to correctly solve all of its test cases.

– **Subtask 1** (0 points) Examples.

– **Subtask 2** (30 points) $|S| \leq 100$.

– **Subtask 3** (70 points) No additional limitations.

Examples

input	output
xabaabxab 10	9

Explanation

In the **first sample case** we can modify the letters in positions 1, 3, 6, 7 and 9 to get nine `a` letters in a row, with a cost of 10 euro.