

Pattern Search II

Input file: **standard input**
Output file: **standard output**
Time limit: 4 seconds
Memory limit: 1024 megabytes

Let's define an infinite sequence of *Fibonacci words* $S_0, S_1, S_2, S_3 \dots$ as follows:

- $S_0 = \text{b}$
- $S_1 = \text{a}$
- $S_i = S_{i-1}S_{i-2}$ for $i \geq 2$

The first few words of this sequence look as follows:

- $S_0 = \text{b}$
- $S_1 = \text{a}$
- $S_2 = \text{ab}$
- $S_3 = \text{aba}$
- $S_4 = \text{abaab}$
- $S_5 = \text{abaababa}$
- $S_6 = \text{abaababaabaab}$

It is easy to notice that each word (except for S_0) is a prefix of the next one. Therefore, we can also define an infinite Fibonacci word S , where the i -th character is the i -th character of these words in the infinite sequence of Fibonacci words (except for S_0) that have at least i characters.

You are given a word t consisting only of the characters 'a' and 'b'. Your task is to find the shortest possible word s that is a **substring** of S and contains t as a **subsequence**, and output its length.

Input

The standard input contains a single line with one word t , consisting only of the letters 'a' and 'b'. t will contain at least one and at most 150,000 characters.

Output

The output should contain a single integer, indicating the minimum possible length of the described word s .

Example

standard input	standard output
aabbaab	8

Note

S does not contain a substring of length 7 or less that contains t as a subsequence. However, it does contain the substring **aababaab**, from which we can remove the fourth character, thus obtaining t . Therefore, the sought length of s is 8.