

# Pseudo-Isomorphic Substrings

## Problem Statement

Two strings A and B, consisting of small English alphabet letters are called pseudo-isomorphic if

- Their lengths are equal
- For every pair (i,j), where  $1 \leq i < j \leq |A|$ ,  $B[i] = B[j]$ , iff  $A[i] = A[j]$
- For every pair (i,j), where  $1 \leq i < j \leq |A|$ ,  $B[i] \neq B[j]$  iff  $A[i] \neq A[j]$

Naturally, we use 1-indexation in these definitions and  $|A|$  denotes the length of the string **A**.

You are given a string S, consisting of no more than  $10^5$  lowercase alphabetical characters. For every prefix of **S** denoted by S', you are expected to find the size of the largest possible set of strings, such that all elements of the set are substrings of S' and no two strings inside the set are pseudo-isomorphic to each other.

if S = abcde  
then, 1<sup>st</sup> prefix of S is 'a'  
then, 2<sup>nd</sup> prefix of S is 'ab'  
then, 3<sup>rd</sup> prefix of S is 'abc'  
then, 4<sup>th</sup> prefix of S is 'abcd' and so on..

## Input Format

The first and only line of input will consist of a single string S. The length of S will not exceed  $10^5$ .

## Output Format

Output N lines. On the i<sup>th</sup> line, output the size of the largest possible set for the first i alphabetical characters of S such that no two strings in the set are pseudo-isomorphic to each other.

## Constraints

$1 \leq |S| \leq 10^5$   
S contains only lower-case english alphabets ('a' - 'z').

## Sample Input #00

```
abbabab
```

## Sample Output #00

```
1
2
4
6
9
12
15
```

## Explanation #00

The first character is 'a', the set is {a} hence 1.  
The first 2 characters are 'ab', the set is {a, b, ab} but 'a' is pseudo-isomorphic to 'b'. So, we can remove

either 'a' or 'b' from the set. We get {a,ab} or {b,ab}, hence 2.

Similarly, the first 3 characters are 'abb', the set is {a, ab, abb, b, bb} and as 'a' is pseudo-isomorphic to 'b', we have to remove either 'a' or 'b' from the set. We get {a,ab, abb, bb}, hence 4. and so on...