



Pseudo-Isomorphic Substrings

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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, 1st prefix of S is 'a'

then, 2nd prefix of S is 'ab'

then, 3rd prefix of S is 'abc'

then, 4th 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 .

Constraints

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

Output Format

Output N lines. On the ith 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.

Sample Input

```
abbabab
```

Sample Output

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

Explanation

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...

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Max Score: 100



Difficulty: Expert



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Java 7  

```
1 import java.io.*;
2 import java.util.*;
3 import java.text.*;
4 import java.math.*;
5 import java.util.regex.*;
6
7 public class Solution {
8
9     public static void main(String[] args) {
10         /* Enter your code here. Read input from STDIN. Print output to STDOUT. Your class should be named Solution. */
11     }
12 }
```

Line: 1 Col: 1

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