Test

Sometimes it is hard to prepare tests for programming problems. Now Bob is preparing tests to new problem about strings — input data to his problem is one string. Bob has 3 wrong solutions to this problem. The first gives the wrong answer if the input data contains the substring s_1, the second enters an infinite loop if the input data contains the substring s_2, and the third requires too much memory if the input data contains the substring s_3. Bob wants these solutions to fail single test. What is the minimal length of test, which couldn't be passed by all three Bob's solutions?

Input

There are several test cases. For each test case there are exactly 3 lines. The i-th line contains string s_i. All the strings are non-empty, consists of lowercase Latin letters, the length of each string doesn't exceed 10^5.

Output

For each test case output one number — what is minimal length of the string, containing s_1, s_2 and s_3 as substrings.

Example

Input:
ab
bc
cd
abacaba
abaaba
x

Output:
4
11