COMP 6651: Algorithm Design Techniques
Winter 2016: Programming Assignment 2

1 Problem

You have been inspired by Mondrian and the modern Dutch art movement called de Stijl. You have decided to make paintings with vertical stripes of bold colors. For example, perhaps you want to make a painting with five stripes - BLUE-GREEN-RED-GREEN-BLUE (abbreviated BGRGB). However, you want to minimize the number of times you change your paintbrush: you plan to do this by by *sweeping* across large areas with a single paint color, then painting over part of it in another color. For example, if you paint the stripes in order, you need five sweeps. But if you divide the canvas into 5 vertical segments, and first paint segments [1..5] (that is, the entire canvas) blue, then paint segments [2..4] green, then paint [3] blue, it is possible to paint this pattern by using three sweeps.

2 Input

The input file has $n \leq 20000$ strings. All strings contain upper case letters only. Every letter abbreviates a paint color. Each string's length varies from 1 to 50 characters. Our aim is to calculate the minimum number of sweeps required to paint the canvas in vertical segments in colors specified by the string.

3 Output

For each input string you need to print the minimum number of paintbrush changes needed to paint the canvas. The output therefore consists of n integers, written on different lines. The output should be written in a separate file called output.

4 Example

Sample Input

YBYB
BGRGB
YBYCYRY
AABBBCCCDABABBBB

Sample Output

3
3
4
6

Explanation

For the first input, It is clear that you can do it with three sweeps: first paint segments [1..3] yellow, then paint segment [2] and in the third sweep paint segment [4]. In fact this is optimal. To see this observe that with two colors, you need at least two sweeps. However, it is impossible to do it with two sweeps. Suppose you sweep once with yellow - this sweep then must cover segments 1 and 3. But then segments 2 and 4 are separated, and need two more sweeps.

5 Requirements

For the constraints given above, your program should run in 1 second. You must submit source code for a program written in C/C++/Java on the Electronic Assignment System. Some test cases will be provided on the course website. You can verify if your program works on the test cases before submitting.

6 Programmer-on-duty

There will be a programmer-on-duty, Tejas Puranik, available to help you with the assignment on Wednesdays 6pm to 9pm in H481.