Problem 7: Error Correcting Palindromes

Overview

Much of computing, especially in the field of artificial intelligence involves the machine adjusting for, i.e. correcting, human errors (sic). Sometimes programs do this for you automatically. [As this specification was typed, Word tried to fix the misspelling in the line above!] In almost all cases, “corrections” are ranked by their “proximity” to the original (error-containing) text and the correction that is closest is chosen.

Problem

In this problem, you will be given a “human palindrome”. In this case, “human” means “may contain errors that invalidate the property of being a palindrome”. [For purposes of this problem, a palindrome is a phrase that – after removing spaces and punctuation – it reads the same forwards and backwards (without regard to case).] Your task is two-fold: you need to correct the palindrome to its nearest companion (defined below) and you need to report how many letters needed to be changed to make this correction.

For purposes of this problem, we will assume that when one of two corrections can be made, we choose the one that is alphabetically first. Thus, both “ahb” and “bha” will correct to “aha” (one change) rather than “bhb” (also one change) because the new letter in “aha” (‘a’) comes alphabetically before the new letter in “bhb” (‘b’).

Input

The input consists of a single line of text containing the “human palindrome” to be corrected. This line may contain upper or lower case letters (which should be thought of as equivalent), spaces, apostrophes, periods, commas, exclamation points or question marks. [No other characters will appear.] The line will contain no more than 128 characters.
Output
The first part of the output is the compressed version of the corrected palindrome, i.e. without spaces or punctuation, expressed in lower case. This is followed by a single space and then the number of changes made in parentheses. (Shifts between equivalent upper and lower case letters do not count as changes.)

Example 1

Input
ahb

Output
aha (1)

Example 2

Input
Madam, in Heck, I Satan.

Output
madamikceckimadam (5)

Example 3

Input  (Supposedly spoken by Napoleon’s younger brother)
Able was I ere I saw Peru

Output
abeewasiereisaweeba (4)