

Problem 8: Roman Palindromes

No wonder Rome fell. Their numbering system was just messed up. Consider the number 4, which in Roman Numerals is "IV". If I reverse the letters and make "VI" I get 6. And in general, for any Roman numeral letters A_1 and A_2 , if A_1 's value is $<$ A_2 's value, then $A_1A_2 = A_2 - A_1$. This is like "IV" = 4. But for A_2A_1 you add, like "VI" = 6.

A table of the Roman Numeral symbols and their decimal equivalents is at right.

We can generalize the A_1A_2 case and the A_2A_1 case with any of the letters. For example, "VC" = 95, but "CV" = 105, while "XM" = 990, and "MX" = 1010. These combinations can also occur "in the middle" of a Roman Numeral: "XXIX" is 2009, "CDXLV" is 445.

I = 1
V = 5
X = 10
L = 50
C = 100
D = 500
M = 1000

Now suppose one were to take a Roman numeral string and generate a palindrome.

Flip the original string end-to-end and "prepend" it in front of the original string according to an even/odd rule: If the length of the original string is even, the first character appears twice, but if the length is odd the first character appears only once. Thus the string "MDC" becomes "CDMDC", and the string "VI" becomes "IVVI".

Apply the following rules and consider $A_1=string[i]$ and $A_2=string[i+1]$ for $i=1..length-1^*$:

1. For letters A_1 and A_2 , if A_1 's value is $<$ A_2 's value, then $A_1A_2 = A_2 - A_1$
2. Else if the letters A_1 and A_2 are $A_1 \geq A_2$, then $A_1A_2 = A_1 + A_2$

The result of the Roman Palindrome is the sum of the answers for all A_1A_2 .

Examples

Input	Palindrome	Value
VI	IVVI	I and V = 5 - 1 = 4 V and V = 5 + 5 = 10 V and I = 5 + 1 = 6 Total Roman Palindrome number = 20
MCM	MCMCM	M and C = 1000 + 100 = 1100 C and M = 1000 - 100 = 900 M and C = 1000 + 100 = 1100 C and M = 1000 - 100 = 900 Total = 4000
MCMLXXIV	VIXXLMCMMCMLXXIV	V and I = 5 + 1 = 6 I and X = 10 - 1 = 9 X and X = 10 + 10 = 20 X and L = 50 - 10 = 40 L and M = 1000 - 50 = 950 M and C = 1000 + 100 = 1100 C and M = 1000 - 100 = 900 M and M = 1000 + 1000 = 2000

* Not to be confusing, but if the arrays used to hold the strings are zero-based, this is $i=0..length-2$; we are just indicating that you consider each pair of characters in the string.

		M and C = 1000 + 100 = 1100 C and M = 1000 - 100 = 900 M and L = 1000 + 50 = 1050 L and X = 50 + 10 = 60 X and X = 10 + 10 = 20 X and I = 10 + 1 = 11 I and V = 5 - 1 = 4 Total = 8170
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Given a string using characters from the set { I, V, X, L, C, D, M }, print the value of the Roman Palindrome.

Input

There will be multiple input cases to consider. Each case has a single input line containing the string of Roman numeral symbols (never more than 10) followed immediately by the end of line. The line following the input for the last case contains only an end of line.

Output

For each input case, display the case number (1, 2, ...), and the value of the Roman Palindrome. Your output should be similar to that shown in the sample. Display a blank line after each line of output.

Sample Input

Output for the Sample Input

VI MCM MCMLXXIV <i>(only an end of line)</i>	Case 1: total = 20 Case 2: total = 4000 Case 3: total = 8170
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