**Question 1:** *Block Palindromes*

A *palindrome* is a word that shows the same sequence of letters when reversed. If a word can have its letters grouped together in two or more blocks (each containing one or more adjacent letters) then it is a *block palindrome* if reversing the order of those blocks results in the same sequence of blocks.

For example, using brackets to indicate blocks, the following are *block palindromes*:
- BONBON can be grouped together as (BON)(BON);
- ONION can be grouped together as (ON)(I)(ON);
- BBACBB can be grouped together as (B)(BACB)(B) or (BB)(AC)(BB) or (B)(B)(AC)(B)(B)
  Note that (BB)(AC)(B)(B) is *not* valid as the reverse (B)(B)(AC)(BB) shows the blocks in a different order.

**1(a) [ 23 marks ]**

Write a program which reads in a word of between 2 and 10 (inclusive) uppercase letters.

You should output a single number, the number of different ways the input can be grouped to show it is a *block palindrome*.

*Sample run*

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BBACBB
3
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**1(b) [ 2 marks ]**

Give all the groupings of AABCBAA that show it is a *block palindrome.*

**1(c) [ 6 marks ]**

Suppose that all the groupings of a *block palindrome* contain an even number of blocks. What can you say about the length of the *block palindrome*? How many different groupings can it have? Justify both your answers.