

Siena College's 32nd Annual High School Programming Contest
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Gold Problem #5: ABRACADABRA – It's not Magic! It's Majorities!

Background Information: ABRACADABRA is a ***balanced word*** but it's not a ***perfectly balanced word***. A ***perfectly balanced word*** has the same number of each type of letter in its right and left halves. For example, NOON, NONO, and ONION are perfectly balanced words. Each of these words has 1 N and 1 O in its right and left halves. When a word has an odd number of letters like ONION, the middle letter does not factor into the balance.

A majority side for a letter in a word is the side (right or left) that has the most occurrences of this letter. For example, in the word AABCBCBAACBABCAACBCAA there are 4 As on the left side and 5 As on the right side so AABCBCBAACBABCAACBCAA has a *right majority side* for the letter A. Likewise, since there are 3 Bs on the left and 2 Bs on the right, this word has a *left majority side* for the letter B. There is no majority side for the letter C because each side has three Cs. If a word has more left majority side letters, then the word is *left unbalanced*. If it has more right majority side letters, then the word is *right unbalanced*. If the number of majority letters is the same, like it is for AABCBCBAACBABCAACBCAA, then the word is a *balanced word*.

For this problem, you will write a program that will take a word as input and then identify whether it is *perfectly balanced*, *balanced*, *right unbalanced*, or *left unbalanced*.

Programming Problem:

Input: A word with between 1 and 55 uppercase letters. (all uppercase and no lowercase)

Output: Two lines. The input word on the first line. On the second line, one of the following four identifications (all uppercase):

1. PERFECTLY BALANCED 2. BALANCED 3. RIGHT UNBALANCED, 4. LEFT UNBALANCED.

Example 1: Input: ABRACADABRA
 Output: ABRACADABRA
 BALANCED

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Example 2:  Input:  ABCDEAAAAA
            Output: ABCDEAAAAA
            LEFT UNBALANCED
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Example 3: Input: ONION
 Output: ONION
 PERFECTLY BALANCED

Example 4: Input AAAAAAAAAAAAAAAAAAAAAAAAAAABCEFGHIJKLMNOPQRSTUVWXYZ
 Output: AAAAAAAAAAAAAAAAAAAAAAAAAAABCEFGHIJKLMNOPQRSTUVWXYZ
 RIGHT UNBALANCED

