CSE116 Problem Set #8

For each of the following problems you should start by writing several JUnit tests that will verify correct behavior. Once you have written at least four distinct tests for each of the problems, begin to implement solutions to each of the problems. Be sure to run your unit tests often. They are not necessarily in order of difficulty.

These problems all involve writing visitors for different types of LRStructs.

1. Define a visitor on an LRStruct<String> which returns the concatenation of all the Strings in the list as its value.
2. Define a visitor on an LRStruct<Integer> which returns the sum of the squares of all the values in the in list. For example, if the list contains 1, 2, 3 and 4 the visitor must return compute 1+4+9+16+0, and return 30 as the answer.
3. Define a visitor on an LRStruct<String> which returns a new LRStruct<String> containing those Strings from the original whose length is at least 5.
4. Define a visitor on an LRStruct<String> which returns a new LRStruct<String> containing those Strings from the original starting with the letter 'E'.
5. Define a visitor on an LRStruct<String> which returns a new LRStruct<String> containing those Strings from the original starting with the letter 'e' or 'E'.
6. Define a visitor on an LRStruct<String> which returns a new LRStruct<String> containing those Strings from the original starting with a vowel ('a', 'e', 'i', 'o' or 'u', or their uppercase equivalents).
7. Define a visitor on an LRStruct<String> which returns the sum of the lengths of all the individual Strings in the list. For example, if the list contains "Fred", "Wilma" and "Pebbles" then the correct answer is 16.
8. Define a visitor on an LRStruct<Integer> which returns the smallest value from the list. You may assume that the list contains at least one value. HINT – Use the argument in execute to pass in the first value from the list: because the list is non-empty by assumption, there is a first value.
9. Re-do exercise 8, removing the assumption that there is at least one value. HINT - Use two visitors: the first to determine whether the list is empty or not, and the second being the visitor you defined to solve exercise 8. If the list is completely empty there is no smallest value and an IllegalStateException should be thrown. Be sure one of your tests checks for the exception being thrown.