Homework 2: Custom String

This assignment is designed to give you practice writing code and applying lessons and topics for the current module.

This homework deals with the following topics:

- The Java Language
- Strings
- Unit Testing

The Assignment

In this assignment, you will implement a simple class called *CustomString*. This class represents a more customizable version of a String, with additional attributes and methods.

For example, the CustomString class has a “reverse” method which returns a new string version of the current string where the capitalization is reversed (i.e., lowercase to uppercase and uppercase to lowercase) for the alphabetical characters specified in a given argument. For CustomString “abc, XYZ; 123.”, calling reverse("bcdxyz@3210.") will return "aBC, xyz; 123.".

The CustomString class also has a “remove” method which returns a new string version of the current string where the alphabetical characters specified in a given argument, are removed. For CustomString "my lucky numbers are 6, 8, and 19.", calling remove("ra6") will return "my lucky numbers e 6, 8, nd 19.".

There are 5 methods that need to be implemented in the CustomString class:

- getString() - Returns the current string.
- setString(String string) - Sets the value of the current string.
- remove(String arg) - Returns a new string version of the current string where the alphabetical characters specified in the given arg, are removed.
- reverse(String arg) - Returns a new string version of the current string where the capitalization is reversed (i.e., lowercase to uppercase, and uppercase to lowercase) for the alphabetical characters specified in the given arg.
- filterLetters(char n, boolean more) - Returns a new string version of the current string where all the letters either >= or <= the given char n, are removed.

Each method has been defined for you, but without the code. See the javadoc for each method for instructions on what the method is supposed to do and how to write the code. It should be clear enough. In some cases, we have provided hints and example method calls to help you get started.

For example, we have defined a "setString" method for you (see below) which sets the value of the current string. Read the javadoc, which explains what the method is supposed to do. Then write your code where it says "// TODO" to implement the method. You'll do this for each method in the program.

```
/**
 * Sets the value of the current string.
 * @param string value to be set
 */
 public void setString(String string) {
     // TODO Implement method
 }
```

In addition, you will write unit tests to test your method implementations. Each unit test method has been defined for you, including some test cases. First make sure you pass all of the provided tests, then write **additional and distinct test cases** for each unit test method.

For example, we have defined a "testSetString" method for you (see below) which tests the "setString" method. Pass the tests provided then write additional tests where it says "// TODO". You'll do this for each unit test method in the program.

```
@Test
void testSetString() {
    //string should be null to start, before setting it
    assertNull(this.myCustomString.getString());

    this.myCustomString.setString("Good-bye!");
    assertEquals("Good-bye!", this.myCustomString.getString());

    // TODO write at least 3 additional test cases
}
```

Tips for this Assignment

In this assignment, some tips are given as follows:

- Converting a String to an array of chars in Java:
  - Use the ”toCharArray()” method of a String
    For example:
```
String myString = “hello”;
//arrayOfChars contains ‘h’, ‘e’, ‘l’, ‘l’, ‘o’
Char[] arrayOfChars = myString.toCharArray();
```
- Checking whether a specified char value is a letter in Java:
  - Use “Character.isLetter(char)”
    For example:
```
//isLetter is true
boolean isLetter = Character.isLetter('t');
```
- Checking whether a specified char value is uppercase in Java:
  - Use “Character.isUpperCase(char)”
    For example:
```
//isUpperCase is true
boolean isUpperCase = Character.isUpperCase('T');
```
- Checking whether a specified char value is lowercase in Java:
  - Use “Character.isLowerCase(char)”
    For example:
```
//isLowerCase is true
boolean isLowerCase = Character.isLowerCase('t');
```
- Converting a character to uppercase in Java:
  - Use “Character.toUpperCase(char)”
    For example:
```
//myChar is ‘T’
char myChar = Character.toUpperCase('t');
```
- Converting a character to lowercase in Java:
  - Use “Character.toLowerCase(char)”
    For example:
```
//myChar is ‘t’
char myChar = Character.toLowerCase('T');
```
- Comparing characters in Java:
  - You can compare characters like you compare numbers using ==, <, and > operators.
    For example:
```
char myChar1 = ‘s’;
char myChar2 = ‘t’;

//compared is true
boolean compared = myChar1 < myChar2;
```

Submission

You have been provided with *CustomString.java* and *CustomStringTest.java*. To complete the assignment, implement the methods in *CustomString.java*, making sure you pass all the tests in *CustomStringTest.java*. Then write **at least 3 additional and distinct test cases** for each unit test method in *CustomStringTest.java*. Do not modify the name of the methods in *CustomString.java* or the automated testing will not recognize it.

You will submit two files for this assignment: *CustomString.java* and *CustomStringTest.java*. Make sure your program and the unit testing files run without errors! Submit the completed program using the steps outlined in the assignment in Coursera.

Evaluation

Points:

1. Does your code function correctly? (15 pts)
    - getString() - 1 pts
    - setString(String string) - 2 pts
    - remove(String arg) - 4 pts
    - reverse(String arg) - 4 pts
    - filterLetters(char n, boolean more) - 4 pts
2. Did you include at least 3 additional distinct and valid test cases for each test method? Do all of your tests pass? (15 pts)
    - testGetString() - 3 pts
    - testSetString() - 3 pts
    - testRemove() - 3 pts
    - testReverse() - 3 pts
    - testFilterLetters() - 3 pts