CSCI 200 – Assignment 4

Due 4/22/16 by 5:00pm

This assignment is designed to strengthen your understanding of some basic Java programming concepts such as Arrays, loops, and all of the other concepts from this semester. This assignment is to be done **individually** - you are not to share work under any circumstances. It is due by the time listed above on that day – no exceptions. Make sure that all the work you submit to me is professional looking. Soft copies of this assignment will be turned in to me by the due date and time or you will receive a zero! Soft copies will be submitted to Blackboard by the due date and time listed above. Hard copies (if any) will be turned in at the beginning of class on the due date to the instructor.

What I expect for the softcopy of this assignment:

You will submit your code for Programming Exercises on Blackboard under Programming Project 4 when complete (attach a zipped version of the project folder that you create with your working codes in it), screenshot of running code), and include the code discussion.

What I expect for the hardcopy of this assignment:

No Hardcopy is required for submission of this assignment

Programming Exercises

(You will submit the code for these programs to Blackboard). Use **Eclipse** and create a Java Project named *YourName*_Java_Assignment4. You will zip this folder and submit zipped folder on Blackboard. Also, Name/Create/Save your program as YourName_Java_Assignment4.java for your solutions.

You must capture a screenshot of the output console and turn it in with this assignment for credit. You will be required to have a comment block header and use comments throughout your code to explain your reasoning. The comment header should include the following information: program name, course name and section number, author (this is your name), due date, and a brief description of the program.

Code Discussion: In the comments section on blackboard (where/when you submit the code), please include a brief paragraph discussing any issues that you encountered and measures that you took to correct them. Also, discuss anything that you learned from this assignment and confusion (if any) that you may still have on the material that we have addressed. This is also *required* for full credit on the programming portion of the assignment.

Program Assignment Description(s)

For this programming assignment, you will write one main method (one program) to solve two sub-problems. **You should solve Part (a) then print blank lines and a "spacer" line of all dashes, then code for Part (b) afterwards (See example on last page).**

Part (a): This part of the assignment is practice creating, filling, and gathering information from arrays. This part is designed to be fairly simple and will make use of topics from loops and arrays alike. For this portion, you will need two arrays; one to store Booleans and one to store integers. Prompt the user for the number of elements that you want in each array (this number will be used to create both arrays and MUST be positive). Create the two arrays to have the user's specified number of elements. Use a random number generator to generate the numbers/Booleans stored in each element of both of the arrays.

The Boolean array should only contain elements that hold Boolean values (true and false). The integer array should hold values from [-5, 5) -- review random number generators from Chapter 3 to remind yourself how to shift the range of the numbers generated.

Once filled with the randomly generated values, you should display the contents of the array on one line, with each elements value separated by commas and spaces (try not to display a ending comma after the last element). For the Boolean array, display the contents as well as how many elements are true, how many are false, and the index of the first true element (display -1 here, if array contains all false values). For the integer array, display the contents along with how many numbers are odd, which elements are odd, and what the average (mean value) of all of the elements is (displayed to exactly 3 decimal places).

Part (b): The goal of this part is to calculate and display a vertical letter-frequency graph which shows the frequency of letters in a given phrase. This code will take in a phrase from the keyboard and count the frequency in which each letter of the alphabet occurs. The string should not exceed 60 characters and can include letters, numbers, blanks and other special characters. If the user submits a string that is too long, the program should display an error message to that effect and re-prompt until an appropriate string has been entered. Once a valid string has been entered, use an array to count the frequency of each letter (ignoring case and all non-letters, of course). Finally, display the letter-frequency stored in the array vertically (See example on last page). Use asterisks (one for each occurrence) to denote the number of times a character occurred.

Code will be graded on its readability, style, and clarity as well as its ability to display the proper results.

Do not turn in useless/wasteful code! Make sure that what you turn into me is final presentation quality.

Good luck!! -Ms. Tobias

Output should be of the form:

```
Welcome to Randomly Generated Array Values Program!
Please enter the number of elements for both arrays: 6
Boolean Array Contents:
true, true, false, true, false, true
     Total TRUEs: 4
     Total FALSEs: 2
     Index of first TRUE: 0
Integer Array Contents:
-3, 2, 0, 0, 1, -5
     Total odd numbers: 3
     Odd elements are: -3, 1, -5
     Element Mean is: -0.833

------------------------------------------------------------

Welcome to Super-D-Duper Letter Frequency Counter!
Please enter a phrase that is no more than 60 characters:
     CSCI 200 is an all-around awesome class!
The following is the Letter-Frequency graph:
*                                   *
*                                   *
*   *                   *           *
*   *   *       *       *   * *     *
*   * * *       *       * * * *   * *   *   *

_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
```

Suggested layout:

```
/*Place header comment block here*/

public class YourName_Java_Assignment5
{
     public static void main(String[] args)
     {
          //Statements to solve Part (a)
          //Your code here

          System.out.println("\n------------------------\n");

          //Statements to solve Part (b)
          //Your code here
     }
}
```