CSC 230: Elementary Data Structures and Algorithms

Assignment Four

Objective:

To work with files
To work with arrays

Assignment:

Create one program called **lastNameFirstInitialHW4.java**. (Mine would be called KikuchiCHW4). This is a simple program that has only the one main class.

The program will load to an array a list of 50 grades read from a file. Once the scores have been loaded to the array, provide the user with a menu of options:

A. Print the grades to the screen sorted in ascending order
B. Calculate and return the average value of the scores
C. Calculate and return the standard deviation of the scores
D. Print the grades to a file sorted in ascending order, along with the average value and standard deviation of the scores
E. Quit

Notes:

- Notice that the menu options are using the char data type.
- Use a switch statement to process the menu options.
- Input data: The 50 grades are in a provided file called **gradesIn.txt**.
- Output data: The file that will be written to will be called **gradesOut.txt**.
- Error Checking:
  - Your program should accept either lower- or upper-case letters for any of the menu options.
  - The program should handle I/O Exceptions. You can do this via a throw or a try catch.
  - The program should ensure that the correct file is opened.

The program is method based. The methods required are:

sortArraysMethod	This will sort the array in ascending order. You can use the sort method from the Arrays class
printValuesMethod	This will print the sorted array
averageArrayMethod	This will return the average of the array as shown in the sample
StandDev	This will return the standard deviation of the array as shown in the sample. There are many, many ways to calculate the standard deviation. (I used the pow and sqrt methods from the Math class).
printToFileArray	This will print the report to the file that includes the printed array, the average, and the standard deviation.

Above the class header, write a javadoc comment containing the integrity policy statement. Under the integrity statement, add comments on your program that show the title of the program (lastNameFirstInitialHW2), your first and last name, and the course name (CSC 230, Sec #). As the first print lines for your program under the main method, make sure that the run screen also prints the title of the program (lastNameFirstInitialHW2), your first and last name, and the course name (CSC 230, Sec #), and the program information as shown in the sample run screen.

Your program must compile. Programs that do not compile will not be accepted.

To Submit this homework:

Turn in, **via the Assignments area** the package called **lastNameFirstInitialHW4** as a **zipped file**

SAMPLE RUN SCREEN (The user can choose these options in any order)

KikuchiCHW4
Christine Kikuchi
CSC 230, Sec #

This program loads to an array a list of 50 grades read from a file.
Once the scores have been loaded to the array, provide the user with a menu of options:
A. Print the grades to the screen sorted in ascending order
B. Calculate and return the average value of the scores
C. Calculate and return the standard deviation of the scores
D. Print the grades to a file sorted in ascending order, along with the average value and standard deviation of the scores
E. Quit

```
**********************************************************************
*  Menu:                                                             *
*  A - Show Grades in Ascending Order.                               *
*  B - Calculate the average value of the scores                     *
*  C - Calculate the Standard Deviation of the scores                *
*  D - Create File with Grades, Average, and Standard Deviation      *
*  E - Quit                                                          *
**********************************************************************
```

Enter a letter for your choice on the menu (A, B, C, D, or E): A
The array in ascending order is: 2 3 3 5 5 5 6 8 8 8 8 9 10 10 11 12 15 17 18 18 20 20 21 24 25 28 31 32 35 35 37 37 37 40 40 41 41 41 42 43 44 46 47 48 49 49 49 49 50 50

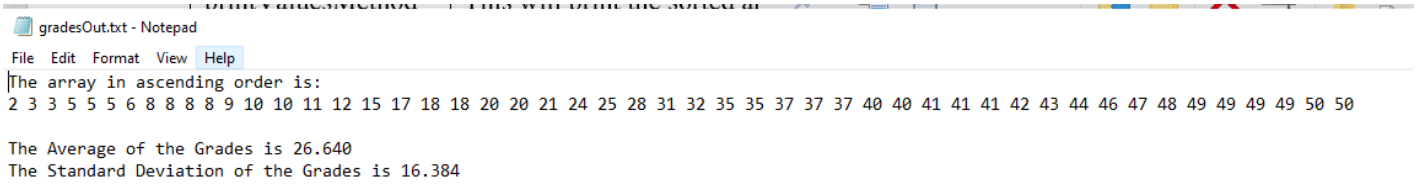
```
**********************************************************************
*  Menu:                                                             *
*  A - Show Grades in Ascending Order.                               *
*  B - Calculate the average value of the scores                     *
*  C - Calculate the Standard Deviation of the scores                *
*  D - Create File with Grades, Average, and Standard Deviation      *
*  E - Quit                                                          *
**********************************************************************
Enter a letter for your choice on the menu (A, B, C, D, or E): b
The Average of the Grades is 26.640

**********************************************************************
*  Menu:                                                             *
*  A - Show Grades in Ascending Order.                               *
*  B - Calculate the average value of the scores                     *
*  C - Calculate the Standard Deviation of the scores                *
*  D - Create File with Grades, Average, and Standard Deviation      *
*  E - Quit                                                          *
**********************************************************************
Enter a letter for your choice on the menu (A, B, C, D, or E): C
The Standard Deviation of the Grades is 16.374

**********************************************************************
*  Menu:                                                             *
*  A - Show Grades in Ascending Order.                               *
*  B - Calculate the average value of the scores                     *
*  C - Calculate the Standard Deviation of the scores                *
*  D - Create File with Grades, Average, and Standard Deviation      *
*  E - Quit                                                          *
**********************************************************************
Enter a letter for your choice on the menu (A, B, C, D, or E): d

**********************************************************************
*  Menu:                                                             *
*  A - Show Grades in Ascending Order.                               *
*  B - Calculate the average value of the scores                     *
*  C - Calculate the Standard Deviation of the scores                *
*  D - Create File with Grades, Average, and Standard Deviation      *
*  E - Quit                                                          *
**********************************************************************
Enter a letter for your choice on the menu (A, B, C, D, or E): E
Thanks for using my program!
```

gradesOut.txt



Homework Four Rubric			
The class is called lastNameFirstInitialHW4.java	1	The class is not called lastNameFirstInitialHW4.java.	0
The class starts with a Javadoc comment that is the Academic Integrity statement	2	The class does not have the Javadoc comment that is the Academic Integrity statement	0
Under the Academic Integrity statement, there are the comments that show the title of the program, the programmer's first and last name, and the course name and section #.	2	The class does not have the comments that are the title of the program, the programmer's first and last name, and the course name and section #.	0
The first print lines print the title of the program, the programmer's first and last name, and the course name and section #, and the program information as shown in the sample run screen	2	The class does not have the print lines that show the title of the program, the programmer's first and last name, and the course name and section #.	0
The program is setup to allow reading from a file	4	The program is not setup to allow reading from a file	
The file is read as long as it has numbers	4	The file is not read as long as it has numbers	
The program is setup to allow writing to a file	4	The program is setup to allow writing to a file	
The file(s) opening has error checking	4	The file(s) opening does not have error checking	

The user is shown a menu with options, A, B, C, D, & E	4	The user is not shown a menu with options, A, B, C, D, & E	
The program uses a do while loop to accept entry for as many times as he/she wishes to make choices	4	The program does not use a do while loop to accept entry for as many times as he/she wishes to make choices	
The user is prompted to enter the character of his or her choice; the character can be entered as a small or upper-case letter and will be converted to an upper-case letter.	4	The user is not prompted to enter the character of his or her choice; the character cannot be entered as a small or upper-case letter and/or is not converted to an upper-case letter.	0
The program has a correctly set up switch statement for choices A, B, C, D, & the default	4	The program does not have a correctly set up switch statement for choices A, B, C, D, & the default	0
Choice A: The sortArraysMethod and the printValuesMethod method are called	4	Choice A: The sortArraysMethod and the printValuesMethod method are not called	0
The sortArraysMethod works as expected	5	The sortArraysMethod does not work as expected	
The printValuesMethod works as expected	5	The printValuesMethod does not work as expected	
Choice B: The averageArrayMethod method is called	4	Choice B: The averageArrayMethod method is not called	0
The averageArrayMethod works as expected, calculating the correct average.	5	The averageArrayMethod does not work as expected, calculating the correct average.	
Choice C: The StandDev method is called	4	Choice C: The StandDev method is bit called	0
The StandDev works as expected, calculating the correct standard deviation	5	The StandDev does not work as expected, calculating the correct standard deviation	
Choice D: The printToFileArray method is called	4	Choice D: The printToFileArray method is not called	0
The printToFileArray works as expected, printing the report to the file	5	The printToFileArray does not work as expected, printing the report to the file	
Choice E: The line: Thanks for using my program! is printed.	4	Choice F: The line: Thanks for using my program! is not printed.	0
Printing to the screen is done in the printValuesMethod method; the sortArraysMethod, averageArrayMethod, & StandDev methods do no printing.	4	Printing to the screen is not done in the printValuesMethod method; the sortArraysMethod, averageArrayMethod, & StandDev methods do printing	0

Both files are closed in the correct place in the program	4	Both files are not closed in the correct place in the program	0
The correct formatting is used for printing the average and standard deviation	4	The correct formatting is not used for printing the average and standard deviation	
The run of the program both on screen and in the file look like the sample	4	The run of the program both on screen and in the file look like the sample	0