

Java for Non Majors

CGS 3416: Spring 2020

Department of Computer Science, Florida State University

Homework 4: 100 points

Due date: 11:59 PM 03/15/2020

1 Objective

The purpose of this assignment is to exercise your familiarity with Strings, the `StringBuilder` Class and Arrays. For this assignment, you're required to turn in 2 programs that involve Strings and Arrays.

Please upload your files `Palindromes.java` and `Statistics.java` to Canvas

2 Program 1

This program should be called `Palindromes.java`

This program will prompt the user to enter a number 'N' and then accept N strings from the user. These strings will consist only of letters (both uppercase and lowercase), numbers and spaces. You should store the strings in an array. You are required to write a method that accepts a string and return `True` if it is palindrome, otherwise returns `False`. (ignoring case and spaces). If a string happens to be a palindrome, add it to result string. After processing all the input, print the result string on the console. Make sure your program conforms to the following requirements.

- The method that processes the string should not have a print statement.
- The output should be printed in a single line and palindromic strings should be separated by a ";", and the case of the letters in the input should be preserved.
- You need not check for any errors.
- A palindrome is defined as a string that reads the same forward and backward. For example, "Race car" is a palindrome.

Sample Run

```
Enter the number of strings: 8
Enter the strings:
Race Car
Mountain Dew
BATMAN
Taco Cat
Stressed Desserts
Is Mayonnaise an instrument
swap paws
A Toyotas a Toyota
```

The palindromes are: Race Car; Taco Cat; Stressed Desserts; swap paws; A Toyotas a Toyota

3 Program 2

This program should be called `Statistics.java`

This program will prompt the user to enter 10 numbers. You are supposed to store the numbers in an array of doubles. You are then required to calculate the mean, variance and standard deviation of the entered values. Make sure your program conforms to the following requirements.

- This program doesn't need separate methods. You can write it all in `main()` if you wish.
- *Mean is defined as the average of all the entered values.* You need to calculate mean first, as variance depends on mean and standard deviation depends on variance.
- *Variance is defined as the average of the squares of the distance from the mean.* For each value in the array, subtract the value from the mean, square the result and then add the square to a running total. Divide that by the number of values (10).
- *Standard deviation is defined as the square root of the variance.* This should be simple enough.
- Print all the results rounded to 2 decimal places.

For example, if your data set was just $\{4, 7.5, 8\}$, then the mean is $(4 + 7.5 + 8)/3 = 19.5/3 = 6.5$.

Variance = $((6.5 - 4)^2 + (6.5 - 7.5)^2 + (6.5 - 8)^2)/3 = (6.25 + 1 + 2.25)/3 = 9.5/3 = 3.17$

Standard Deviation = $\sqrt{3.17} = 1.78$

Sample Run

Enter the 10 numbers: 5

8
10
6
12
3
5
7
9
-2

The mean is : 6.3

The variance is : 14.01

The standard deviation is : 3.74

Generic Guidelines

- Please make sure you're only using the concepts already discussed in class. That is, please try and restrict yourself to loops, selection statements methods and arrays.
- Each of the programs is worth 50 points.
- Please make sure that you're conforming to specifications (program name, print statements, expected inputs and outputs etc.).
- Please make sure your code is readable.
- Please make sure you've compiled and run your program before you turn it in. A grade 0 will be awarded if your program does not compile.