Intro to Java Week 3 Coding Assignment

Points possible: 70

Category	Criteria	% of Grade
Functionality	Does the code work?	25
Organization	Is the code clean and organized? Proper use of white space, syntax, and consistency are utilized. Names and comments are concise and clear.	25
Creativity	Student solved the problems presented in the assignment using creativity and out of the box thinking.	25
Completeness	All requirements of the assignment are complete.	25

Instructions: In Eclipse, or an IDE of your choice, write the code that accomplishes the objectives listed below. Ensure that the code compiles and runs as directed. Take screenshots of the code and of the running program (make sure to get screenshots of all required functionality) and paste them in this document where instructed below. Create a new repository on GitHub for this week's assignments and push this document, with your Java project code, to the repository. Add the URL for this week's repository to this document where instructed and submit this document to your instructor when complete.

Coding Steps:

1. Create an array of int called ages that contains the following values: 3, 9, 23, 64, 2, 8, 28, 93.
    a. Programmatically subtract the value of the first element in the array from the value in the last element of the array (i.e. do not use ages[7] in your code). Print the result to the console.
    b. Add a new age to your array and repeat the step above to ensure it is dynamic (works for arrays of different lengths).
    c. Use a loop to iterate through the array and calculate the average age. Print the result to the console.
2. Create an array of String called names that contains the following values: "Sam", "Tommy", "Tim", "Sally", "Buck", "Bob".
    a. Use a loop to iterate through the array and calculate the average number of letters per name. Print the result to the console.
    b. Use a loop to iterate through the array again and concatenate all the names together, separated by spaces, and print the result to the console.

3. How do you access the last element of any array?
4. How do you access the first element of any array?
5. Create a new array of int called nameLengths. Write a loop to iterate over the previously created names array and add the length of each name to the nameLengths array.
6. Write a loop to iterate over the nameLengths array and calculate the sum of all the elements in the array. Print the result to the console.
7. Write a method that takes a String, word, and an int, n, as arguments and returns the word concatenated to itself n number of times. (i.e. if I pass in “Hello” and 3, I would expect the method to return “HelloHelloHello”).
8. Write a method that takes two Strings, firstName and lastName, and returns a full name (the full name should be the first and the last name as a String separated by a space).
9. Write a method that takes an array of int and returns true if the sum of all the ints in the array is greater than 100.
10. Write a method that takes an array of double and returns the average of all the elements in the array.
11. Write a method that takes two arrays of double and returns true if the average of the elements in the first array is greater than the average of the elements in the second array.
12. Write a method called willBuyDrink that takes a boolean isHotOutside, and a double moneyInPocket, and returns true if it is hot outside and if moneyInPocket is greater than 10.50.
13. Create a method of your own that solves a problem. In comments, write what the method does and why you created it.

Screenshots of Code:

```java
public class CodingAssignment {

    public static void main(String[] args) {

        // step 1.
        int[] ages = {3, 9, 23, 64, 2, 8, 28, 93};

        // a.
        System.out.println( ages[ages.length - 1] - ages[0] ); // subtracted first element from last element

        // b.
        int[] agesNew = new int[ages.length + 1];
        for (int i = 0; i < ages.length; i++) {
            agesNew[i] = ages[i];
        }

        agesNew[agesNew.length - 1] = 22; // added new age to array

        for (int age : agesNew) {
            System.out.print(age + " ");
        }
        System.out.println();
        System.out.println( agesNew[agesNew.length - 1] - agesNew[0] ); // repeating step a.

        // c.
        int sumAgesNew = 0;

        for (int i = 0; i < agesNew.length; i++) {
            sumAgesNew += agesNew[i];
        }
        System.out.println( (double) sumAgesNew / agesNew.length); // prints average of ages in array
```

Problems Javadoc Declaration Console

<terminated> CodingAssignment [Java Application] C:\Program Files\Java\jdk-11.0.15\bin\javaw.exe (Jul 14, 2022, 3:19:26 PM – 3:19:26 PM) [pid: 3396]

```
90
3 9 23 64 2 8 28 93 22
19
28.0
```

```java
        // step 2.
        String[] names = {"Sam", "Tommy", "Tim", "Sally", "Buck", "Bob"};

        // a.
        int sumLetters = 0;

        for (String name : names) {
            sumLetters += name.length();
        }

        System.out.println((double) sumLetters / names.length); // prints average amount of letters per name

        // b.
        String namesConcatenated = "";

        for (String name : names) {
            namesConcatenated += name + " ";
        }

        System.out.println(namesConcatenated); // prints all names concatenated together, separated by spaces
```

Problems Javadoc Declaration Console

<terminated> CodingAssignment [Java Application] C:\Program Files\Java\jdk-11.0.15\bin\javaw.exe (Jul 14, 2022, 10:10:37 PM – 10:10:37 PM) [pid: 5512]

```
3.8333333333333335
Sam Tommy Tim Sally Buck Bob
```

```java
        // step 3.
        int[] exampleArr = {1, 2, 3, 4, 5};
        System.out.println( exampleArr[exampleArr.length - 1] ); // accessing the last element in an array

        // step 4.
        System.out.println( exampleArr[0] ); // accessing the first element in an array
    }
```

Problems Javadoc Declaration Console

<terminated> CodingAssignment [Java Application] C:\Program Files\Java\jdk-11.0.15\bin\javaw.exe (Jul 14, 2022, 3:37:43 PM – 3:37:44 PM) [pid: 2724]

```
5
1
```

```java
        // step 5.
        int[] nameLengths = new int[names.length];

        for (int i = 0; i < nameLengths.length; i++) {
            nameLengths[i] = names[i].length();
            System.out.print(nameLengths[i] + " ");  // prints out array nameLengths
        }

        System.out.println();

        // step 6.
        int totalLetters = 0;

        for (int i = 0; i < nameLengths.length; i++) {
            totalLetters += nameLengths[i];
        }

        System.out.println(totalLetters); // prints sum of all elements in array nameLengths
```

Problems Javadoc Declaration Console

<terminated> CodingAssignment [Java Application] C:\Program Files\Java\jdk-11.0.15\bin\javaw.exe (Jul 15, 2022, 3:06:37 PM – 3:06:37 PM) [pid: 17144]

```
3 5 3 5 4 3
23
```

```java
        // step 5.
        int[] nameLengths = new int[names.length];

        for (int i = 0; i < nameLengths.length; i++) {
            nameLengths[i] = names[i].length();  // resulting array nameLengths = [3,5,3,5,4,3]
        }

        // step 6.
        int totalLetters = 0;

        for (int i = 0; i < nameLengths.length; i++) {
            totalLetters += nameLengths[i];
        }

        System.out.println(totalLetters); // prints sum of all elements in array nameLengths
    }
```

Problems Javadoc Declaration Console

<terminated> CodingAssignment [Java Application] C:\Program Files\Java\jdk-11.0.15\bin\javaw.exe (Jul 14, 2022, 4:06:38 PM – 4:06:38 PM) [pid: 16460]

```
23
```

```java
        // step 7.
        System.out.println(repeatString("Hello", 3) );
    }

    static String repeatString(String str, int x) {
        String newStr = "";
        for (int i = 1; i <= x; i++) {
            newStr += str;
        }
        return newStr;
    }
```

Problems Javadoc Declaration Console

<terminated> CodingAssignment [Java Application] C:\Program Files\Java\jdk-11.0.15\bin\javaw.exe (Jul 14, 2022, 4:11:11 PM – 4:11:11 PM) [pid: 1860]

```
HelloHelloHello
```

```java
        // step 8.
        String firstName = "Johnny";
        String lastName = "Lee";

        System.out.println(fullName(firstName, lastName) );
    }

    static String fullName(String firstName, String lastName) {
        return firstName + " " + lastName;
    }
```

Problems Javadoc Declaration Console

<terminated> CodingAssignment [Java Application] C:\Program Files\Java\jdk-11.0.15\bin\javaw.exe (Jul 14, 2022, 4:17:58 PM – 4:17:58 PM) [pid: 10628]

```
Johnny Lee
```

```java
        // step 9.
        int[] integers = {10, 20, 30, 40, 50, 60};
        System.out.println(sumLarger100(integers) );
    }

    static boolean sumLarger100(int[] arr) {
        int sum = 0;
        for (int integers : arr) {
            sum += integers;
        }
        return sum > 100;
    }
```

Problems Javadoc Declaration Console

<terminated> CodingAssignment [Java Application] C:\Program Files\Java\jdk-11.0.15\bin\javaw.exe (Jul 14, 2022, 4:22:13 PM – 4:22:14 PM) [pid: 8908]

```
true
```

```java
        // step 10.
        double[] doubArr = {1.5, 2.3, 1.2, 1.9, 2.2, 2.3};
        System.out.println(averageArr(doubArr) );

    }

    static double averageArr(double[] arr) {
        double sum = 0;
        for (int i = 0; i < arr.length; i++) {
            sum += arr[i];
        }
        return sum / arr.length;
    }
```

Problems Javadoc Declaration Console

<terminated> CodingAssignment [Java Application] C:\Program Files\Java\jdk-11.0.15\bin\javaw.exe (Jul 14, 2022, 4:29:12 PM – 4:29:12 PM) [pid: 1116]

```
1.9000000000000004
```

```java
        // step 11.
        double[] arr1 = {1.5, 2.3, 1.2, 1.9, 2.2, 2.3};
        double[] arr2 = {4.7, 5.2, 4.9, 5.0, 4.4, 4.6};

        System.out.println(averageLarger(arr1, arr2));
    }

    static boolean averageLarger(double[] arr1, double[] arr2) {
        return averageArr(arr1) > averageArr(arr2);  //returns true if average of arr1 is greater than average of arr2
    }

    static double averageArr(double[] arr) {
        double sum = 0;
        for (int i = 0; i < arr.length; i++) {
            sum += arr[i];
        }
        return sum / arr.length;
    }
```

Problems Javadoc Declaration Console

<terminated> CodingAssignment [Java Application] C:\Program Files\Java\jdk-11.0.15\bin\javaw.exe (Jul 14, 2022, 4:36:02 PM – 4:36:02 PM) [pid: 11152]

```
false
```

```java
        // step 12.
        boolean isHotOutside = false;
        double moneyInPocket = 20.00;

        System.out.println(willBuyDrink(isHotOutside, moneyInPocket) ); // returns true if hot outside and money greater than 10.50

    }

    static boolean willBuyDrink(boolean isHotOutside, double moneyInPocket) {
        if (isHotOutside == true && moneyInPocket > 10.50) {
            return true;
        } else {
            return false;
        }
    }
```

Problems Javadoc Declaration Console

<terminated> CodingAssignment [Java Application] C:\Program Files\Java\jdk-11.0.15\bin\javaw.exe (Jul 14, 2022, 4:44:05 PM – 4:44:06 PM) [pid: 4380]

```
false
```

```java
        // step 13.
        // the following prints out the standard deviation(stddev) of a set of data, in this case an array of double
        // i created this method to easily find the stddev of large sets of data, to avoid the hassle of doing it by hand

        double[] dataSample = {3.21,3.63,3.50,3.33,3.35,3.49,3.28,3.48,3.09,3.58,3.29,3.41,3.53,3.60,3.22,3.34,3.51,3.24,3.44};

        System.out.println(STDDEV(dataSample) ); // prints standard deviation of the sample
    }

    static double STDDEV(double[] dataSample) {

        double[] deviation = new double[dataSample.length];
        double sumOfSquaredDev = 0.0;

        for (int i = 0; i < dataSample.length; i++) {
            deviation[i] = dataSample[i] - averageArr(dataSample);     // averageArr from earlier part of assignment
            deviation[i] *= deviation[i];                              // squared deviations from mean
            sumOfSquaredDev += deviation[i];                           // sum all squared deviations
        }
        double variance = sumOfSquaredDev / (dataSample.length - 1);   // calculating variance
        return Math.sqrt(variance);                                    // stddev = sqrt(variance)
    }
```

Problems Javadoc Declaration Console

<terminated> CodingAssignment [Java Application] C:\Program Files\Java\jdk-11.0.15\bin\javaw.exe (Jul 14, 2022, 7:57:44 PM – 7:57:45 PM) [pid: 10016]

```
0.15052928063166107
```

Screenshots of Running Application:

URL to GitHub Repository:

https://github.com/johnnylee-55/week3_Coding_Assignment/blob/main/src/CodingAssignment.java