Computer Science 121

Lab 10
100 Points

In this lab you will be practicing arrays.
You will be creating various methods for a class using arrays.
<u>You need to implement and test one method at a time in this lab, otherwise you cannot find your errors!</u>
You need to finish methods 1 to 5 in the lab and demonstrate to your instructor. You need to submit methods 6 to 8 in e-campus before the next lab and demonstrate during the next lab.

Also, include the following comment at the beginning of your code: /*
* Your Name
* Submission Date
* CS 121 Lab
* Name of Program
*
* Describe what the program does in one to two sentences.
*/
Also, explain what is going on at different parts of your code. For example, state where you're declaring variable, where you're getting user input, where you're performing computations, where you're outputting results, etc. **If you do not include comments throughout your code, you will lose points!!!**

Create a new Java program and name the class **ArrayMethods**. We are given an array of doubles. We are interested in performing several operations on the array. For each operation, you will create a separate method. Each method is described below:

1. main Method (15 Points)

In the main method, ask the user for the size of the array. Create a double array of the given size. As you build other methods, use/call them in the main method.

2. fillArray (15 Points)

This method will fill the array with random double values between 0 and 100 (100 exclusive), with only 2 decimal points. This method does not return anything and will set the values in the original array.

Use the **fillArray** method in the main method to store elements in the array and print the result.

3. printArray (10 Points)

This method prints all the items in the array. This method does not return anything. The elements should be separated by at least one space. Use this method to print the elements of array. After this method is complete, invoke it in the main method to see the elements in your array.

4. multiplyArray (10 Points)

This method will accept two parameters as arguments. One is the array, and the other is an integer variable by which all the elements of the array is multiplied.

The method will need to create a new array inside the method, multiply all the array elements with the integer parameter, and **return** the array created. This means you will need to create a new array in **multiplyArray**. Make sure that the values in the original array values are not changed.

Remember, you must return the new array from the method and not modify the values in the original array. Do not print anything from the method multiplyArray.

In the **main** method, prompt the user to enter an integer value by which the array elements need to be multiplied.

Pass the original array and the integer value as parameters to **multiplyArray** and assign the result to a new array. Print the contents of new array using printArray method from 3.

5. largest (15 Points)

This method searches for the largest number in the array. The method **must** return the largest number. A variable should be used to keep track of the current largest number. Be mindful of what the variable is initialized to.

Remember, you must return the largest number from the method and not print it inside the method largest.

Use this method in the main method to print the largest number in the original array.

6. smallest (15 Points)

This method searches for the smallest number in the array. The method **must** return the smallest number. A variable should be used to keep track of the current smallest number. Be mindful of what the variable is initialized to.

Remember, you must return the smallest number from the method and not print it inside the method.

Use this method in the main method to print the smallest number in the original array.

7. sumArray (10 Points)

This method adds all the elements in the array. The method returns the sum.

Remember, you must return the sum from the method and not print it inside the method.

Use this method in the main method to print the sum of the numbers in the original array.

8. avgArray (10 Points)

This method takes the average of all the elements in the array. The method returns the average.

Remember, you must return the average from the method and not print it inside the method.

Use this method in the main method to print the average of the numbers in the original array.

Below is a sample output of the program

```
Enter the size of the array:
 5
The array elements are:
  31.05         38.52         18.60         91.92         83.03
Largest is 91.92
Smallest is 18.6
Sum is 263.120
Average is 52.624
Enter the integer to multiply with:
 3
The array elements are:
  93.15        115.56         55.80        275.76        249.09
>
```