

1. PROGRAM 9 INSTRUCTIONS, CS101, PROF. LOFTIN

Write a class `ArrayStats` which has two public static methods

```
public static double mean (double[] ar)
    // returns the mean of the values in the array
public static double sd (double[] ar)
    // returns the standard deviation of the values in the array
```

These methods will pass an array of doubles as parameters and will return double values of the mean and standard deviation respectively.

Consider x_0, \dots, x_{n-1} a collection of numbers. The *mean* (or *average*) of this collection is given by the formula

$$\text{mean} = \frac{1}{n} \sum_{i=0}^{n-1} x_i,$$

where the Σ notation represents the sum:

$$\sum_{i=0}^{n-1} x_i = x_0 + x_1 + x_2 + \dots + x_{n-1}.$$

On the other hand the *standard deviation* of the same collection of numbers is given by

$$\text{sd} = \sqrt{\sum_{i=0}^{n-1} (x_i - \text{mean})^2}.$$

2. HOW TO DO IT

Each of the two methods will require a `for` loop to compute the sums involved. You will also need to access the `length` of the array to compute the mean. The `sd` method should call the `mean` method only once to compute the mean. Each method should use local variables as appropriate.

3. A SAMPLE DRIVER PROGRAM

```
public class StatDriver{
    public static void main(String[] args){
        double x[] = {3.4,5,62,13,-6,0,39,.672,14.9};
        double y,z;
        y = ArrayStats.mean(x);
        z = ArrayStats.sd(x);
        System.out.println("The mean is " + y);
        System.out.println("The standard deviation is " + z);
    }
}
```

4. OUTPUT OF THE SAMPLE DRIVER PROGRAM

```
The mean is 14.663555555555556
The standard deviation is 62.40066370017408
```

5. HOW TO TURN IT IN

Your file should be labeled `ArrayStats.java` and should be turned in via Blackboard.