Practice Exercise #12: Basic Statistics

http://www.comp.nus.edu.sg/~cs1020/4_misc/practice.html

Reference: Week 4 Arrays

Objectives:

1. Using array
2. Using **DecimalFormat** class

Task statement:

Given *n* values $X_1, X_2, \ldots, X_n$, the **mean** (average) μ is defined as follows:

$$\mu = \frac{1}{n}\sum_{i=1}^{n} X_i$$

The **variance** *var* is defined as follows:

$$var = \frac{1}{n}\sum_{i=1}^{n} (X_i - \mu)^2$$

And the **standard deviation** σ is the square root of variance:

$$\sigma = \sqrt{var}$$

Write **Statistics.java** to read in *n*, the number of values, followed by *n* integer values, and compute μ and σ. You may assume that $n > 0$.

The values μ and σ should be shown in 3 decimal places, and you are to use the **DecimalFormat** class.

Your program should contain the following methods. You may additional methods if you deem it necessary.

- **public static int[] readArray()**: To read the input data and return the integer array to the caller.
- **public static double computeMean(int[] arr)**: To compute the mean of the values in arr.
- **public static double computeStdDev(int[] arr)**: To compute the standard deviation of the values in arr.

You must not change the method headers given above.

In the skeleton program provided, it includes a **printArray(int[] arr)** method for your testing purpose.

Sample run #1:

```
Enter size of array: 3
Enter 3 values:
2 5 3
Mean = 3.333
Standard deviation = 1.247
```

Sample run #2:

```
Enter size of array: 10
Enter 10 values:
19 213 -42 76 100 27 -35 -12 57 171
Mean = 57.400
Standard deviation = 80.567
```

Sample run #3:

```
Enter size of array: 1
Enter 1 value: ← note the singular word "value"
12345
Mean = 12345.000
Standard deviation = 0.000
```