

## Weekly Project 5 Statistics

### Background:

1. On Schoology, find the text file (*numbers.txt*) containing a large ( $N \leq 1000$ ) number of integers. The number of integers in the file is initially unknown. The integers range in value from 0 to 100. The text file has been created with one value on each line.
2. Your program must find the mean (average), standard deviation, range, and mode of the list of numbers in the file. In case you needed a refresher, calculating the standard deviation consists of the following steps:
  - a. Find the mean (average) of the list of numbers.
  - b. Determine the difference of each number from the average, and square each difference. Sum all the differences.
  - c. Divide this sum by (the number of values - 1).
  - d. Take the square root of the above division problem from step c.

Example, given this list of numbers: 7 4 5 9 10

- a. The average =  $(7 + 4 + 5 + 9 + 10) / 5 = 7$
- b. Sum of squares of differences from the mean:

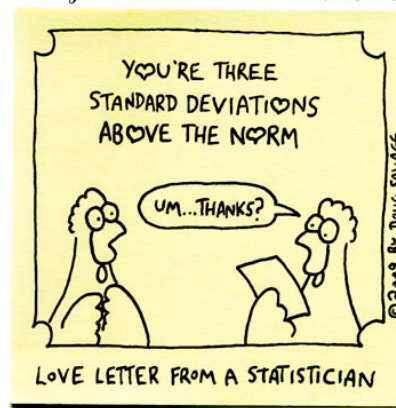
$$\begin{array}{ccccccccc} (7-7)^2 & + & (4-7)^2 & + & (5-7)^2 & + & (9-7)^2 & + & (10-7)^2 \\ 0 & + & 9 & + & 4 & + & 4 & + & 9 & = 26 \end{array}$$

- c.  $\frac{26}{(5-1)} = 6.50$

- d. Standard Deviation =  $\sqrt{6.50} = 2.55$

*Savage Chickens*

by Doug Savage



### Assignment:

1. Your program should read in the entries in the file into an array. Note that we don't initially know the number of values in the text file. How would you determine the size needed for the array?
2. Your program should calculate the mean, standard deviation, range, and mode of the data in *numbers.txt*. Note that with so many numbers, the sum may be very large. How would you handle this?
3. Your program should properly label and print out each of the four statistics (mean, standard deviation, range, and mode). Format the real numbers to print with 2 decimal places.
4. Your program should include helper methods that increase the readability of the code and break down tasks into smaller sub-tasks.

5. You need to import the following (at least)

```
import java.io.File;  
import java.io.FileNotFoundException;  
import java.util.Scanner;
```

and include this as your main method line:

```
public static void main(String args[]) throws FileNotFoundException
```

**How to Submit:** Submit your java code online to Schoology. Be sure to include your name in comments. You can talk about ideas with others but **THE CODE MUST BE SOLELY YOURS.**