CIS 279 HW 1

Review of Basics: Control Statements, Repetition, ArrayLists, Methods and Text File IO

Write a program to read student data from a text file which is attached to the drop box as HW1_Students.txt. This file is in the format:

Student ID (int)

Full name (last, first) (String)

Test score (double)

We need to process this data:

- Read data from the file.
- Calculate the average score for the group.
- Determine whether a particular score is greater than, equal to or less than the average.
- Derive a letter grade for each numeric score
- Calculate the standard deviation of the group of scores.
- Display output as shown in the sample below.

Because of this, we'll need to maintain lists of data in memory. We could use arrays of IDs, names, scores, etc.; however, the trend is to use more flexible structures like ArrayLists, Vectors or LinkedLists because, unlike fixed size arrays, they can expand to hold more data as needed.

The rules for deriving a letter grade are:

- Numeric grade >= 90, 'A'
- Numeric grade >= 80 and < 90, 'B'
- Numeric grade >= 70 and < 80, 'C'
- Numeric grade >= 60 and < 70, 'D'
- Numeric grade, 60, 'F'

Of course you know how to express these rules in code without using compound conditions, right?

Calculating a standard deviation:

- Calculate the average for the group
- Subtract the average from each score (Score - Average) and raise it to the second power (Score - Average)^2
- Sum the previous values of (Score - Average)^2
- Divide this sum by the number of scores minus 1
- Take the square root of the previous value

See the example below:

Student	Score	Score - Average	(Score - Average)^2
Roth, Philip	80	3.5	12.25
McCall-Smith, Alexander	75	-1.5	2.25
Baldacci, David	70	-6.5	42.25
Garcia Marquez, Gabriel	90	13.5	182.25
Grisham, John	75	-1.5	2.25
DeLillo, Don	85	8.5	72.25
Borges, Jorge	95	18.5	342.25
Patterson, John	70	-6.5	42.25
Sparks, Nicolas	60	-16.5	272.25
Brown, Dan	65	-11.5	132.25
Sum	765		1102.5
Average	76.5		
Count - 1			9
Sum((Score - Average)^2)/(Count - 1)			122.5
=SqRoot(122.5)			11.06797
Check using Excel's stdev function			11.06797

Sample output:

Group average: 76.5 Standard deviation: 11.06797

Student	Score	Relative to Average	Letter Grade
Roth, Philip	80	> Average	B
McCall-Smith, Alexander	75	< Average	C
Baldacci, David	70	< Average	C

You'll probably need to use System.out.printf to produce well-aligned output.