Math 201 - Program #6

Name _____

May 3, 2011

Write, compile, and test a C++ program that determines the slope and y-intercept of the line that best fits (in the least-squares sense) a collection of data points of the form (x_i, y_i) . The work-horse for your program should be a function named LinReg with a function header line similar to

This function should be called by using the syntax LinReg(n, x, y, slope, yint, r), where

- n is the number of data points;
- **x** is a one-dimensional array containing the *x*-values;
- y is a one-dimensional array containing the corresponding y-values;
- slope is the computed slope of the best fit line;
- yint is the computed *y*-intercept of the best fit line;
- **r** is the linear correlation coefficient that measures the strength of the linear relationship between the paired *x* and *y*-values; and
- the return value is 1 or -1 according to whether the function is successful or not.

Use the following formula for the linear correlation coefficient:

$$r = \frac{\sum_{i=1}^{n} (x_i - \overline{x})(y_i - \overline{y})}{\sqrt{\sum_{i=1}^{n} (x_i - \overline{x})^2 \sum_{i=1}^{n} (y_i - \overline{y})^2}}$$

The main function should read the collection of data points from a data file until end-of-file is reached. Your data file should be formatted so that there is exactly one (x, y) pair on each line. For example...

53.0	80
67.5	344
72.0	416
72.0	348
73.5	262
68.5	360
73.0	332
37.0	34

Program output should include number of data points in file, slope of best fit line, y-intercept of best fit line, and linear correlation coefficient.