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Lab Assignment #6

10 Points

Due: March 5, 2015

# 1 Programming in C

Programming in C is very similar to programming in C++. In this lab, you will learn more about programming in C by writing a program to perform statistical analysis on some data using arrays to store data.

Before starting this lab, you should read the *Brief Introduction to C* document that is posted on the CS Forums. I/O (input/output) in C is considerably different than I/O in C++.

## Warning

In the past, an extremely high percentage of students who did not begin this assignment before the lab session did not complete it. It is strongly recommended that you begin this lab ahead of time.

## 1.1 Description

Functions must be used to perform the analysis described below. All output is to be written to an output file.

### 1.1.1 Display Standard Header

Put your standard output information in a function named `ShowHeader()`. You will need to pass a file pointer.

### 1.1.2 Read and store data

Read a column of data from an external file—the file name *must* be entered by the user. The exact number of points is not known. There will be no more than 100 points in each data file.

### 1.1.3 Find the minimum, maximum, and average

A function for each operation should be written or a function that passes these values by reference may be used (this is the preferred method).

### 1.1.4 Calculate the standard deviation

The standard deviation,  $\sigma$ , is the square root of the variance. The following formulas may be used to calculate the standard deviation.

$$\text{variance} = \frac{1}{n} \sum_{i=1}^n x_i^2 - \frac{1}{n^2} \left( \sum_{i=1}^n x_i \right)^2 \quad \text{or}$$

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

### 1.1.5 Process Data Files

There will be three data files for you to analyze. These data files will be posted on the class web site in the near future if they have already not been posted. **Do not turn in the data files!**

## 1.2 Deliverables

- Programs—fully documented through code comments. All functions should be fully documented also.
- Output—Neatly formatted and documented. **Do not turn in the input (data) files!**
- Program design sheet—In addition to your program and the output, attach a page showing the design of your program. This may be in diagram or text form, so long as it clearly outlines your program's design. It will be helpful to create this **before** beginning the lab.