

## Lab 3

### Statistics Package

#### Objective

To sort data in ascending order and to calculate statistical features in a menu-driven program.

#### Assignment

##### Part I

Create a text file containing anywhere from 30 to 50 integers. Write a program that reads the data into a `vector` from the text file. Using separate functions, determine how many elements are in the `vector`, display the `vector` to the screen in a presentable fashion (e.g. 10 or 20 integers per line), sort the `vector` from smallest to largest, and display the sorted `vector`.

##### Part II

Add a menu function to the above program to create a menu-driven statistics toolkit that will compute all of the following. The program should run until user elects to quit.

- Mean                      Arithmetic average
- Median                  Middle value if the length of the `vector` is odd; average of the two middle values if the length is even
- Mode                    Most frequently occurring value (very tricky – there can be more than one mode)
- Range                    Difference between the highest and lowest values

- Standard deviation       $\sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n - 1}}$ , where  $\bar{x}$  is the average of all the numbers.