ECCS 1611 – Programming 1

Lab 7 –Introduction to Functions

**Introduction to Functions.**

Please write the following programs using Visual Studio or Xcode. When completed, please demonstrate each program by taking a screenshot (see scoresheet for details) and submit your .cpp file to Moodle. All problems except for the last one are *derived* from the textbook.

* For this lab you may use the program format shown in the cube.cpp code listing in section 5.2 of the book.
* For all programs you **MUST** implement the functions **AS SHOWN** – you may not create new names and/or parameters.
* The functions that are to be written for this lab are **NOT** to include any cin or cout statements.
* **You, should, however use as many cin or cout statements as you need to create and debug your code. Just remove from your final version before submitting the .cpp file**

**P7-1** Write the following functions and provide one program to test both of them.

a. double smallest(double x, double y, double z), returning the smallest of the arguments.

b. double average(double x, double y, double z), returning the average of the arguments.

You wrote a similar non-function version of this lab recently. You can re-use some of this code if you wish.

Example run (with user input indicated with ***bold italics***):

Enter three numbers: ***2.2 1.1 4.8***

Smallest value is 1.1

Average is 2.7

**P7-2** Write the following functions:

a. bool all\_the\_same(int x, int y, int z), returning true only if the arguments are all the same.

b. bool all\_different(int x, int y, int z), returning true only if the arguments are all different.

c. bool sorted(int x, int y, int z), returning true only if the arguments are sorted in ascending order; that is, with the smallest one coming first.

Provide a program that tests all three of your functions via a loop construct for acquiring testing data.

Example run (with user input indicated with ***bold italics***):

Enter three numbers or Q to quit: ***2 1 3***

Numbers are not all the same.

Numbers are all different.

Numbers are not sorted.

Enter three numbers or Q to quit: ***4 4 4***

Numbers are all the same.

Numbers are not all different.

Numbers are sorted.

Enter three numbers or Q to quit: ***Q***

**P7-3** Write the following functions:

a. int first\_digit(int n), returning the first digit of the argument.

b. int last\_digit(int n), returning the last digit of the argument.

c. int digits(int n), returning the number of digits of the argument.

For example, first\_digit(1729) returns 1, last\_digit(1729) returns 9, and digits(1729) returns 4. Provide a program that tests all three of your functions via a loop construct for acquiring testing data.

There are two ways to go about solving this problem:

* You have a digit stripper .cpp program from an earlier lab which you should take a look at.
* You could convert the int to a string: <https://www.bitdegree.org/learn/string-to-int-c-plus-plus>

(Note use the C++ 11 and above method)

Example run (with user input indicated with ***bold italics***):

Enter number or Q to quit: ***1729***

First digit: 1 Last digit: 9 Number of digits: 4

Enter number or Q to quit: ***1234567***

First digit: 1 Last digit: 7 Number of digits: 7

Enter number or Q to quit: ***Q***