

CS 100 Lab Two – Spring 2016

Create a directory called **lab2** on your machine. Move into that directory. Complete the four tasks shown below.

1. Name this program **stats2.c** – Last time, we read in five numbers and calculated the sum and average. Now that we have arrays, we can calculate the variance and standard deviation as well. We need the array so that we can remember the numbers that we read. For this program, you are to read in five numbers and print the mean (or average), variance, and standard deviation of these numbers. A simple tutorial on these concepts can be found at <http://www.mathsisfun.com/data/standard-deviation.html>
To complete this program, you should:

- Declare an array that holds five integers
- Read five values into that array (such as 600, 470, 170, 430 and 300)
- Find the mean (average) of those five values (a double), 394 for the example numbers above
- Find the variance (you need the mean and each value to do this), which should be 21,704
- Use the **sqrt** function in C to take the square root of the variance, giving you the standard deviation(147.322775). To use the **sqrt** function, add the statement **#include <math.h>** and compile with **gcc stats2.c -lm** (**-lm** loads math functions into the executable)

2. Name this program **change.c** – You have an amount of change (such as 41 cents or 72 cents) and you want to figure out how many quarters, dimes, nickels and pennies that is. Your change will always be an integer value between 0 and 99. You can do this with integer division and the mod operator (%). For example, consider 72 cents. The process defined below will figure out the correct combination of coins:

- Divide 72 by **25** using integer division to determine the number of **quarters** ($72 / 25 = 2$) then use the mod function $72 \% 25$ to see how much change is left ($72 \% 25 = 22$)
- Take the 22 (what you have left) and figure out how many **dimes** that is ($22 / 10 = 2$) then use the mod function to see how much change is left ($22 \% 10 = 2$)
- Take the 2 (what you have left) and figure out how many **nickels** that is ($2 / 5 = 0$) then use the mod function to see how much change is left ($2 \% 5 = 2$)
- Take the 2 (what you have left) and that is your **pennies**
- Print the number of quarters (2), dimes (2), nickels (0) and pennies (2)

3. Name this program **arrays1.c** – Retrieve the file arrays1.c from troll.cs.ua.edu using
Windows: **wget troll.cs.ua.edu/cs100/labs/arrays1.c**
Mac: **curl -O troll.cs.ua.edu/cs100/labs/arrays1.c**

The program currently consists of nothing but comments. You need to add the line(s) of code after each comment to accomplish the stated task. The tasks all involve basic arrays and pointers.

4. Name this program **arrays2.c** – Retrieve the file arrays2.c from troll.cs.ua.edu using
Windows: **wget troll.cs.ua.edu/cs100/labs/arrays2.c**
Mac: **curl -O troll.cs.ua.edu/cs100/labs/arrays2.c**

As with the previous problem, you need to add the line(s) of code after each comment to accomplish the stated task. This time we are focusing on arrays of characters (strings).

Submit your lab

First, on your local machine, bundle the files in your **lab2** directory into a single (compressed) file. To do this:

- PC: Using Windows Explorer, right click on the **lab2** directory and select “Send To” and then “Compressed (zipped) folder”
- Mac: Using Finder, use a secondary click on the **lab2** directory and then select “Compress *foldername*”

Once you have a compressed file that contains your four lab2 programs, submit that file to Blackboard.

Attendance: We will circulate a roster sheet shortly after lab starts and again about half-way through the lab. Not being present to sign the roster sheet will result in a deduction of 25 points for each missed signature.