CS 270 **Programming Assignment #2**
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February 26, 2024 **Due:** March 6, 2024

Objective: The purpose of this assignment is for you to develop a better understanding of the Linux run-time environment that a C program operates under. **NOTE: This assignment cannot be done on a Windows Operating System.**

Description:

As a test program, write a C program that stores data in an array, computes the sum, average, maximum and minimum values of the array. Do this by writing a main and three functions — a summing/averaging, a maximum and a minimum. Place each of these functions in a separate file. Also, make the array global (so that it is visible to the linker), and don't use it as an argument to any of the functions.

1. Compile these files (*using a Linux system*), and generate link maps (using `readelf` and the other tools we discussed in lecture) for each separate function as well as the final executable.

   Determine the following:

   - The size of each function.
   - The address where each function is loaded into memory.
   - The name and location of the *entry point* for the entire program.
   - The locations and names of any functions (subroutines) from `stdio` (*not* `iostream`) that are linked with your file.
   - The locations and sizes of the data sections used by your program.

2. Recompile your files using the `-O` ("minus-Oh"), the optimize option, then answer the same questions as above.

3. Modify your code so that the array is declared inside `main()` and is an argument to each function. Recompile your files, then answer the questions in Part 1 again.

Deliverables:

- Submit the writeup with the program (printed)
- Results (summary for each of the three parts listed above)
- Program Log (document what and when you worked on tasks)
- Source files