

22 January, 2022

Ford C Programming Academy 2022

Progress Summary - Week 02

During week 2 of training, we spent considerable time consolidating information from week one. The functional differences between pointers, arrays, and NULL-terminated strings always are a tough go for new students, and many were dismayed that C does not really treat arrays the same way as FORTRAN (they're engineering values) or MATLAB (they're matrices). The long weekend and short week took its toll on us all, but we made good progress in understanding how the pieces fit together.

All students were able to complete the group and individual programming assignments, which included the following exercises:

Mortgage Calculator

Write program that accepts user input and calculates a mortgage payment. This demands some thought as to the correct format for various inputs, how to sanitize input data, and how to use the math libraries.

Shopping List

Copy strings into a fixed-size statically-allocated array, then sort and print them using qsort. Uses loops and the string library. We discussed the difference between sorting an array of objects vs. sorting an array of pointers.

Structured Shopping List

Use an array of statically-allocated structs to hold information about the list items, including mixed numeric values and strings.

Sensor Chain

Write a series of functions that returns values from a simulated accelerometer. Uses structs as return values. Emphasizes converting data from integers -> floating point -> struct -> back to integers for display.

On Monday, we picked apart the toolchain and looked at the command line. On Tuesday, we spent a fair amount of time in in-class discussion about how the small pieces of code that we are writing can be made to fit in a larger environment. All the students contributed a lot to the discussion, and had good ideas ranging from flow charts to documentation to standards conformance to testing to source code management, and many things in between. On

thursday, our group programming emphasized how to think about writing code and how to approach the job of breaking down a task into functions.

This week we took our first look at source code generated by MATLAB/SimuLink. It was typical machine-generated code - names of the identifiers are all derived from model elements, and the various output files are highly stylized, revolving around where a particular construct would be represented in memory. This should become clearer in week three as we discuss memory allocation in detail.

My plan for Week 3 is to have the students continue to work together in small groups. Hopefully, Anna will be able to join us for a session on Wednesday.



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