EENG 260 (Microprocessor/Microcontrollers

HW0

Assembly, Pseudo Code, Instructions Set and Libraries

**Problem 1:** Assembly language

Assembly language is a low-level programming language compared to writing code in C, Python, C++, Fortran, Pascal etc. Writing code in any of the high level programming languages is appealing as you do not need to know the machine specifics i.e. CPU registers, addressing memory in a specific and precise manner. Why we persist programming in Assembly?

Assembly can directly control the resources and hardware of the microcontroller, making it preferable since it can more efficiently interact with the microcontroller to complete tasks. In contrast, higher level language like C must be compiled into assembly, which would then be assembled into Assembly, which requires extra time and resources when assembly can do the same things with less.

**Problem 2:** Programming Models

We have direct register access model and software driver model. What is the difference between the two programming models? Which would you select for this course?

Direct Register Control gives much more control over what is being done with registers and the code manipulating it, at the cost of simplicity, convenience, and readability.

Software Driver Model has much more readable and understandable instructions and terminology, is made to be user friendly in comparison, but lacks the amount of control since it must go through another layer of processing before the unit has access to instructions it can understand.

I would select Software Driver Model for this course because it is much easier to understand as a starting point, being new to this kind of development.

**Problem 3:** Significance of flow chart or pseudo code

Why is it necessary to produce pseudo-code or a program flow chart before writing code in whatever language?

Pseudo-code/flow charts help solidify the conceptual structure of a program/piece of code as a proof of concept before spending the time concreting that as real code. Working through pseudocode can help a programmer discover better solutions, fallacies in the proposed solution, shortcuts that save time, etc, before any actual code is written.

**Problem 4:** Instruction Set

Of what value/use is the instruction set architecture of an MCU?

The instruction set of an MCU is often created to be much more limited and focused because they are usually designed for specific functions, meaning that less space could be taken up by these instruction sets so the MCU’s functionality can be focused on what it was designed for.

**Problem 5:** The Tiva C Series Development Board

Why do we have two TM4C123GH6PM microcontroller ICs on a single development board?

Two ICs on a single development board allows programs to be developed that can utilize communication between the ICs