CSI 370 Computer Architecture
Research 2 - Project

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It is time to start thinking about projects. The purpose of this assignment is for you to write a one-page overview of your intended project. This will also be the beginning of your technical report that you submit alongside your implementation. All documentation should be written in LaTeX. **The first submission, "Research 2," should begin explaining the what, why, how, and potential challenges of your project on a macro scale. The one-page submission is due one week after assigned.**

Students may work independently or in pairs. The project is flexible and has two options: (1) use a combination of provided hardware kits and microcontroller programming to build a device, or (2) implement an appropriate application or portion of an application using Assembly. **The project must be unique to this class.**

As you consider project ideas, keep scope in mind. Choose something that is challenging, but doable given the timeframe. Projects will be due the last day of class and will be presented during the final exam slot. The project implementation is the project grade. The technical report and presentation is your final exam grade.

Option 1 - Arduino/Hardware Project:

◇ Must be unique in the sense that it cannot be an exact implementation of a tutorial found online from the Arduino site or elsewhere. You can use tutorials as a starting point if needed, but the final product must go beyond following a guide.

◇ You are allowed to use the Ardunio C-language variant for most of the software implementation for the project, but at least one code section or function must be written using the microcontroller's instruction set. As part of your technical report, you will elaborate on the "Assembly" section of your code and explain the instructions and their function.

◇ Arduino Uno is based on the ATmega 8-bit AVR enhanced RISC architecture. Some other Arduino models use different microcontrollers/processors.

◇ http://arduino.cc

◇ If you have your own microcontroller of a different type, such as PIC or ARM, you are welcome to use it for your project, so long as you follow the same requirements. Depending on department funds, we may be able to purchase a specific microcontroller for you: make requests to the professor.

Option 2 - Software Project:

◇ Program must be unique to this class.

◇ Must be substantial. That is, not as basic as the weekly assignments in this class.

◇ Could write a new program from scratch, in part or in whole, with Assembly.

◇ Could re-implement a program in Assembly that you previously wrote in a high-level language.

◇ Could re-implement function(s) in Assembly that are part of a larger project you have written. This means linking assembly code with a high-level language. This is an opportunity to make a program more efficient. In fact, as part of your technical report you could have results of benchmark tests based on both versions of the program.

No matter which option you choose, the technical report must explain **in detail** the following components from a macro (project as a whole) and micro stance (the finer details). In a sense, you are documenting the project and your progress throughout implementation.

◇ What?

◇ Why?

◇ How?

◇ Challenges?

◇ Solutions?

◇ Explanations

◇ Visualizations

◇ Sources where applicable

I expect professional writing, professional quality, and professional presentations.