Lab 5: Open-Ended Project

Fall 2019

Prelab Assignment (3-6 hours)

1. Read the rest of this document.
2. Choose your groupmate(s).
3. Brainstorm among your group on what direction you want to go for the project and why.
4. Develop a 2-page proposal with schedule, goals, and three check points (end of first lab session, beginning of second session and the end of second session) of your project. Discuss with and be approved by your supervisor (the TA) of your proposal before the first session of Lab 5.

More on Prelab

You can choose from the following options or come up with your own idea.

- Create a videogame that uses the joystick for control and the LCD for display.
- Make music with the board by generating signals of different frequencies and combining them to be heard via the audio jack or an external speaker.
- Sample input from an onboard sensor such as the microphone, accelerometer, magnetometer, or gyroscope and visualize the result on the LCD or through some other method.

You will likely need to heavily reference the textbook and the Discovery Kit user manual that can be found on Canvas, as well as online resources. Make sure to record any useful sources so you can find them again and share with the rest of the team.

The proposal must be comprehensive as it will serve as the contract with your supervisor, TA. At a minimum, it should contain the following.

- What are you trying to build? Please include a diagram.
- How are you going to build it? Please include a diagram.
- What are your success criteria? What should be the expectations of your supervisor? Please include a diagram or table.

Hint: draw.io is an easy-to-use, free website for making diagrams.

Introduction

Having completed the previous four labs, you are now proficient in the basics of embedded systems programming. However, this is an **engineering** course, which means it should give you the opportunity to be creative and solve open-ended problems. In this lab, you are tasked with writing a new application of your choosing for the STM32L4 Discovery Kit. The intention is to simulate an industry scenario in a low-stakes environment. You will first develop a plan to be approved by your supervisor,

the TA. Then, you will implement a prototype of your application that must meet the expectations you outlined in the plan. Finally, you will present your results to the rest of the team (the class).

Lab Assignment (4-6 hours)

Note: Only groups of 2-3 are allowed for this assignment. If you do not have a partner, please join another group.

Part 1: Finalizing the Plan

Before you start building, you need to finalize the blueprint from prelab. Discuss and develop an implementation plan with your groupmates of task assignment.

Part 2: Building a Prototype

The de facto version control software is Git. Anytime you are working on code with anybody else (or even by yourself), you **must** use Git. Collaborating by emailing .zip files is a recipe for total disaster; nobody in industry will take you seriously if you do this. Since this course does not cover Git, you do not need to learn how to use its great features. However, you should post your code on github.cs.tufts.edu via the online GUI so the rest of your team can see your work.

The only additional requirement for this part is that you must stick to the plan you developed in Prelab and Part 1. If you learn new information you had failed to consider, you must change the design first, then you can make the modification to your implementation. **Any updates to your plan must be approved by your supervisor** (the TA).

You will likely need to spend time outside of lab working on this part. Keep the three check points in mind and follow your schedule closely.

Oral Presentation (~3 hours)

Instead of a written report, you will give a group presentation to the rest of the section during the last week of class (Tuesday, December 3 and Friday, December 6). See the presentation rubric on Canvas. **Please email your slides to the TA before coming to lab** to ensure the presentations go smoothly.

Technical lab reports that follow the typical guidelines will be accepted for a maximum of 30 points extra credit.