Project Documentation Format

General Instructions

The goal of a CPE 329 project submission is to create an engineering document on how your project was designed and operates. An effective engineering document would allow co-workers at your workplace re-create your work with minimal effort. Another way to look at this document is to ask yourself, "If I gave myself this document before I started the project, would I be able to re-build the project in a minimal amount of time?" Alternatively, "Would this document pass muster if passed up to a higher pay-grade such as my engineering manager?"

All figures and diagram must be digitally created. No hand drawn diagrams will be accepted. Recommend software for creating block diagrams, flow charts, and schematics: Visio (free at calpoly.onthehub.com), Lucidchart (free with Cal Poly Office365), Draw.io, Dia, and Circuit Lab (circuitlab.com)

All diagrams, figures, graphs and tables should be labeled and referenced in the text explicitly using Figure/Table numbers. Include page numbering. You must cite all text and figures that you include in your lab report that are not your work! Including work copied from the lab manual, specifications, the internet, or other sources is acceptable if it is clearly cited. For each project at very least the microcontroller datasheet must be referenced and cited. Any time there is data in your code, you must describe the genesis of that data. Tricky functions in your code should be described in your report. Code is a component – probably one of the biggest components in your projects.

The project report must be written with proper English to receive a good grade. Both spelling and grammar matter as you express your ideas. The report should be polished, professional looking, and visually pleasing. This may be accomplished through a variety of means, including adding color, creating eye-catching figures, ensuring code is neatly incorporated and exhibited, etc. Reports lacking in polish and professional appearance will not receive a grade of higher than 90%.

Required Sections

Cover page

- Project name/title
- Names, class number, section #, quarter, experiment #, title, date, and instructor's name.
- A tasteful graphic if desired.

Behavior Description

Describe the behavior of the designed device. This should be a short synopsis that explains in your own words the functionality of the device.

System Specification

In tabular form, include all of the technical specifications and parameters of the designed device. Specifications are hard quantifiable and measurable numbers or describe a type of technology uses.
Examples: System specifications should include items such as power supply voltage, power consumption, battery life, bits resolution for ADC or DAC, time resolution/waveform accuracy, display size and resolution, clock frequency, physical size, weight, or environmental parameters.

System Architecture

A high-level block diagram of all of the components, both internal modules of the MCU and external devices. The block diagram should convey data and control flow between components.

System Schematic
A detailed schematic of the designed device. Show all items as electronic components. A button is not a rectangle but rather a switch that shows connections to ground with a pullup resistor to the port. All components with numbered pins should always show the pin number above each trace directly outside of where the wire attaches to the component. All components are labeled with unique numbers (R1, C1, etc. Typically U# is used for ICs and Q# is used for transistors use Q#) and identifiable model numbers.

Software Architecture
A detailed diagram to explain the process flow and logic of the designed software system running on the MCU. This can include a flow chart or a state diagram.

Bill of Materials
The parts list for hardware should be written in the form of a Bill of Materials (BOM). A BOM will typically be organized as a table with columns for things like: Item #, Part Number, Supplier Name, Quantity, Price Each, and Extended Price (Quantity x Price Each). The BOM typically shows all parts required, including hardware, printed circuit board, etc, and will a sum shown at the bottom to show the total price of all components.

Ethics implications of your project
Both partners should write 1 paragraph of the ethical implications of their project. The paragraphs should both tackle different ethical issues. Common ethical issues could be: environmental, societal and moral.

Answers to Questions
Answers to questions asked in the project assignment. Type each complete question before including your answer. If no questions were given in the assignment this section can be skipped.

Appendices
- Your C Code, with banners for each function and lines commented. The source code must be readable with proper spacing and tabbing. Use good variable and signal names. The source code should also contain comments for understanding and readability. To make the code readable in the report, it can be easily highlighted with https://tohtml.com/c/
- References to any material used in the project (including datasheets).
- **For the final project only**, write a user's manual for your final project