490B - Midterm Team Report and Individual Report

Submitted on Beach Board Dropbox

2 Submissions:

- Team Report – One per team
- Individual Report – 1 Page, Not Double Spaced, Detailing your contributions. Please mention if you worked with other team members on a specific aspect. Also include your perception of the contributions by other team members if you feel that the workload is not being distributed evenly or if members have been absent.

Format Guidelines: Not double-spaced, 1.5 spacing is ok, 12pt Calibri Font or similar. Should be mostly written (approx.. 60% or more), diagrams and images are necessary but should not comprise the majority of the report. The report should be long enough to demonstrate an understanding of the design problem being worked on and a commitment to the success of the entire project. The length of the report is ultimately up to the team.

Midterm Report will be graded on completeness, thoroughness, and the overall attention given to the details.

The following order is not meant to be 100% adhered too. It is up to the team to determine the organization. The following is just a complete list of the many aspects

<u>**Team Name**</u>

The name must describe the project. This team name must be included on the title page of all future reports, labs, etc. submitted by your team.

<u>**Team Members and Biography**</u>

On one page, include a picture of each team member and a short one paragraph biography for each. Biography should be professional and something that a prospective employer would be interested in (i.e. Engineering Interests and/or hobbies and other interests that make you unique).

Project Overview

Provide a one to two paragraph, non-technical, description of your project. This must be a clear, uncomplicated description that any lay person could understand. Include any diagrams or drawings to help the reader understand the project. Who is the intended end-user of this product?

Customer Needs

This was covered in class in more detail. This should consist of a list of all customer needs. These are the non-technical requirements that the product needs to do in order to satisfy the needs of the customer.

Product/Project Specifications

There should be at least one specification for each item from the customer needs, and in most cases, multiple specifications will arise from one entry of the customer needs. These specifications contain the quantifiable and measurable outcome for each need. A good guide is to think to yourself: You should have a perfectly working product so long as every specification is met, no other assumptions should have to be made in order for your product to be successful, work and for the customer to be satisfied and accept delivery. The Specification and the customer needs will grow, evolve and change with the project. These may be the most important documents to maintain and they will provide the direction and set the overall goals that must be met.

Work Breakdown Structure

A Deliverable oriented breakdown of the project into smaller components. This should be updated to include the most recent changes.

Project Implementation

The same as the project overview, but now using the technical "jargon" that accurately conveys how the entire project is to be implemented

Overall System Functional Block Diagram or Diagrams

Many of our projects are being made up of other commercial (off-the-shelf) products or modules. These may be represented as boxes/blocks with all inputs/outputs/power connections clearly labeled. Every aspect of your project should exist in one of these modules

and should have all inputs/outputs clearly labeled including power connections (in other words, if there is a wire involved it should be included).

A table must be written for each block/module after the Diagram and must include the functionality of every input or output, Signal Name, Signal Description, Signal Type (Analog/Digital/Power), Voltage Level, Current Requirements (if it is a power connection) and Operation.

Subcomponent Description

Each subcomponent of your project should be broken down into a section that describes the functionality, description, and implementation. This would also be the place where snapshots of the schematic would serve to explain the functionality. The goal here is to prove that you have a complete understanding of the fundamentals of these components, not just that you can follow a "cookbook" to make something work.

Gantt Chart, including the Functional Milestone Demos

The Functional Demos and Milestones should be a corner stone of the Gantt Chart. Although everyone's schedule will be different, your timeline at a minimum should comprise the full 490B semester, although going above and beyond by including time from the 490A semester and between semesters is encouraged.

Functional Demos and Milestones Contract

Following the Gantt Chart, the contract established between the design team and the instructor/customer should also be included in this report. Check the assignment guidelines for the contract details and keep in mind that any alteration to the contract after being accepted requires both the design team and instructor approval.

Complete Schematic

Designed in a proper schematic entry/capture program, i.e. Circuit Maker/ Altium, or Orcad. A Detailed schematic of the above mentioned modules. If the module is an "off-the-shelf component" then a schematic does not need to be included. Every project is using a Microcontroller or FPGA. This "core" module of your project must have a schematic created by you. In other words, if you are using a Arduino/ARM/Xilinx, then you must recreate the schematic.

All schematics will include a **BOM** (Bill of Materials) that includes every part, part number, description, package used, manufacturer, distributer, cost, and quantity.

Similar Products

Research other similar products and try to find commercial products that are similar to your proposed project. Describe the commercial products and how yours is different. Maybe your project has different abilities or uses different technology for implementation, cost, etc…

Societal and Environmental Impact or Importance

How does this product benefit society and the environment? Try to consider the larger impact and importance of your project. Consider low power devices and how your project can make efficient use of materials, batteries, and resources. Consider the sustainability of the product from many perspectives. Can the theoretical organization producing the product maintain the product line? Sustain employees growth and well-being? Serve the community? This is your chance to tout the positive implications of your project and is important these days, we don't just want to be creating a fad that ends up in the garbage but instead want to benefit people and society.

Power Management

All power requirements should be accounted for and shown in a schematic as well as an included power budget. If a battery is used, then an appropriate discharge curve should be included along with a description of the power components used, approximate efficiency and if you are maximizing your battery capacity effectively.

Circuit Models, Simulations and Software Verifications

All projects will include some aspect or verification, either software or hardware verification. Analog circuits and power supplies can be modeled and simulated in a proper circuit modeling program like LTSpice or equivalent. FPGA and digital hardware should be simulated and verified in Xilinx. Any circuit or software that the instructor sees is subject to inquiry as to the functionality and verification of this component or module. Verification of different aspects of our projects will give us the confidence that we aren't wasting our time building something that doesn't have a chance at working. A waveform, appropriate notes/calculations or program output, and explanation should be used demonstrate the functionality.

- There should be several different verifications demonstrated in this report of both hardware and software. I cannot provide and exact number as that will be different for every project.

Complete Software Code

For large libraries (larger than a couple of pages), only the routines used and called by your program need to be included. Also, it should be clearly specified which code was original and written by the team. Other outside code should be cited and the sources should be easily found by the instructor.

Grading and Other Notes

I will be using the previous semester reports in conjuction with this report to look for changes and improvements.

A - All items are included and well defined. Multiple Circuit and Software verifications have been used and documented. The entire project looks promising and has a good chance of success. There are no obvious unknowns in the design.

B - All items are included and at least one verification has been undertaken and demonstrated adequately.

C - Most items are included and some have not been sufficiently explained or expanded on.

D-F – Some items are included, verification has not been done or is lacking. Obvious questions, holes/unknowns still persist in the design.