ECE 2799 - Homework 1 Outline

Problem - Needs Assessment & Problem Formulation

For your assigned project, develop a product specification.

For this exercise, you are to go through the process discussed in class:

- Do your market research
- Determine your customer requirements
- Develop a detailed product specification

You are to hand in a report that clearly illustrates the data you collected and how you derived your final specifications from that data.

What is expected?

Homework 1 requires you to write a short report. The report must be well-written, logically organized and must contain a sufficient amount of detail that the reader has confidence in your conclusions. You can plan on receiving a bad grade for a report that is written poorly, not spell checked, or incomplete. If you have difficulty writing, please see the instructors, tutors, or the WPI Writing Center for help.

A General Outline for Homework 1

To complete Homework 1, your report must answer, at a minimum, the following questions:

- Who is your market?
- Why is your product of interest to this market?
- What do your customers explicitly state (or what have you been able to discover) that they want from your product?
- What might your customers implicitly expect from your product?
- What is the minimum capability product must have?
- What is the relative importance of additional features of your product?
- Will your product satisfy the needs of your market?
- What evidence do you have that it will do so?

To fully answer these questions, you must do market research and interpret your results. You must use the market research to: derive customer requirements and expectations; find similar products and assess their desirability; determine the price points in the existing market; identify possible sources of competition; determine the implicit and explicit requirements of the product; and identify possible intellectual property concerns. Once you have done this, you can then compile a detailed list of product requirements.

Not all customer requirements are feasible or necessary; however, you must justify the generation of each aspect of your product requirements fully. You should then use the product requirements to determine specific product specifications for your product.

Sample Outline

1. **Introduction**

    a. Introduce your product
    b. Explain why you expect your product to have market appeal

2. **Market Research**

    a. Identify your market(s) and explain how you conducted market research
    b. Describe the results your research yielded
    c. Describe the conclusions you have drawn from the research

3. **Customer Requirements**

    a. List the particular customer requirements for the product derived from the market research
    b. Discuss both explicit and implied requirements
    c. Reconcile any surprises

4. **Product Requirements**

    a. List the specific requirements for your product
    b. For each requirement, explain why that requirement is important
    c. Explain how each customer requirement influences the various product requirements
    d. Provide an "artist's concept" drawing of your product

5. **Product Specifications**

    a. List the product specifications for your product
    b. Explain how these specifications were derived from the requirements
    c. Provide a **functional block diagram** of your product (see explanation below)
    d. Explain the function of each major functional parts (You do not need to know how to build these parts yet).
    e. Explain the mechanical, electrical, ergonomic, and other components in the design
    f. Provide diagrams to illustrate the various parts of the product

6. **Conclusion**
   a. Comment on the product specifications you have generated
   b. How do your specifications reflect the results of your market research?
   c. Are there any parts of the design which might be risky (as in "very difficult")
   d. Are there any ways to reduce risk?

Keep in mind

Neatness counts. Your reports should look like something you would be proud to show to your boss. There should be no hand-drawn figures, no spelling errors, and no grammar errors. Title pages should contain the names of the team members and their EE mailbox numbers, the project name, and the team number. If you include material from journals or other sources they should be referenced in the text and included in a "references" section at the end of the report. Copies of survey questions or collected data should be summarized in the report and included in an appendix to the report. A table of contents is a nice touch. Be sure to look at the example homework provided, and read the comments provided in the link just below it.

About functional block diagrams: These are diagrams in which major subsystems are identified in terms of what they need to do. Typically, this involves a description of the inputs and outputs. DO NOT jump to conclusions regarding how you will achieve these functions. Simply state the system requirements as dictated by the customer requirements. At this stage being too detailed may very well be a warning sign. Students have a tendency to confuse "specification" with "implementation." For HW1 we're not concerned with the implementation details; rather we're concerned with you demonstrating an understanding of the specifications for your system, and how those specifications were derived from customer/market requirements.

If the above is followed by more detail, we'll less worried than if a detailed "implementation" appears without being derived from customer requirements. For the projects assigned, we seriously doubt that any customers would have asked for a PIC Microprocessor, or any other particular component!