

ECE 2799 - Homework 2 Outline

Problem - Abstraction & Synthesis

For your assigned project, examine design options and compare your product's value to that of your competitors. Once this is complete, write a report documenting how you made the decisions necessary to select your approach for implementing the product specification you developed in Homework 1.

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

- Identify who your competitors are
- Determine how well the competing products address market concerns
- Use brainstorming to identify possible ways of implementing your product
- Explain how each of your most viable design options addresses your product requirements and specifications
- Use value analysis with caution to evaluate your most viable design options
- Explain customer criteria with respect to quality, convenience, and cost of product
- Use value analysis with caution to determine how well your solution compares to your competition

You are to hand in a short report that clearly illustrates the process you went through and how you determined that the solution you have is worth pursuing.

What is expected?

Homework 2 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.

To complete this assignment, you must document the process that led to the final design you have chosen. You must explain both viable and unviable options considered; sometimes options that sound impossible may become realizable. You should evaluate your design options by discussing each option's ability to satisfy the product requirements, which should reflect customer requirements. After discussing and evaluating your options, you should make design recommendations for the product.

The second part of Homework 2 asks you to compare the value of your product to that of your competitors. You should use your customer requirements to derive criteria and weights of quality, convenience, and cost. Explain how you determined these criteria and weights and how they relate to your customer requirements (i.e., why they are important to your customers). Research at least three competitors and rate their value as compared to your own. Even if you have a brand new product, there are still competitors; think about products that compete for your market or could easily adapt existing products to compete with you. For every weight you assign explain the meaning of that weight and the reason it was assigned.

A General Outline for Homework 2

To complete Homework 2, your report must answer, at a minimum, the following questions:

- What approaches to your design did you consider (explain the main ones)?
- What approaches did you reject (and why)?
- Are there other approaches that might be worth considering?
- What is the final approach you selected (and why)?
- What are possible shortcomings/limitations to your decision?
- How does your approach address each requirement in your product specification?
- Who are your competitors?
- What products are your most likely competition (and why)?
- What is the value of competing products relative to your own?
- What are possible shortcomings/limitations to your analysis?

To fully answer these questions, you must brainstorm solutions, perform value analysis and then interpret your results. The weights you use in your value analysis must be defined, and the reasons for assigning particular weights must be provided. Similarly, you must use value analysis to determine how your product compares to products offered by your competitors.

NOTE: When using value analysis, be sure that you do not inadvertently change the weights for your criteria by using different numerical scales. Each criterion must be mapped into the same numerical scale. Be sure to acknowledge any rankings or decisions that are subjective or approximate, or that rely on incomplete information. Keep in mind that this is a very coarse tool, and do not confuse the precision of your calculations with the accuracy of your results.

Sample Outline

(This is just an example—feel free to choose your own organization.)

1. Introduction

- a. Summarize your product and the essential specifications
- b. Discuss the purpose of this report
- c. Provide a brief summary of your conclusions

2. Design Options

- a. Given your product specification, explain your general design approach
- b. Define a set of value criteria you will use to evaluate your design options
- c. Define the metrics (weights) you will use in your value analysis
- d. Summarize the best approaches that resulted from your brainstorming

3. Specific Module Design Options (one section per design option)

- a. Explain how these design options satisfy the product requirements
- b. Explain in detail the options available for a given design module
- c. Explain advantages and disadvantages of each design option
- d. Perform value analysis
- e. Explain why you made the weight assignments you did

4. Select Your Preferred Design Approach

- a. Perform value analysis, and select a preferred approach
- b. Explain any sensitivities in your value analysis, and acknowledge any possible errors

5. Competitive Value Analysis

- a. Explain customers' essential criteria with regard to quality, convenience, cost
- b. Explain customer weights for each criterion
- a. Introduce your competitors -- who are they and why are they competition?
- b. Evaluate and explain the value of each competitor with respect to customer criteria
- c. Compare your chosen design approach to your competition using value analysis
- d. Explain any sensitivities in your value analysis, and acknowledge any possible errors.

6. Conclusion

- a. Given your design choice, explain the advantages and disadvantages of your product
- b. Evaluate and explain the value of your product with respect to customer criteria
- c. Comment on the value analysis spreadsheet results and their validity
- d. How does your product compete in the market?
- e. Are there any design options which you may need to reconsider?

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 your Value Analysis spreadsheets 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.
