

University of California at Berkeley
Mechanical Engineering

ME 230 Real Time Software for Mechanical System Control
Fall, 2006

Final Project Proposal and Feasibility Study

Assigned: Friday, September 8, 2006
Group Formulation: Wednesday, September 13, 2006
Project Proposal Due: Wednesday, September 27, 2006
Project Proposal Meeting: Friday, September 29, 2006 (No Lecture)
First Milestone Presentation: Week of October 22
Second Milestone Presentation: Week of November 13
First Demonstration: Friday, December 8, 2006
Final Demonstration: Wednesday, December 13, 2006
Due: 5PM Tuesday, December 19, 2006

Objectives

- 1) Develop ideas for a final project
- 2) Articulate those ideas in the form of a proposal with specifications for the performance of the resulting system
- 3) Identify critical aspects of the system; devise and carry out lab experiments to determine the likelihood that the proposed system will work.

Final Project

The ground rules for the final project are fairly simple:

(Do not be concerned if you do not understand all of the terminology or concepts at this time. You will learn them along the way.)

- 1) It is “product” rather than “technology” oriented.
- 2) There must be a real physical system involved (the system maybe simulated, if so real world uncertainties need to be present in simulation).
- 3) It should have sufficient complexity so that the task/state design model makes sense.
- 4) The specified performance must depend to some extent on real time software behavior.
- 5) The project should work in the end. If you want to try something really ambitious, propose the project in two sections, one called “Will Work” and one called “Might Work”. I will not reduce your grade if the “Might Work” section of the project does not work.

What's not restricted – where the project is to be done, what kind of equipment is involved, what computing language to use, whether or not you build your own hardware, etc.

The final project is more like an industrial design project than an exercise. In the final project the product is the goal. Any needed combination of technologies and skills can be used.

Picking the project objective is part of the project. The intent is that the product be strongly based on real time control software. There is no requirement any hardware be built. It is perfectly acceptable to use existing hardware in the lab, equipment in a research lab you are associated with, or other existing hardware. You are also free to build or modify hardware for the project. Keep in mind, however, that building hardware is a very time-consuming activity and the grade will be based mainly on the software system design and implementation. In addition, a simulation of the system may be used in place of hardware that is not available. However it is important to point out that real-time simulation can easily become a daunting task in itself.

Finding the right level of complexity for the final project is important. If it is too simple getting a top grade is difficult even if the project is carried out well. Likewise, choice of something too complex makes it difficult to make enough progress to demonstrate your understanding. I am more than happy to discuss project plans with you. The final project proposal should document what you want to do and present the acceptance test specifications.

The final project includes a presentation. There is no separate grade for the presentation, but the presentation is considered as part of the overall project grade.

Group Formulation

It appears there will be 18 - 20 students in the class. So please form groups of three or four. I would like to limit the class to five groups. This way each of you will have your own workstation throughout the semester.

Project Proposal

This is a report your group submits to convince the CTO (Chief Technical Officer) that your product will be profitable for the company to pursue. The main body of the report should be technical, however, it should not be all. For some of you, this may be the first time you have to sell an idea to someone. Do not get hung up on it, but I do want you to sit back and think about how you would do this. As engineers, there will be times in your career where you will have to do this.

Project Proposal Meeting

This is a meeting where I will have most of the fun, and your group will be on the hot seat. Again as engineers, you will have to do this way more than once in your career. For those of you going for a PhD, your qualifying exam is one of these times. (Don't worry this meeting will not be as bad as it sounds). On this day there will not be any lecture, but each group will sign-up for a 10-minute time slot. I will have looked over your Proposal prior to this meeting so be prepared. You will be given 3 minutes to make a presentation in the classroom. Remember, your group is trying to make a sale of an idea. It must show that you believe in your idea.

First and Second Milestones

These are meetings that I have scheduled to help you schedule. I leave it for you to determine what will be presented during these milestones. These milestones should be included in the Project Proposal. The final project specifications will be presented during the second Milestone meeting. The CTO (me) has the liberty to redefine the specification based on what he feels is best for the future of the company.

Demonstration

Everyone knows what this is. This is the actual deadline for the project. But I know that most of you no matter what I say, you will be programming to the last minute. So it is my hope that the last week is enough for you to catch up on your sleep, study for finals, and finish the documentation for the project. Documentation can be handed in at anytime between the time of demonstration and December 19, 2006 (Last day of the semester).