Massachusetts Institute of Technology
6.115 Final Project Proposal/Worksheet

Issued: April 2, 2013 Due: April 9, 2013

Please use this worksheet to organize your thoughts and plans for your final project and develop a brief ñtechnical disclosureò essay or proposal due in lecture on Tuesday, April 9. Your proposal should be **at least 3 pages** in length and typically not more than 4. It should contain one page with at least two pictures: an overall system hardware schematic and a software flowchart for your final project concept. It should contain two to three other full pages of single column, 12-point typed text with one-inch margins describing your final project. Specific content for these pages is discussed below. We will review your draft submission that you hand in on April 9 and discuss it with you during your proposal interview on April 11 or 12. Based on our discussions, we will ask you to refine your final project idea and hand in a final proposal in class on Tuesday, April 23. This proposal is worth 2 of the 20 total points associated with your final project. The remaining 18 points are earned based on your final project report and demonstration.

Final project reports **written in your lab notebook** are due without exception in the laboratory no later than 5:00 P.M. on Thursday, May 16, 2012. There will be a mid-course interview by sign-up appointment on Thursday, May 2 and Friday, May 3. Final project demonstration check-offs will occur on Thursday, May 16 by sign-up appointment. DO NOT WAIT UNTIL THE LAST MINUTE TO START YOUR FINAL PROJECT!

Your final project must use an 8051-compatible processor that you program in 8051-assembly language, and must also make use of your PSoC evaluation board. If you do not want to use your R31JP, this is fine, subject to our approval and the requirement that the processor is 8051 compatible and that you program it using 8051 assembly language. You should also incorporate the PSoC into your project. We have a small (!) budget to buy some custom components. Be sure to account for shipping time if you plan to order a part, especially if you cannot complete the project without this component. Making sure that you locate needed parts, or working around parts you cannot get, is part of the final project.

The purpose of the final project is to demonstrate your mastery of the skills and techniques we have examined this term. The final project is an opportunity for you to be creative and have fun. As a rough guide, the final project counts for 20 points and therefore should involve the effort of two lab assignments. This might mean wiring about 5-8 chips and writing 8-12 pages of assembly code. This is a guide, not a hard requirement. That is, more hardware and less software or vice-versa might be appropriate and acceptable for a particular, well-thought-out project.

Please include the following section headings in your draft proposal. That is, the topics listed below constitute a rough outline of what we would like to see in your proposal. You may add additional information or deviate from this outline as needed to make your project concept clear.

Requested Outline:

Background/Introduction: Please briefly describe your project. Why is it interesting and creative? What interested you in the idea?

Hardware description: Draw a block or functional diagram of the hardware system you will develop. Describe how it works in this section, and refer to the diagram.

Software description: Draw a flowchart or outline of the software you will develop to bring your system to life. Describe how it works in this section, and refer to your flowchart or outline.

Project scope and management: A critical part of 6.115 is learning to get a system that you imagine built and working correctly. Part of the project development process is managing your time and project risk level carefully to ensure that you can deliver something that works. In this section, consider three different levels of completion for your project: first, discuss project goals with a modest risk level that will in all probability lead to a working project that we would both agree is worth at least a ñBò or ñreasonable and competentò grade evaluation; second, add project goals that might involve more work or risk that would make the project exciting, e.g., more likely to be a commercial success or illicit a ñwowò from your friends and colleagues (an ñAò level or ñexcellentò grade evaluation); third, add project goals that might be high risk but would make the project spectacular (worthy of a journal publication in an education or research periodical) that you would tackle if you find yourself with tons of spare time ☺. Discuss your different levels of goals in the context of your hardware and software diagrams. For example, you may wish to put dashed boxes around hardware subsystems, indicating ñcoreò hardware essential for your project at any level, and then indicating ñbonusò or ñadditionalò subsystems you'll add to expand the project capabilities and excitement.

Special component needs: *What special chips will you need*? Be as specific as possible: at least describe the functions you want in your peripheral chips. If possible, give part numbers for chips you plan to use. *What special electronic components will you need*? Where do you plan to locate them? Be as specific as possible. This section refers to items that you might want, somewhat like our fluorescent lamp fixture, e.g., magnetic card reader, modem, motors, LED displays, computer and display peripherals like disk drives monitors, and televisions. *What special mechanical components will you need*? Where do you plan to locate them? This includes items like gears, wheels, wood, plastic boxes, zero-insertion-force chip carriers, etc.

Timetable: Please give a complete timetable of your work plan. Describe:
During the week starting April 15 I will complete:
During the week starting April 23 I will complete:
During the week starting April 29 I will complete:
During the week starting May 6 I will complete:
During the week starting May 13 I will complete:

Addendum: Information about the final project writeup in your lab notebook:

We often get questions about the final project writeup. Please refer to the final project proposal sheet and the FP project lecture handout for the basic points. Here is a summary of the salient points we discuss in the final project lecture:

1.) The final report should be clearly presented in your LAB NOTEBOOK. Pick a nice clean fresh area in the notebook to start the report, and clearly indicate it as your final project report.

2.) Please include your code in a removable printout pack.

3.) Use standard 6.115 "demolab" writeup procedures: full schematics, commented code, explanations, scope photos, and experimental results in the lab notebook report.

4.) The FP report is DIFFERENT from a lab report in this sense: In the case of the labs, we already knew what you were doing. So, we accepted clearly presented, grammatically correct "solutions" to the lab without a lot of preamble or story. In the case of the final project, you need to tell the story of your project. If you did a good job with your final project proposal, you should expect to reuse an introductory paragraph or two from the proposal, making sure that you clearly explain what your project was. Use a high-level overview diagram of the hardware, and another for the software, to explain the project overall.

Present your usual lab-style results in an essay that clearly explains what you did, i.e., that sets clear context for the results. Remember, there is no "lab" from which you are answering questions. You are responsible for clearly explaining what you were trying to do, and what you did.

In the body of your report, be sure to have:
- Hardware Description (2 points)
- Software Description (2 points)
- Hardware/mechanical schematics (2 points)
- Commented, clear code (2 points)

(8 points total for the writeup).

You can receive up to 10 points for the ñin-personò checkoff in the lab, where a 10 is a perfect demonstration that meets the goals set forth for the ñAò level project in your FP proposal. A 0 score means nothing worked and/or little to nothing new was attempted.

Please turn in your lab notebook with FP report at your checkoff no later than the last day of classes.