Lab Assignment 1

Lab Report Template and Guide

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Submit date:

Due Date: 9/2/2014

**Abstract**

Summarize the main points of the lab in a few sentences. In 1-2 minutes the reader should get an overall impression of the purpose of the lab, the progress made and the final outcome.

This is a lab report template for the Embedded Design class and it also serves also as a lab report guide. The following sections outline and describe the contents of a proper lab report.

# Introduction

The purpose of the laboratory exercises is to reinforce your understanding of the material presented in class and discussed in the textbook. Our integrated classroom laboratory environment is designed to give you the ability to test out new material presented in class in an immersive hands-on environment. The laboratory report serves as your way to capture your experience in the lab, as well as to document the various elements of the lab that you have mastered. The report format is designed to practice technical writing and strengthen your ability to convey technical concepts and experimental results in concise English.

Each report should present a clear and concise description of the work your group completed. The following format should be used for all reports. Each report should be typed, including equations. All figures should be computer generated using an appropriate drawing tool. There is no minimum / maximum page length or typesetting requirements. It is up to you and your group to make the reports look professional and read well. Using a typesetting system (e.g., Latex) or wordprocessing software (e.g., OpenOffice or MS Office) is recommended.

Each lab report should have a cover page which contains the following infor­mation: Course Number and Title, Section Number, Instructor’s Name, Lab Title, Names of Students, Due Date, and Date Submitted. Pages should be numbered.

Lab reports should present and preserve your knowledge. By following the for­mat describe here-in, you should be able to return to this document in a few years and understand what you did, how you did it, what worked and what failed, and what work you thought might be interesting in the future. If you develop your report carefully, it could be shared with others in the future, including a prospective employer or a capstone team.

Note on Technical Writing Style: Using the first person (“I,” “me,” “we,” “our,” etc.) is usually inappropriate in most technical papers. So if you want to practice your technical writing skills in the reports, write in the third (“one might”, “a user could”, etc.). However, if it helps you to maintain a sense of ownership and pride to associate yourself with your work, then use the plural first person (i.e., the pronouns “we” and “our” are acceptable, even if you did the lab alone, but “I”, “my”, or “you” are not to be used). Always use the past tense -such as “. . . we ran a simulation . . . ” not “. . . we simulate . . . .”

The following sections outline and describe the format and content of a proper lab report. Let us start with the introduction.

# Introduction

In the introduction section you should explain the lab such that you could return to this report in a few years and understand immediately what you did and why. What is the goal? What are the constraints? What knowledge does this lab assume you have? If possible, make predictions about the results before you begin your work and document those predictions here. Try to keep this section short and concise.

# Lab Discussion

You may title this section whatever you see fit (i.e., it does not have to be titled “Lab Discussion”). Include all results from the prelab questions in this section. All equipment (both hardware and software) utilized during the lab to obtain the results should be recorded (make, model, etc.). This record may be the same for every lab, but is important if someone is to repeat your work, and also to identify features of the equipment that may influence your results.

# Results and Analysis

This section may be divided into “Results” and “Analysis” sections. For multi-part labs, you may include subsections to discuss each part. Present your numerical results graphically or in a table whenever possible. Use Excel or MATLAB or similar graphing programs.

All graphs should be properly titled and large enough to read easily, with every axis properly labeled (including units of measurement), and must have captions or figure numbers for easy reference. Axis labels should contain the description of the quantity, the symbol, and the units. Use figures to help communicate the experimental setup and your results. Do not just present the results without any explanations. Remember, a picture is worth a thousand words, which is especially true for technical writing. Make sure to place a caption below each figure, and above each table, and to introduce and discuss the graph/figure/table with a callout to the graph/figure/table. If the report fails to comment on a figure/graph/table, the assumption is that the authors do not understand what the results mean or why they were presented. A good rule of thumb is to use the minimum amount of data, output, or other supporting material to adequately document your work. If a figure exists without comment, leave it out.

Present your results using tables, graphs, code listings, etc. Analyze the results: do they make sense? What are the possible sources of error?

# Conclusion

Explain what the results indicate from a larger or system-level perspective. Reconcile experimental results and account for any differences you observed. If appropriate, explain what work might be done in the future.

# References

If you use any additional texts, papers, websites, etc. and refer to them in the report, then you must include a reference. Note that copying text from other sources is typically considered plagiarism. If you verbatim copy text you will need to put “the copied text” in double quotes and cite the source. In case you are using main ideas from a different paper you need to cite. For example, most of this lab report guide is based by work of Michael Benjamin [1]. Also if you find useful sources, please tell me about them.

1. Michael Benjamin, “*Lab Report Guide*”, Northeastern University, January 18 2006. Appendix

Use an appendix to present additional information such source code snippets, code organization or test run outputs.