Lab Title

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Abstract

A succinct summary of the lab report claims, and the reasons that potential readers should be interested. This is essentially a highly condensed version of the introduction section. One paragraph is best, two is acceptable. Three is almost certainly a symptom of being inadequately succinct.

1 Introduction

1.1 What is the problem?

As succinct a claim of the problem you are solving as possible. Note that you may have to introduce some background to make this understandable, but keep it short. Also, do not confuse the claim of the what the problem is with what comes later about why it is really a problem.

Briefly describe the system being built, and why we want to build it. Consider what skills building this system will teach you. Also consider what part this particular design will play in the overall semester.

1.2 Why is our solution worth considering

This is where you discuss at a fairly high level of abstraction why the solution proposed here is worth paying attention to. It is important to not extend these arguments beyond a summary these issues, or the introduction gets way too long.

Discuss (at a high level) why this particular system works as it does, and why this is a good thing.
It may be helpful to include a figure or diagram of the system you are building. Do not include any figures, graphs or diagrams without discussing them. Such additions do not contribute to the report. Make sure you refer to the specific portions of the figure that make your point.

1.3 How the rest of the paper is structured

The rest of the paper first describes the implementation of our system in Section 2. Section 3 presents the experimental results demonstrating the validity of the claims we have made about our system, while Section 4 presents our conclusions and discusses future work.

2 Implementation

2.1 High level summary of what you did, introducing the rest of this whole section, and giving an overview of what is discussed

Much like the abstract or the first part of the introduction chapter this should be limited to one paragraph or at most two. That means you assert what you will be explaining in the rest of the section, without actually explaining it. A third paragraph can give an overview of the major parts of the rest of the chapter. This can be quite short for a project of modest scale, but can take three large paragraphs for a large project.

2.2 Background information necessary to understand What we did: Our Solution

Sometimes this section is empty, but often the reader will require some amount of background information to properly understand and evaluated what you did, so put that in this section.

Describe the components you used. Discuss the inputs and outputs of each component, and why they are useful. Do not discuss their integration here - that will be in the next subsection.

2.3 What we did: Our Solution and How our solution Works

This is where you explain the essential elements of your solution to the problem, and how the parts related to each other. Also make sure to point out why the reader ought to believe that your approach actually solves the problem posed in the introduction.
Rereading your own problem statement in the introduction from time to time, can be a big help.

Discuss how the parts that you included in your system interact to provide some functionality. Be sure and discuss both the how and the why. Include any diagrams of the complete system here. If this lab requires wire wrapping, be sure and discuss the specific parts you used and why you connected them as you did.

### Program 2.1 Program Example 1

```c
1 while (!rt_suspend(SUSPEND_IF_NRT)) {
2     if (receive() == SUCCESS) {
3         produce();
4         transmit();
5     }
6    
7     if (stop_time()) break;
8 }
```

I am the text referring to both the program and the figure. The program is labeled as “prog-ex-1” and so I refer to it in the text as Figure 2.1. Note that referring to a specific figure is essentially a proper noun and thus the word “figure” is capitalized when I refer to Figure 2.1.

## 3 Evaluation

### 3.1 How we tested our solution and why this approach is a good way to demonstrate that you have created a good solution to the real problem

This part introduces the rest of the chapter as normal, but it must also describe the intellectual basis of your evaluation. What are the performance metrics, why are they appropriate as a measure of whether your approach solves the stated problem, and how well it solves it. Also describe the system parameters you will vary, and the overall structure of your experimental plan. Note that this should include what other approaches you will evaluate to compare their performance to that of your approach.

Discuss the lab equipment you used to test your system, including, but not limited to, logic probes, voltage sources and oscilloscopes. Convince the reader that these approaches correctly test your system. Also convince the reader that this is the best way to test your system.
3.2 How our solution performed

For each of the tests or sets of tests in your evaluation test plan, compare, contrast, and interpret the results. Make sure you cover all of the comparisons, both favorable and unfavorable between the performance of your approach and that of others. Remember several things: others will make the unfavorable comparison even if you do not, your approach can be attractive without being the best in every situation, and the authors of the other approaches will often be the reviewers of your arguments, so be fair and truthful.

You may want to include a figure or drawing of the oscilloscope output. If you are not testing with a scope, describe in detail how you verified the correct performance of your system. Saying “the light blinked” is not sufficient.

As before, any figures or graphs that you do include must be referenced and discussed. Simply presenting a figure or graph without discussing its meaning adds nothing to the report. Make sure you point out the relevant parts of a figure or graph, and refer to the specific areas which make your point.

3.3 Why the reader should be impressed with our approach

Here you summarize the strengths and weaknesses of your approach to the problem, and characterize for the reader the range of situations in which your approach is desirable. Also explain your contribution, and why the reader should agree with you about its value. Be realistic, which includes an avoidance of false modesty as well as unjustified optimism.

Describe how well the system solves the problem at hand.

4 Conclusions and Future Work

4.1 What is the problem? Why our approach is a good solution to the real problem, and Why the reader should be impressed

This recapitulates the argument presented in the whole document. Obviously, it does it in a highly condensed way, stating the problem as succinctly as possible. Make sure the structure of the argument and the terminology used here is consistent with that of the introduction. When you are writing the conclusion is often a good time to rewrite the introduction to tighten it up, limit claims and descriptions that were too optimistic, and then follow the implications of any changes through the rest of the document. This can be a pain, but it is less horrible than having inconsistent claims or terminology in different parts of the thesis.
4.2 What we will do next to: improve our approach, apply our approach to harder versions of this problem, and solve related problems with this approach or a variation on this approach.

This is a part that is often neglected because it is dead last and authors are often eager to just be done with the document at this point. However, it is important to try and do a good job here of recording your thoughts about the extensions and improvements that can be made. At this point in the writing process you are most completely able to address this issue and really important insights and important future work can be lost if you fail to write them down now.

As far as the lab reports are concerned, you may wish to look ahead at the next lab or two and see if you can figure out how the design addressed in your report will be integrated or used in the next design.