Technical University of Cluj-Napoca
Computer Science Department

SCSY.104.01.04-B6. Structure of Computer Systems

Guide for Writing the Project Report

The final project report should be written in the style of a technical paper. There are several acceptable formats for writing technical papers. One of them is described in this guide. You should follow this format, unless you know that your format is also acceptable.

The project report should contain the following parts, in this order:

Title Page
Table of Contents
1. Abstract
2. Introduction
3. Theoretical Background
4. Design and Implementation
5. Experimental Results
6. Conclusions

References
Appendix

These parts are explained in the following sections.

Title Page

The title page contains the following information about the project:

- University name;
- Department name;
- Title of the project;
- Name of the student or students;
- Group number;
- Name of the advisor;
- Date.

The information on the title page should be centered both vertically and horizontally.

Table of Contents

The table of contents provides a list of the headings in the project report and their page numbers. Use leaders (spaced periods) to connect the section or subsection title on the left hand margin with the page number on the right hand margin. Indent each level of subheading with spaces. Place the table of contents on a separate page.

It is recommended to generate the table of contents automatically. To use this feature of the text editor, format the title of each section and subsection with a heading style (Heading 1, Heading 2, Heading 3).

Abstract

The abstract should provide a short overview of the project report. Since it summarizes the entire project report, you should write it last. The abstract should include:

- An introductory sentence that draws attention to the topic;
- A brief description of the problem to be solved and main objectives of the project;
- The method of solution (techniques, language, tools);
- A summary of the results;
- A statement of the main conclusions.

The abstract should take up about one-third to one-half of a page. Place the abstract in a single paragraph and on a separate page. Do not include references, figures and equations in this section. Write the abstract in the past tense.

Introduction

The introduction expands on the abstract. It places the project's subject in a broader context and provides some background information for the reader (more detailed background information will be provided in the "Theoretical Background" section). The introduction also defines the problem to be solved, the objectives of the project, briefly describes the proposed solution, and provides information about the contents of each subsequent section.

You may follow these steps to write the introduction:

- Describe the context of the project's subject and the technology trends related to this subject;
- Define the area of study, explain the basic terminology, and describe the importance of this area;
- State clearly and in details the problem to be solved and the main *objectives* of the project;
- Describe briefly the proposed solution and explain how it is different from (or superior to) other existing solutions;
- In the last paragraph of the introduction, summarize what will be described in each subsequent section of the report.

The introduction may expand on two or three pages. Use references to existing work in the form of numbers included in square brackets, such as [1] [5].

Theoretical Background

In this section, describe the theoretical foundations related to your project, such as models, methods and technologies that can be used. Review the previous literature and place your work in the context of what has been done before. Reference each book, paper, program documentation, and on-line material used to accomplish the project goals. Where appropriate, emphasize what is new or unique about your work.

The theoretical background should be synthetic. Do not place entire passages or sections from the textbook or other sources in the project report. SUCH PROJECTS WILL BE REJECTED! Provide an overview of what you have read and learned, and place references in the text for further reading. Suggestions for high quality supplemental readings that may be used for future projects are welcome.

Design and Implementation

This is the main part of the project report. It should contain a description of each step you performed to achieve the project objectives. The following topics should be included in this section:

- The experimental method used: a hardware implementation, a software implementation, a simulator or an analytical model;
- The solution chosen from several possible solutions described in the "Technical Background" section and the reason why this solution has been chosen;
- A block diagram or general architecture of the system and a description of each hardware and/or software module's function;
- The algorithms implemented by each module, where appropriate;
- Implementation details: the block diagram including the I/O ports and control signals, the software architecture showing the communication between modules, the user interface, classes and/or library functions used, etc.;
- User manual (where appropriate): operating system requirements, program installation, menus etc.

In this section, you should also document all design alternatives you may have considered but then rejected. Do not include the source code or the detailed logic diagram of the hardware modules in this part; these should be placed in the Appendix.

Experimental Results

In this section, you should prove that the system designed has been successfully implemented and the results obtained are valid. Provide simulation results, performance metrics, comparison between different implementations or between your implementation and similar systems. Include the following information in this part:

- The design tools used: language, software environment, CAD tools, simulator (specify the hardware platform, the operating system and the version of each design tool);
- The target device used and information from the implementation reports in tabular form: number of logic blocks, number of flip-flops, maximum operating speed etc.;
- The testing procedure used, the testbenches and other tools developed for testing the design (such as conversion programs);
- Screen captures with the simulation results;
- Comparisons between several implementations of the same module (such as a pipelined and a non-pipelined implementation) or between a hardware and software implementation.

In this section you should not only present the implementation results, but also discuss and interpret these results. Use figures, tables and graphs for comparative purposes. Describe the difficulties encountered and how did you solve them.

Conclusions

This part is a summary of the project report in a few paragraphs. It should also contain your observations about the results obtained, the lessons you learned and proposals for future work. The following are suggestions for this section:

- Describe in short the problem that was solved by the project and how the project goals were achieved;
- Highlight your original contributions;
- Present the advantages and drawbacks of your design;
- Suggest applications for your design;
- Propose future work related to your project.

References

This section is a list of all the resource materials consulted for the project. Each citation from the literature must be complete and correct. There must be at least one citation in the text for each reference listed in this section. Number reference citations consecutively in the order of appearance in the text and include them in square brackets, such as [1].

Use the following formats for references representing books, papers and on-line resources, respectively:

[1] Patterson, D. A. and Hennessy, J. L., *Computer Organization and Design – The Hardware/Software Interface*, Second Edition, Morgan Kaufmann, 1997.

[2] McMillan, S. and Guccione, S., "Partial Run-Time Reconfiguration Using JRTR", in *Proceedings of the 10th International Workshop on Field-Programmable Logic and Applications* (FPL), 2000, pp. 352-360.

[3] Chapman, K., "PicoBlaze 8-Bit Microcontroller for Virtex-E and Spartan-II/IIE Devices", Xilinx Application Note XAPP213 (v2.1), 2003, **http://www.xilinx.com/xapp/xapp213.pdf**.

Appendix

An appendix is a supplemental section of the paper. Place in this section the information that is too detailed to be placed in the body of the paper. The source code should be placed in an appendix. Detailed logic diagrams may also be placed in an appendix. Appendices should be labeled with a two-line heading. The first line consists of the word **Appendix** and a letter (such as **Appendix A**), and the second line contains the title of the appendix.

Additional Requirements

1. Number the sections as illustrated at the beginning of this guide. Do not number the table of contents, the references section and the appendices. Number the subsections as 1.1 or 1.1.1. Format section and subsection titles in bold. Do not underline titles.
2. Number the figures and tables and add a caption for each. Place figure captions below the figures. Place table captions above the tables. Reference each figure and table in the text (e.g., "Figure 5 shows the block diagram of the multiplier").
3. Number each page.
4. Submit the project report in printed form and in electronic form. Printing the appendices is not mandatory. Submit the source code, schematics, design files and executable files in electronic form.