Santa Clara University

School of Engineering

Formatting Instructions for Senior Thesis

GENERAL INFORMATION

Each Senior Design Project must be described and documented in a written Design Thesis and, after having been approved by all advisors of the project and the department chair, submitted to the appropriate engineering department for distribution to the University Library. The department may also archive the Design Thesis according to its own policy.

The standard format for submission of the design thesis is electronic, as a PDF/A formatted file.

The file submitted by students should be one PDF/A file with all of the required parts, including a signed approval page, meeting the requirements specified below. In addition, each thesis must be accompanied by a fully executed publication agreement (the form for which is available on the University Library website at: http://libguides.scu.edu/loader.php?type=d&id=607253).

FORMAT

Margins- All pages must have at least a one-inch margin on all sides. Wider margins (up to 1.25 inch) may be used if desired; narrower margins are not acceptable. Text may be either left justified or left and right justified.

Font- Times (New) Roman, or other standard font may be used, but the same font must be used for all pages of regular text of the thesis. For the body of the text, font size should be 12 pt. A different font and size may be used for tables, figures, or text that needs to be differentiated from the surrounding content. The minimum font size should be not less than 8 pt, and the font used in figures should be consistent. Line spacing should be 1 ½.

Paper- The body of the thesis should be in a single column.

Pagination- Page numbers should be centered in the bottom margin (footer). No page number should appear on the signature and title pages. The next page is number "iii," and all other pages of the preliminary material are numbered consecutively in small Roman numerals. Use Arabic numerals beginning with number "1" on the first page of the text and continuing throughout the rest of the thesis including the reference material. Every page must be numbered, including figures and appendices. The pages of appendices may be numbered relative to the appendix in which they appear, for example, A-1, A-2, B-1, etc.

PRELIMINARY PAGES

The preliminary pages must include a signature approval page, the title page, table of contents,

and abstract. An acknowledgement page is optional. A List of Figures, List of Tables, and Nomenclature page are optional at the discretion of the advisor. (See departmental guidelines.)

Signature Approval Page: This form has a set format. You are required to use the format shown in the attached sample. (This page is NOT numbered.)

Title Page: This page also has a set format. You are required to use the format shown in the attached sample. (This page is NOT numbered.)

Abstract: An abstract must be included in thesis. A good abstract (see sample attached) is a concise summary (1–2 paragraphs) of the entire project: introduction, problem statement, work accomplished, results, conclusions, and recommendations. When you write the abstract, imagine that the reader will not read anything else, but that you must get your major point across immediately. This requires efficiency of words and phrases. An abstract is written to stand alone, without jargon or reference to figures and tables in the report body.

Acknowledgments: Inclusion of an Acknowledgment page is optional. This section, if included, follows the abstract. It is a brief acknowledgment of assistance given to the author(s) in the design project and in preparation of the thesis.

Table of Contents: Each thesis must have a table of contents that indicates the principal divisions of the thesis and the pages on which they begin. These divisions must agree, in wording and style, with the divisions described in the text.

List of Figures: The Table of Contents should be followed by a page containing a list of figures or illustrations (if figures are included in the thesis).

List of Tables: A list of tables should be provided after the List of Figures (if present) or Table of Contents (if tables are included in the thesis).

TEXT

The text is the main body of the thesis. Every thesis should have at least: an Introduction (or first chapter), a main body consisting of the "middle" chapters, a Summary or Conclusions (last chapter), a Bibliography or References section, and some number of Appendices, as required by the department and advisor.

Each department provides guidance on the organization of the middle chapters and what they should include.

EVERY thesis MUST address a variety of non-technical issues, INCLUDING the learning objectives of the STS and Civic Engagement requirements in the university core. See the "Capstone Project Guidelines Addendum" and "Professional Issues and Constraints" documents, as well as individual department guidelines for advice.

Figures: Figures may be drawings, charts, diagrams, photographs, etc. Figures may be inserted whenever needed within the text; they should be consecutively numbered throughout the thesis and must each include a descriptive caption. Figures should be separated from the text, not wrapped in-line.

All graphs must have axes properly labeled and readable text size.

Figures are numbered and captioned, centered at the bottom of each figure.

Tables: Tables should be easily read. Headings and the column and row entries should be clearly related. Tables larger than a half page within the text are better if they are placed on a separate page; half-page or shorter tables may be centered on the page with text above and below. Multipage tables should have the column heading repeated at the top of each table subdivision, i.e., on each page.

Tables are numbered and titled, centered above each table. All tables should be numbered consecutively throughout the thesis.

Any text, tables or illustrations that are oriented in the landscape mode should be placed in the thesis so that they are viewable from the bottom and/or right edge of the page.

All figure captions and table titles MUST be on the same page as the figure or table.

Formulas: Mathematical formulas should be inserted directly into the text where needed using an equation editor provided within the word processing software. Complex formulas of two or more lines should not be included in text lines but placed in the proper position in the center of the page between lines of text. Variables should be defined clearly in the text.

$$\sigma = \frac{My}{I} \qquad \text{(eq. 3)}$$

Mathematical symbols should be italicized in the equations and within the text when used. Mathematical functions are not italicized. Units should not be italicized. Units that are named after an individual are typically capitalized (*e.g.,* Volt), while units that are not should be lowercase (*e.g.,* kilo).

Footnotes and references: All material and information in the thesis that comes from another source (i.e., not the team's own work), must be properly referenced and attributed. This includes background data, figures, equations, research findings, previous theses, suppliers or competitors' products, etc. All such sources must likewise appear in the Bibliography.

Footnotes and references must follow a consistent style throughout the thesis. Footnotes are numbered consecutively throughout each chapter or main division. Footnotes should be placed at the bottom of the page; a partial horizontal line one space above the first line of the footnote must separate the footnotes from the text. References should be numbered and match with the numbers in the Bibliography.

REFERENCE MATERIAL

Reference material includes:

Bibliography: The bibliography should be arranged in a definite order, either alphabetical or chronological, and single-spaced, with double spacing between entries. All books, articles, web pages, and other materials used in preparing the thesis should be listed in the bibliography, and a consistent style should be followed. See departmental guidelines for specific format required. The Bibliography is a separate section, at the same level as a chapter, but is not numbered (as a chapter would be).

Appendices: In most theses it is desirable to include certain material, i.e., test forms, blank record forms, detailed apparatus descriptions, detailed drawings, information on components from manufacturers, computer output from analyses etc., which does not actually form a part of the text. Such information should be made part of the thesis as one or more appendices, designated by capital letters, which are usually placed after the bibliography e.g., Appendix A, Appendix B.

SANTA CLARA UNIVERSITY

Department of XXX Engineering

I HEREBY RECOMMEND THAT THE THESIS PREPARED
UNDER MY SUPERVISION BY

Student Names, separated by commas

ENTITLED

TITLE OF SENIOR DESIGN PROJECT

BE ACCEPTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF

BACHELOR OF SCIENCE
IN
XXX ENGINEERING

Thesis Advisor(s) (use separate line for each advisor) date

Department Chair(s) (use separate line for each chair) date

TITLE OF SENIOR DESIGN PROJECT

By

Student Names, separated by commas

SENIOR DESIGN PROJECT REPORT

Submitted to
the Department of XXX Engineering

of

SANTA CLARA UNIVERSITY

in Partial Fulfillment of the Requirements
for the degree of
Bachelor of Science in XXX Engineering

Santa Clara, California

Term Year

Improving Program Slicing with Dynamic Points-To Data

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2002

ABSTRACT

Problem statement: Program slicing is a potentially useful analysis for aiding program understanding. However, slices of even small programs are often too large to be generally useful. Imprecise pointer analyses have been suggested as one cause of this problem. In this paper, we use dynamic points-to data, which represents optimal or optimistic pointer information, to obtain a bound on the best case slice size improvement that can be achieved with improved pointer precision. (Work Accomplished) Our experiments show that slice size can be reduced significantly for programs that make frequent use of calls through function pointers because for them the dynamic pointer data results in a considerably smaller call graph, which leads to fewer data dependences. Programs without or with only few calls through function pointers, however, show only insignificant improvement. We identified Amdahl's law as the reason for this behavior: C programs appear to have a large fraction of direct data dependencies so that reducing spurious dependencies via pointers is only of limited benefit. (Conclusions) Consequently, to make slicing useful in general for such programs, improvements beyond better pointer analyses will be necessary. On the other hand, since we show that collecting dynamic function pointer information can be performed with little overhead (average slowdown of 10% for our benchmarks), dynamic pointer information may be a practical approach to making slicing of programs with frequent function pointer use more successful in reality. (Results, Recommendations)

Keywords: Program Slicing, Points-To Analysis, Dynamic Analysis.

Acknowledgments

This thesis is dedicated to my family. They have supported me at rough times and have shared my joy at good times through all these months.

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I would like to thank Dr. Peter Dommel, who gave me his insights when I got stuck in my research and corrected some errors for me as my thesis reader. Also I would like to thank all of my friends who supported me both physically and in spirit.

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