Put Your Title Here, Title Case,
Arial, Bold, 12pt, centered
can span 1 to 3 lines

A Thesis Proposal (if Ths 1) / A Thesis (if Ths 2)
Presented to the
Department of Computer Science
College of Information and Computing Sciences
University of Santo Tomas

In Partial Fulfilment
of the Requirements for the Degree
Bachelor of Science in Computer Science

By

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Approval Sheet

Thesis Title: <THESIS TITLE>

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2. **<Proponent 2 First Name Middle Initial. Last Name >**
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In partial fulfillment of the requirements for the degree of ***Bachelor of Science in Computer Science***, the thesis mentioned above, has been adequately prepared and submitted by above mentioned proponents. This thesis was duly defended in an oral examination before a duly constituted tribunal with a grade of

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Certificate of Authenticity and Originality

We, the authors of this thesis, "<<< <<< <<< <insert title here> >>> >>> >>>", hereby certify and vouch that the contents of this research work is solely our own original work; that no part of this work has been copied nor taken without due permission or proper acknowledgment and citation of the respective authors; that we are upholding academic professionalism by integrating intellectual property rights laws in research and projects as requirements of our program.

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<<Group Member 1 Name>>	**<<Group Member 2 Name>>**
<<Group Member 3 Name>>	**<<Group Member 4 Name>>**

Program: BS Computer Science Date: <<Month, Day, Year>>

Acknowledgment

In no more than one page, acknowledge the people and organizations that have provided extraordinary assistance, contribution, participation and motivation in writing this thesis. This generally may include your thesis coordinator, thesis adviser, panel members, other researchers, family, friends, and most especially God. Dedications are usually considered inappropriate in a thesis manuscript.

Abstract

The abstract is a one page summary at the beginning of your manuscript. Briefly describe the thesis problem, your solution, the results and the significance of your thesis. Limit it from 50 to 100 words. This is also required by CICS to describe your thesis in its thesis bank. The Program Chair will not approve your thesis without this.

Table of Contents

List of Figures

List of Tables

Chapter I The Problem and Its Background

A. Introduction

In the introduction, you should describe what the study is all about. Give an overview of the thesis: establish the field of study, give a brief statement of the problem, discuss current views and ideas about the problem, state why existing solutions are unsatisfactory, briefly state the scope and coverage of the study, give a significance to the study, briefly describe your proposal to solve the problem, and indicate what you intend to accomplish.

In Thesis 1, you are making a thesis proposal. You formulate an original approach that could potentially solve a significant computer science problem and create a plan to determine the effectiveness and the efficiency of your approach. Hence, the tenses of your sentences must be appropriate. All gathered information must be presented in the past or present tense depending if they are historical or current, respectively. You state future actions you intend to conduct in the future tense. You write only the title page, the table of contents, the lists of figures and tables. chapters 1 to 3 and the reference list. The members of your thesis proposal defense panel will read your manuscript. When your panel approves your proposal, you proceed with Thesis 2.

In Thesis 2, you implement the plans you formed in Thesis 1 and complete your thesis manuscript. The readers of your manuscript are the members of your thesis defense panel and the general public. The manuscript should be written as if all the thesis activities have already been completed. That is, that you planned your activies, executed them, obtained the results, analyzed, concluded and are now making recommendations. Therefore, you must rewrite the title page, chapters 1 to 3, and the additional chapters 4

and 5 with this point of view. You must also include all the required forms and sections before chapter 1 and the appendices after the references section.

B. Background of the Study

In this section you should do the following: state the motivation of the study and present the scenario surrounding the research topic where the problem exists. You could discuss historical developments that led to the existence of this problem. Discuss the ideas that led to the conceptualization of the research problem.

This part aims to provide the reader the necessary information regarding the areas surrounding the proposed research problem.

The document must have a one inch margin on top, right and bottom, and a one and a half inch margin on the left of each page. For each paragraph, the first line must be indented half an inch. The remaining lines must be aligned on the left margin. The right side must have ragged alignment. There must be two spaces between each sentence. The exceptions on indentation are the sections on "Definition of Terms and the References list where a hanging indent is used.

In general, use Times New Roman 12pt normal font throughout the manuscript. Exceptions are chapter and section labels which are in boldface, Figure and Table labels and their captions where Arial 10pt font is used, and Source codes and algorithms where Courier New 8pt font is used. Important terms must be italicized and be defined in the section "Definition of Terms".

It is highly recommended that sentences in the manuscript be in the active voice instead of the passive voice. In scientific writing, using the active voice makes the meaning of sentences clear for the readers, and keeps sentences from becoming too

complex and lengthy. In the active voice, the subject performs the action. On the other hand, in the passive voice, the subject is acted upon. The sentence "The hypothesis was tested by Klein in 2008" is in the passive voice. This is better written in your thesis manuscript in the active voice as "Klein tested the hypothesis in 2008".

C. Theoretical Framework

In the theoretical framework, you should discuss briefly the major concepts and findings relevant to the proposed study. You could discuss what's known so far related to the problem. You should present the different theories and models that provide the conceptual underpinning of the study. Also, provide the reader a theoretical background to be able to understand the research problem. Give a 'mini-seminar' dealing with the subject area(s) surrounding the research problem.

Illustrate in a diagram the ideas that surround the problem, the ideas of causes and effects of the problem, and the ideas that could be put together to solve the problem. You could point the reader to Figure I1 that shows the different factors surrounding the problem and the ideas that have been used and may be used to address the problem.

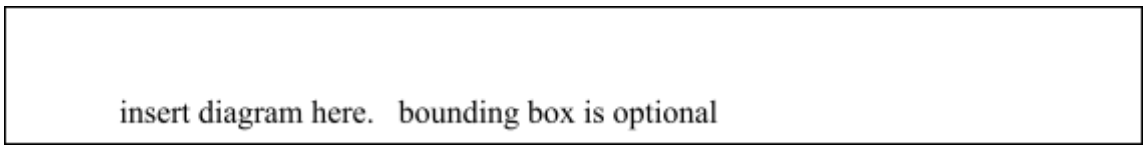

Figure I1 Theoretical Framework Diagram

You should always provide a narrative that discusses each of your diagrams. Every diagram must have text that refers to it as in the previous paragraph. The figure number and the caption must be below the diagram. The caption for figures and tables should use the arial 10pt boldface font.

You should quote important short statements from reliable sources. You should summarize or paraphrase long statements from your references. In any case, you should cite your sources using the APA format. Visit the following websites to learn more about the APA style of referencing:

- The basics of APA style tutorial :

  http://flash1r.apa.org/apastyle/basics/index.htm

- APA style: http://www.apastyle.org/index.aspx

Here are some examples of citations. Check out the references section for the corresponding complete bibliographic entries. Observe that the list of references must be sorted in alphabetical order with a hanging indent for the first line.

Suppose you paraphrase a paragraph from a journal article. Your paraphrase should be ended by a citation like in this sentence (Chu & Beasley, 1998). Books, journals, periodicals and conference proceedings are the more reliable and ideal sources of information. A good way to find these reliable sources are through the libraries, EBSCO, Science Direct and Google Scholar. You should cite the reliable sources of website articles that contain the information you use. They are typically at the bottom of the web pages.

Suppose this is a scholarly statement that comes from some web source (WebAuthLastName, 2011). You have to cite your source using the above sample format. If the source is a website that did not specify an author and has no date, use the format (One-Sample z-test). Another example is a publication by the Google corporation for their research which should simply be cited as (Google). In this case, there is no specific individual author nor a publication date. Take note that this is not a random google

search result. The organization that actually published this website is Google. If a source such as a pdf document came from a website, you should cite it using this format with complete bibliographic entry in the references section (Klein, 2008).

It is also acceptable to have your citation as part of your sentence. For example you could say that in 1998, Chu & Beasley employed a heuristic approach for the multidimensional knapsack problem using a genetic algorithm. If there are many authors, you could use a shortened format (First, et al., 2009). In sentence form, you could say that First et al. argued in the 2009 conference for the visually impaired using computers, that sound is a critical mechanism for usability. An example of a book entry is given (Dela Cruz, 2012). You could cite multiple articles as shown here (Chu & Beasley, 1998; Klein, 2008; Tyson; Williams, Turner, Miller, & Claus, 2011).

Here is another example. Multitasking can now be implemented with ease due to recent developments in cloud computing (Dela Cruz, 2010). However Williams, Turner, Miller, & Claus discovered in 2011 that there are other factors that affect the ease of implementation of multitasking projects.

D. Conceptual Framework

From the theoretical framework, focus on specific variables and processes surrounding the problem that you want to investigate in your thesis. Show causes and effects by identifying the inputs (independent variables), the processes (actions, events, programs), and the outputs (dependent variables)

A diagram must be included to help visualize relationships. For example, Figure 12 provides a picture that can locate the problem, the factors involved, and the effects.

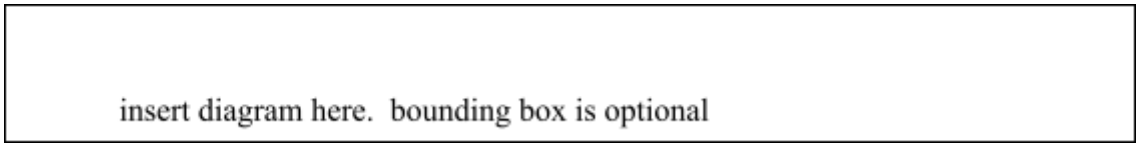

Figure I2 Conceptual Framework Diagram

Include your ideas that may solve the problem. Your solution must control the effects of the inputs and processes on the outputs to solve the problem. You may break down the process and show additional diagrams for each part.

E. Statement of the Problem

State the main research topic (i.e. the general problem), followed by the underlying investigative questions (i.e. the specific problems). The general problem is an expanded reiteration of the title itself in declarative form (i.e. ends in period). What is the problem that you want to address?

Break down the main problem into sub-problems. You may phrase each sub-problem in interrogative form (i.e. ends in question mark). The sub-problems, when tested, investigated or synthesized, provide answers to the main/general problem.

F. Objectives

The objectives should be dovetailed with the problem statements. For each specific problem, there must be a specific objective to address the problem. Address the purpose of the investigation. Cite the specific, concrete and achievable goals .

Discuss the nature and form of the output or deliverable which will contribute new information and increase the stock of knowledge.

You may answer the following questions to state your objectives. What additional information must be collected? Any surveys needed? What systems must be built?

What tests must be done? How should they be conducted? What analyses are useful to prove the effectiveness of the solutions?

G. Scope and Limitations

Identify the total area of the study by establishing the parameters and indicate the cut-offs of the investigation. Give a frank admission of any weakness or shortcoming of the study, be it in the lack of representation of the sampling or the cost and time constraints of the investigation.

Intentionally narrow down the scope into a reasonable area which is manageable but wide enough to permit substantial research results. Include the assumptions, occurrences or considerations that may be considered in delimiting the area of study.

H. Significance of the Study

Establish a logical need for the study, that it does not duplicate a previous investigation and that past studies are inadequate. Illustrate the importance of the study in terms of content and methodology. Give a straightforward statement of the value of investigation to IT practitioners or to other entities which could benefit from the study. State the academic significance by addressing how the research output would yield an 'improved' knowledge and how it applies to the problem.

I. Definition of Terms

This section defines the terms used in the study.

Give a glossary of the concepts/ variables in the study. Include clear definition of key terms according to how they are used in the study to facilitate understanding of the problem and avoid ambiguous meanings. Define only what is absolutely necessary.

Only terms, word, or phrases which have special or unique meanings in the study should be defined. The terms defined should be arranged in alphabetical order. The terms must be in boldface. Fully spell out important acronyms. Each entry must use hanging indentation. Examples aer given below.

Arbitrary. This is not really a definition of arbitrary, but provided just to give a format of an entry in this section that spans more than one line.

Fast. An adjective that indicates that the speed of something covers more distance for the same unit of time.

Intelligence. The ability to learn or understand or to deal with new or trying situations. Alternatively, it is the ability to apply knowledge to manipulate one's environment or to think abstractly as measured by objective criteria such as tests.

Slow. The opposite of fast.

Word. A juxtaposition of letters to form a term that denotes something.

Chapter II Review of Related Literature and Studies

A. Title of First Group of Related Literature and Studies

This chapter should discuss studies, inquiries, or investigations already conducted to which the present study is related or has some bearing or similarity. Discuss only the major findings, ideas, principles, or conclusions relevant to the problem under investigation. Evaluate each study being reviewed and explain how it relates to the present study. Identify similarities and differences with the present study.

You need to group ideas, concepts, solutions, etc. currently available. You may group by the location of source of information: literature vs study, foreign vs. local. You may group by kind of publication: books, journals, reports and websites. You may also group by topic to give an organized exposition of many ideas related to your research.

Make sure you do not plagiarize. Paraphrase, summarize and synthesize gathered research material. Do not just directly copy and paste from your sources. Every idea that is not originally yours must be referenced to its source. Use the APA style of citations to a reference item listed in the references section of this thesis manuscript. The following are helpful:

- The basics of APA style tutorial :

  http://flash1r.apa.org/apastyle/basics/index.htm

- APA style: http://www.apastyle.org/index.aspx

If a source is in the reference list, it must be cited somewhere in the manuscript. If you cite a source, there must be a bibliographic entry in the referece list.

B. Title of Second Group of Related Literature and Studies

Discussion for another group of ideas.

In this chapter, you should expound on the theoretical framework. Cite the information sources (books, journal articles, white papers, internet sources, etc.) using the APA style.

You may refer to tables like the one in Table II1 that show results from previous studies. Just like in figures, the caption must use the Arial 10pt boldface font. However, the table number and the caption must be above the table.

Table II1 Average time of completion of test subjects under various conditions

Each table must be referred to from the narratives, as in the previous paragraph.

C. etc.

Discussion for another group of ideas.

In your review of the information sources, ask "why do the key discussion points give a critical foundation for the proposed research ?" The objective is to show that existing works have not solved the research problem at hand; thus, there is a need to do the proposed study to provide new insights and more relevant information, methods and solutions. Build the case of the proposed research work.

D. Synthesis

You must consolidate all the ideas reviewed in this chapter. You should explain how each idea contributes to the problem or to the solution you are proposing or have implemented. This section justifies the direct bearing and relevance of the related readings, related literature, and related studies to the present study. How do these information fit into your study ? How are they useful ?

Chapter III Research Design and Methodology

A. Hypothesis

Formulate theories that will serve as the backbone of your arguments to support your thesis. Identify the hypotheses of these theories. What do you intend to prove or find out? What are the expected consequences of these hypotheses. Succeeding sections and chapters will show how these will be tested and the results of these tests.

You could start by stating your assumptions. Afterwards, say that if these assumptions are met, then you theorize that if you apply your solution, you will obtain your desired result.

B. Research Methods

Identify the research methods used. You may use one or more of the below methods. You need to explain why you use these methods and to what extent do you use these methods. The list below also illustrates the third, fourth and fifth level of heading. Preferably you should only have three or four levels of headings.

1. Experimental or scientific method.

The third level heading must be sentence case, Times New Roman boldface, 10pt. Numbering should be in sequence 1, 2, 3, etc.

In this method, you should identify and define the problem. Formulate hypotheses and their consequences. Design experiments that will test your theories. Identify variables and control other factors. Gather and develop hardware and software. Conduct pilot study. Conduct the experiment.

2. Descriptive or statistical analysis method

In this method, you compile raw data, then summarize. Use statistics to validate your conclusions. Below is an example of fourth level heading:

a. Fourth level heading 1

The fourth level heading must be sentence case, Times New Roman boldface italicized, 10pt. Numbering should be in sequence a, b, c, etc. Below is a list of items at the fifth level of headings.

i. *Fifth level heading 1*

Fifth level heading must be sentence, Times New Roman italicized, 10pt. Numbering should be in sequence of roman numbers i, ii, iii, iv, etc.

ii. *Fifth level heading 2*

Text for fifth level heading 2

iii. *Fifth level heading 3*

Text for fifth level heading 3

b. Fourth level heading 2

This is the text accompanying the second item in a fourth level list of items.

3. Action method

In this method, you improve research strategies to find a solution.

4. Classification research method

In this method, you recognize the subjects of the research to understand them and to differentiate between each of them.

5. Exploratory or experience research method

In this method, you use intuition, personal, professional, and academic experiences to discover a solution.

6. Developmental research method

In this method, you track the growth or decay of a subject.

C. Research Design

The research design presents the strategy for the study, and an action plan by which the strategy is to be carried out. It should be a guide on how to replicate the study, about its methods and the techniques to be used. Detail scientific activities like procedures, techniques, statistical sampling, experimentation, proofs of concepts, etc. that you intend to carry out. Discuss how each objective would be addressed by the research design. Discuss why the selected approach is superior to other potential research design approaches.

D. Research Instruments

1. Identify research instruments to be used:

hardware, software, people, etc.

Explain why your choices are suitable for your thesis and to what extent will they be used.

2. Identify sources of data :

Library: Journals, Books, Articles, Newspapers

Internet: Websites

Experts: Communication with Professionals, Practitioners, Users

Experiments

Explain why your choices are suitable for your thesis and to what extent will they be used.

E. Sampling and Data Gathering Procedure

Identify sampling techniques to be used: Random, Cluster, Stratified, Systematic

Identify data gathering techniques to be used: Interviews, Surveys, Polls, Experimentation and Observation,, Simulation

Explain why your choices are suitable for your thesis and to what extent will they be used.

F. Statistical Treatment of the Data

Discuss what statistical measures, models and tests will be used to analyze the data. Statistical Treatment: Measures of Center and Variation, Frequency Distribution, Linear Correlation and Regression, Hypothesis Testing: Z-test, T-test, etc. Explain why your choices are suitable for your thesis and to what extent will they be used.

Chapter IV Presentation and Analysis of Data

A. System Architecture

Some narrative: the diagram shown in Figure IV1 illustrates the created system's modules and how they interact with each other. The sentence that refers to figures and tables must not be too far from the figures and tables themselves.

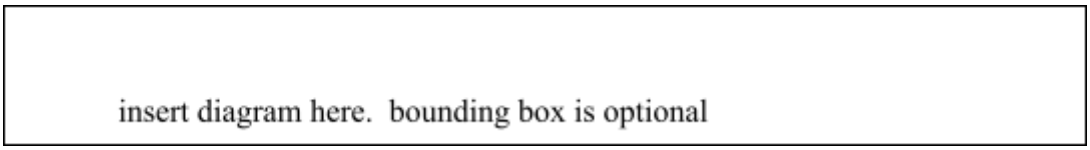

Figure IV1 System Architecture

You have implemented a system that determines the effectiveness of your solution. Your system architecture is a diagram that must show how the modules or components of your system interact, highlighting those that are critical to solve your thesis problem. Give a short narrative description of the major processes and data flow of the system as illustrated by the figure. Usually, your system gets inputs provided by an external entity and generates outputs consumed by an external entity. These external entities could be a person or another system. These must be reflected in your system architecture.

Provide a narrative that gives a high-level view of your system. The detailed narrative description will be in the next section.

B. Description of the Modules and Interfaces

Describe each module and interface of the system. The modules should be described in the order of the flow of the processing from the system's inputs to the

system's outputs. For each module, identify its own inputs and the entities or modules that supply them, its process to transform the inputs into the outputs, and identify its own outputs and the entities or modules that consume these outputs.

C. Sample System Simulation of Test Data

Identify a small but representative test input data. Explain how this test data is processed by the system. Show how the data flows from module to module as it is being transformed to generate the corresponding output. You may show screenshots or file dumps to illustrate the input, process and output of each module, and of the entire system.

D. Test Results

Categorize the data used to test the system using the sampling techniques described in chapter 3. Measure the results for each category and for the aggregate of all categories using the statistical tools described in chapter 3. Show the numerical figures in a table like Table IV1. Describe the results using statistical graphs like frequency histograms, line graphs, pie charts, etc.

Table IV1 Test results per category of input

	category 1 …	category n	overall
condition 1 …	result	result	result
condition m	result	result	result
overall	result	result	result

E. Analysis and Interpretation of the Results

Analyze the test results. Perform the statistical tests described in chapter 3. Decide on the effectiveness and efficiency of the created system based on this analysis. For which conditions are the results of each category good or bad? Which categories provide good or bad results for each condition?

Chapter V Summary, Conclusions and Recommendations

A. Summary

Discuss findings per hypothesis, compare with previous results, and be analytical, logical and comprehensive.

B. Conclusions

Answer the following questions: How well do your results support your hypothesis? How well do your solution and testing results address your statement of the problem? How well did you accomplish your objectives? What are the implications and significance of your results? Make final comments and judgment on the study.

C. Recommendations

State further improvements and extensions possible, and recommend that newly discoverred problems and issues be addressed.

References

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Appendix A : Survey Forms

Insert the survey forms here, if any. Each one must have a figure number and a caption. After each form, a narrative should follow describing the form. Include here questionnaires and sample answers from respondents. Include also filled evaluation forms from experts, if any.

Appendix B : Detailed System Specifications

Use figures and narratives to clearly explain detailed specifications for parts of the system not fully described in chapter 4, if any.

Appendix C : Database Designs

Use database models as figures and provide narratives to clearly explain database designs, if any.

Appendix D : User Interface Screenshots

Include additional important screenshots of the system not included in chapter 4, if any. Each one must have a figure number and a caption.

Appendix E : Additional Test Data and Test Results

List additional test data and test results not included in chapter 4, if any. Use tables and statistical graphs with narratives to describe them.

Appendix F : Detailed Results Analysis

Put here additional mathematical and statistical computations not included in chapter 4, if any. Explain the computations to support your analysis in arriving at your conclusions.

Appendix G : Mathematical Proofs

Include here mathematical proofs needed to prove your theorems, if any.

Appendix H : Critical Source Code and Test Scripts

This appendix is required. Source codes that critically support your thesis should be included here. Do not include the following: source codes for your GUI, source codes for established or well known algorithms, and other source codes that are not directly related to your proposed solution.

For source codes and algorithms, it is advisable to use the "Courier New" font. You may use the small 8pt, with single spacing. If your code has few characters per line, you may also use two column format.

Curriculum Vitae of Each Member

This appendix is required. One to two page per member. Include a 1x1 ID picture image for each member.