<Title of Thesis>

A Thesis

Presented to

the Faculty of the College of Computer Studies

De La Salle University

In Partial Fulfillment

of the Requirements for the Degree of

Bachelor of Science in Computer Science

by

<last name, first name, middle initial of proponent, alphabetically arranged>

<last name, first name, middle initial of proponent, alphabetically arranged>

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<last name, first name, middle initial of proponent, alphabetically arranged>

<adviser’s signature>

<adviser’s name>

Faculty Adviser

<date of submission>

Acknowledgement

(No further instructions from the guidelines.)

Abstract

From 150 to 200 words of short, direct and complete sentences, the abstract should be informative enough to serve as a substitute for reading the thesis itself. It states the rationale and the objectives of the research. Do not put citations or quotes in this section. **Avoid beginning the abstract with “This paper/document/thesis/study/ project/…”**

The abstract should include **at least three** keywords that are relevant to the thesis project. For example:

**Keywords:** agent, collaboration, communication, multi-agent systems, and distributed artificial intelligence.

**Make sure to update this page once the rest of the thesis document is done.** Everything that was done must be in the past tense.

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**TIP:** To update the Table of Contents, hover your cursor/mouse over the Table of Contents. On the upper left, there should appear 2 buttons. Click **Update Table**.

**NOTE:** Please check the page numbers of **Bibliography** and the **Appendices** after updating to make sure they match the actual page numbers.

List of Tables

**No table of figures entries found.**

**TIP:** To update the list of tables/figures, click on the text “**No table of figures entries found.**” and under the **References** tab, click **Update Table**.

List of Figures

**No table of figures entries found.**

**TIP:** To update the list of tables/figures, click on the text “**No table of figures entries found.**” and under the **References** tab, click **Update Table**.

# Research Description

<provide a sentence or two describing this section>

## Overview of the Current State of Technology

(Thesis Proposal section 1.1)

This section gives the reader an overview of the specific technology or field in the international or local setting. The information regarding the technology or field should be contemporary and not based on outdated sources. Discussion must not be too technical or too detailed.

This section ends with a discussion on the problems faced by or that still exist in the specific technology or field (e.g., limitations of existing software or algorithms). The problem statement would lead to the research objectives.

**TIP:** When citing authors, use **References → Insert Citation** so that you can have the Bibliography automatically update your cited works.

## Research Objectives

(Thesis Proposal section 1.2)

### General Objective

This section states the overall goal that must be achieved to answer the problem.

### Specific Objectives

This subsection is an elaboration of the general objective. It states the specific steps that must be undertaken to accomplish the general objective. These objectives must ***be specific, measurable, attainable, realistic, and time-bounded***. Each specific objective may start with “**to design/survey/review/analyze…**”

Studying a particular programming language or development tool (e.g., to study Windows/Object-Oriented/Graphics/C++ programming) to accomplish a general objective is inherent in all thesis and, therefore, must not be included here.

## Scope and Limitations of the Research

(Thesis Proposal section 1.3)

This section discusses the boundaries (**with respect to the objectives**) of the research and the constraints within which the research will be developed.

## Significance of the Research

(Thesis Proposal section 1.4)

This section explains why research must be done in this area. It rationalizes the objective of the research with that of the stated problem. Avoid including here sentences such as “This research will be beneficial to the proponents/department/college” as this is already an inherent requirement of all ST thesis projects. Focus on the research’s contribution to the Computer Science field.

## Research Methodology

(Based on Thesis Proposal section 3.0 but modified to reflect what was actually done while developing the project.)

This section lists and discusses the specific steps and activities that will be performed by the proponents to accomplish the project. The discussion covers the activities from Thesis Proposal to THSST-3.

Examples of activities include inquiry, survey, research, brainstorming, canvassing, consultation, review, interviews, observe, experiment, design, test, document, etc. The methodology also includes the following information:

* What will be done
* How it will be done
* When and how long will the activity be done
* Where will it be done
* Why should be activity be done

# Review of Related Literature

This section discusses the features, capabilities, and limitations of existing research, algorithms, or software that are relevant and related/similar to the thesis. The reviewed work and software must be arranged either in chronological order, or by area (from general to specific). Observe a consistent format when presenting each of the reviewed works. In this section, the maximum number of pages is 20. At the end of this section, a table of summary should be included discussing the different systems discussed so far.

Part of the contents of this section is lifted from Chapter 2 of the Thesis Proposal. Additional materials gathered during the different thesis stages must also be included. It is highly recommended that all existing systems being studied and reviewed are recent. This chapter should contain at most 20 pages, thus the discussion must be clear and concise.

**TIP:** When citing authors, use **References → Insert Citation** so that you can have the **Bibliography** automatically update your cited works.

**TIP:** When adding figures and tables, use **References → Insert Caption** so that you can have the **List of Figures/Tables** automatically update your figures and tables.

**TIP:** Need more chapter headings? **Home → Styles** has Heading 1 for new chapters, and Heading 2, 3, 4, …, 9 for subchapter headings.

# Theoretical Framework

This section discusses relevant theories and concepts to be used in the course of designing or developing the thesis. Include only those concepts that you feel will be needed. **Do not copy the whole source material.** Use the topics stated in the Thesis Proposal Research Objectives as a guide in determining the contents of this section.

**TIP:** When citing authors, use **References → Insert Citation** so that you can have the **Bibliography** automatically update your cited works.

**TIP:** When adding figures and tables, use **References → Insert Caption** so that you can have the **List of Figures/Tables** automatically update your figures and tables.

**TIP:** Need more chapter headings? **Home → Styles** has Heading 1 for new chapters, and Heading 2, 3, 4, …, 9 for subchapter headings.

# The System Model, Algorithm, and Design

(Only part of the Thesis Document **for Basic Research**.)

Included in the THSST-1 document **for Basic Research** discussing the preliminary design, model and algorithms. Final design and implementation should be documented and part of the THSST-3 document. Take note that this section in THSST-1 is subject to change depending on the research output of the proponents, and advices coming from the thesis adviser and/or thesis panel committee.

# Analysis

(Only part of the Thesis Document **for Basic Research**.)

(No further instructions from the guidelines.)

# The <XYZ> System

(Only part of the Thesis Document **for Applied & Application-Based Research**.)

This section gives the overall specifications and functional requirements of the software to be developed.

## System Overview

This section gives an overall view of the main features and capabilities of the software.

## System Objectives

This section states the specific requirements that must be met by the system.

## System Scope and Limitations

This section discusses the scope and limitations (i.e., the level of capability or extent of power) of each major function listed in section 4.2 above. This means that operations, which are beyond the identified limits, will simply be invalidated/ignored, and will not cause the system to malfunction, but instead cause the system to respond with error messages.

Justifications for the identified limitations and assumptions must be included here. Assumptions are the conditions that must be satisfied or things that must be existing/available/followed in order for the system to function properly. Ignoring such assumptions might result in system malfunction, which will not be the responsibility of the proponents.

## Architectural Design

This section presents the initial internal design of the system, by discussing its major components and their interactions. These components include the software components (e.g., modules, database systems, etc.), as well as the hardware components (e.g., processors, devices, etc.). The components and their interactions are graphically represented using design tools, such as hierarchical charts, structure charts or object models. Data flow diagrams may also be included to show how information passes among processes. In addition, discussions on why certain alternative and trade-offs were chosen must be included (e.g., issues on software decomposition, cost of hardware). Take note that this section can be modified as the thesis group sees fit during the development.

## System Functions

This section provides a listing of all the functions that must be performed or delivered by the system, and a description of each. Screen designs may be included, to help visualize the function being discussed. Usually, the functions are based on the menu and toolbar options. If a function generates reports, the report formats must be included in this section. Take note that this section can be modified as the thesis group sees fit during the development.

## Physical Environment and Resources

This section discusses the hardware and software resources needed to implement and to execute the system. If the system has a special set of target users, this section also includes the user specification (e.g., educational level, experience, and technical expertise). For certain uncommon resources, a discussion of why such resources are necessary must also be included.

# Design and Implementation Issues

(Only part of the Thesis Document **for Applied & Application-Based Research**.)

This section discusses the design and implementation of the major data structures and algorithms used in the software. It included a discussion on the major issues and problems encountered, and the corresponding solutions and alternatives employed by the proponents. Parts of the design tools in the Technical Manual may be lifted as figures in this section.

# Results and Observations

(No further instructions from the guidelines **for Basic Research**.)

**Instructions for Applied & Application-Based Research:**

This section presents the analysis, interpretation and implications of the summarized test results, as well as observations on the limits of the system’s capabilities. It also discusses the type(s) of testing performed on the system, the test data used, and the results of the tests.

The type(s) of tests performed varies depending on the system developed. For instance, commissioned software would require a detailed acceptance test and system response time analysis, while software implementing an algorithm would require an analysis of the performance of the algorithm on different machines or on different test data.

# Conclusion and Recommendations

This chapter gives an assessment of what happened in this project. It presents explanations and justifications on how the objectives of the thesis were met, to what extent and why some objectives were not met.

This chapter also includes a discussion of possible improvements that can be made on the software, as well as future directions of the research topic in general. This serves as a springboard for projects that may be done by future thesis groups.

# Bibliography

**There are no sources in the current document.**

**TIP:** To update the Bibliography, hover your cursor/mouse over the Bibliography. On the upper left, there should appear 2 buttons. Click **Update Citations and Bibliography**.

**NOTE:** After updating, the Bibliography will be compact, just highlight the Bibliography (except the title) and click **Home → Styles → Bibliography** to automatically add spacing.

1. xxx

<content>

1. yyy

<content>

1. Resource Persons

<Full name and title, e.g., Dr. Juan de la Cruz>

<Profession, e.g., faculty>

<Department, e.g., College of Computer Studies>

<Name of institution, e.g., De La Salle University>

<E-mail address>

1. Personal Vitae

<Full name and title, e.g., Mr. Juan de la Cruz>

<Residence address>

<Contact numbers>

<E-mail address>

<Full name and title, e.g., Mr. Juan de la Cruz>

<Residence address>

<Contact numbers>

<E-mail address>

<Full name and title, e.g., Mr. Juan de la Cruz>

<Residence address>

<Contact numbers>

<E-mail address>

<Full name and title, e.g., Mr. Juan de la Cruz>

<Residence address>

<Contact numbers>

<E-mail address>

# GUIDES ON M.S. WORD FORMATTING

This section should be removed and the Table of Contents updated before printing the document. This section will contain tips and instructions on how to do formatting in M.S. Word.

## Tips

### Red Text of Importance and Blue Text of Tip-Giving

Throughout the document, you will find text in red and text in blue. The text in red are notes pertaining to the actual thesis document, such as when a chapter is meant for submission. The text in blue on the other hand are merely notes and tips on how to best use this word document file’s formatting capabilities.

Other indicators is that the blue text are often labeled with the words “Tip” and “Note” while the red text has no labels.

## Instructions

### Using the Table of Contents

This section discusses the Table of Contents, Headings and Page Numbers. Each entry in the Table of Contents contains a Heading and Page Number.

To see a clickable outline of the headings, tick the **View 🡪 Navigation Pane** checkbox in the Show section.

#### The Table of Contents and Headings

The Table of Contents is directly tied to the Headings. The Table of Contents uses the headings to generate each entry and its corresponding page number. In the sections below are three types of headings:

##### Headings with Chapter Numbers

The following are headings found under **Home → Styles** you can use:

* Heading 1 generates **x.0. Chapter Title** where x is any number 1, 2, … depending on existing chapters before itself (1.0, 2.0, 3.0, … x.0)
* Heading 2 generates **x.y. Subchapter Title** where x is the chapter it’s currently under and y is any number 1,2, … depending on existing chapters before itself (1.1, 1.2, 1.3, 2.1, 2.2, …, x.y)
* Heading 3 generates a subchapter for Heading 2; similar to Heading 2, it generates a subchapter number of **x.y.z. Sub-subchapter Title** where x.y is the subchapter it is currently under and z is any number 1, 2, … depending on existing chapters before itself (1.1.1, 1.1.2, 1.1.3, 1.2.1, …, x.y.z)
* Heading 4 generates a subchapter for Heading 3
* Heading 5 generates a subchapter for Heading 4
* Heading 6 generates a subchapter for Heading 5
* Heading 7 generates a subchapter for Heading 6
* Heading 8 generates a subchapter for Heading 7
* Heading 9 generates a subchapter for Heading 8

##### Headings with No Chapter Numbers

For a chapter or subchapter to appear in the Table of Contents without a chapter number, just use its corresponding Heading (Heading 1, Heading 2, …) and then remove the chapter number using Backspace.

##### Headings Not in Table of Contents

For a chapter or subchapter to have the look of a Heading but not appear in the Table of Contents, use “Heading (No ToC)” in **Home → Styles**.

#### The Table of Contents and Page Numbers

The Table of Contents finds Headings (discussed in the previous section) and finds the page number of the page each heading is found on. Unfortunately, it has some limitations. It can do continuous numbering with and without chapter numbers (e.g. Chapter 2.0 at page 3 gives a page number “2-3” or “3”); however, it cannot do chapters with a different kind of header.

For example, an “**Appendix A. xxx**” that comes after “**10.0 yyy**” will produce a page number of “10-1” instead of “A-1”. This is because the page numbers use *Heading 1* as a basis and *Heading 1* uses an “**x.0.**” numbering format and cannot be changed to “**Appendix x.**” in the middle of a document.

A possible solution to this is the use of a second document (.doc/docx) that contains the appendices and makes use of its own Table of Contents with the Multilevel List containing the Appendix format. However, doing this requires the pages of the original document and the pages of the appendix document’s Table of Contents to be constantly updated to be in line with each other.

Aside from that solution, the solution this document is taking is the use of a different kind of numbering system for the appendices (i.e. “- x -“ where x is the page number). This ensures that the appendices are different without requiring a separate document altogether.

### Using the List of Tables and List of Figures

The List of Tables and the List of Figures can both be used to track tables and figures respectively through their caption. To give a table or figure a caption, do the following:

1. Select the table (just have the typing cursor inside the table) or figure that needs the caption.
2. Amongst the tabs, choose **References 🡪 Insert Caption**. Another way is to right-click on figures and choose **Insert Caption…** instead.
3. Fix the caption to the desired output.
4. Select the **List of Figures** or the **List of Tables** according to what was changed.
5. Amongst the tabs, choose **References 🡪 Update Table** inside the Captions section, don’t choose the one inside the Table of Contents section!

Of course, this will work for any caption. If a new list for a different type of caption is needed, just do the following:

1. Amongst the tabs, choose **Page Layout 🡪 Breaks 🡪 Next Page**. Breaks is found under inside the Page Setup section, while Next Page is found under Section Breaks.
2. Place the text cursor on that new page.
3. Amongst the tabs, choose **References 🡪 Insert Table of Figures** inside the Captions section.
4. Choose the correct caption type or *Caption Label* and fix the settings to how you want it to look.
5. Press OK.

### Using the Bibliography

This section will discuss how to use the citations and bibliography for this document. This includes adding a citation and updating the bibliography.

#### Adding a Citation

To add a citation, find the **References** tab and select the **Insert Citation** button. This will produce a dropdown with the choices **Add New Source…** and **Add New Placeholder…**. When unsure about the actual source information or it’s something to be verified later, choose to add a placeholder, but when the source information is already ready, choose to add a new source.

To modify the citation (to remove the name for example if “Name (Year)” is the goal), right-click on the citation and select “**Edit Citation**”.

#### Update the Bibliography

After adding a citation or modifying a citation source, head to 10.0 Bibliography and place the text cursor inside the Bibliography. An option to **Update Citations and Bibliography** will appear above the area, select that.

**Don’t forget to select all the new bibliography entries and select the “*Bibliography APA*” style in Home 🡪 Styles immediately after updating the bibliography.** This is to ensure that the bibliography follows the correct APA format.