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REPUBLIQUE DU CAMEROUN

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MINISTERE D'ENSEIGNEMENT SUPERIEURE

Yaoundé International
Business School
developing innovative professionals



PersonLinks
designs

DEPARTMENT: SOFTWARE ENGINEERING

SPECIALTY: SOFTWARE ENGINEERING

**HND RESEARCH PROJECT REPORT WRITING GUIDE FOR
SOFTWARE ENGINEERING STUDENTS; THE CASE OF YIBS**

A report presented and submitted to the School of Computer Engineering of the Yaounde International Business School (YIBS) in partial fulfilment of the requirements for the award of the degree of a Higher National Diploma (HND) in Software Engineering (SWE)

Submitted by;

MUNJAM THOMAS T.

Registration Number: xxxyyyyy2001

Academic Supervisor:

Mr. DDDD HHHH W.

Lecturer – YIBS

Field Supervisor:

Mr. AAAA BBBB

Engineer – UBA Bank

Academic Year: 2024/2025

DECLARATION

I, **NAME NAME NAME** declare that the work entitled “**XXXXXXXXXXXXX
YYYYYYYYYYYYYYYYYY ZZZZZZZZZZZZ**” is my own original work, conceived and presented in the partial fulfilment of the requirement for the award of a Higher National Diploma (HND) in Software Engineering at Yaounde International Business School (YIBS). I further declare that this work has not been submitted before now, and all the sources I have used or quoted have been indicated and acknowledged as citations and complete references.

Signed:

Date:

CERTIFICATION

This is to certify that the work entitled “XXXXXXXXXXXXX YYYYYYYYYYYYYYYYYY
ZZZZZZZZZZZZ” was carried out by NAME NAME NAME in partial fulfilment for the
award of a Higher National Diploma (HND) in Software Engineering (SWE) and has been
submitted for examination with my approval as the Academic Supervisor.

ACADEMIC SUPERVISOR

Signed:

Date:

Name:

DEDICATION

Dedicate your work to a single person, or a single group of persons.

ACKNOWLEDGEMENTS

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ABSTRACT

As Elsevier publication wisely stated: the abstract is your chance to describe your research in a limited number of words: use those words wisely. Together, the title and abstract should fully represent your thesis/article. A well written abstract will help readers understand what your thesis is about and whether it's interesting or useful for them. It will also help improve visibility through abstracting and indexing. The abstract should summarize the problem or objective of your research, and its method, results, and conclusions.

Thus, briefly state the **(1)** a short statement of the problem or area(s) of investigation, **(2)** a brief discussion of the methods and procedures used in gathering data or information/methodology, **(3)** A summary of findings/key results, and **(4)** Recommendations/conclusions. Generally, abstracts are between 100 and 30 words.

Importantly, don't promise more than your article delivers. Many authors write the abstract last, so it reflects the content accurately. But it can also be helpful to write it first, to help you focus your thoughts and give you a good starting point for the thesis or article.

Keywords: *data hiding, cryptography, encryption, steganography, security.*

LIST OF FIGURES

All figures (pictures and drawings) that appear in your work should all be placed here with their page numbers. Figure number, figure title and page number

(It is important and easier to use the automatic caption feature found in the References tab of the Microsoft Word menu bar).

LIST OF TABLES

All tables that appear in your work should all be placed here with their page numbers. Table number, table title and page number.

(It is important and easier to use the automatic caption feature found in the References tab of the Microsoft Word menu bar).

LIST OF ABBREVIATIONS

AES – Advanced Encryption Standard

GUI – Graphical User Interface

HTML – HyperText Markup Language

IDE – Integrated Development Environment

JPEG – Joint Picture Expert Group

LSB – Least Significant Bit

NIST – National Institute for Standards and Technology

PNG – Portable Network Graphic

SDLC – System Development Life Cycle

SQL – Structured Query Language

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FONT FORMATTING CRITERIA

This page is not part of your research project report, so do not include it in your work. This is meant to guide you with the general formatting options to be applied as you work on.

General for all Texts in the document

- Font type: Times New Roman
- Font size: 12 pts
- Line spacing: 1.5 pts
- Text alignment: Justify

Chapters and Titles (heading level 1)

- Font size: 14 pts
- Font case: All uppercase
- Font style: Bold
- Text alignment: Center

Sub-headings Level 2 – (1.1.)

- Font size: 12 pts
- Font case: All uppercase
- Font style: Bold
- Text alignment: Left

Sub-headings Level 3 – (1.1.1.)

- Font size: 12 pts
- Font case: Capitalize the First Letter of Each Word
- Font style: Bold
- Text alignment: Left

Any other sub-headings

- Do NOT number them as sub-levels. Leave them unnumbered, or use a new numbering system like A, B, C, ... or i, ii, iii, iv, ... etc.
- Font size: 12 pts
- Font case: Capitalize the first letter only
- Font style: Bold
- Text alignment: Left

CHAPTER ONE

GENERAL INTRODUCTION

Chapter 1, which introduces the study and states the focus of the study, begins an introductory paragraph and the with background information regarding the problem under investigation as the first sub-section. The Introduction chapter should provide readers with a brief summary of literature and research related to the problem being investigated and should lead up to the statement of the problem. In general, the Introduction begins with a broader perspective of the problem and becomes narrower as the Introduction proceeds. The Introduction (and Background of the Problem) section(s) are normally expanded in Chapter 2 (Review of Related Literature). Therefore, there is no need for excessive write-ups in this chapter.

(This introductory paragraph before the background of study should be just about half of a page).

1.1. BACKGROUND OF STUDY

It provides the rationale/ justification of the study. Gives evidence and conditions of existing situation to make the reader feel the urgency of the problem and the need to solve it. However, try to capture the thrust of your research within the first sentence. Avoid circular reasoning (turning around, repeating the same thing again and again).

(Also **avoid** the need to separate background of study into sub-sections such as historical, conceptual, etc.).

1.2. PROBLEM STATEMENT

The statement of the problem is the focal point of your research. It is just one sentence (with a few paragraphs of elaboration) that explains something that needs close attention (no need for lengthy content). The main function of formulating a research problem is to decide what you want to find out about (or what problem you aim at solving). It is extremely important to evaluate the research problem in the light of your resources at your disposal, the time available and your supervisor's knowledge and expertise in your field of study. Also ask yourself whether you have sufficient knowledge of computers and software that you plan to use.

1.3. OBJECTIVES

Objectives are the goals you set out to attain in your study. Since these objectives inform the reader of what you want to achieve through the study, it is extremely important to word them clearly and specifically.

Objectives should be listed under two headings.

1.3.1. General Objective (single)

The general objective is the overall (main) objective of your research and should be one, and therefore should not be listed or numbered.

1.3.2. Specific Objectives (between 3 and 5)

These are separate specific objectives of your research and thus, they should be listed (with bullets).

1.4. RESEARCH QUESTIONS (3 questions are appropriate)

Questions are real questions with question marks. In applied research, such as in Engineering fields, research questions are used (though a good, applied research involves statistical or variable analysis). It is up to you and your supervisor to choose!

Research Questions should be numbered.

1.5. SIGNIFICANCE OF THE STUDY

Refers to relevance of the study in terms of academic contributions and practical use.

- It justifies the reason for your study and makes the purpose worth pursuing.
- The significance of the study answers the questions:
 - Why is your study important?
 - To whom is it important?
 - What benefit(s) will occur if your study is done?

1.6. SCOPE OF RESEARCH

The scope sets the boundary of your research study.

1.7. DELIMITATIONS OF THE STUDY

Delimitations are the boundaries that the researcher sets in a research study, deciding what to include and what to exclude. They help to narrow down the study and make it more manageable and relevant to the research goal.

1.8. LIMITATIONS OF THE STUDY (Optional)

The limitations of a study are its flaws or shortcomings which could be the result of unavailability of resources, small sample size, flawed methodology, etc. No study is completely flawless or inclusive of all possible aspects.

1.9. DEFINITION OF KEYWORDS

Here, the researcher will define the keywords of the work; most likely, those mentioned in the abstract.

1.10. ORGANIZATION OF THE STUDY

The final section in Chapter 1 summarizes the contents of each of the chapters that will comprise the study. This permits readers to know what information will be found in each chapter and facilitates finding specific information without searching through the dissertation page by page to do so. This section also provides a logical transition into the next chapter of the dissertation.

CHAPTER TWO

LITERATURE REVIEW AND PRESENTATION OF INTERNSHIP PLACE

Introduce your Chapter with an introductory paragraph.

The purpose of Chapter 2 is to provide the reader with a comprehensive review of the literature related to the problem under investigation and a discussion of internship activities. The review of related literature should greatly expand upon the introduction and background information presented in Chapter 1. This chapter may contain theories and models relevant to the problem, general concept overview of the problem, current trends related to the problem and related works, and significant research data published about the problem.

Explore all the various types of literature reviews you can, placing them under sub-headings. (**Avoid** the need to break this chapter into empirical, theoretical, etc.).

Citations and references are very pertinent here. See an example below of a paragraph containing **two** in-text citations.

The modern community of the globe insists on an interdisciplinary approach and sensibility while collaborating and communicating – generate values of multiple sorts (O'brien, 2022). Moving Image Course cultivates a storyteller to gear up with techniques and tools for the integration of live action, animation, motion graphics, sound, photography, augmentations, and virtual interactions to create values and mark a sense of sustainability (Stilentski, 2018).

2.1. GENERAL CONCEPT ON [AREA OF STUDY/TOPIC]

Feel free to split your writ-ups on the general concepts here under sub-sub-sections as need be.

2.2. REVIEW OF SOME RELATED WORKS

Review past works related to your topic/area of study. Review their methodologies, review their advantages and limitations, etc.

2.3. IDENTIFICATION OF RESEARCH GAPS

This can be seen as the paragraph which concludes the literature section and points out the main gap in research which your research aims to solve.

2.4. PRESENTATION OF INTERNSHIP PLACE AND ACTIVITIES

This section focuses on the internship site and all the activities carried out, with observations.

- 2.4.1. History of Company/Enterprise
- 2.4.2. Geographical Location of Company/Enterprise
- 2.4.3. Organization of Company/Structure of Company (with organigram)
- 2.4.4. Mission and Vision of Company
- 2.4.5. Strengths and Weaknesses
- 2.4.6. Activities Carried out by Intern

End your chapter two with a concluding paragraph which summarizes key aspects.

CHAPTER THREE

METHODOLOGY

Give an introductory paragraph.

This chapter should make clear to the reader the way that you intend to approach the research problem and the techniques and logic that you will use to address it. It also includes the procedures, the sample and the instruments you will use in your research.

The methodology answers these three main questions:

- How is the data/ requirements going to be collected or generated?
- How will data/requirements be analyzed or designed?
- What processes, methods, tools, and techniques will be used and how they will be used?

In other words, the methodology shows the reader how you are going to obtain your results.

3.1. PROPOSED METHODOLOGY

In this section, the researcher presents in summary how they plan to tackle the problem in a descriptive narrative which brings about their choice of methodological approach(es).

3.2. DATA COLLECTION (For applied research, this may be optional)

Introduce what data collection is all about in a few sentences.

Tools and techniques for data collection or requirements gathering are described here. They may include:

- | | |
|--|---|
| • Interviews | • Remote Sensing (through GPS, robots or drones for instance) |
| • Review of existing documents (documentation) | • Joint Application Development (JAD) |
| • Questionnaires (Physical or Google forms) | • Focus Groups |
| | • Participatory Design |
| | • Observation |

You must not do all, only report on the ones you will use. Put them under sub-sections as in the examples below.

3.1.1. Review of existing documents

3.1.2. Questionnaires

The secondary source of data collection was a survey via questionnaires distribution to a fair number of end users of these web-based applications and platforms.

3.1.3. Observation

Observation played a vital role in the study carried out in this research. In everyday life,

.....

..... etc

NOTE: There are many other research types and methods to explore depending on the nature of your topic. Explore them.

3.3. POPULATION SAMPLE (For applied research, this may be optional)

This section describes the population used in the study and the process utilized in selecting a sample. Unless the population is extremely small, a sample usually will be drawn from the population. The sample should be small enough to provide a manageable volume of data, but the sample must accurately represent the population if any valid inferences are to be drawn from the sample results.

3.4. QUALITATIVE ANALYSIS (For applied research, this may be optional)

A study is classified as qualitative if the purpose of the study is primarily to describe a situation, phenomenon or event.

Qualitative research attempts to increase our understanding of why things are the way they are in our social world and why people act the way they do.

Qualitative research is concerned with finding the answers to questions which begin with: **why? How? In what way?**

Even though qualitative research is not encouraged in the Computer Engineering Departments, your applied research could make use of qualitative analysis.

You could embed qualitative analysis in your applied research to answer the following questions for instance:

- What does the population (or sample) think about my idea? Your idea could be a Web/Mobile Application to address a problem in the community for instance.
- What does the population (or sample) think about my solution? What is their experience (opinion, feeling) after using my solution?

Best applied research include a qualitative analysis. So, we advocate your research design to be smart enough to accommodate both applied and qualitative approaches, even though they are made optional.

3.4.1. Tools & Techniques used in Qualitative Analysis

If you decide to make use of qualitative design in your applied research (which is encouraged). You could make use of the following tools and techniques:

- Sampling (probabilistic or non-probabilistic sampling)
- Descriptive and inferential statistics
- Statistical software packages (like Spreadsheets, SPSS, Stata, etc.).

3.5. PROCESSES, METHODS, TECHNIQUES AND TOOLS

Whether you are developing a model, an algorithm, or a software system, you will use Processes, Methods, Techniques, and Tools. In Chapter 3 you should indicate the ones you will use. They may include, for instance:

Processes:

- ☐ System Development Lifecycles
- ☐ Analysis and Design Cycles

- ☐ Implementation and Testing Cycles
- ☐ Work Breakdown Structures and Plans

Methods and Techniques:

- ☐ Unified Modeling Language (UML)
- ☐ Modeling and Diagramming Techniques
- ☐ Agile Development
- ☐ Prototyping
- ☐ Algorithmic Design
- ☐ Structured Analysis and Design Technique (SADT)
- ☐ Information Engineering
- ☐ Modeling and Simulation

Tools:

- ☐ Development Tools and Languages
- ☐ Testing Tools
- ☐ Data Resource Management Tools
- ☐ System Software

Place them as well under appropriate sub-topics like the examples below. (Only those you will choose to use in your research).

3.5.1. Processes

The processes which we considered here in this research were that of the System Development Life Cycle (SDLC), which is a project management model that defines the stages involved in bringing a project from inception to completion.

The agile software development life cycle (SDLC) model combines iterative and incremental process models with a focus on process adaptability and end-user satisfaction through quick delivery of functional software.

3.5.2. Methods and Techniques

The method which we considered in this research was the Unified Modeling Language (UML)..... Etc.

Talk about them, what they are, why you chose to use them and how they fit into your research, but do not put the diagrams here. They will come in chapter 4.

3.5.3. Tools

In this research, we made use of software development tools and programming languages, and system testing tools peculiar to our proposed system.

Development Tools and Languages: Development tools and languages used in the realization of this project included physical device such as a computer with average processing capabilities, a drawing board to map the flow of subtasks and design models, and several software ranging from the Windows 11 operating system, Google chrome browser, Sublime Text version 4 for coding, and not forgetting the languages used which are HTML5 and PHP 8.0 and MySQL.

Testing Tools: Testing tools used to test the functionality of our system included still the computer, the web browser, and a server. Due to time and cost constraints, system testing was done through a virtual server installed on the computer. The software which provided us with this virtual server functionality is the Xampp application which incorporates Apache local server and MySQL.

CHAPTER FOUR

ANALYSIS, DESIGN, AND PRESENTATION OF RESULTS

Give an introductory paragraph.

In this chapter, we present an analysis of the data collected in the previous chapter, design of the system to be developed, implementation of the system and subsequently, testing of the system and our findings from the test.

This chapter 4 is the execution of what has been said to be done in Chapter 3 (Methodology). It provides:

- **The statistical analysis of data collected** (if qualitative design has been used). It could be statistical analysis of the idea (is it good or bad) or the solution (UX, user experience)
- **The analysis of the requirements gathered**. Specifications of the model, the algorithm, or the system is properly documented here.
- **The design of the specifications**. Diagrams, models, and other artifacts are designed at this stage.
- **The implementation and the testing of designs**. It is done using the tools and techniques listed in the methodology.
- **The findings and results**. It is the reporting of the findings and results (Please note that Chapter 4 is limited to reporting/presenting findings and results, and is not the proper place for conclusions or recommendations. Chapter 5 is where conclusions are made.

4.1. DATA ANALYSIS (For applied research, this may be optional)

4.1.1. Descriptive Statistics

4.1.2. Inferential Statistics

4.2. SYSTEM DESIGN

Talk about the way you design the system. Maybe you have an algorithm, a flowchart, a schematic diagram, etc. Your UML diagrams also come in this section with brief paragraphs which explain each one of them. Place them under appropriate subheadings.

4.3. PRESENTATION OF RESULTS

All results and screenshots of implementation and or simulation of your system come in this section. Each figure (image/screenshot) must have comments of at least a brief paragraph which explains what is being shown in the figure.

NB: If you have so many screenshots, only select some of the key ones (not more than 10) to place here and describe them. The rest should feature in the appendix section.

4.4. DISCUSSION OF RESULTS

Here, we want to discuss the outcome of our research after having presented the results and findings, also with their implications.

For your paragraphs, use words such as *to begin*, *initially*, *subsequently*, *furthermore*, *moreover*, *in addition*, *finally*, etc.

Give a concluding paragraph for your chapter 4.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

Give an introductory paragraph which acts as a summary of all.

5.1. RECOMMENDATIONS

Present your recommendations here as paragraphs or point sentences.

You want to take note of the different categories of people whom you are making the recommendations to (to the researcher, the school, the company, the general population, subsequent researchers, etc.). It all depends on you, which ones you choose.

If you choose to use bullet points, separate the categories under sub-sub-sections, but if you decide to use paragraphs, then you must not place them under sub-sub-sections.

5.2. SUGGESTIONS (AND FUTURE WORKS)

Make your suggestions and propositions here in detailed, yet concise paragraphs or point sentences. (Your suggestions and proposals could be for the system, the company, the school, other researchers, the public, future researchers, yourself, etc.)

5.3. CONCLUSION

This section concludes the entire research report from chapter 1 to 5. Concluding the overall idea and purpose of your research. It could be in a few paragraphs as deemed necessary by the researcher and supervisor.

REFERENCES

There is no introduction or any additional sentences here. Just the references alone.

References for all cited work will be placed in this section. Each reference should include all the details about a source at the researcher's disposal and must contain at least the name of the author, the title of the book/article and the year. Other details should be included if available to the researcher.

NB0: For an HND report in computer Engineering, it should contain on average about 30 references for reviewed material.

NB1: The reference must be done using the standard APA (at least Sixth Edition) Referencing format.

NB2: It is advisable to use the "Insert Citation" option found under the "References" tab of Microsoft Word application to include in-text citation during write-ups, which will automatically generate the references in this section easily.

Find below an example of references presented in the above-mentioned format.

Aljazaery, Ibtisam, Alrikabi, Haider, Aziz, & Mustafa. (2020). Combination of Hiding and Encryption for Data Security. *International Journal of Interactive Mobile Technologies (IJIM)*, 14(34). doi:10.3991/ijim.v14i09.14173

Amjad, R., Tanzila, S., Toqeer, M., Zahid, M., Mohsin, S., & Adeel, A. (2018, December 6). Data hiding technique in steganography for information security using number theory. *Journal of Information Science: Sage Journals*, 45(6). doi:https://doi.org/10.1177/0165551518816303

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APPENDICES

APPENDIX I: QUESTIONNAIRE (If any)

Dear respondents, kindly fill out the survey to aid in carrying out a study on the improvement of data hiding and security for web-based applications.

1. Are you a member of this university?

.....

2. Do you have any background knowledge on what encryption is all about?

.....

3. Please mention some of the online platforms which you use in your day-to-day activities.

.....

4. How many of the above-mentioned online platforms do you trust for secure communication?

.....

5. Do you think if an intruder were to have the ciphertext, he could manage to decrypt and get the message?

.....

6. Would communication be safer if an intruder did not know in the first place that communication was taking place?

.....

7. Do you think that encryption of a message is a more secure method of ensuring security as compared to other methods?

.....

APPENDIX II: SCREENSHOTS (If any)

APPENDIX III: DATASETS/SOURCE CODES