TYPE THE TITLE OF THE THESIS HERE

By
FIRSTNAME OTHERNAME SURNAME
(Current Qualification)

A PROJECT SUBMITTED TO

DEPARTMENT OF COMPUTER SOFTWARE ENGINEERING

ELERINMOSA INSTITUTE OF TECHNOLOGY, ERIN-OSUN

IN PARTIAL FULFILMENT OF THE REQUIREMENTS

FOR THE AWARD OF NATIONAL INNOVATION DIPLOMA IN

COMPUTER SOFTWARE ENGINEERING

SEPTEMBER, 2022

ELERINMOSA INSTITUTE OF TECHNOLOGY, ERIN-OSUN, NIGERIA
EIT LIBRARY
NATIONAL INNOVATION DIPLOMA PROJECT

AUTHORISATION TO COPY

Author: Firstname Othername Surname

Title: Type the Title of the Thesis Here

Degree: NID(Computer Software Engineering)

Year: 2022

I, Firstname Othername Surname, hereby authorise the EIT Library to copy my project in part or whole in response to request from individuals and or organisations for the purpose of private study or research.

_____
Signature of Author and Date

CERTIFICATION

The undersigned hereby certify that this is an original research carried out by First-name Othername Surname with the registration number CSE/2019/001 in the Department of Computer Software Engineering, Elerinmosa Institute of Technology under my supervision.

Supervisor: _____

Name & Signature of Supervisor

Head of Department: _____

Name & Signature of Head of Department

ACKNOWLEDGEMENTS

Type your acknowledgements here.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

Type the abstract of your thesis here. It should contain four(4) paragraphs, i.e.

Paragraph 1: Statement of the Problem and Objectives

Paragraph 2: Methodology

Paragraph 3: Result

Paragraph 4: Conclusion

CHAPTER ONE

INTRODUCTION

This chapter introduces the content of this thesis.

For research proposal you should use future tense style in your reporting. For example you will state that "I will formulate the system using formal language". For completed research work you should use reported tense style in your reporting. For example you will state that "I formulated the system using formal language".

You are expected to give clear explanation to the content of the thesis using simple sentences. You are expected to summaries the following in this introductory chapter.

1.1 Background

In this section you should document the background to this research in terms of the research question it answers. Provide the computing background to the philosophy, theory or metaphor underlying the research. Provide the context and scope of the research by which the statement of the research problem. Also summarise the following in clear explanation.

1.2 Statement of the Research Problem

The statement of research problem should state four things clearly: (i) The state of the art in the literature. (ii) The gap or problem identified in documented literature. (iii) Why is it important to address the problem? (iv) How did you address the problem?

This can take the following form.

> Various approaches to the solution of problem of X is well documented in the literature. However, the effectiveness of method P has not been demonstrated on sparse data set. Most problems in human face recognition involves sparse data manipulation. This research applied method P to sparse data of humans face with dark skins.

1.3 Research Aim and Objectives

State the aim. There should be one aim for your research. The aim is the final outcome of the research. The objectives are the individual tasks in the aim. The objective will state what you did at each task. For example it may include:

1. Specification of the model or the system.
2. Data design and collection.
3. Formulation of the model.
4. Design of the model.
5. Implementation of the model or system.
6. Evaluation.

1.4 Research Methodology

In the methodology you are expected to document how you achieved each of the objective. You need to state the methods you used for each task and how your combined all the methods during the realisation of the research problem-solving. Specifically you are to state the methods you used to:

1. Specify the system of model: State the characteristics of the input and output of the model of system you have developed. Provide the requirement for the input and the output by imposing restriction on the scopes of values or strings accepted and acceptable. Your will need to state assumptions that informs your requirements.
2. Formulate your system or model: Use symbols to represent the inputs and the output and state the process by which the output is computed from the input using the process.
3. Design the system: E.g, Use design tools such as flow chart, UML diagrams, tree, entity relation diagram, sequence diagram, circuit diagram, timing diagram, etc. for the model or system.
4. Implement the model or system. This may include program coding, simulation and/or hardware aspect
5. Evaluate the system: This may include alpha-beta method, mean-opinion score, etc.

1.5 Research Philosophy

State the theories of computing that defines the framework for this work. This section is particularly very important for Ph.D. thesis.

1.6 Research Justification

Why do you think solving this problem is worth the effort. This is a general perspective.

1.7 Contribution to Knowledge

This should arise from your research statement of problem. The unique attribute of the technique you apply to the problem should be stated here.

1.8 Organisation of Thesis

State how this thesis is arranged from Chapter Two onwards.

CHAPTER TWO

LITERATURE REVIEW

2.1 Fundamental Concepts

In this section you are to present carefully selected fundamental concepts. They are fundamental because other concepts can be logically derived from them. Identify and list all such concepts that are key to the explanation to your research discourse. To harvest such concepts, you need to consult the literature as documented in encyclopedia, standard dictionary, journals, handbooks and general use in technical discourse. Then discuss the context in which you will be using these concepts in your thesis.

Note that **Chapter** heading should be in all upper case. **Section** should be in title case as depicted in the section. Note that the title fo **Subsection** and definition should be in sentence case as indicated in the following illustrations.

2.1.1 Definition of Terms

A simple one term definition should appear as depicted in Definition 2.1.1:

Definition 2.1.1 (Computing) *Computing is the creation and manipu-*

lation of concepts in the process of constructing the solution to a well-defined problem.

A more elaborate definition should appear as depicted in Definition 2.1.2:

Definition 2.1.2 (Grammar) *The grammar of a grammar G is a four tuple $\mathbf{G} = \langle \mathbf{\Sigma}, \mathbf{V}, \mathbf{P}, \mathbf{S} \rangle$ where;*

- *Σ is the finite, non-empty, set of symbols comprising the alphabet of the language of G;*
- *V is the finite, non-empty set of non-terminal symbols comprising the vocabulary of the language of G;*
- *P is the non-empty finite set of re-write rules or productions for generated strings for the expression of the language of G;*
- *S is a distinguish non-terminal start symbol.*

2.2 Analysis of Theories

Relevant, related and core theories and models should be explained here. Your explanation should engage the discourse in the literature, not a mere listing or verbose presentation of contents. To do this, you should write out the questions that you think the paper you are reading should answer. While reading the paper, determine for yourself whether the paper has answered the questions adequately in you own view. Your questions and responses are what you should document in your theoretical analysis of

the literature. PhD students are required to comment on the theoretical foundations presented in the literature and situate their analysis in wider context and perspective by suggesting important, and perhaps new, lines of argument based on present circumstance.

2.3 Technical Foundations

Discuss the Techniques, methods, design, technologies, model and tools in the literature that are relevant to this research.

Table 2.1 depicts how to include basic table into your text. You must discuss each and very illustration in the text. To do this state what each column of item contains ans discuss at least two cases of the row items in the table.

Table 2.1: Items in Research Steps

Item	Description
Data collection	Observation, questionnaire, digital camera, thermometer, transducers, video recorder, microphone, etc;
Data encoding	Formatting (e.g. field definition), code definition (e.g. Binary coded), key determination, indexing procedure, database structuring (linear or non-linear);
Specification	Formal language, UML use case diagram
Formulation	Equation, model digram, formal method language, automata model formula
Design	Flowchart, UML diagrams, logic diagrams, state transition diagrams and tables; schema,
Simulation	Simulation software e.g. CNP tool, JFLAP
Implementation	Programming language, software and hardware development tools
Evaluation	Testing of simulated or implemented software and hardware

2.4 Review of Related Work

Engage the literature from the theoretical perspective you have selected (PhD candidate must do this). Your engagement should be with the view to explain and discuss the issues presented and documented in the literature, not a mere listing or verbose presentation of contents. To do this, you should write out the questions that you think each of the paper you read should answer. While reading the paper, determine for yourself whether the paper has answered the questions adequately in you own view. Your questions and responses is what you should document in your analysis of the literature.

Focus more on the problem being solved by the author. The method used to state specification, collect data, formulate models, design model, implement system, evaluate system as well as analysis of results. Explain how the concepts presented in the paper is useful or not adequate for your work.

A literature review table will be very useful for this purpose. Create a literature review table as depicted in Table E.1 in Appendix **D**.

This is the format for citing sources. To cite book use Hollis (1999) Dreyfus (1992) for one or two authors and Goossens *et al.* (1999) for more than two authors. Technical report should cited as Buss *et al.* (1987). Conference inproceedings should be cited as Geach (1968); Fulga (2012). Thesis should be cited as Clarkson (1985); Olọ́runfẹ́mi (2018) for Ph.D and Master thesis as Dingemanse (2006); Oládiméjì (2012). Article in journal should be cited as Saeedi *et al.* (2010) Mc-

Carthy (2007); Lawal (2008); Turing (1950) . Work in-collection, should be cited as Li *et al.* (2008). Miscellaneous source, for example personal communication should be cited as Olóròdé (2016). Booklet such as inaugural lecture should be cited as Akìwọ̀wọ̀ (1980). Your can use out-text citing as (McCarthy, 2007).

How these citations should be listed is presented in the Reference section of this document.

2.5 Chapter Summary

Provide a summary for this chapter.

Discuss the six(6) literature items that are core to this research and state how they will inform the research activity and its methodology.

CHAPTER THREE

METHODOLOGY

3.1 System Specification

In this section, you are to document in details the characteristics of the input and output of the model of system you have developed. Provide the requirement for the input and the output by imposing restriction on the scopes of values or strings accepted and acceptable. Your will need to state assumptions that informs your requirements.

A specification should address the *input* and *output* of the problem-solving process, in the $Input \rightarrow \boxed{\text{process()}} \rightarrow Output$ formulation.

Example of circuit module digram for expressing hardware system specification is shown in Figure 3.1. Example of use case digram for expressing software system specification is shown in Figure 3.2.

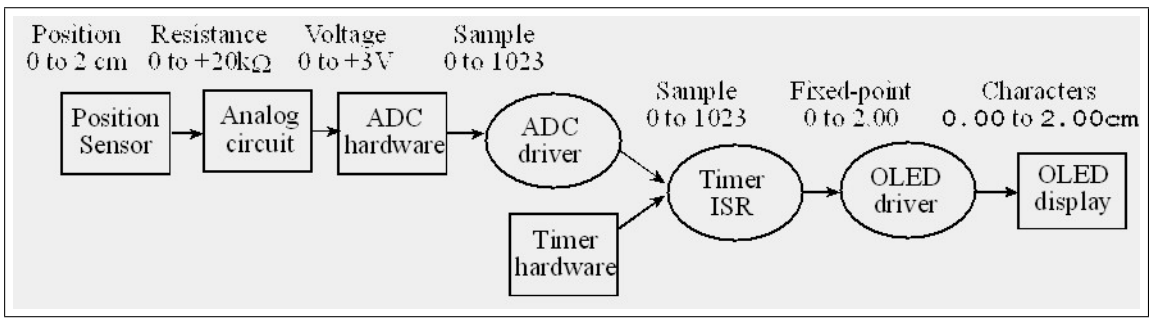

Figure 3.1: Hardware system specification

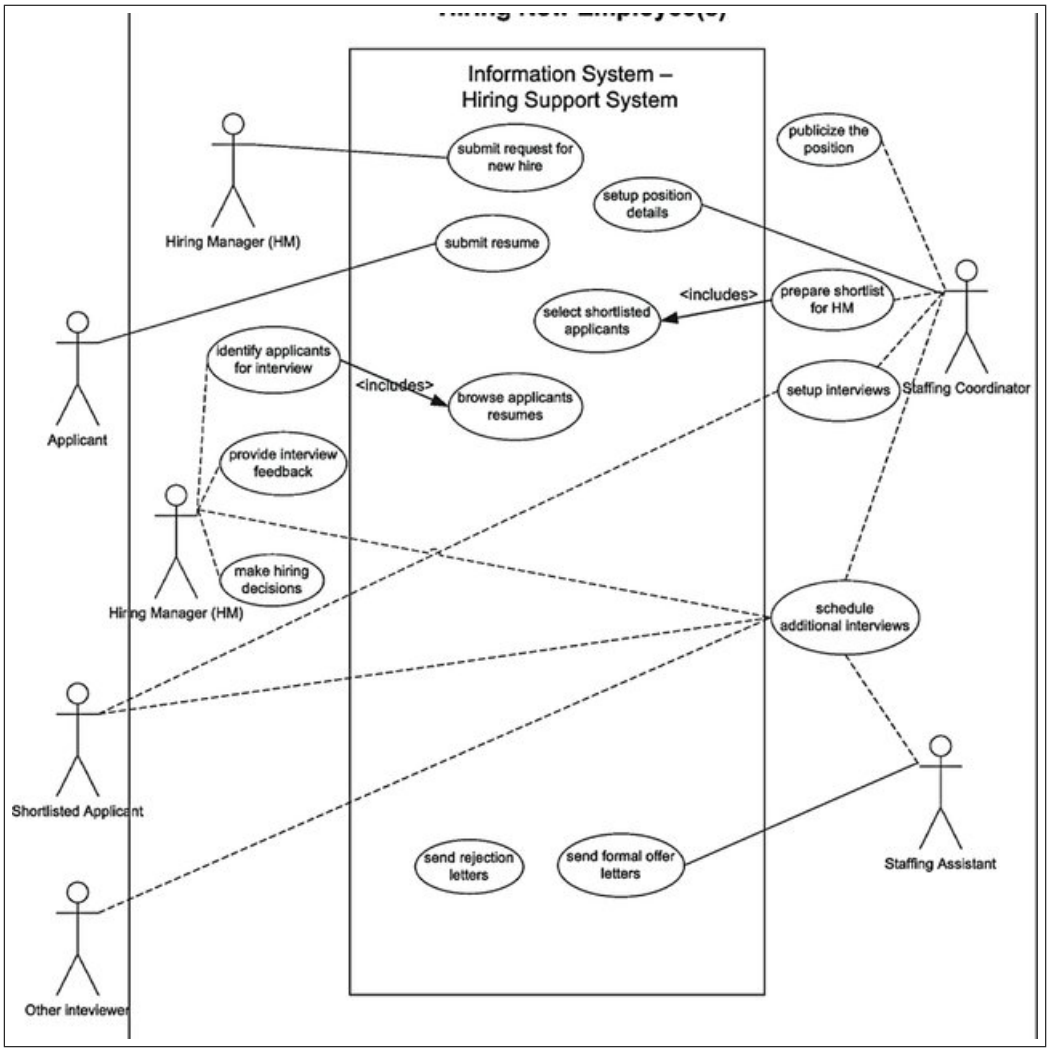

Figure 3.2: Use case diagram of system specification

3.2 Data Collection

Data collected must be discussed in detail. An analysis of important data relevant for model formulation can be presented as depicted in Table 3.1. All table must be discussed in text. To do this, state what each column represents. Explain the first and the list items in the table as well as any other item that is interesting. For example, explain each item, or row, with largest or smallest values.

Table 3.1: Special Characters in Research Data

Symbols	Frequency	Comments
Ọ	1 in 1,000	Found in *Yorùbá* names
π	1 in 5	Common in math
\$	4 in 5	Used in business
Ψ_1^2	1 in 40,000	Unexplained usage

3.3 Model Formulation

In this section you are to document in details the symbolic representation and formulation of the inputs and the output as well as state the process by which the output is computed from the input using the process. This is an example of in-text equation: $\lim_{n\to\infty} x = 0$. In-text equations do not require reference numbering.

If the equation is in-line however, it must be placed on a line outside the text like Equation 3.1 with unique reference number. The reference number must be used to discuss the equation in the text.

$$\lim_{n\to\infty} x = 0 \tag{3.1}$$

Other examples of in-line equations are as presented in Equations 3.2, 3.3 and 3.4.

$$A_{m,n} = \begin{pmatrix} a_{1,1} & a_{1,2} & \cdots & a_{1,n} \\ a_{2,1} & a_{2,2} & \cdots & a_{2,n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{m,1} & a_{m,2} & \cdots & a_{m,n} \end{pmatrix} \tag{3.2}$$

$$A = \begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix} \tag{3.3}$$

$$|x| = \begin{cases} -x & \text{if } x < 0, \\ 0 & \text{if } x = 0, \\ x & \text{if } x > 0. \end{cases} \tag{3.4}$$

3.4 System Design

In this section, you are to document in details how you used design tools such as flowchart, UML diagrams, tree, entity relation diagram, sequence diagram, circuit diagram, timing diagram, etc. for the model or system. This include the design for data, user interface, program, hardware circuit, output, and so on.

The design of the structure of data using tree diagram should appear as depicted in Figure 3.3. Every tree diagram must be discussed in the body of the text. For example in the case of Figure 3.3 you should state what the root, branches and leaves of the tree stands for and how you system will process a typical input.

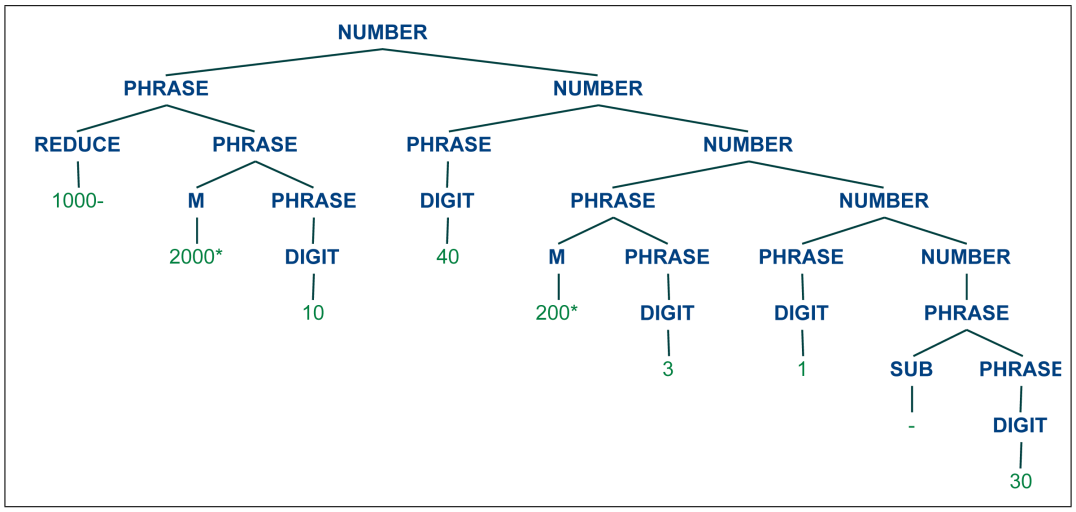

Figure 3.3: System Design Tree

Each algorithm can be represented in pseudocode as depicted in Algorithm 1. For clarity, you may also set lines to identify the structure in

Algorithm 1: Frequency Number Computation

Input: Node α's ID (ID_α), and node α's neighbors' IDs within two communication hops.
Output: The frequency number ($FreNum_\alpha$) node α gets assigned.
$index$ = 0; $FreNum_\alpha$ = -1;
repeat
  Rnd_α = Random(ID_α, $index$);
  $Found = TRUE$;
  for *each node* β *in* α*'s two communication hops* **do**
    Rnd_β = Random(ID_β, $index$);
    if *(*$Rnd_\alpha < Rnd_\beta$*) or (*$Rnd_\alpha == Rnd_\beta$ *and* $ID_\alpha < ID_\beta$*);*
     then
      $Found = FALSE$; break;
    end
  end
  if $Found$ **then**
    $FreNum_\alpha = index$;
  else
    $index$ ++;
  end
until $FreNum_\alpha > -1$;

your algorithm as shown in Algorithm 2.

Class digram for Object Oriented program design can be included as shown in Figure 3.4.

A transition diagram should appear as depicted in Figure 3.5. Every diagram must be discussed in the body of the text. For example in the case of Figure 3.5 you should state what each of the yellow circle stands for and how the machine will transit between states for a given input.

A design algorithm represented using flowchart should be depicted as shown in Figure 3.6.

Hardware design can be presented as block digram in Figure 3.7.

Algorithm 2: Frequency Number Computation

Input: Node α's ID (ID_α), and node α's neighbors' IDs within two communication hops.
Output: The frequency number ($FreNum_\alpha$) node α gets assigned.

$index$ = 0; $FreNum_\alpha$ = -1;
repeat
  Rnd_α = Random(ID_α, $index$);
  $Found = TRUE$;
  for *each node* β *in* α*'s two communication hops* **do**
    Rnd_β = Random(ID_β, $index$);
    if *(*$Rnd_\alpha < Rnd_\beta$*) or (*Rnd_α == Rnd_β *and* $ID_\alpha < ID_\beta$*);*
    then
      $Found = FALSE$; break;
    end
  end
  if $Found$ **then**
    $FreNum_\alpha = index$;
  else
    $index$ ++;
  end
until $FreNum_\alpha > -1$;

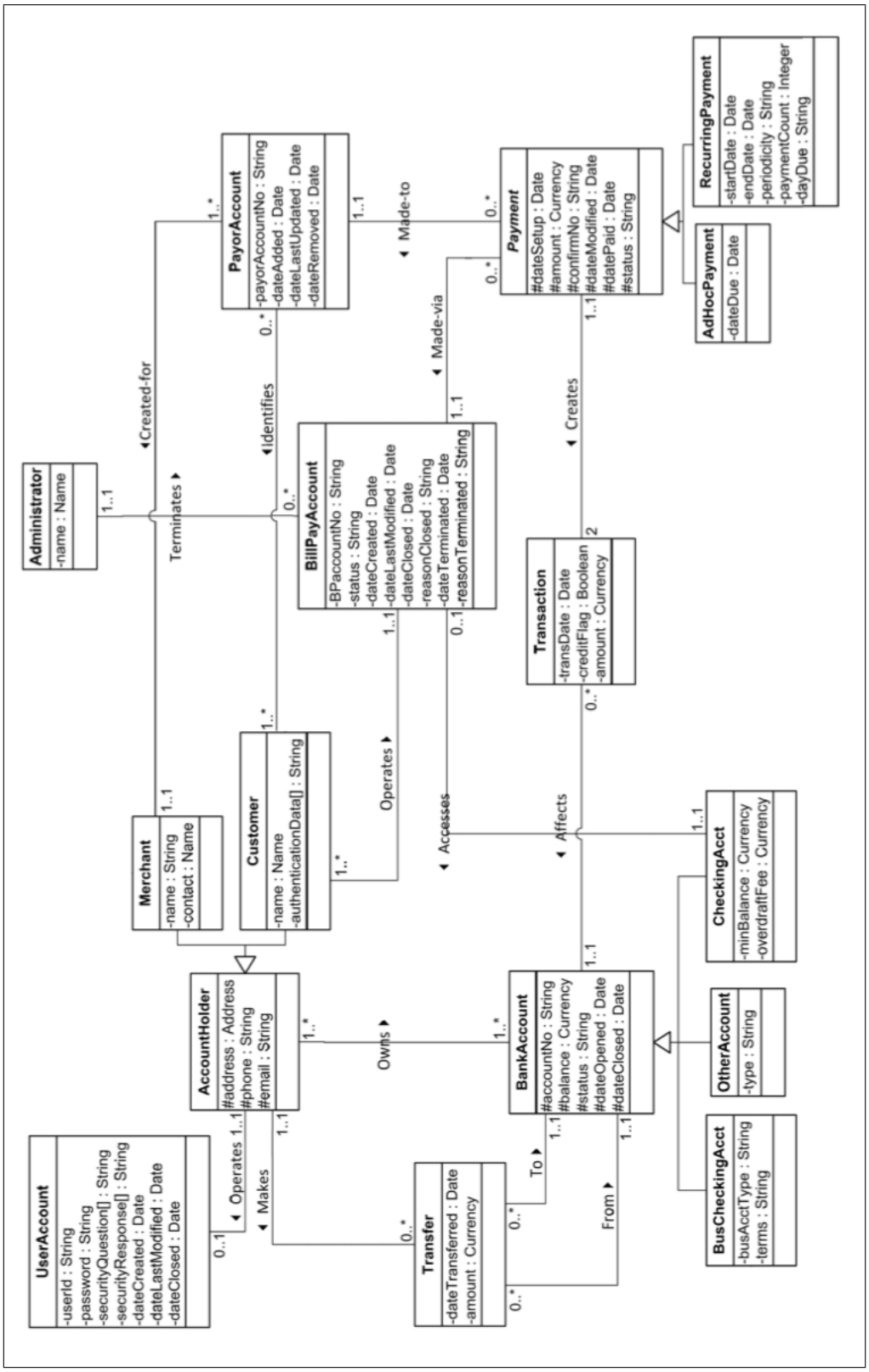

Figure 3.4: Class diagram for OOP Program

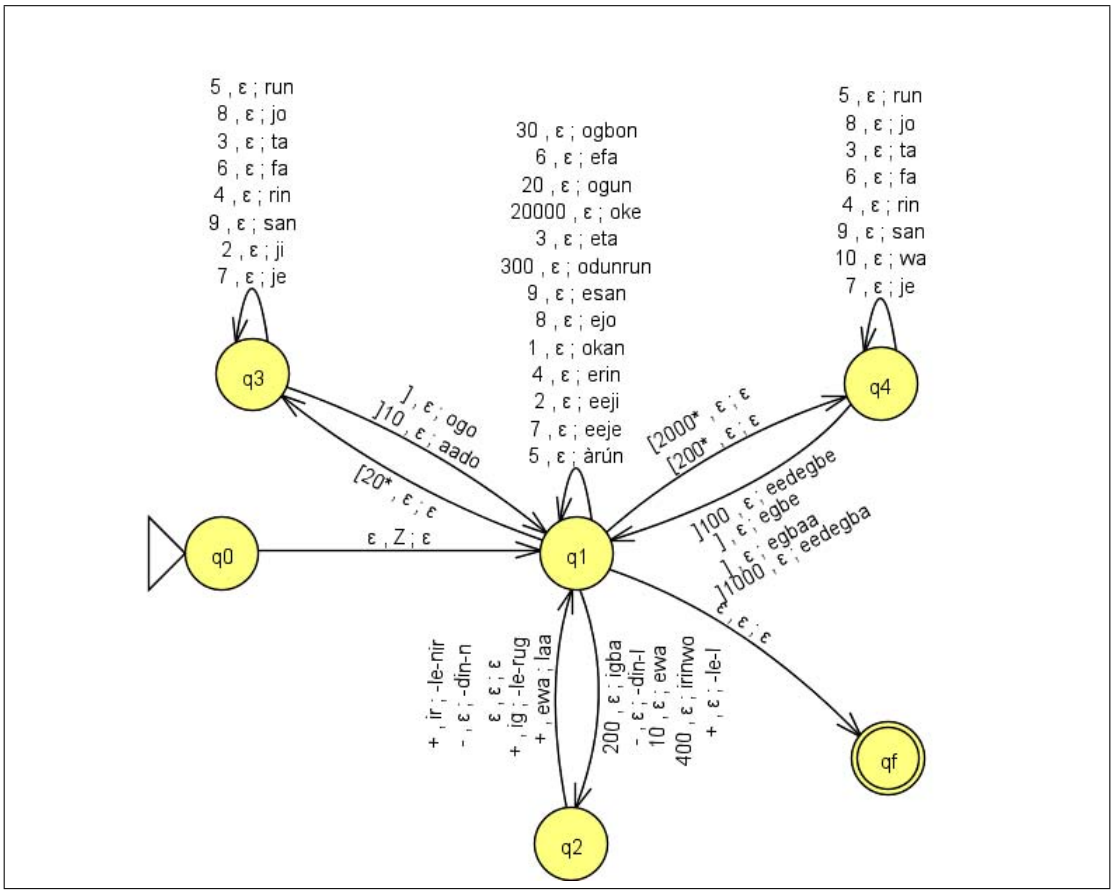

Figure 3.5: Transition Diagram for PDA

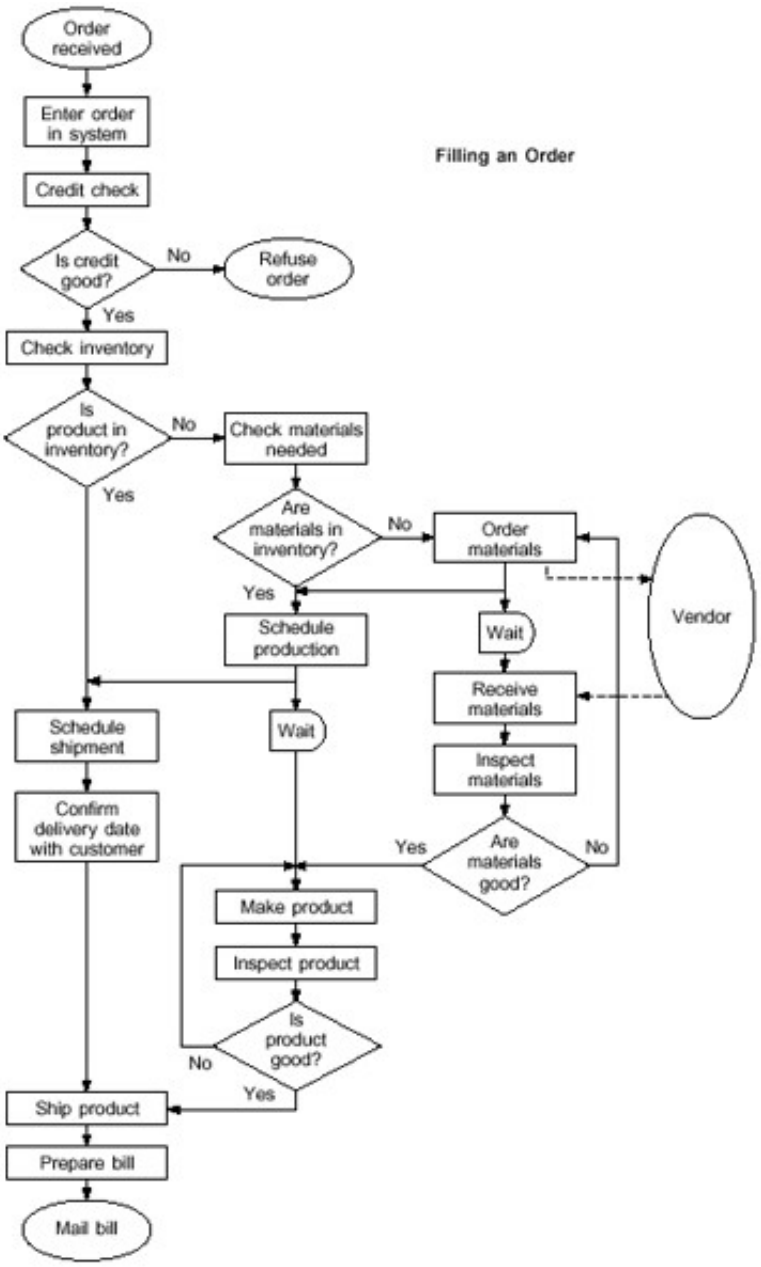

Figure 3.6: Flowchart of Program Design

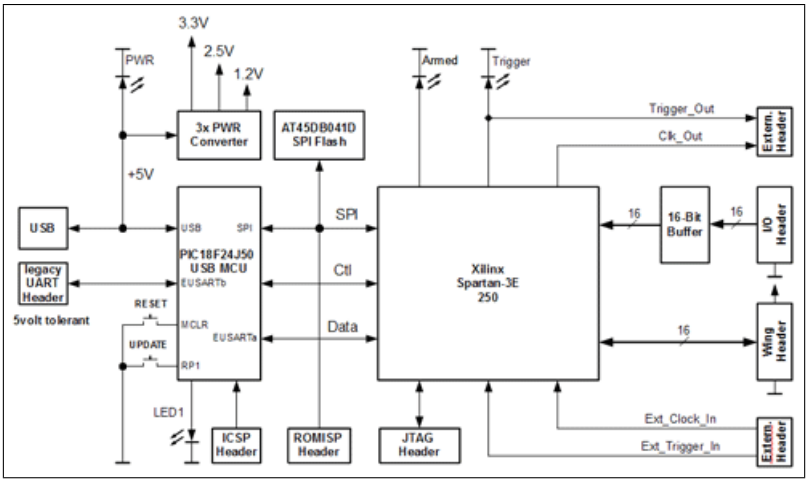

Figure 3.7: Block diagram of hardware system

3.5 System Implementation

You are now to document in details how you coded your program, did your simulation and/or hardware construction. The codes for the program modules that realise important aspects of your solution should be discussed here.

A user interface for the implemented program should appear as depicted in Figure 3.8. Every such diagram must be discussed in the body of the text. For example in the case of Figure 3.8 you should discuss each section of the interface and state how the program will respond for a given input.

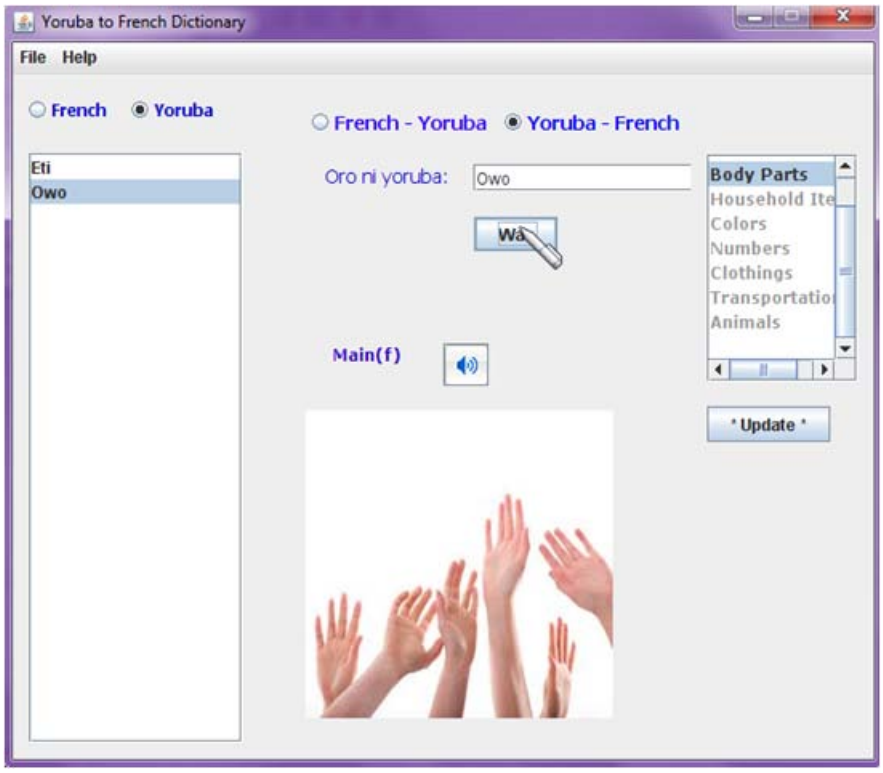

Figure 3.8: Implementation Interface

Image of hardware implementation can be included as shown in Figure 3.9.

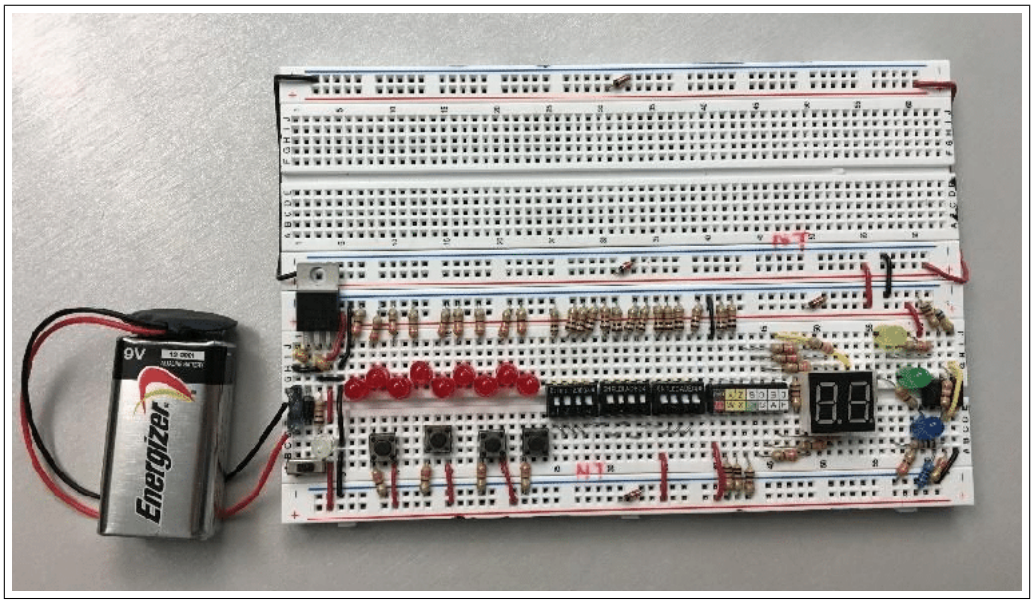

Figure 3.9: Breadboard of hardware system implementation

3.6 System Evaluation

You are now to document in details how you did your evaluation e.g. alpha-beta method, mean-opinion score, hardware performance characteristics, etc.

3.7 Chapter Summary

Summary of the contents of this chapter.

CHAPTER FOUR

RESULT AND DISCUSSION

4.1 Discussion of Results

Analyse and discuss the results you obtained as precisely as possible.

Result that include range of values should appear as depicted in Table 4.1.

Table 4.1: CPU Performance During Simulation

Tests cycle	CPU utilisation (%)	Average response time (Sec)
1.	30 – 40	6.0 – 8.0
2.	40 – 50	5.0 – 7.0
3.	50 – 60	3.0 – 5.0
4.	60 – 70	2.0 – 4.0
5.	70 – 80	1.0 – 3.0

4.2 Research Findings

Explain the interesting aspect of your findings and relate them with other findings in the literature. For PhD thesis, how the theory explains the result must be stated and demonstrated with incisive examples. Cases of problem that cannot be handle by the research solution approach must also be explained from a theoretical perspective.

4.3 Implication of Findings

Discuss the possible interpretation of your findings and applications to users or other researches. For example, the usefulness of your data in other researches; if so how and how do you intend to make it available to other researcher. Can your model be used to develop a working system, if so how will this be realised together with possible cost of deployment. What utility will the outcome of this research give to practical and theoretical activities in computing?

4.4 Chapter Summary

Summary of the contents of is chapter.

CHAPTER FIVE

SUMMARY AND CONCLUSION

5.1 Research Summary

Discuss the summary of your work in the context of what you documented in Chapter One.

5.2 Research Conclusion

Provide a conclusion to your problem-solving task in term of what you set out to do in your statement of research problem and what you have been able to achieve. State possible future direction for the work and general limitations that you are aware of.

END OF TEXT

REFERENCES

Akìwọ̀wọ̀, A. (1980). Ajobi and Ajogbe: Variations on the Theme of Sociation. Inaugural Lecture Series 46, University of Ife.

Buss, J. F., Rosenberg, A. L., and Knott, J. D. (1987). Vertex Types in Book-Embeddings. Technical report, Amherst, MA, USA.

Clarkson, K. L. (1985). *Algorithms for Closest-Point Problems (Computational Geometry)*. PhD thesis, Stanford University, Stanford, CA, USA. AAT 8506171.

Dingemanse, M. (2006). The Body in Yorùbá: a linguistic study. Available at http://ideophone.org/dl?id=3., Leiden University, Leiden. Retrieved on November 28, 2016.

Dreyfus, H. (1992). *What Computers Still Can't Do*. MIT Press, New York.

Fulga, A. (2012). Language and the perception of Space, Motion and Time. In *Concordia Working Papers in Applied Linguistics*, volume 3, pp. 1–12. COPAL-2012.

Geach, P. T. (1968). What Actually Exists. In *Proceedings of the Aristotlian Society*, volume 42, pp. 7–16.

Goossens, M., Rahtz, S. P., Moore, R., and Sutor, R. S. (1999). *The Latex Web Companion: Integrating TEX, HTML, and XML*. Addison-Wesley Longman Publishing Co., Inc., Boston, MA, USA, 1st edition.

Hollis, B. S. (1999). *Visual Basic 6: Design, Specification, and Objects with Other*. Prentice Hall PTR, Upper Saddle River, NJ, USA, 1st edition.

Lawal, B. (2008). Èjìwàpọ̀: The Dialectics of Twoness in Yorùbá Art and Culture. *African Arts*, 41(1):24–39.

Li, C.-L., Buyuktur, A. G., Hutchful, D. K., Sant, N. B., and Nainwal, S. K. (2008). Portalis: using competitive online interactions to support aid initiatives for the homeless. In *CHI '08 extended abstracts on Human factors in computing systems*, pp. 3873–3878, New York, NY, USA. ACM.

McCarthy, J. (2007). From here to human-level AI. *Artificial Intelligence*, 171:1174–1182.

Oládiméjì, B. A. (2012). Development of a Computational System for African Fractals Recognition. M.sc, Ọbáfẹ́mi Awólọ́wọ̀ University, Ilé-Ifẹ̀, Nigeria.

Olọ́runfẹ́mi, T. O. (2018). *A Computational Formulation of the Logic of Discourse in Yorùbá Language Automated Dialogue System*. Ph.d, Ọbáfẹ́mi Awólọ́wọ̀ University, Ilé-Ifẹ̀, Nigeria.

Olóròdé, O. (2016). Some Sayings and proverbs in Yorùbá. Personal communication.

Saeedi, M., Zamani, M. S., and Sedighi, M. (2010). A library-based synthesis methodology for reversible logic. *Microelectron. J.*, 41(4):185–194.

Turing, A. M. (1950). Computing Machinery and Intelligent. *Mind*, 59(236):433–460.

APPENDIX A

GLOSSARY OF SYMBOLS AND ACRONYMS

Here you are to list all symbols and acronyms used in the text of this thesis and give their description as depicted in Tables A.1 and A.2, respectively.

Table A.1: List of Symbols

Symbols	Description
Σ	A non-empty, finite set of symbols representing the alphabet of a language
V	The vocabulary a language
$\langle G \rangle$	The grammar of a language
$L(G)$	The language whose structure is defined by the grammar G
$\not\mathbb{N}$	The symbol of Naira, the Nigerian currency.
$\exists x$	The symbol for "it is possible to find an instance of x".
$\forall x$	The symbol for "For all instances of x".
$f : A \to B$	f is a function with domain A and codomain B.
$f(x)$	Image of x under the function $f()$.
$B = f(A)$	Equation mapping domain A to codomain B using function $f()$.

Table A.2: List of Acronym

Acronyms	Description
WYTIWYG	What You Think Is What You Get
ASCII	American Standard Code for Information Interchange
WYSIWYG	What See Think Is What You Get
AMSTrans	American Mathematical Society Translations
CACM	Communications of the ACM
CompServ	Computing Surveys
ACMMathSoft	ACM Transactions on Mathematical Software
ApplMathComp	Applied Mathematics and Computation
CompJour	The Computer Journal
CompSysSci	Journal of Computer and System Sciences
Computer	IEEE Computer
IEEETransComp	IEEE Transactions on Computers
IntSuper	International Journal of Supercomputing Applications
SoftPracExp	Software Practice and Experience

APPENDIX B

RESEARCH DATA

This Appendix will document research data that are not contained in the body of the thesis. All the data you used, that is not presented in the body of the thesis, must be placed here. The format of the data must be stated: (i) Plain text, (ii) Markup text e.g XML, HTML. The structure of the data must be stated as well.

APPENDIX C

SOURCE CODE LISTINGS

This Appendix should contain the source code of your programs.

It is expected that your source code document will be large. So print it in *small* font (i.e font size 6) and affix a Compact Disc containing the entire program source code in the last page of this Appendix.

APPENDIX D

SAMPLE OUTPUTS

This Appendix should contain sample program outputs, user interface images or mockups for software development. In the case of hardware this will be images or picture of stages in hardware system or construction operations.

APPENDIX E

LITERATURE REVIEW TABLE

This Appendix should contain the literature review table you constructed during this research. A literature review table is a Table containing six(6) column for each of the relevant and core literature sources that you used in this research. These columns are: (1) Serial number, (2) Citation, (3) Problem addressed, (4) Methodology, (5) Result, and (6) Comment/Remark. Table E.1 is an example of a literature review table. The literature review table is best presented in landscape.

Table E.1: Literature Review Table

Ser.No	Citation	Problem	Methodology	Result	Comment
1.	Alade(2015)	Developed a system for animating folk-tale	Digitisation of images and deploying theory of motion using story work-bench.	Woking animation for selected tales	The approach for data collection can be applied here but the aim of this research is to develop a generic animator for various genre of narratives