Imus Institute of Science and Technology

UNDERGRADUATE THESIS

Assessment Software

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A thesis submitted in fulfillment of the requirements
for the degree of BS in Electronics Engineering

in the

Engineering Department

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Declaration of Authorship

I, John Jeruel TIONGCO, declare that this thesis titled, "Assessment Software" and the work presented in it are my own. I confirm that:

- This work was done wholly or mainly while in candidature for a research degree at this University.
- Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated.
- Where I have consulted the published work of others, this is always clearly attributed.
- Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work.
- I have acknowledged all main sources of help.
- Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself.

Signed:

Date:

Imus Institute of Science and Technology

Abstract

Engineering Faculty
Engineering Department

BS in Electronics Engineering

Assessment Software

by John Jeruel TIONGCO

The project aims to explore the possibility of modernizing assessment procedures via software developed using industry standards such as AGILE, UP, UML and many others. The paper can treated as a *blue print* and the *alpha version* of the software a *proof of concept*. The paper also contains many software development artifacts such as a *use case model*, *class diagrams*, *interaction diagrams*, and many other models.

This project does not aim to, first, justify the existence of the project by presenting a robust *business case*. Second, produce a software up to its *end of life-cycle*.

Acknowledgements

First, I would like to thank Engr. Berone Bunyi, my advisor, for guiding the project and providing support at every turn.

To Engr. Arnold Balbuena as my mentor and father of the engineering department.
To Engr. Gilbert Laguardia for providing feedback during initial presentation.

To Aleli Benzon for proof reading and providing suggestions to improve readability.

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List of Abbreviations

LAH	**L**ist **A**bbreviations **H**ere
WSF	**W**hat (it) **S**tands **F**or

To Aleli, Bambam, Pimpim, and my Family, Thank you. . .

Preface

The Preface is an optional read but contains vital information on how the paper was structured, the resources used in creating the software and writing th paper itself, and finally additional resources such as the online repository of the project.

Structure of the Paper

Although the paper is labeled as thesis it is virtually a capstone project. This is more evident when the only requirement given is that it should have a prototype. And so the suggested format from the article "Guidelines in Writing Design Project / Research Project Proposal" doesn't seem to frame the project properly. Be that as it may, in order to comply and frame the project properly, I superimposed the *Universal Process Phases:***Inception, Elaboration, Construction, and Transition** over the suggested format in the following manner:

Chapter I–The Problem and Its Setting *superimposed with* Inception – Contains the subsections *Vision, Business Case, Supplementary Requirements, Use-case Model,* and *Iteration Plan* which replaced the subsections *Introduction, Statement of the Problem, Objectives of the Study, Importance of the Study,* and *Scope and Limitations of the Study* respectively. The lack of the subsections *Definition of Terms* and *Conceptual Framework* is addressed on the next chapter.

Chapter II–The Problem and Its Setting *superimposed with* Elaboration Pt. 1 – This chapter completely deviates from the suggested format since there are no hypothesis to prove or a conclusion to draw. There are also no conceptual framework on which the project can be framed into. Instead this chapter is spent on creating that *conceptual domain* with the help of a *class diagram* in **UML**.

Chapter III–Methodology *superimposed with* Elaboration Pt.2 and Construction – description

In addition the manual of the software can be found in "Cross Ref" appendix

Software, Standards, and Technology Used

Below is a table enumerating all the software, standards or languages, and other technologies used in the creating the software and the paper itself.

TABLE 1: Resources Used in the Project

Resource	Function	Link
Qt5	UI IDE	some link

Repository

Repo Link

Chapter 1

Inception

Objectives

- Establish what the software should be. Possibly what it will be in the future
- test

1.1 Vision

Revision History

Date	Version	Description	Author
June 20, 2021	Draft	Initial vision for the project.	John Jeruel TIONGCO

1.1.1 Introduction

The purpose of this document is to collect, analyze, and define high-level needs and features of the *Assessment Software*. It focuses on the capabilities needed by the stakeholders, and the target users, and why these needs exist. The details of how the *Assessment Software* fulfills these needs are detailed in the use-case and supplementary specifications.

1.1.1.1 Reference

See `Glossary`

1.1.2 Positioning

1.1.2.1 Problem Statement

problem of	The lack of modernization in assessment
affects	Test makers and test takers
the impact of which is	That there is too much manual labor that can otherwise be automated through software.
a successful solution would be	Create a software that can automate assessment, reducing time spent and improving the integrity of the results.

1.1.2.2 Product Position Statement

For	Individuals or small to medium size organizations.
Who	Wish to automate assessment procedures.
Assessment Software	Is an *open-source* software product.
That	That can automate assessment such as testing and evaluating.
Unlike	Expensive web-base XaaS solutions which are complicated to use. Or general document editing programs which lacks essential features.
Our Product	Is simple. Doesn't require programming skills to use or extensive hardware resources. Can be used *off-line*. And intended for personal and small scales use.

1.1.3 Stakeholders and User Descriptions

1.1.3.1 Stake Holder Summary

Name	Represents	Role
Developer	As of now represents the entirety of the project	Main source of funds and does everything in the project, from requirement, analysis and design, implementation, testing, deployment to project management
End-user	Represents individuals who wants to use the software, mainly me	Uses the software

1.1.3.2 User Summary

Name	Description	Stakeholders
Test makers	Creates question banks and generates test Administers test.	Self-represented
Test takers	Takes the test	Self-represented
Evaluators	Evaluates the results and draws conclusions.	Self-represented

1.1.3.3 User Environment

Assessment is a lengthy process and tedious at times. Often the purpose of assessment is missed altogether and *passing the test* becomes the priority. This leads to assessment being reduced to a compulsory *formality* instead of a tool for learning.

Users are expected to have at least a relatively *low-end PC* in order to use the software. Internet connection is not required in the operations but might be needed in updating the software.

1.1.3.4 Key Stakeholder or User Needs

The *needs* provided in these section is generated by myself as I am the first *end-user* of the software. As it moves further in development I might elicit new needs from future stake-holders and end-users.

Need	Priority	Concerns	Current Solution	Proposed Solution
Automatic test generation	High	**Manual test creation is tedious and time consuming**	No current solution	Employ the use a question bank and automatically generate a test questionnaire
Automatic test checking	High	**Software should be able check test answers**	No current solution	Answers are of course included with test item so checking the answer can be automated
Digitized test results	Low	**Manual recording is time consuming and laborious**	No current solution	Test results are converted to a spread sheet readable format like **.csv** or can be pipe-lined to a **DBMS**. alternatively an evaluation module can made for the software
Able to run on a low-end PC	Medium	**I have a *potato* laptop**	No current solution	Develop for low-end PC
Usability Requirements	Low	—	No current solution	Will be addressed in the *UI Mock-ups*
Technical support needs	Low	—	No current solution	Will be addressed during deployment stage

1.1.3.5 Alternatives and Competition

The only true open-source program that can be considered a competition for this project is a *computer-based testing* software called **TCExam**. TCExam is a platform type software that must be run using a web-server. I wouldn't deny the fact that TCExam outclasses this project but in my opinion it fulfills a different niche than what Assessment Software is trying to fill.

For alternatives, there are open-source documents editors such as **Libre Office: Writer**, **Google Docs and Google Forms**, etc . . .. These software are intended for general use and lack the main features that address the needs of the end users.

1.1.4 Product Overview

1.1.4.1 Product Perspective

Assessment Software is planned to be a standalone software although it would use Qt5 GUI API for its *UI* it's back end architecture would be designed from scratch.

1.1.4.2 Assumption and Dependencies

No dependencies to other systems as of this version.

1.1.5 Product Features

Will be provided at Chapter 2

1.1.6 Other Product Requirements

None for this version

1.2 Business Case

One of the goals in the inception phase is to determine whether a new system is feasible and worth exploring. "feasible" is straight forward, while "worth exploring" is somewhat vague. To clarify the term, by saying a project is worth exploring is tantamount to saying the project is profitable. By creating a *business case* both those **risk**, as they are termed in the industry, are analyzed and ultimately justified. But as it stands I find that building a *business case* for this project to be redundant.

1.2.1 Rationale for Leaving Out Business Case

The rationale for leaving out *business case* is that both questions asked in this section already has answers. Yes, the project is feasible, it has to be, otherwise the project would be canceled[1]. Is the project profitable? The question is invalid since the project is meant to be *open-source*. Now the question is "Is it valid to leave out the building the business case for the project?". Yes, it is perfectly valid[2]. An artifact's function is to serve as utility for the project or the development of a program. In this case building a *business case* doesn't provide any utility and will only consume resources.

In addition *business cases* are a project by themselves. It may contain sections such as *executive summary, problem statement, analysis of the situation, solution options, cost-benefit analysis, etc.*... It is best that such studies and analysis are left to those who have expertise in the subject matter[3]. As an engineering student I think such endeavors is out of my field of study.

1.3 Supplementary Requirements

Some requirement used

[1] The paper is an undergrad course requirement. The student of course has to fund it to complete the course.

[2] biblio craid larman

[3] Say students of business disciplines such as BS Accountancy or BS Business Management

1.4 Use-case Model

Text Model of most important use case

1.5 Iteration Plan

Contains the story map from project

Chapter 2

Elaboration Pt. 1

Objectives

- Establish what the software should be. Possibly what it will be in the future
- test test test test test test test test test test test test test test test test test test test test

2.1 Main Section 1

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Chapter 3

Elaboration Pt.2 and Construction

3.1 Main Section 1

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Appendix A

Frequently Asked Questions

A.1 How do I change the colors of links?

The color of links can be changed to your liking using:

`\hypersetup{urlcolor=red}`, or
`\hypersetup{citecolor=green}`, or
`\hypersetup{allcolor=blue}`.

If you want to completely hide the links, you can use:

`\hypersetup{allcolors=.}`, or even better:
`\hypersetup{hidelinks}`.

If you want to have obvious links in the PDF but not the printed text, use:

`\hypersetup{colorlinks=false}`.

Bibliography

Arnold, A. S. et al. (Mar. 1998). "A Simple Extended-Cavity Diode Laser". In: *Review of Scientific Instruments* 69.3, pp. 1236–1239. URL: http://link.aip.org/link/?RSI/69/1236/1.

Hawthorn, C. J., K. P. Weber, and R. E. Scholten (Dec. 2001). "Littrow Configuration Tunable External Cavity Diode Laser with Fixed Direction Output Beam". In: *Review of Scientific Instruments* 72.12, pp. 4477–4479. URL: http://link.aip.org/link/?RSI/72/4477/1.

Wieman, Carl E. and Leo Hollberg (Jan. 1991). "Using Diode Lasers for Atomic Physics". In: *Review of Scientific Instruments* 62.1, pp. 1–20. URL: http://link.aip.org/link/?RSI/62/1/1.