MOBILE APPLICATION:

THE DEVELOPMENT OF MOBILE GAMIFICATION FOR PROGRAMMING TECHNIQUE SUBJECT (Pro-Programming)

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This report submitted in partial fulfilment of the requirement for the Bachelor of Computer Science (Interactive Media)

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
UNIVERSITI TEKNIKAL MALAYSIA MELAKA
2017

BORANG PENGESAHAN STATUS TESIS

JUDUL: THE DEVELOPMENT OF MOBILE GAMIFICATION FOR PROGRAMMING TECHNIQUE SUBJECT (Pro-Programming)

SESI PENGAJIAN: 2016/2017

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Tarikh: 15/08/2017

DECLARATION

I hereby declare that this project report
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THE DEVELOPMENT OF MOBILE GAMIFICATION FOR PROGRAMMING TECHNIQUE SUBJECT
(Pro-Programming)

is written by me and is my own effort and that no part has been plagiarized without citations.

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DEDICATION

This project is dedicated to my father, who taught me that the best kind of knowledge to have is that which is learned for its own sake. It is also dedicated to my mother, who taught me that even the largest task can be accomplished if it is done one step at a time. To my supervisor, Dr. Siti Nurul Mahfuzah, who is the backbone of this project and who keep guiding me from the beginning until the end of this project. To my evaluator, Pn. Shahrul Badariah who gives a good advices and feedback on this project. Last but not least, to all of my beloved friends who help me to stand still until I finish my project.

ACKNOWLEDGEMENT

In the Name of Allah, the Beneficent, the Merciful

First praise is to Allah, the Almighty, on whom ultimately we depend for sustenance and guidance.

Secondly, my sincere appreciation goes to my supervisor Dr. Siti Nurul Mahfuzah whose guidance, careful reading and constructive comments was too valuable. Her timely and efficient contribution helped me shape this into its final form and I express my sincerest appreciation for her assistance in any way that I may have asked.

Next, my deepest gratitude goes to my family especially to my mom who always give her endless suppport every single day and every single night to me.

I also wish to thank the Faculty of Information and Communication Technology, its leadership and the staff for providing me with an academic base, which has enabled me to take up this study.

I am also indebted to my friends. I would like to take this opportunity to say warm thanks to all my beloved friends, who have been so supportive along the way of doing my project.

Last but not least, a special thanks, tribute and appreciation to all those their names do not appear here who have contributed to the successful completion of this study.

ABSTRACT

Games are part of daily life. It is entertaining but at the same time act as a modelling behavior too. By applying game mechanics and dynamics to tasks and learning processes we can increase user engagement with a learning application and its specific tasks.This project aims to identify how a gamified learning approach influences programming learning, achievement and motivation, through a context-aware mobile learning environment. While having multiple uses in commercial practices, gamification implies well established techniques similar to those found in games. We will take a closer look at the ones that are appropriate to the learning process and moreover to the m-learning and analyze relevant examples.

ABSTRAK

Aplikasi permainan adalah sebahagian daripada kehidupan seharian. Ia menghiburkan tetapi pada masa yang sama bertindak sebagai perihal model. Dengan menggunakan mekanik permainan ke atas tugas-tugas tertentu dalam proses pembelajaran, kita boleh meningkatkan penglibatan pengguna dengan aplikasi pembelajaran dalam sesuatu projek. Ini adalah bertujuan khusus untuk mengenal pasti bagaimana pendekatan pembelajaran dalam mekanik permainan mampu mempengaruh pembelajaran pengaturcaraan, pencapaian serta motivasi, melalui pembelajaran mudah alih. Selain mempunyai pelbagai kegunaan dalam amalan komersial, aplikasi pembelajaran menggunakan mekanik permainan ini turut menggunakan teknik yang sama dalam aplikasi permainan sebenar. Kita akan melihat dengan lebih dekat pada subjek yang sesuai dengan proses pembelajaran tersebut terutamanya kepada "m-learning" serta menganalisis contoh yang relevan.

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CHAPTER I

INTRODUCTION

1.1 Introduction

This chapter will show the general overview and the background of this project with the title “Development of Mobile Gamification for Programming Technique Subject”. The short name for this mobile application is Pro-Progamming due to the subject chosen which is a Programming Technique subject. The mobile application that want to be build is about changing the old learning process through gamification element in order to make the learning more fun.

Gamification is the concept of applying game mechanics to engage and motivate people to achieve their goals. Gamification taps into the natural desires and needs of the users impulses which revolve around the idea of achievement while competition is another technique that will appear along the way. The human desire of appearing on the leaderboard drives players to complete more tasks, in turn fueling deeper engagement.

A mobile application is a computer program designed to run on smartphones, tablet computers and other mobile devices. With the massive growing of technology, almost all students own at least one mobile gadget. Mobile app has become a convenient tool for the students to access information. A mobile app with the combination of useful information that include gamification technique will make the students understand in a more effective way.

Students who are interested in pursuing their studies in the Programming Technique subject might want to get a good result but not to be stressed out at the same time. Instead of browsing the useful information on the slides, having a mobile application consist all of the information as well as gamification will be so much more convenient.

1.2 Problem Statements

Based on the previous experience, students who take Programming Technique subject are usually difficult to get good grades. Lack of Interest and motivation to continue learning (González et al, 2014). To make sure the majority of the students understand about the Programming Technique subject , solution need to be done by examine the behaviour study of the students.

In addition, the traditional website consists of useful information. However students and lecturers are not able to access the information when they are offline. Past research also showed that less engagement among students in building knowledge because often times the students are treated as ordinary technology users (Tan, 2013). Solution of accessing this information freely is needed to overcome this situation.

On the other hand, the lecturer usually teach in a big class that contain with so many students. They barely known the status of their students on helping them in getting a good result. Few researchers stated that gamification has the potential for a positive impact on performance, productivity, and user engagement (Simoes et al, 2013).

1.3 Objectives

This project emphasis on the following objectives:

i. To identify the problems that students faced in understanding Programming Technique subject .

ii. To develop a mobile application (Pro-Programming) consists of useful information about Programming Technique subject using gamification leaderboard.

iii. To evaluate the effectiveness of this mobile application to the user.

1.4 Scope

The project scope is based on the 50 questionnaires that has been done among the students and the lecturers on selecting the chapter from BITP 1113 Programming Technique subject. There are 12 chapters for BITP 1113 Programming Technique subject but only one critical topic is selected to be implement in this project. The chapter that has to be covered is Repetition.

1.5 Project Significant

This mobile application is built for the next generation of students. The purpose of this project is to make them understand about the Programming Technique course. This mobile application follow the current technology and the new style of learning with using gamification. Now, everyone can use their smartphone by training themselves in getting a good grade in this course.

1.6 Expected Output

From this mobile application, learning process for the Programming Technique course become more effective. Some of the functions that will be implement are view profile, reading materials, answer quiz, comment in forum, and display scores. This way of learning will make the students well prepared on getting a good result.

1.7 Conclusion

The project will teach the future students about the Programming technique course before they passes their exam or even implement the real basic programming system. Through the notes, they will be information about the situation and condition of Programming Technique course. Through the quiz, students will train themselves on getting a good grade. Through the forum, everyone can have an informal discussion wherever and whenever they want. Through the scores, the students will have a desire on competing their friends in a healthy way. There are few elements of multimedia for the development of this mobile application. The next chapter will explain about literature review and project methodology.

CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

This chapter will discuss on two topics; literature review and project methodology. Literature review shows the research that related to this project. It shows the target of the mobile development.

The research that found is about learning process. People still use the old version style of learning such as reading books. Using mobile application is the new way to interact people to learn something new.

In the methodology it shows the technique that use to develop this mobile application. The methodology that suitable for this project is ADDIE model. It acts as guider when developing this project. There are five phases in ADDIE model which is analysis phase, design phase, development phase, implementation phase and evaluation phase

2.2 Domain

The domain for this project is education and learning using mobile learning technology. The topic of this project is about critical subject that has been faced by the

students in the Programming Technique course.

Mobile learning that is enhanced with mobile tools and mobile communication which is the people can learn anywhere and anytime. Many people see it as a follow-up of e-learning, where computer an internet in used for education.

Traditional tools in use are bored and not effective for several people while modern teaching tools included multimedia and animation that can make student attracted and learn in an effective way (Gitanjali Banerjee, 2011)

2.2.1 Mobile Learning

M –learning is the modern form of learning which help people to learn and studies at anywhere and anytime. Using portable computing devices with wireless networks enables mobility and mobile learning, allowing teaching and learning to extend to spaces beyond the traditional classroom. Within the classroom, mobile learning gives instructors and learners gives interaction.

One of the mobile technologies appearance is their availability, where mobile devices can be accessed much more easier than the desktops. Plus, students enjoy a little access to those desktop computers. For example, universities provide many computer facilities located in the lab. But, most of these computer labs are unavailable for self-access due to the fact that they are almost constantly reserved for teaching classes.

Nowadays, most of the people have at least one desktop computers at home but the fact is it is usually shared between family members. Mobile devices outnumber desktop computers 5 to 1 (Cohen A.Japan, 2012). This lack of exposure and the complexity of desktop computers means that a solution of mobile learning will be effective to the students.

2.3 Existing System

2.3.1 Comparison of Existing System

Table 2.1 Comparison Table

JVM Programming Language	Treehouse : Learn Programming and Design	Pro-Programming
Has dull interface	Has interactive interface	Has interactive interface
Can display real coding build	Can display real coding build	Coding build based on quiz questions
Learn through notes	Learn through videos	Learn through videos
No gamification technique	No gamification technique	Implement gamification technique
User is not allow to ask questions	User is not allow to ask questions	User can asks questions
The content is most important	The content is most important	The way information is processed and used is most important.

2.4 Project Methodology

Project methodology need to be defined before developing a project. The methodology used in the research is ADDIE Model as shown in Figure 2.1. There are five phase in ADDIE Model which are analysis phase, design phase, developer phase, implementation phase and evaluate phase

Figure 2.1 : ADDIE Model

2.4.1 Analysis Phase

Information is gathered about the intended audience, the challenges that exist, the task to be completed, the delivery options, and the learning objective. For this mobile application, the analysis phase involve the problem statement, target user, literature review, project methodology, project hardware and software requirement. In order to gather the analysis data for this mobile application, questionnaire is collected among the students and lecturers based on the problems that the subject has been faced during the Programming Technique course learning. All of the information is gathered by collecting the data from the 50 sets of questionnaires.

2.4.2 Design Phase

From the information in the analysis phase, it creates an outline of instructional strategies. The design should be sequential and logical. Therefore, all of the data in the analysis phase will be used to determine the content for the entire project. In this phase, system architecture, preliminary design, user interface design, and navigation design are determined.

2.4.3 Development Phase

Based on all of the information gather in analysis and design phase the creation and assembly of the material and activities will be utilized in this phase. Pro-Programming content is developed according to the exact syllybus of the real teaching course. In this phase, the software that will be used to develop this mobile application is by using Intel XDK. For the designing in user interface, Adobe Illustrator CS6 and Adobe Photoshop CS6 are used while for the video development, free software tools is used, named Powtoon.

2.4.4 Implementation Phase

After done build the mobile application, the encompasses review and testing is done to ensure that the reference material, workshop activities, equipment, tools and software are ready for training and follow by learners participation in the instruction such as this project will be compile into specific device and platform to be tested by target user. If a problem occurs, the problem found will be repair.

2.4.5 Evaluation Phase

This project is ready to the final testing and assessment of program intended to ensure the training and content achieved the learning objectives. This project will be tested to ensure its effectiveness to the user and achieved the objective.

2.5 Project Requirement

All the software and hardware needed for this project will be identify in this part. This will be the platform used the project is complete.

2.5.1 Software Requirement

Below are the list of software that required for developing and delivering this project:

i. Operating system Windows 10
ii. Adobe Illustrator CS6
iii. Adobe Photoshop CS6
iv. Kingsoft Writer
v. Kingsoft Presentation
vi. Microsoft Visio 2010
vii. Intel XDK
viii. Smartgreen Server
ix. Database MySQL
x. PhpMyAdmin

2.5.2 Hardware Requirement

Below is the list of hardware requirement for developing and delivering this Project:

i. A set of personal computer with intel Pentium 4 or higher
ii. RAM 512mb or higher
iii. Hard Disk minimum 80bg.
iv. Printer
v. Scanner
vi. Mobile Phone

2.6 Conclusion

As a conclusion, this chapter discussed about the literature review and project methodology. There are five parts which are introduction, domain, existing system, comparison of existing system, project methodology and project requirement. In introduction part, it explains about literature review and project methodology. In domain part it discussed about the suitable domain to use for this Project. The existing system part discussed about the existing system that have similar domain through case study and related of research. ADDIE Model is used for project methodology. Lastly, the software and hardware requirement that used in this project are listed in project requirement part. The next activity that need to be developed will be discussed in chapter 3, the analysis report writing.

CHAPTER III

ANALYSIS

3.1 Introduction

This chapter will discuss about the analysis for this project. It is importance to understand the user requirement and the system requirement during the analysis phase. This chapter also will be explain the finding and the fact of the project.

3.2 Current Scenario Analysis

The current scenario of analysis is to approach Programming Technique course as a platform in mobile application through gamification leaderboard.

Starting with Blackberry, the leader in market share, the results show that out of the top 100 paid and top 100 free apps, there are no education apps, although an education category does exist (Blackberry, 2010). For the iPhone, the situation is different. Among the Top 200 paid apps in the iPhone app store, there are five education apps:

43. My very first app ($0.99),
51. Star Walk - 5 stars astronomy guide ($2.99),
81. Ace Flashcard ($0.99),

152. Cookie Doodle (0.99), and

177. Wheels on the Bus ($0.99).

(Apple, 2010)

For the top 200 free apps in the iPhone app store, there is only one education app: 64. American Museum of Natural History: Cosmic Discoveries (Apple, 2010). Unfortunately, there is no education category in the Android platform, so no results were found (Android, 2010).

In Study 2, breakdown and percentage data were collected for categories of top applications in each app store. The results for each app store are listed in Figures 1-3. Results show that games and entertainment apps are the highest rated applications across all three platforms.

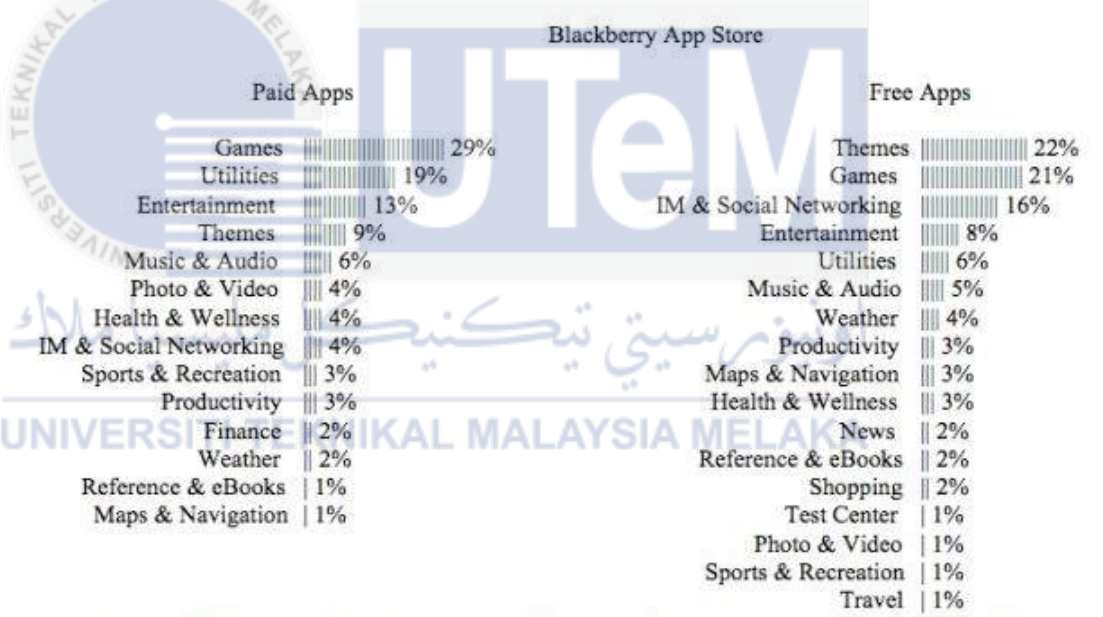


Figure 1. Top 100 Blackberry Paid and Free Applications. Each | mark represents one application (Blackberry, 2010).

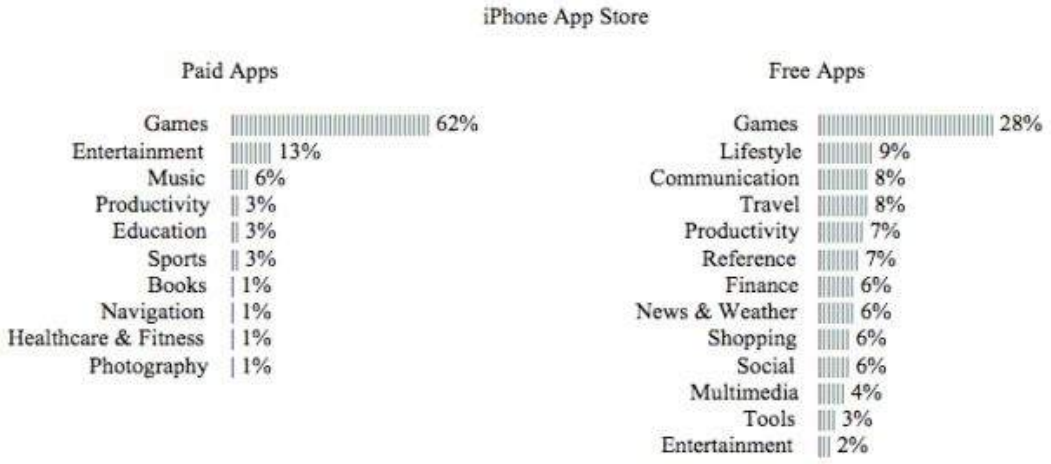


Figure 2. Top 70 Apple iPhone Paid and Free Applications. Each | mark represents one application (Android, 2010).

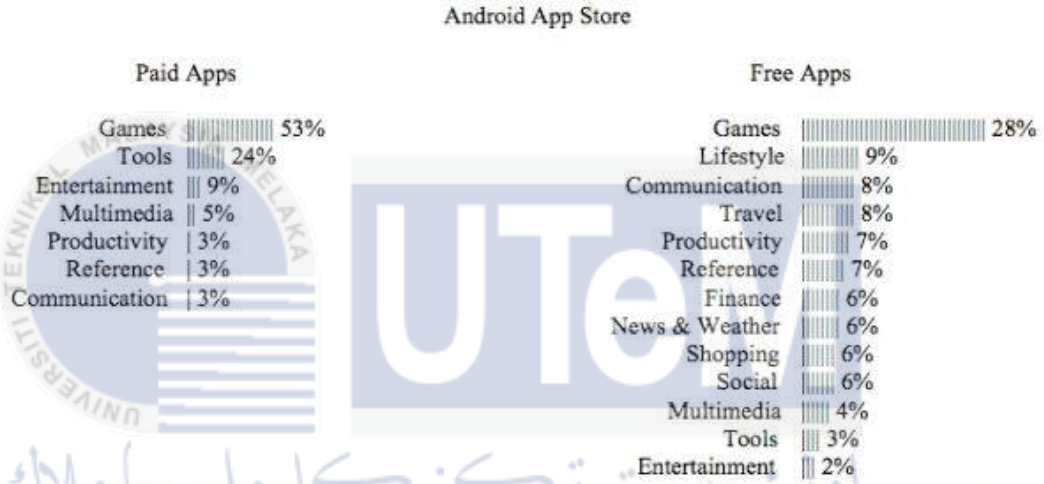


Figure 3. Top 34 Android Paid Applications and Top 134 Android Free Applications. Each | mark represents one application (Apple, 2010).

After looking at the case study, by developing an education mobile app through gamification technique will be a very good idea in improving the education approach.

3.3 Software Requirement

Below is the listed software that used for development this project.

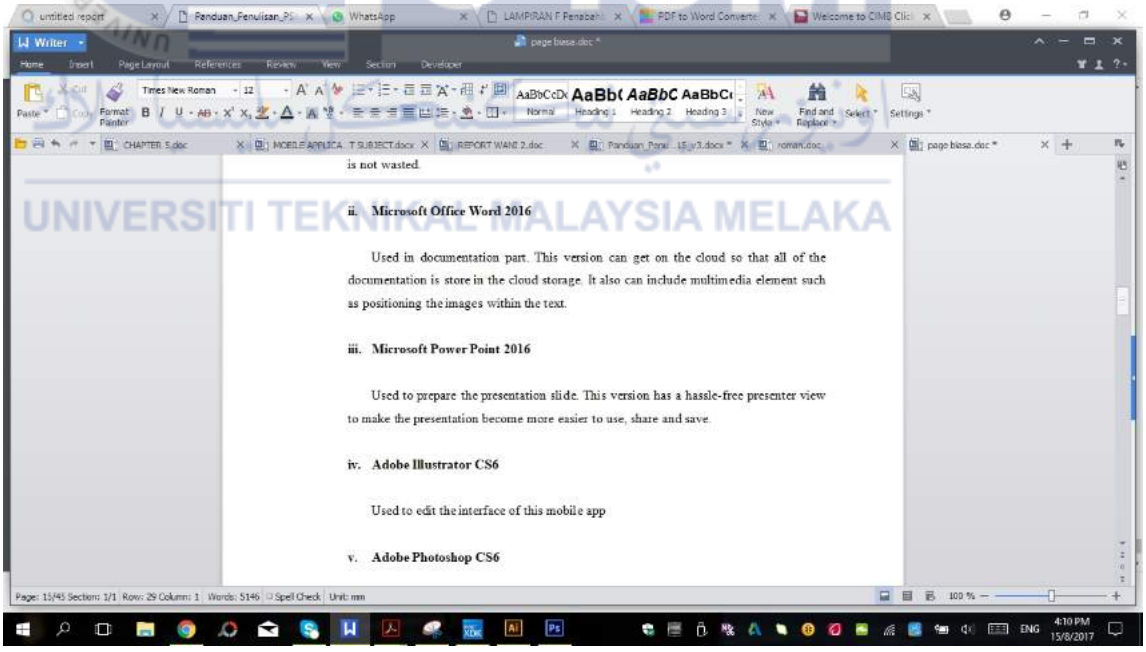
i. Windows 10

It has continuous update to overcome any problem that happen in the previous version. Plus, it is also unified across devices which means windows 10 is able to work seamlessly across the devices, such as Xbox One or Windows Phone. It is less storage used and is better system restore to ensure performance is maintained and storage space is not wasted.

ii. Microsoft Office Word 2016

Used in documentation part. This version can get on the cloud so that all of the documentation is store in the cloud storage. It also can include multimedia element such as positioning the images within the text.

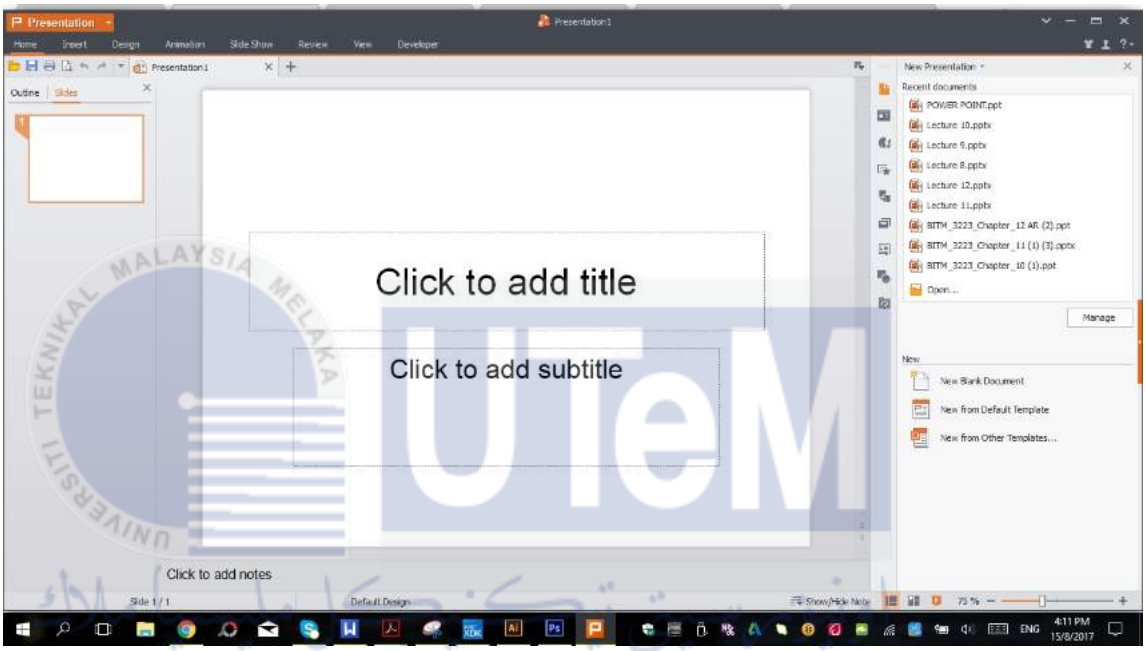
Figure 3.1 Microsoft Office Word 2016



iii. Microsoft Power Point 2016

Used to prepare the presentation slide. This version has a hassle-free presenter view to make the presentation become more easier to use, share and save.

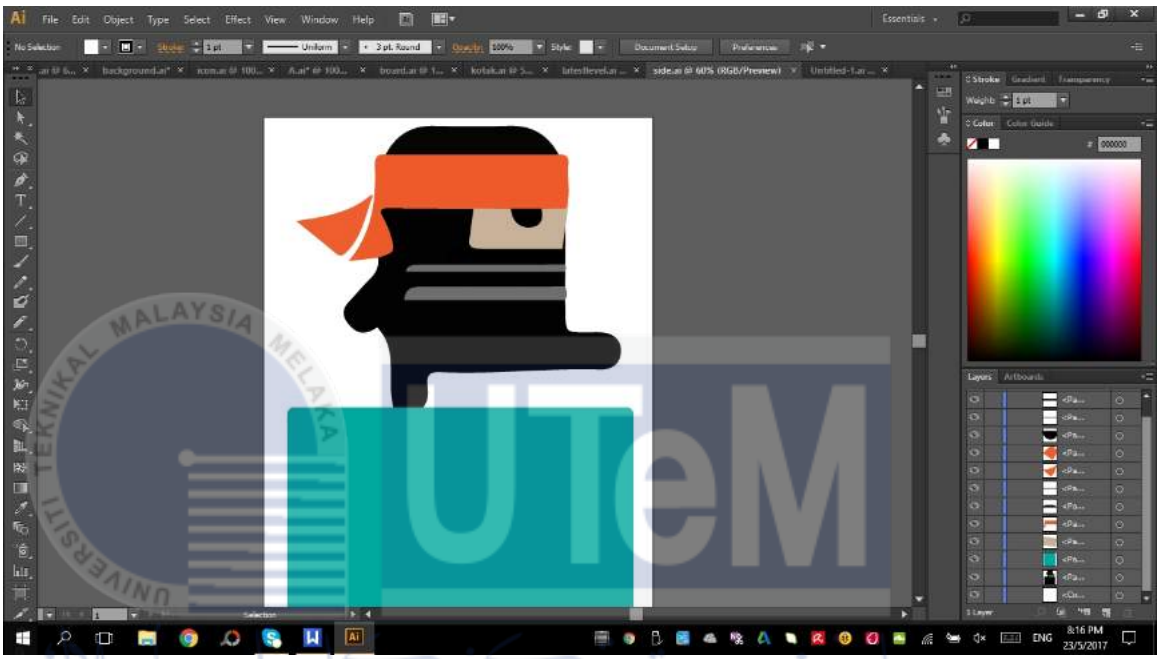
Figure 3.2 Microsoft Power Point 2016



iv. Adobe Illustrator CS6

Used to edit the interface of this mobile application

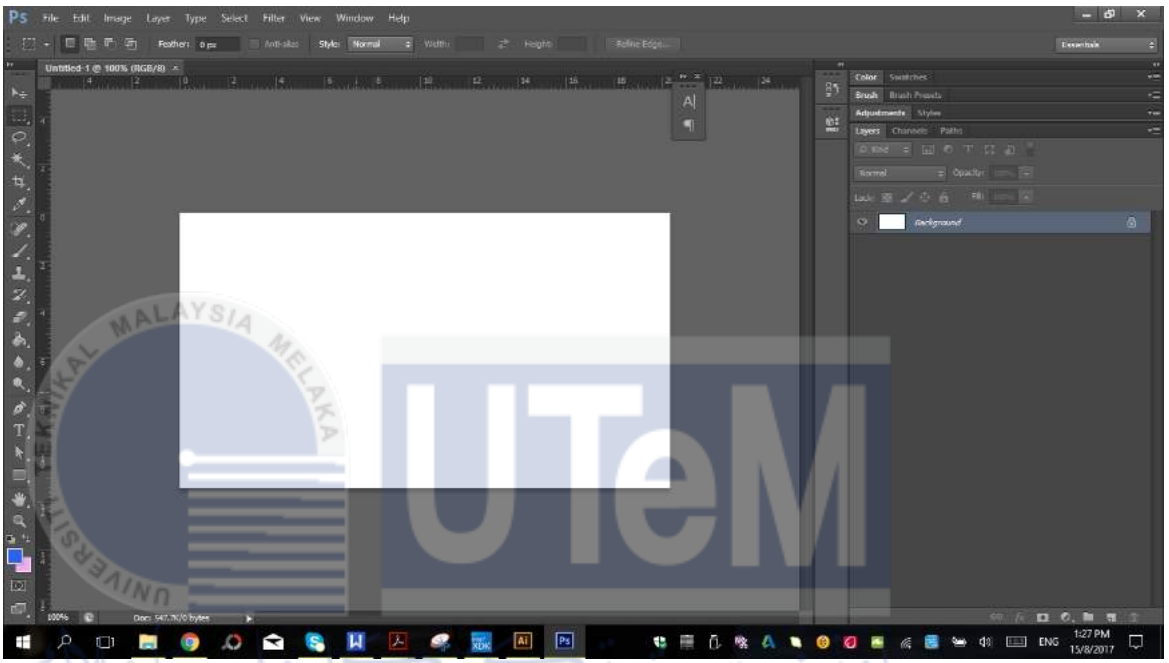
Figure 3.3 Adobe Illustrator CS6



v. Adobe Photoshop CS6

Used to edit the interface of this mobile application.

Figure 3.4 Adobe Photoshop CS6



vi. Intel XDK

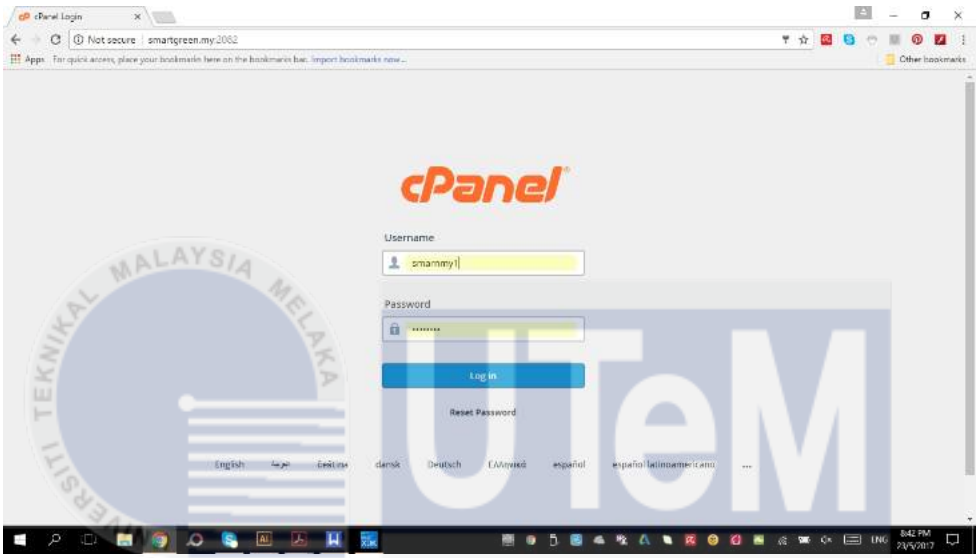
Used to develop the project and to test the mobile application before launching it. In addition, the tools/language used are Java Script and HTML 5.

Figure 3.5 Intel XDK

vii. Web Server Simulator

Used for the web server simulator and to test the project.

Figure 3.6 Web Server



viii. Database MySQL

Used to store the entire data of this project.

3.2.3 Hardware Requirement

Below is the list of hardware requirement for developing and delivering this project.

A set of personal Computer

i. Intel® Core™ i5-3210M CPU @ 2.50GHz
ii. Memory 4.00 GB of RAM

iii. System type 64-bit operating system.
iv. Hardisk 500 GB
v. Graphic card NVidia GeForce 600M
vi. Keyboard and Mouse (Optical)

Printer

Used to print out the entire project documentation. Canon PIXMA E510 series

Scanner

Used for scanning graphic, image and article for this project. Canon PIXMA E510 series.

CD-R / DVD – R

Use as a medium to submit and delivering the final project product.

Server

Computer that provides functionality for other programs. The computer that runs a server program is also called as server.

3.4 Project Schedule and Milestones

This project consists of two phases. Phase 1 is focusing on the development process. While phase two is a test phase where the product will be evaluate to see the project meet it objective or not. The project schedule will be show in table 3.3. While the project milestone in table 3.4.

Table 3.1 Project Schedule

Activities	Start Date	End Date	Result
Planning	Week 1	Week 3	Project Plan
Design	Week 4	Week 7	Storyboard and user interfaces
Development	Week 8	Week 11	Build the mobile application
Testing and Evaluation	Week 12	Week 14	Fix bug and improve the product
Development	Week 15	Week 15	Finalize the product

Table 3.2 Project Milestone

No	Task	Week													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Meet and discussion with supervisor														
2	Prepare the proposal														
3	Submission of proposal														
4	Design the mobile application														
5	Project Implement														
6	Final Presentation														
7	Preparation of project report														
8	Submission of the project report														

3.4 Conclusion

As a conclusion, all of the requirement specification including product and process requirement are identified. This chapter also include the hardware and software requirement used to develop this project. Finally, the purpose of schedule and milestone in this chapter is to ensure this project finish within the time given. On the next chapter , all od the design of this project will be explained.

CHAPTER IV

DESIGN

4.1 Introduction

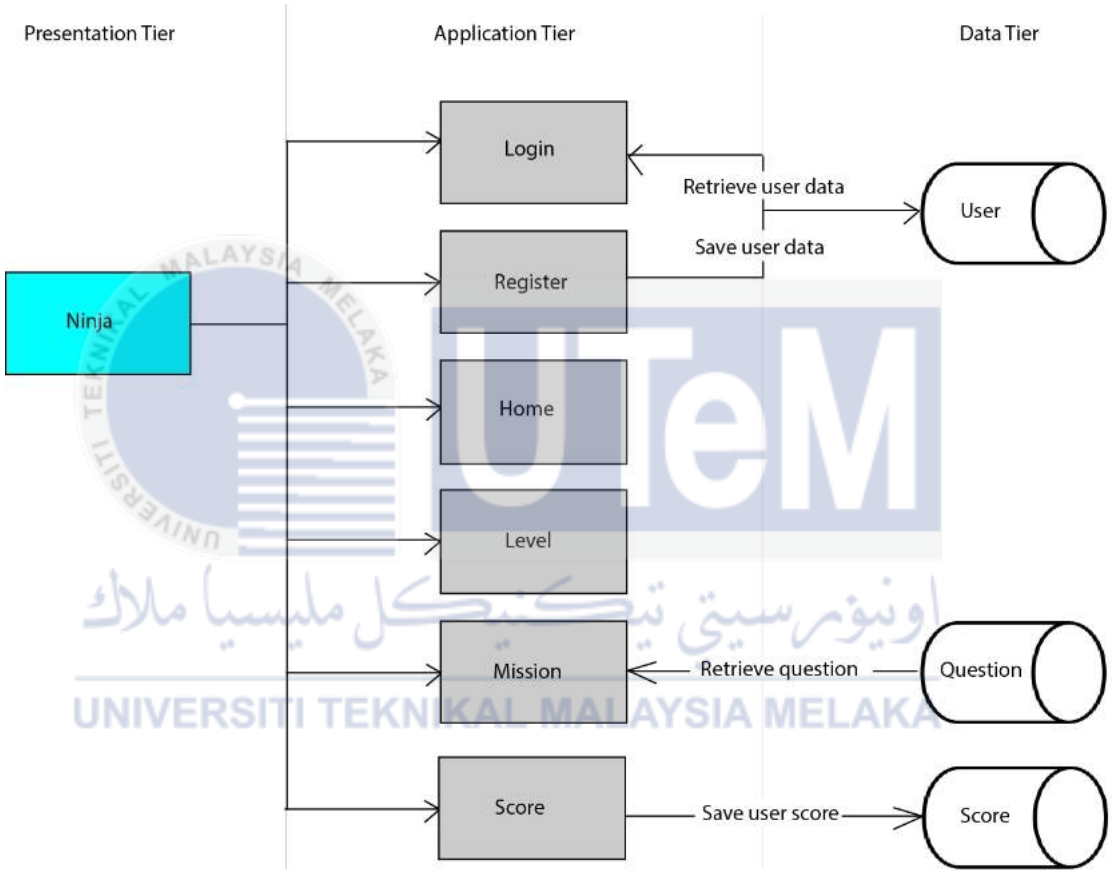
This chapter presents the design of the mobile application, whose purpose is to meet the requirements defined in the analysis. The overall flow of this mobile application will be describe briefly. Based on the ADDIE Model, design is the second phase of the model and it can be defined as the systematic development of the learning process. This chapter will be focused on several main aspects which are system architecture, preliminary design and user interface design. System architecture is the conceptual model that defines the structure, behaviour and views of an overall system. For the preliminary design all of the storyboard design will be stated. Furthermore, in the user interface design, details of the navigation, input, output, database, metaphors, template, media creation and integration, and also uploading file will be explained in details.

4.2 System Architecture

System architecture is a design of relationship between the section, the flow, and the functionality of the system. To develop this project, the three-tier system architecture is presented. First tier is the presentation tier which is user interface. It enable user to

interact with this system. Next, the application tier will work, if the system and the application server allow the system function based on user requirement. The third tier system architecture is represent the database server as a store for the user information, question and score.

Figure 4.1 : Three Tier Architecture



i. Presentation Tier

This is the topmost level of the application. The presentation tier displays information related to the services. It link and work together with another two tiers by outputting the results to the application tier and data tier. It is generally known as a user interface. There is one potential user for this system which is the students.

ii. Application Tier

This application tier is the control of the application's functionality by performing the detailed process. There are several features that allow user to use this application.

Table 4.1: Description about the flow at application tier

Ninja (Pro-Programming User)	Login	User must enter the username and password that has been registered before in order to use this mobile application. Once, the username and password is filled and the user click login, the smartgreen server will execute the information in the MySQL database user table. If the username and password match, the user will go to the home page. If the username or password is entered wrongly, or leave blank and the user click login button, alert will be pop out.
	Register	User register by saving the data such as name, matric number, username and password into the database. If one of the column is leave blank, alert will be pop out. User is needed to login once the register is successful.
	Home	This function will display all of the main menu of this Pro-Programming Mobile Application.
	Level	Level is refer to the part of the learning content. It contained videos of the Repetition subject.
	Mission	Mission refers to the quiz. The questions of the quiz will be retrieved from the database question table.
	Score	All of the user's scores will be stored in the database score table.

iii. Data Tier

Data tier consist of database server. The server use is the Smartgreen CPanel server. The database use is the MySQL database. Php and javascript coding are being used in order to call the data from the file manager and from the table. In this part, all of the information is stored and retrieved. This tier will improve the scalability, performance, keep data neutral and independent from the server.

Table 4.2 : Description about the flow at data tier

User	As a medium to store and retrieve the information of candidate.
Question	As a medium to store entire created question and retrieve the question.
Score	As a medium to store retrieve the score.

This application provides several advantages such as can modify or replace one tier without affecting the other tiers and can separate the application function from the database function.

4.3 Preliminary Design

Preliminary design is a design phase between construction and schematic documents. The content of the application and multimedia elements defines the content, navigation and features in this project.

4.3.1 Storyboard Design

The purpose of designing storyboard is to describe the overview of the project. The storyboard below will describe all of the details.

Table 4.3 : Main page storyboard design

SUBJECT	PROJECT	DESIGNER	PAGE
FINAL YEAR PROJECT	DEVELOPMENT OF MOBILE APPLICATION ON PROGRAMMING TECHNIQUE SUBJECT	NURUL SYAZWANI BINTI ALIAS	MAIN PAGE

Header Background Text Button Avatar Footer	Graphic: Scenery background. Avatar design Action: If the user click on the button, user will be link to the login page.

Table 4.4 : Login page storyboard design

SUBJECT	PROJECT	DESIGNER	PAGE
FINAL YEAR PROJECT	DEVELOPMENT OF MOBILE APPLICATION ON PROGRAMMING TECHNIQUE SUBJECT	NURUL SYAZWANI BINTI ALIAS	LOGIN PAGE

Header Background Text Input1 Input 2 Button 1 Text Button 2 Footer	Graphic: Scenery background. Action: If input 1 and input 2 is filled in wrongly or leave blank, an alert will be pop out when the user click button 1. If button 2 is clicked, user will be navigate to the register page.

Table 4.5 : Register page storyboard design

SUBJECT	PROJECT	DESIGNER	PAGE
FINAL YEAR PROJECT	DEVELOPMENT OF MOBILE APPLICATION ON PROGRAMMING TECHNIQUE SUBJECT	NURUL SYAZWANI BINTI ALIAS	REGISTER PAGE

Header Background Text Input 1 Input 2 Input 3 Input 4 Button 1 Footer	Graphic: Scenery background. Action: If input 1, input 2, input 3 and input 4 is leave blank and the user click on button 1, an alert will be pop out. If the register is successful, the user will be navigate to the login page.

Table 4.6 : Home page storyboard design

SUBJECT	PROJECT	DESIGNER	PAGE

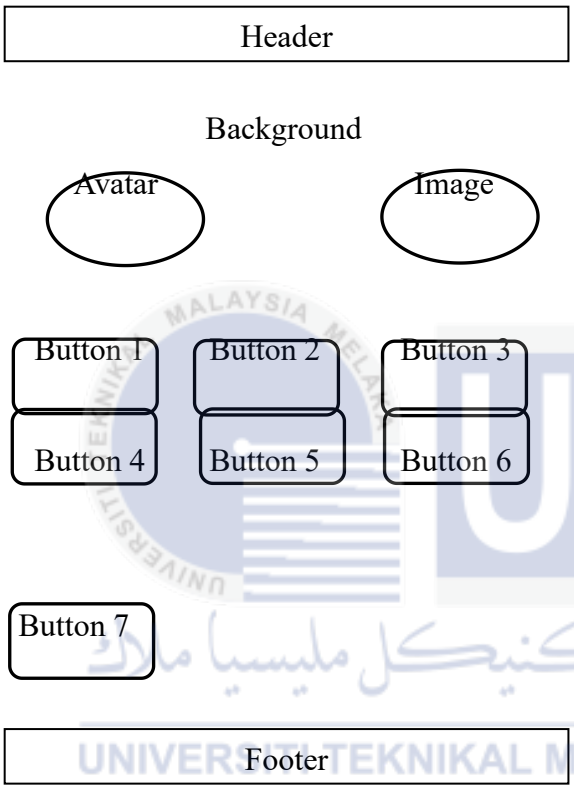
FINAL YEAR PROJECT	DEVELOPMENT OF MOBILE APPLICATION ON PROGRAMMING TECHNIQUE SUBJECT	NURUL SYAZWANI BINTI ALIAS	HOME PAGE

Header Background Button 1 Button 2 Button 3 Button 4 Button 5 Footer	Graphic: Scenery background. Action: If button 1 is clicked, user will be navigate to the level page. Level present parts of learning If button 2 is clicked, user will be navigate to the mission page. Mission present quiz. If button 3 is clicked, user will be navigate to the community page. Community means forum. If button 4 is clicked, user will navigate to the leaderboard. Leaderboard means collections of scores. If button 5 is clicked, user will be logout and navigate to the main page.

Table 4.7 : Level page storyboard design

SUBJECT	PROJECT	DESIGNER	PAGE

FINAL YEAR PROJECT	DEVELOPMENT OF MOBILE APPLICATION ON PROGRAMMING TECHNIQUE SUBJECT	NURUL SYAZWANI BINTI ALIAS	LEVEL PAGE



Graphic:

Scenery background.

Avatar image.

Level image.

Action:

If button 1 is clicked, user will be navigate to the learning outcome of the repetition video.

If button 2 is clicked, user will be navigate to the part 1 of the repetition video.

If button 3 is clicked, user will be navigate to the part 2 of the repetition video.

If button 4 is clicked, user will be navigate to the part 3 of the repetition video.

If button 5 is clicked, user will be navigate to the part 4 of the repetition video.

If button 6 is clicked, user will be navigate

	to the part 5 of the repetition video. If button 7 is clicked, user will be navigate to the home page.

Table 4.8 : Mission page storyboard design

SUBJECT	PROJECT	DESIGNER	PAGE
FINAL YEAR PROJECT	DEVELOPMENT OF MOBILE APPLICATION ON PROGRAMMING TECHNIQUE SUBJECT	NURUL SYAZWANI BINTI ALIAS	MISSION PAGE

Header Background Button 1 Button 2 Button 3 Avatar Button 4 Footer	Graphic: Scenery background. Level image. Action: If button 1 is clicked, user will be navigate to the quiz 1. If button 2 is clicked, user will be navigate to the quiz 2. If button 3 is clicked, user will be navigate to the quiz 3. If button 4 is clicked, user will be navigate

	to the home page.

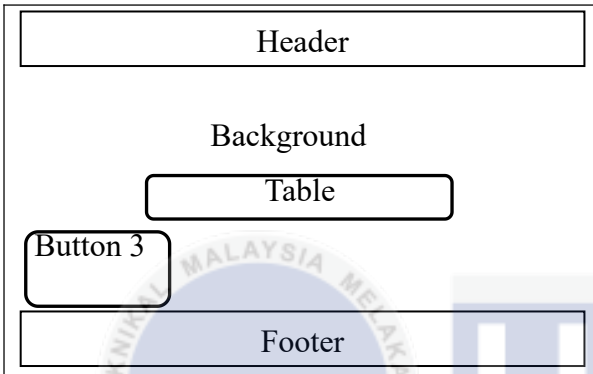
Table 4.9 : Community page storyboard design

SUBJECT	PROJECT	DESIGNER	PAGE
FINAL YEAR PROJECT	DEVELOPMENT OF MOBILE APPLICATION ON PROGRAMMING TECHNIQUE SUBJECT	NURUL SYAZWANI BINTI ALIAS	COMMUNITY PAGE

Header Background Input 1 Button 2 Button 3 Table Footer	Graphic: Scenery background. Action: If input 1 is filled and button 2 is clicked, the information will be stored in the database. If there is no information to be filled, error will be pop out. If button 3 is clicked, user will be navigate to the home page. Message will be display in the table

Table 4.10 : Score page storyboard design

SUBJECT	PROJECT	DESIGNER	PAGE
FINAL YEAR PROJECT	DEVELOPMENT OF MOBILE APPLICATION ON PROGRAMMING TECHNIQUE SUBJECT	NURUL SYAZWANI BINTI ALIAS	SCORE PAGE

	Graphic: Scenery background. Action: Result of the scores will be display in the table If button 3 is clicked, user will be navigate to the home page.

4.4 User Interface Design

User interface design is use to enable system interacts with the user. It is included the screen that displays the navigation through the system and how the system interact will define in interface design. This mobile application will use Intel XDK as the main software.

i. **Navigation Design**

Figure 4.2 Pro-Programming Mobile Application Navigation Chart

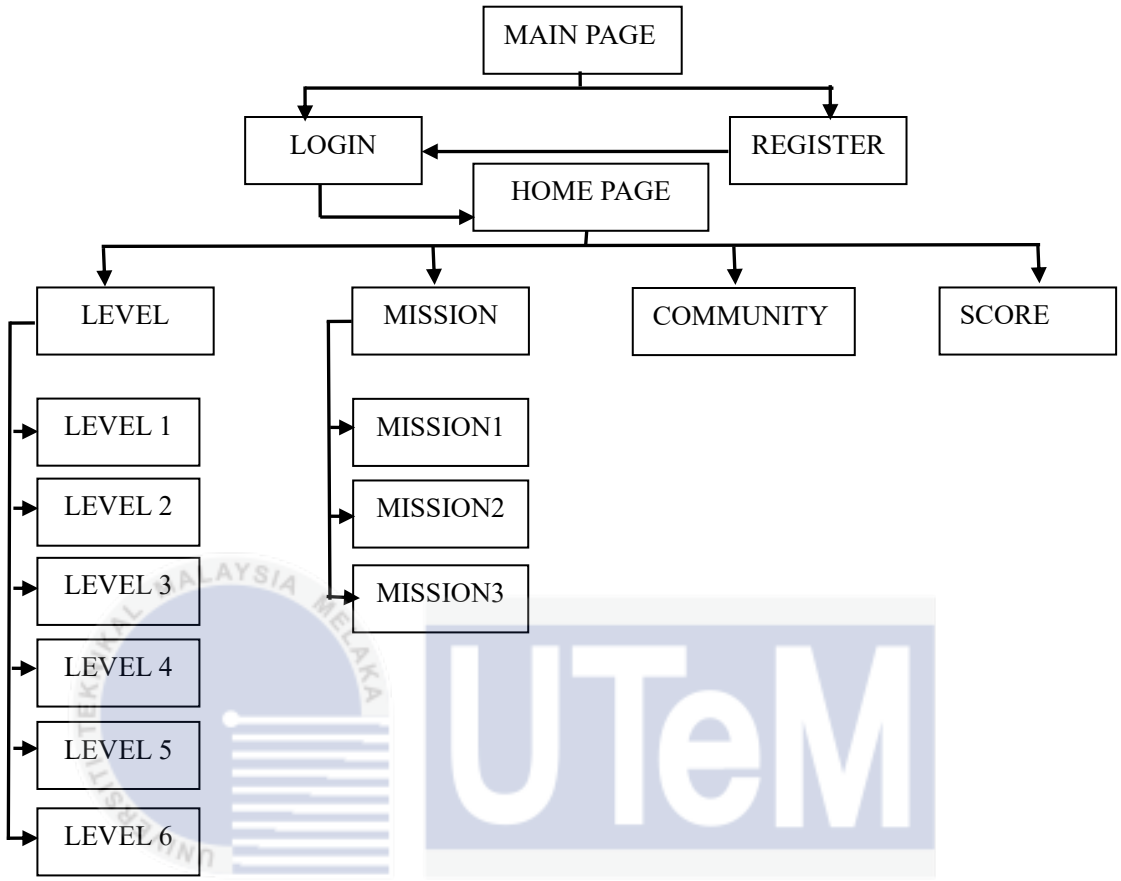


Figure 4.2 shows the navigation chart of the Pro-Programming Mobile Application. Firstly, username and password is needed in order to use this mobile application. The user need to register in order to get the username and password. Next, user will be navigate to the home page. Home page contain level, mission, community and score. Level is known as a chapter. In the level section user will be exposed to videos of the subject choosen which is repetition. Overall, there are 6 levels which means there are 6 videos of repetition subject learning. Furthermore, mission is known as a quiz. There are 3 mission which means there are 3 quizzes. User need to go through the level section before they can participate in the mission section. After that, community is used for discussion between the users. Lastly, score is collected and can be view by the user.

ii. **Input Design**

The input type can be text and number.

Login Page	Username	Text Field
	Password	Text Field
Register Page	Name	Text Field
	Matric No	Text Field
	Username	Text Field
	Password	Text Field
Mission Page	Multiple Choices	Select Button
Community Page	Message	Text Field

Figure 4.3 Example screenshot of the input design

iii. **Output Design**

Output will be in report which is after user do test. The total mark and correcting the

answer will be display and the alert box will contain the instruction and the warning.

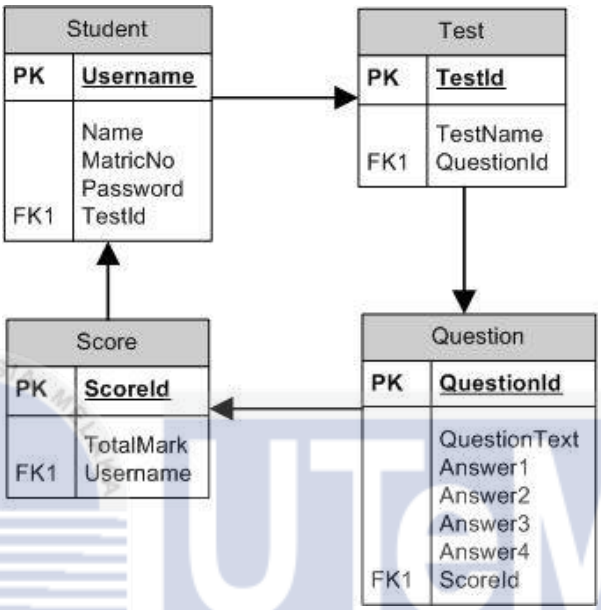
Figure 4.4 Example screenshot of the output design

Iv. Database Design

Database design is the process of producing a detailed data model for a database.

a. Entity Relationship Diagram(ERD)

Figure 4.5: ERD of Pro-Programming mobile application



b. Data Dictionary

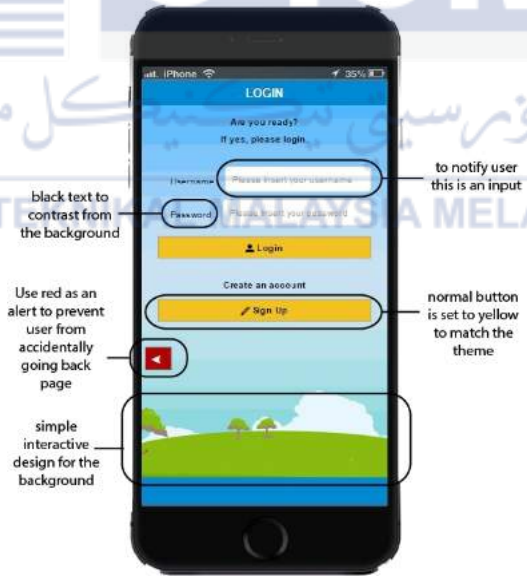
It is scheme of all object in the database which is read-only set of table that provides information about the database. The data dictionary of this system is attached to Appendix**.**

v. **Metaphors**

Design of the human computer interface (HCI) is needed to build an effective

mobile application. Based on design of the human computer interface (HCI), the user can understand the mobile application quickly and clearly. The metaphors are including colour, image and text determination. The major colour used for each template design is blue, green and yellow. This is the earth colour. The colours are suitable for learning because it can make the user feel relax and calm. Next, the font colour must be contrast with the background colour which is black. This is to provide a clear view of the text. Furthermore, the type of font used is Arial because it is the standard typeface for a normal mobile application usage. The input colour space is white colour, the placeholder text is in grey colour and the input text is in black colour. This is to differentiate between the instruction and the input requirement. In addition, all of the normal button is standardize to a yellow colour. This is good for the theme of the mobile application. The home button is set to an orange colour while the warning button such as go back and log out button are set to a red colour. This is to alert and give warning to the user from losing the data while answering the quiz.

Figure 4.6: Explaination design



vii. Media creation and integration

Element of multimedia involved in this system are text, graphic, video,and audio.

For the user interface design, the design are created using Adobe Illustrator CS6 and Adobe Photoshop CS6. For the development of video, free software name Powtoon is used. All of the graphics will be located inside the folder images in the system file while for the videos, embed code is used in the coding segment. By having all of this creative element, this mobile application will be so much fun to use.

Figure 4.7: The avatar design

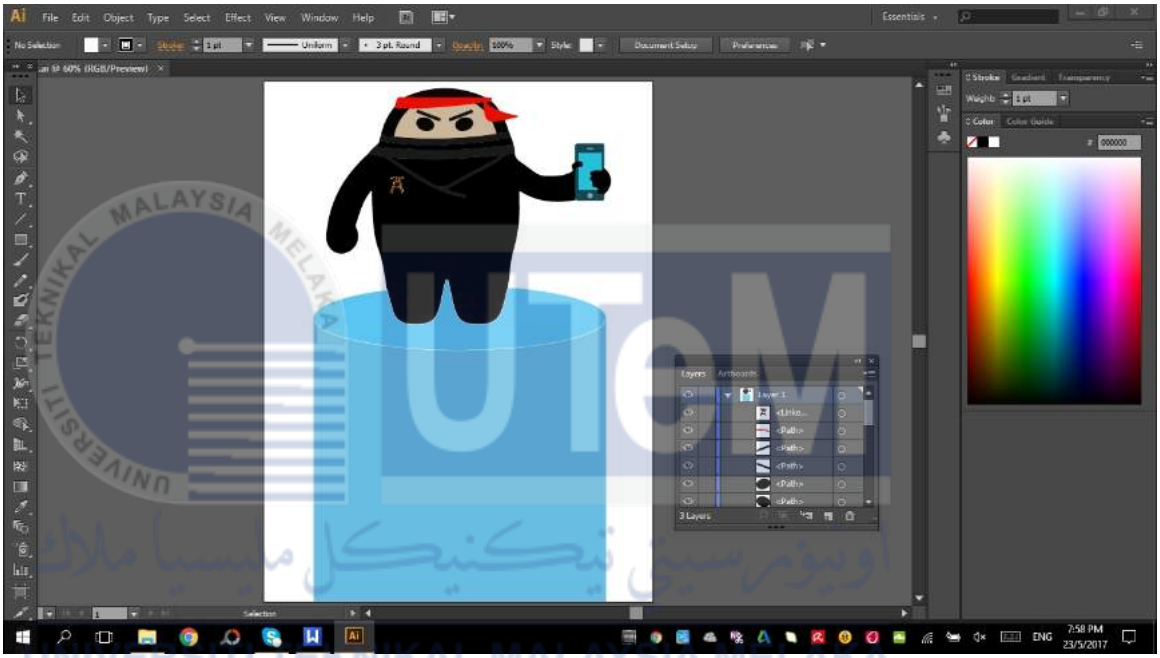


Figure 4.8: The background design

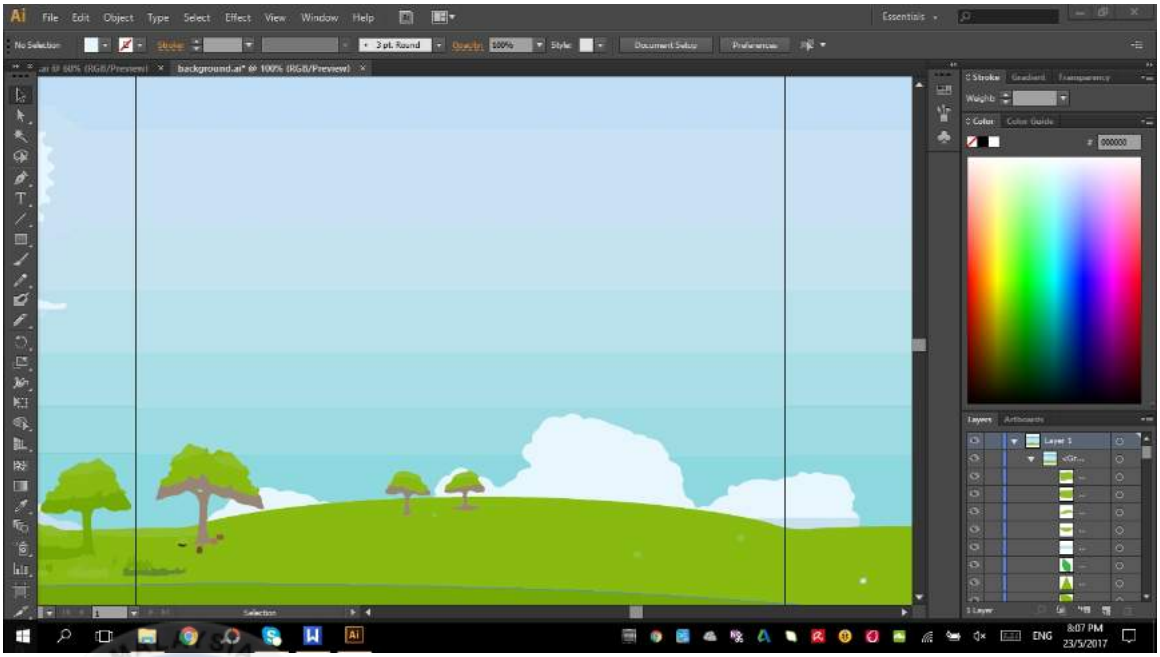


Figure 4.9: The logo design

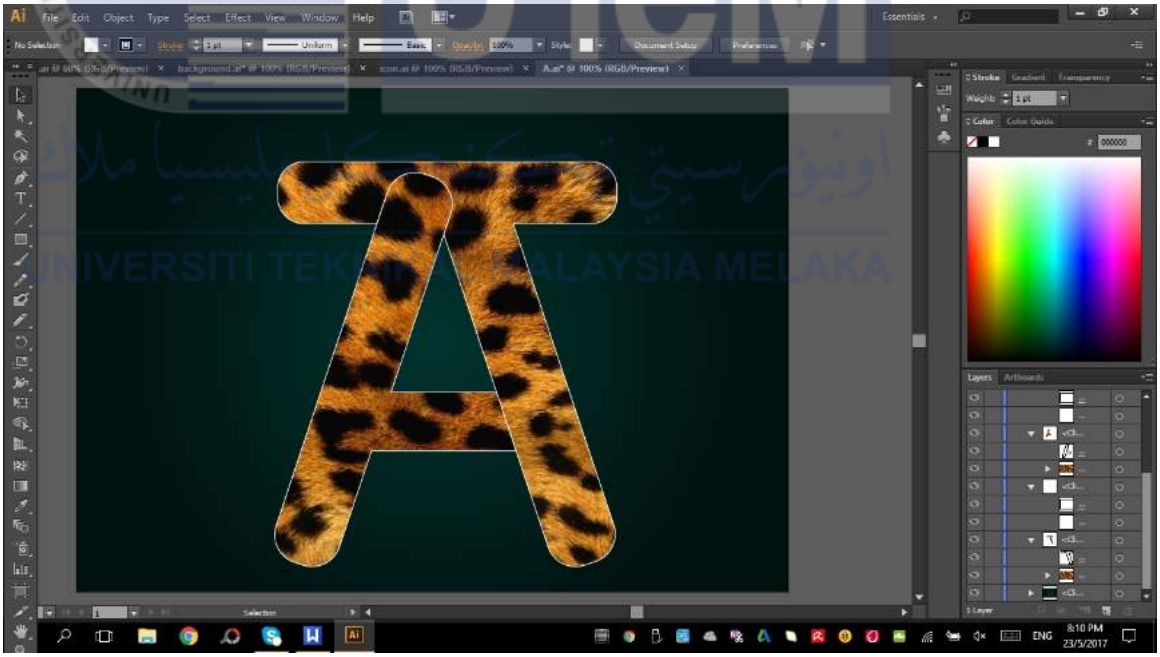


Figure 4.10: The level design

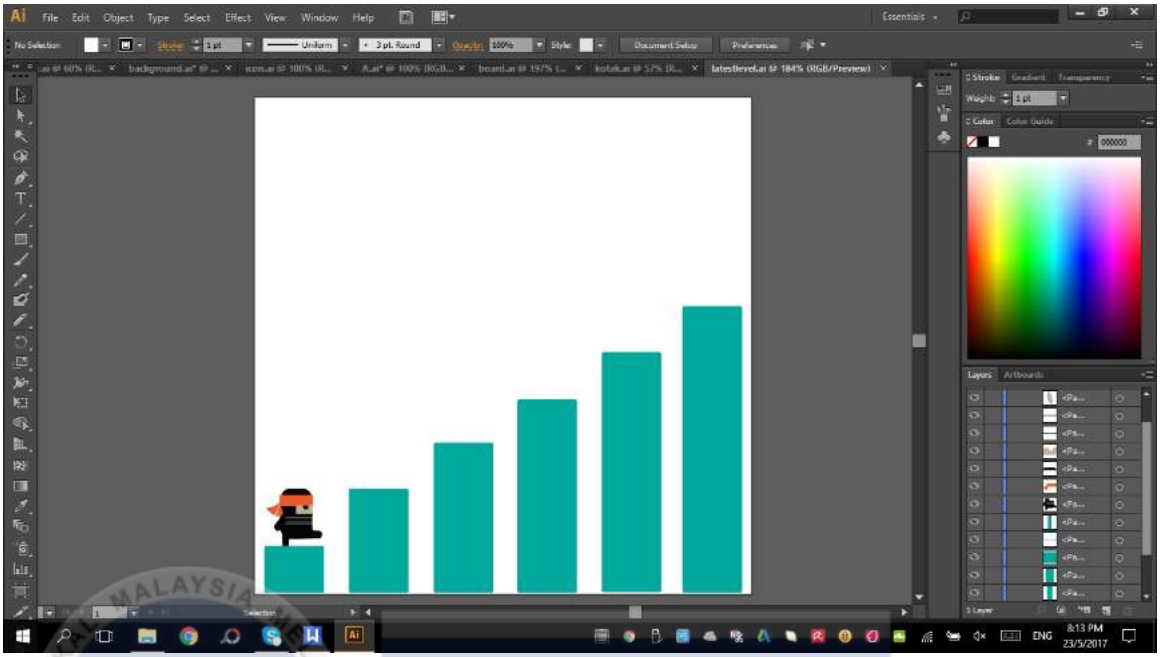


Figure 4.11: The side view of the avatar design

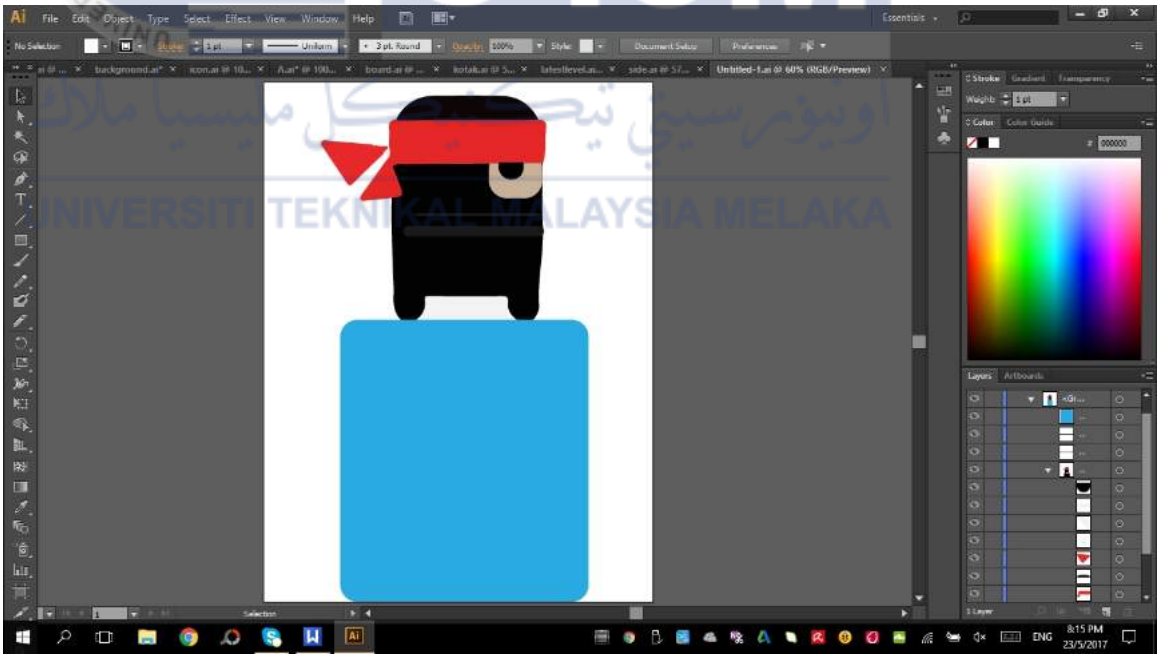


Figure 4.11: The side taking step of the avatar design

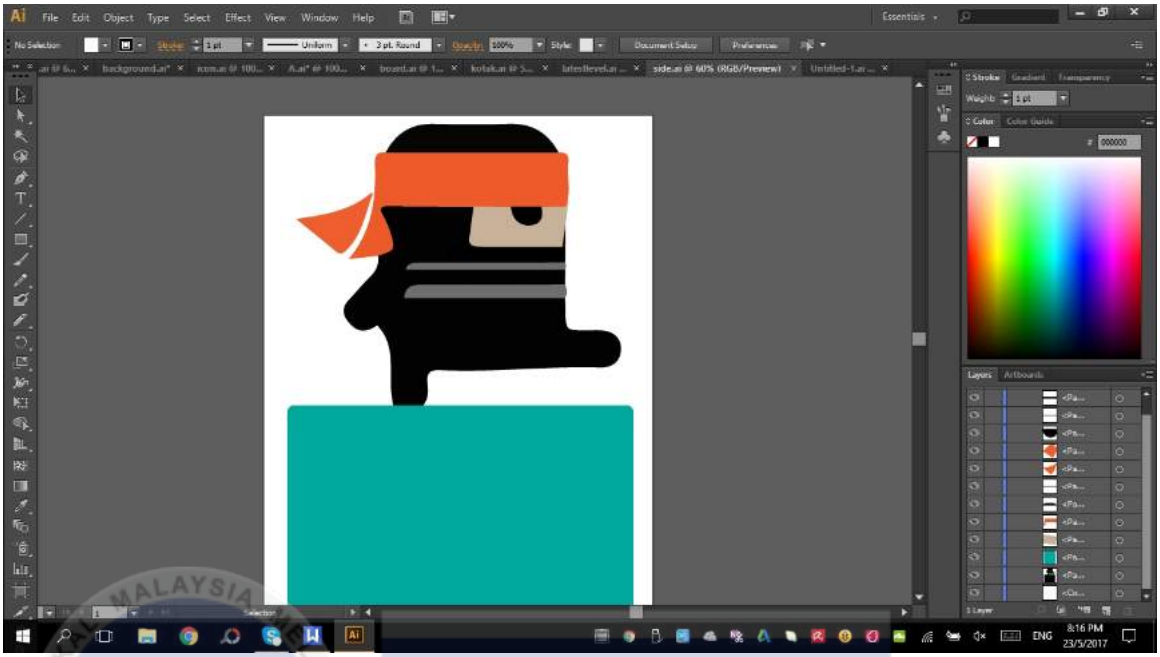


Figure 4.12: The video development

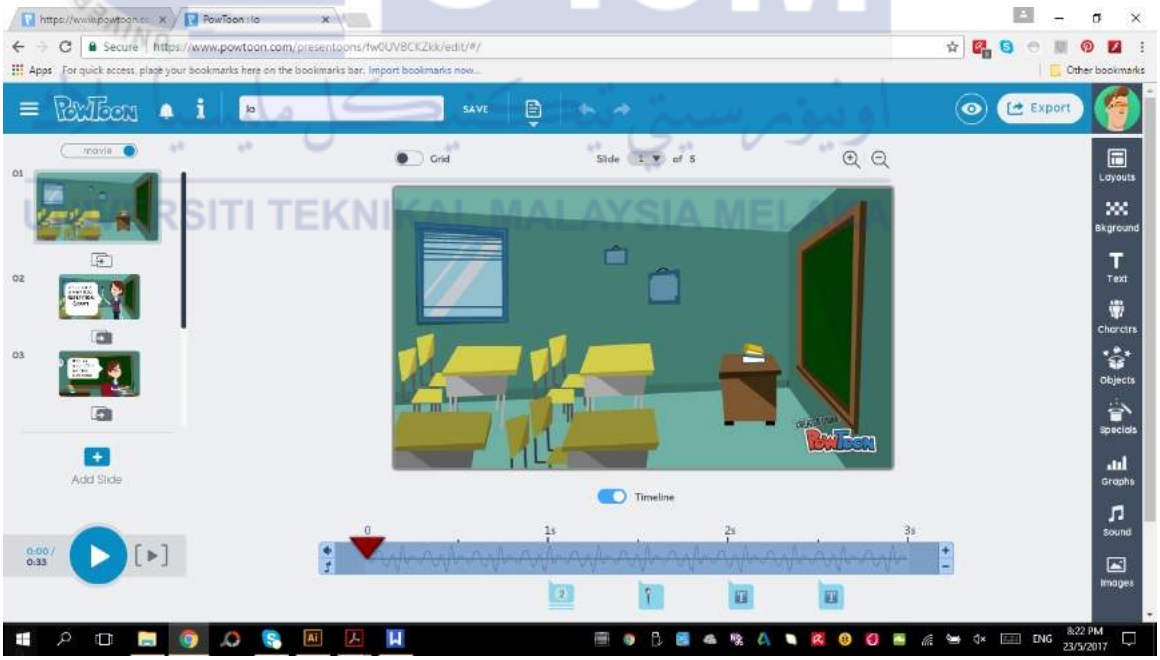
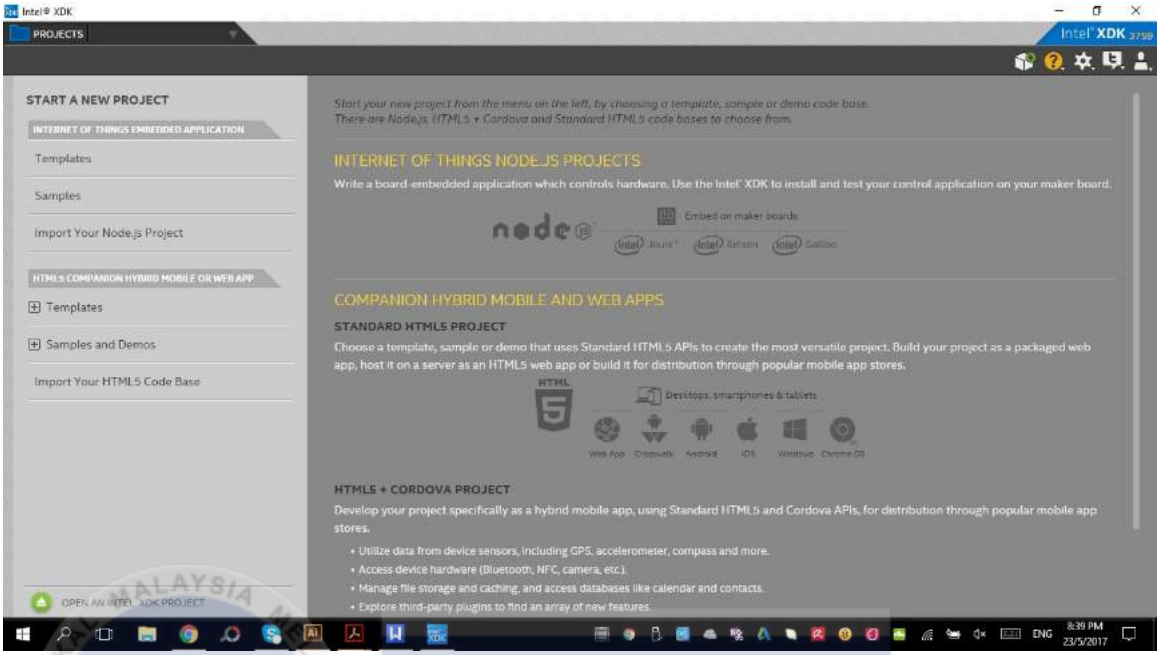


Figure 4.13: The application development



viii. Uploading File

Java Script and HTML5 language are being used to develop the interface for this mobile application. It will produce “apk” that can be install in the android operating system. The system will be upload to the web hosting server. The smartgreen web hosting enable the developer to upload the php file in the online server and the server provide MySQL database. To upload the system into the smartgreen server, Intel XDK is needed to be installed first. Step of uploading file to the smartgreen web hosting is shown below:

Figure 4.14: Screenshot main page of the webserver, smartgreen

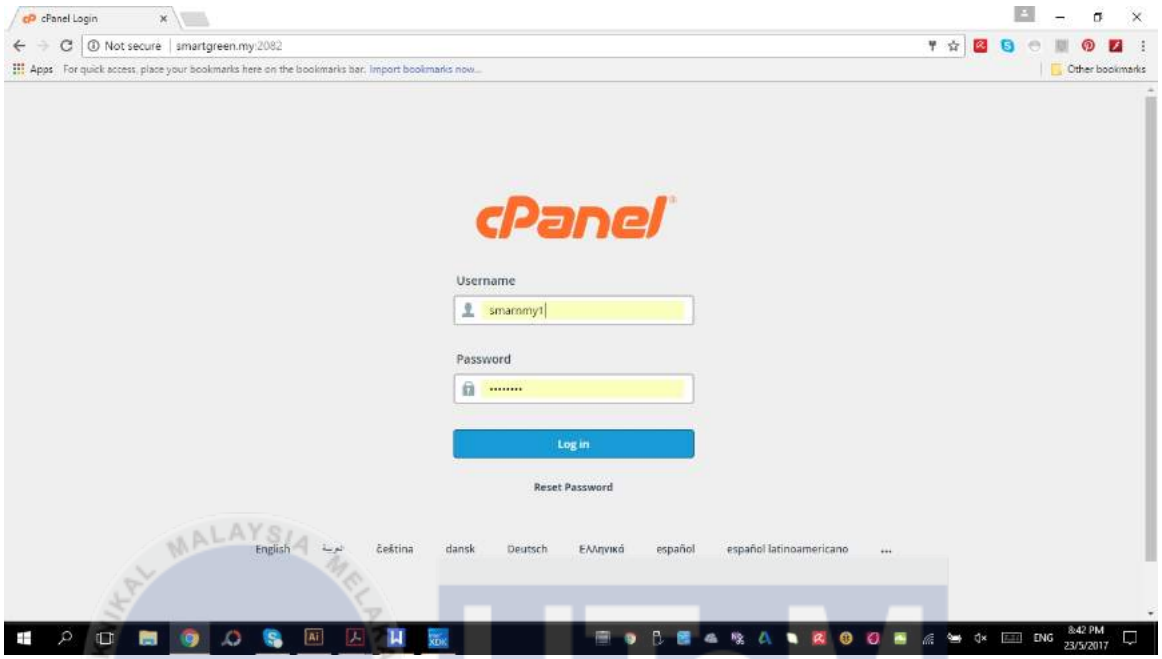


Figure 4.15: Screenshot of the application in the web server

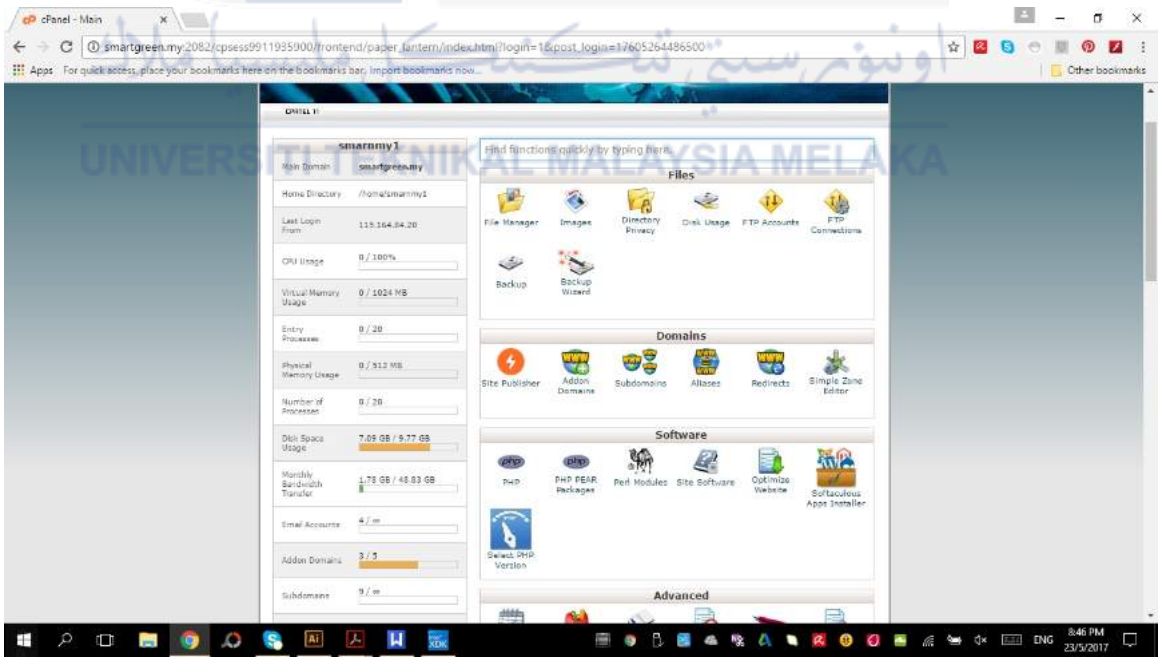
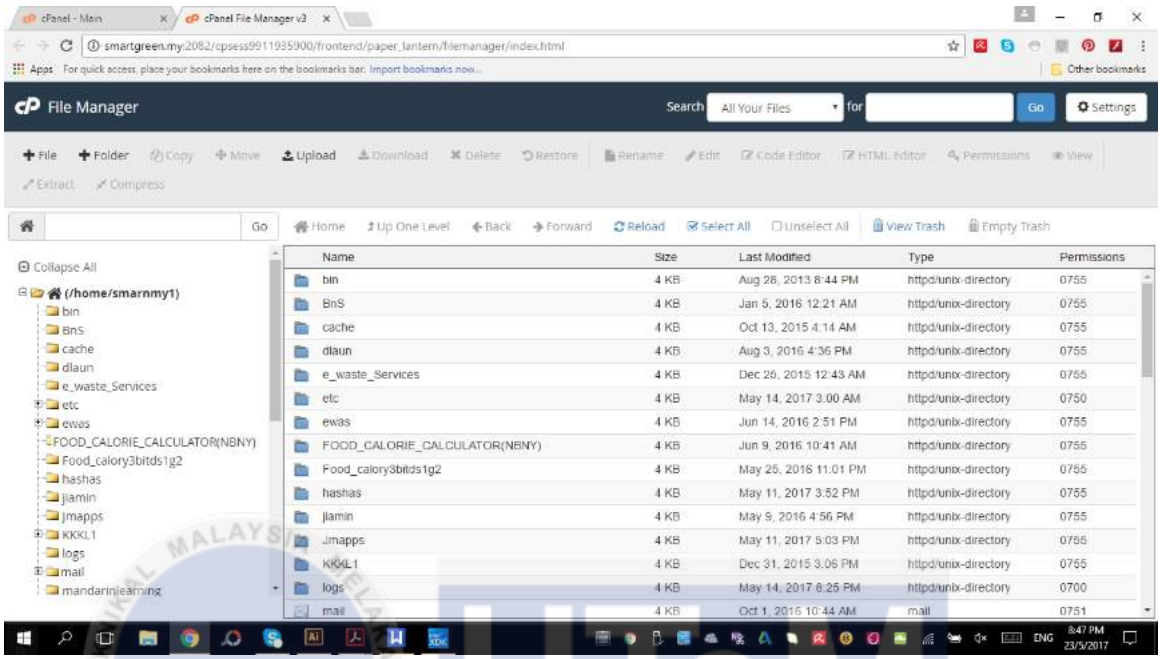


Figure 4.16: Screenshot of the web server file manager



4.4 Conclusion

The design phase is important to make sure the effectiveness of this system. This chapter explain the architecture of the mobile application. The flow of this website has been define in the navigation design. The storyboard of the website also play an importance role to give an overview on how to design the mobile application.

CHAPTER V

IMPLEMENTATION

5.1 Introduction

During implementation phase, the activities that will include in this chapter are media creation, media integration, product configuration management as well as the implementation status. Media creation is all about the content creation for the system and the media integration is determine the process of integrating the created content. Next, product configuration management will discuss about the configuration setup of the system and lastly describe the progress of the development status of the system.

5.2 Media Creation

Media creation of this developed project is inclusive of the components of text, graphic and video. Each of the creation of the components will be discussed in this section.

5.2.1 Production of Texts

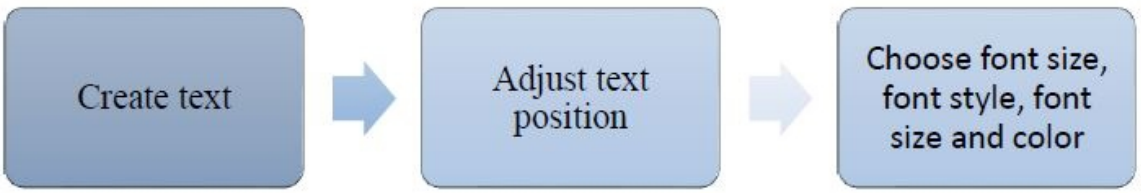
Text is a crucial element for user to understand the information. A consistent and dynamic of the font family, font size and font color will let students feel comfortable to read. Hence, production of text plays important roles when developing this mobile application. This is because the purpose of this mobile application is for education. The selection of text must easier to read. The text was static for the user suitability in using the application. Besides that, for education the used of the text must be sans serif font. Final decision for types of font, color and arrangement of the text in this mobile application was decided. The used of the text in this entire project are stated in the table below.

Table 5.1: Type format for the system

Font	Format	Description
Arial	13pt.	The text was used for the main title every page.
	4pt.	The text was used for the content in this mobile application.

Figure 5.1: Process of Production of Text Element in the Level (the notes)

Figure 5.2 Creation of Text Using Intel XDK



5.2.2 Production of Graphic

Graphic are suitable used for visual presentation because graphic always have combination of text, illustration and color. To develop this project, the graphics was edited by using Adobe Illustrator CS6 then save as Portable Network Graphics (PNG) format. Besides, the graphics that are edited also save in the Illustrator Document (AI) for precaution step and backup that is taken in case of the graphic damage or reediting.

Table 5.2: Graphic Format and Description

Format	Description
PNG	Minimum compression loss.
	The quality of images is not changed by any compression ratio.
	Easy to upload to the mobile application.
AI	Make vector graphics scalable to any proportion.
	Used for painting and drawing.
	Used to trace the image from the internet.

5.2.3 Production of Audio

The audio for this project is recorded and edited using Audacity. Some of the source are downloaded from the YouTube channel. The used of the audio in this project are save as:

Table 5.3: Audio Format and description

Format	Description
MP3	Can be played on variety platform of players.
	Small file size

5.2.4 Production of Video

Some of the videos in this project are edited using free tools software called Powtoon and some of the videos are downloaded from the YouTube Channel. The source of the original videos downloaded are originally from the lecturer in UTeM.

Table 5.4: Video Format and description

Format	Description
MP4	Can be played on variety platform of players.
	Small file size

5.3 Media Integration

There are several software that used to integrate all of the materials. Firstly, the

Intel XDK software is needed to integrate the mobile application interface with the PHP programming language. Database is needed for this system to make sure all of the user data are stored and user also can retrieved back the data. The database, MySQL is using a Smartgreen CPanel server. Then for the graphic, everything is edited in Adobe Photoshop and Adobe Illustrator. While for the production videos, Powtoon is used. Along with the videos production, audio is also been recorded and edited using Audacity. The installation of the final product is then transfer to mobile devices and run as the mobile application.

5.4 Configuration Environment Setup

i. **Server Configuration**

This mobile application has a database that use to store and retrieve the data. The web server simulator apache is used for the web server simulator and to test the project. MySQL database is used to store the entire data of this project.

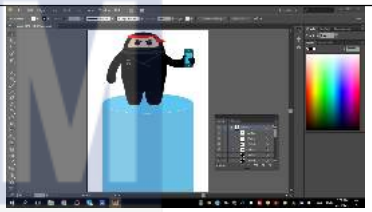
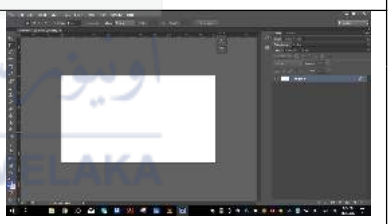
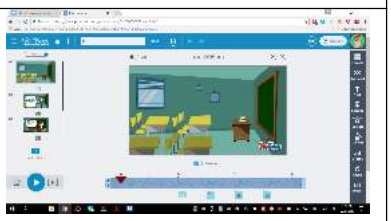
Table 5.5: My SQLServer Configuration

PHP MyAdmin	
HOST	localhost
USER	smarnmy1
PASSWORD	Sma20405
DATABASE	smarnmy1_nurulsyazwani

ii. **Software Configuration**

Several software are used to develop this mobile gamification :

Table 5.6: Software Configuration

SOFTWARE	FUNCTION	INTERFACE
Intel XDK	Uses to develop mobile application	
	All of the video, audio and images are inserted into this Software	
	Arrange java and php coding	
	Build the apk format for mobile installation	
Adobe Illustrator	Version: 6	
	Create 2D graphics and texts	
Adobe Photoshop	Version: 6	
	Create and edit image	
Powtoon	Create video	
Smartgreen cPanel	Store Database	

iii. **Version Control Procedure**

For development process of this mobile application have two version control produce. Firstly, for the 1st version has login module and register module. Next, 2nd version has test module such as user can be answering the test.

Figure 5.3 : Version Control Procedure 1.1

Version 1.1: Login Module	
Function	**Description**
Login	Enable user to access the entire system
Version 1.2: Register Module	
Function	**Description**
Register	Required user to register the system and the input will store into the database.

Figure 5.4 : Version Control Procedure 2.1

Version 2.1: Test Module	
Function	**Description**
Test	Enable user to answering the question that retrieve form the database.

5.5 Implementation Status

Table 5.7: Implementation Status

Description	Duration to Complete	Percentage	Status
Story Board Design	1 week	100%	Completed (On Time)
Template Design	1 week	100%	Completed (On Time)
Designing the Database	1 week	100%	Completed (On Time)
Test Question	1 day	100%	Completed (On Time)

5.5 Conclusion

Implementation phase is the major phase for developing a mobile application because it includes a detailed of the product development process. It describes the production of text, audio and graphic clearly. After the media creation was done, the integration process of the product also explained in detail. Other than that, the configuration management are explained about the software tools that required by the developer for managing the development of the mobile application. Lastly, the implementation status for each task will be defined to indicate the progress of the project.

CHAPTER VI

TESTING AND EVALUATION

6.1 Introduction

The final phase of this project development is testing. The purpose of testing is to estimate to what level that this project had successfully achieved the objectives and is able to transfer the information to the target users also gather the information whether the final product is ready to release to the target users or not. This mobile application testing is conducted in two ways, which are black box testing and user acceptance testing. The black box testing will test the functionality of the mobile application. This to find errors and bugs in this application. It also makes sure the system achieves the requirements. While for the user acceptance testing, it will test how the target users feel about the mobile application. This chapter explained how this testing process is planned and implemented. Finally, the test result and analysis are recorded.

6.2 Test Plan

This chapter describes on how testing will be accomplished. It consists of test user, test environment and test schedule.

6.2.1 Test User

For the test user, there are 50 respondents that participate in this testing session and is divided into three categories which are freshman students, senior students and multimedia expert. The testing takes place at Kampus Induk, UTeM, Kampus Industri, UTeM and through online based.

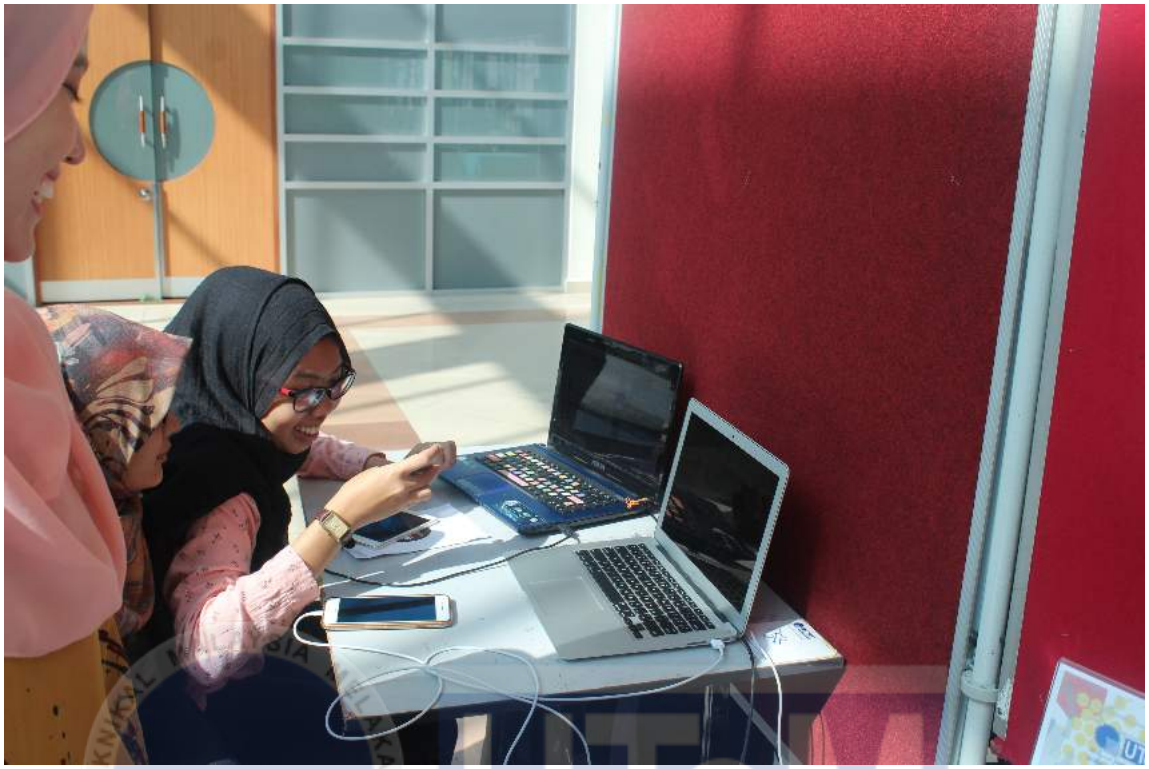
i. Students (Freshman)

This categories of test user will be tested in the term of "Perceived Usefulnes (USE)" and in the term of "Perceived Ease Of Use (EOU)". This test is done by 30 freshmen from UTeM.

ii. Students (Senior)

This categories of test user also will be tested with the same term of "Perceived Usefulnes (USE)" and in the term of "Perceived Ease Of Use (EOU)" to know what the thoughts between the freshman and the senior. This test is done by 15 senior students from UTeM.

Figure 6.1 : The environment of testing at Universiti Teknikal Malaysia Melaka, UTeM among the students



ii. Multimedia Expert

For this type of test user, the categories that will be observed are on the ease of use, technicality, teaching materials and overall of the system. The tester of this categories are lecturers, industrial people, and also the judges. Overall, there were 5 respondents.

Figure 6.2 : The environment of testing at Universiti Teknikal Malaysia Melaka, UTeM among the Multimedia Expert

6.2.2 Test Environment

Test environment is the location where the testing will be conducted. The location must be a suitable place in order for the testing process to be smooth and complete. To provide an accurate data and feedback the test environment will be conducted in the real environment for the system. The location that used for testing this mobile application is in UTeM whereas all of the hardware required can be set up for this testing. Below are the details of the hardware and software requirement.

i. Hardware Requirement

Table 6.1: Hardware requirement for the test environment

Hardware	Specification
Processor	Intel® Core™ i5-3210M CPU @ 2.50GHz
RAM	Memory 4.00 GB of RAM
Hard Disk	Hardisk 500 GB
Mobile Phone	Resolution 240X340
	Android versin 4.0.0

ii. Software Requirement

Table 6.2: Software requirement for the test environment

Software	Specification
Operating System	Windows 10
Browser	Internet Explorer
Intel XDK	Emulator

6.2.3 Test Schedule

Having the test schedule is important in order to manage activities that involved in the testing phase. All of the test will be done step by step and it must be enough time to collect and gather the results. Test schedule will organized the duration and the timeline of the testing that will be conducted which is shown below.

Table 6.3: Test Schedule

Scope	Explanation
Profession	Students
	Lecturers
	Industrial people
Total of respondents	Students : 45
	Lecturers : 2
	Industrial people : 3
Date	24/05/2017
	27/07/2017
Duration per session (minutes)	15
Number of respondents per session	2-3
Total time spent (minutes)	255

6.3 Test Strategy

Test strategy is a guideline to the testing plan. The objective in this part is to clarify and validate the function and challenges of the test project. It is very important part for the software development to be successful. The alpha and beta testing are chosen for this development. It is an integral part of development methodologies.

6.3.1 Classes of Test

i. Alpha testing

It is the started phase of the software development process. In this phase, unit testing and system testing are carried out. Unit testing is used to detect and verify the functionality of the several part in the source code. It is also to ensure that the function is working properly with no crash and bugs. To make sure the mobile application meet its requirements, a system testing must be done.

ii. Beta testing

Beta testing started when the mobile application is completely functioning and ready for the user feedback. Usability testing must be done to identify if the user interface is user friendly and easy to use. Moreover, quantitative methods are used where survey are carried out on getting opinion about the mobile application. There are 50 sets of questionnaire distributed to the users. To help making the evaluating easier, the result of the survey is using scaling technique. Below is the scaling for the testing.

Table 6.4 : Scale of testing

Scale	Description
1	Strongly disagree/ Strongly dissatisfied
2	Disagree/Dissatisfied
3	Neutral/ Not sure
4	Agree/ Satisfied
5	Strongly agree/ Strongly satisfied

6.4 Test Implementation

Test section will discuss about the test description and the test data.

6.4.1 Test Description

The mobile application is tested by using functionality and usability testing to ensure that the mobile application is successfully functioning to all possible input condition and to collect user's feedback about the mobile application.

i. Functionality testing

This testing must be done to ensure the mobile application is running properly without any error or bugs. The main purpose of this testing is to confirm the project is functioning like what has been planning earlier. This testing only require user to give their opinion on the application prototype.

ii. Usability testing

The reason for this testing is to gather user's feedback on the mobile application for this project. The data will be gathered by given a set of questionnaire to the user for the Feedback

6.4.2 Test data

Table 6.5 : Scale of testing for students

PERCEIVED USEFULNESS (USE)

No	Usefulness	SD				SA
1	Delivering the lessons in teaching aids are easy to follow *Penyampaian isi pelajaran dalam alat bantu mengajar tersebut senang diikuti*	1	2	3	4	5
2	Teaching material produced by the lecturers use the appropriate color background *Bahan pengajaran yang dihasilkan oleh pensyarah menggunakan warna latar belakang yang bersesuaian*	1	2	3	4	5
3	I enjoy learning in group *Saya seronok belajar secara berkumpulan*	1	2	3	4	5
4	The teaching materials is very interesting to learn *Bahan pembelajaran ini sangat menarik untuk belajar*	1	2	3	4	5
5	I easily understand the concepts *Saya dapat memahami konsep yang diajarkan oleh pensyarah dengan mudah*	1	2	3	4	5
6	The teaching materials provided by lecturers are easy to understand *Bahan pengajaran yang dihasilkan memudahkan saya untuk memahami sesuatu konsep*	1	2	3	4	5
7	Interesting learning activities using the template provided *Aktiviti pembelajaran menarik menggunakan templat yang disediakan*	1	2	3	4	5
8	A variety of teaching activities make me interest to learn *Aktiviti pengajaran yang pelbagai menarik minat saya untuk belajar*	1	2	3	4	5

PERCEIVED EASE OF USE (EOU)

No	Ease of use	SD				SA
1	Learning to use the Pro-Programming is easy for me *Pembelajaran menggunakan* Pro-Programming *adalah mudah bagi saya*	1	2	3	4	5
2	Text that use is easy to read *Tulisan yang digunakan mudah dibaca*	1	2	3	4	5
3	The learning material is equipped with interactive graphics *Bahan pembelajaran ini dilengkapi dengan grafik yang menarik*	1	2	3	4	5
4	The template used is suitable for me *Templat pengajaran yang disediakan oleh pensyarah sesuai dengan kecerdasan saya*	1	2	3	4	5
5	I love to study what I learn *Saya suka belajar*	1	2	3	4	5
6	I like to practise *Saya suka membuat latihan*	1	2	3	4	5
7	I enjoy learning using all the templates provided by the lecturers *Saya seronok belajar menggunakan semua templat yang disediakan oleh pensyarah*	1	2	3	4	5

Table 6.6 : Scale of testing for multimedia expert

Instruction: For each statement below, please tick (√) that reflects you are most likely response. Your response will help to provide for a better learning environment.

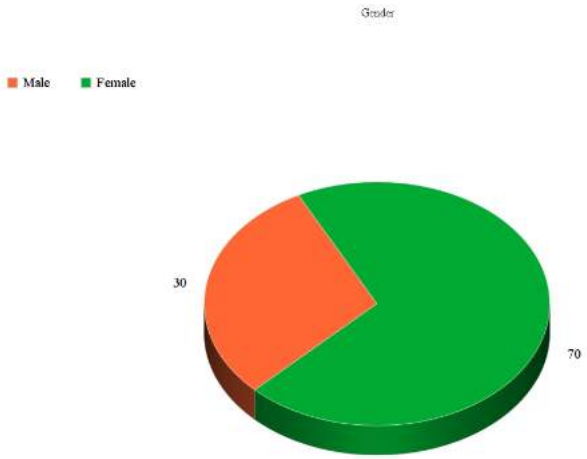
Category	Item	Scale				
		1	2	3	4	5
Ease of Use	Title sequence is brief and can be by passed					
	Easy for target audience to operate independently					
	Pro-Programming is usable without reference manual					
	User can navigate the system without difficulty					
	Menus and other features make the system user friendly					
	User can exit from any screen					
	Directions are clear and easy to follow.					
	The interface design is intuitive and provides easy navigation.					
	Clear instructions are associated with menu and navigation					
	Functions of buttons are easily identified					
Technical	Screen directions are consistent and easy to follow					
	Program utilizes all the capabilities of the hardware					
	No modification to PC system settings was required.					
	Connectivity was consistent.					
	Speed of access was good.					
	The system runs properly					
Teaching Materials	Pro-Programming can be used by all lecturers.					
	Pro-Programming is easy used by novice user.					
Overall	I am satisfied with Pro-Programming					
	The overall module design in Pro-Programming has achieved.					

6.5 Test Result and Analysis

TEST USER : STUDENT

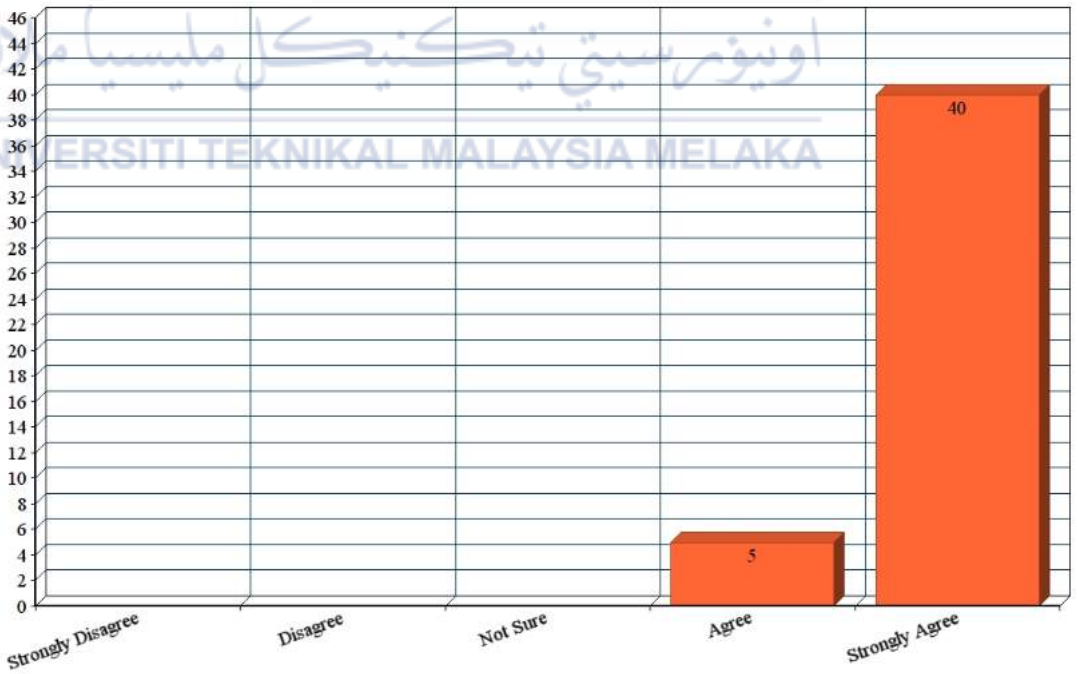
Based on the questionnaire that have been distribute, an analysis has been done.

PERCEIVED USEFULNESS (USE)

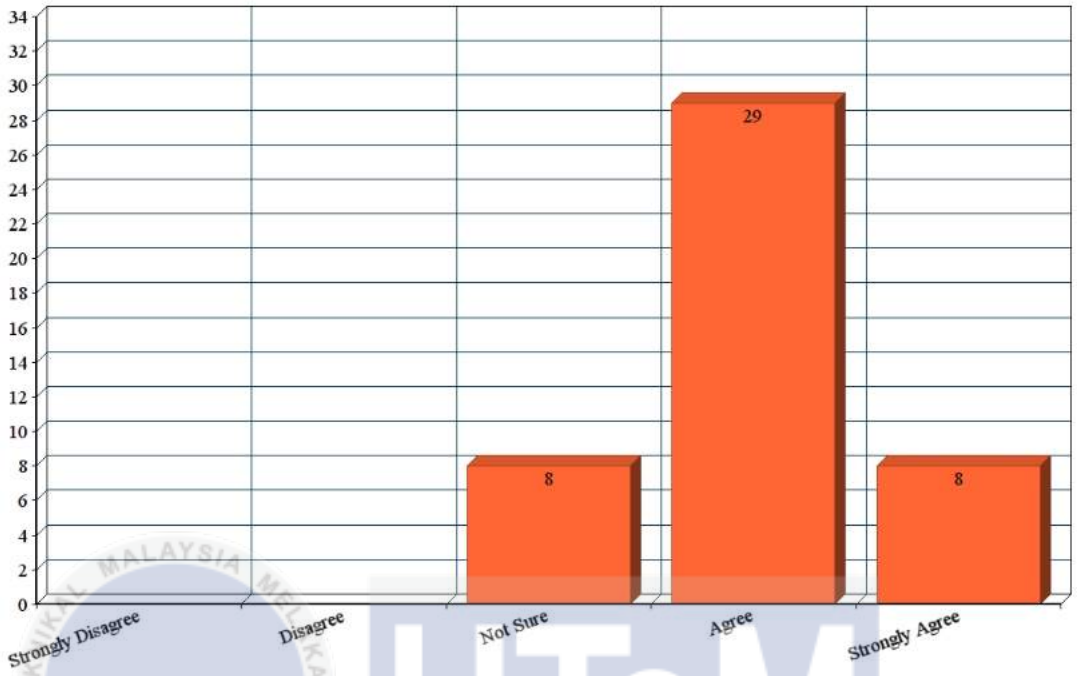


Delivering the lessons in teaching aids are easy to follow

Teaching material produced by the lecturers use the appropriate color background

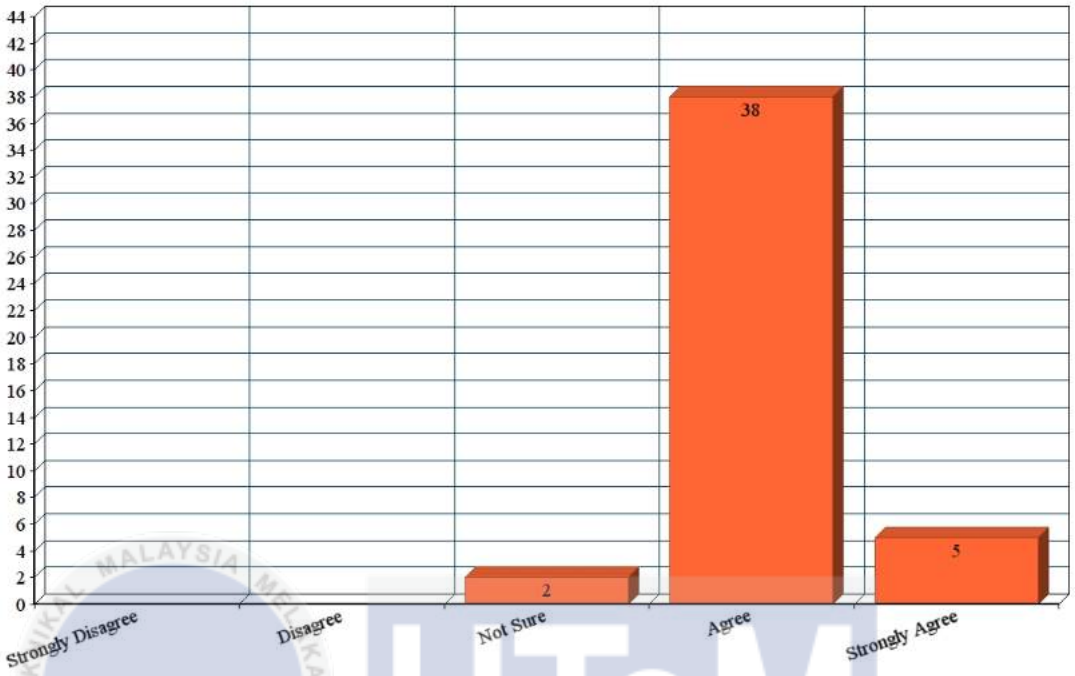


I enjoy learning in group

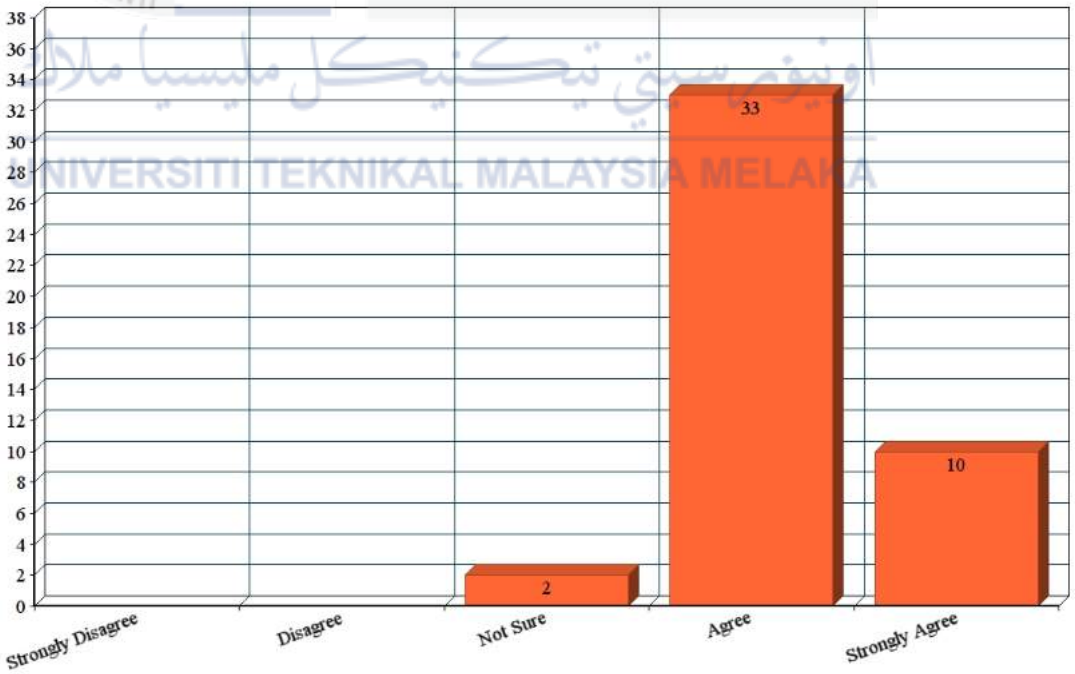


The teaching materials are very interesting to learn

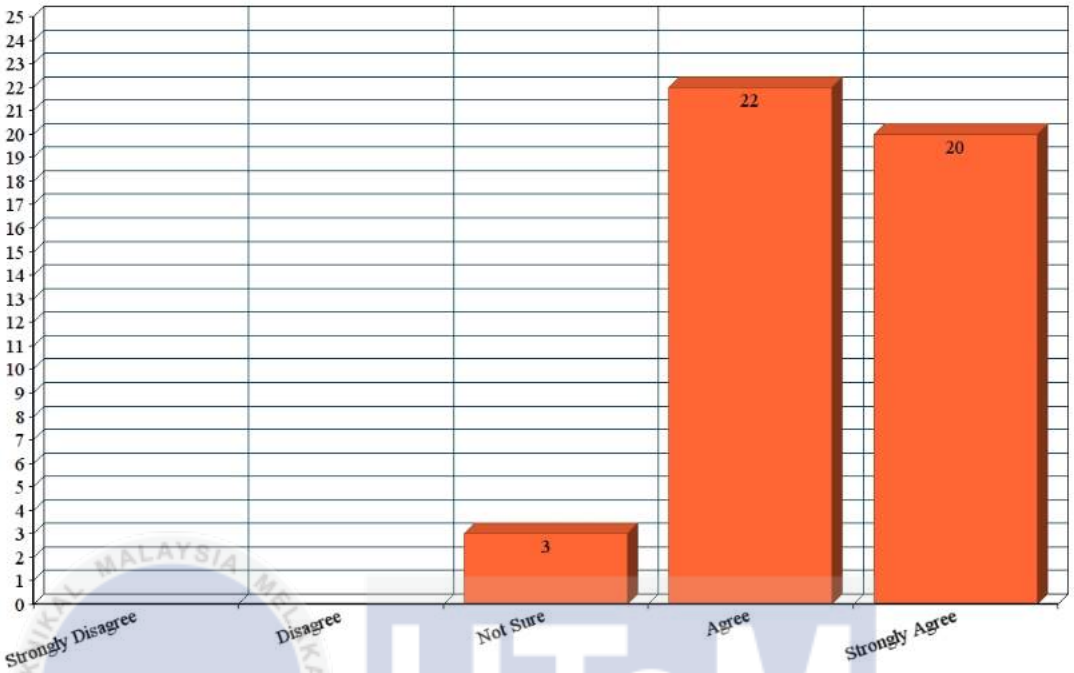
I easily understand the concepts



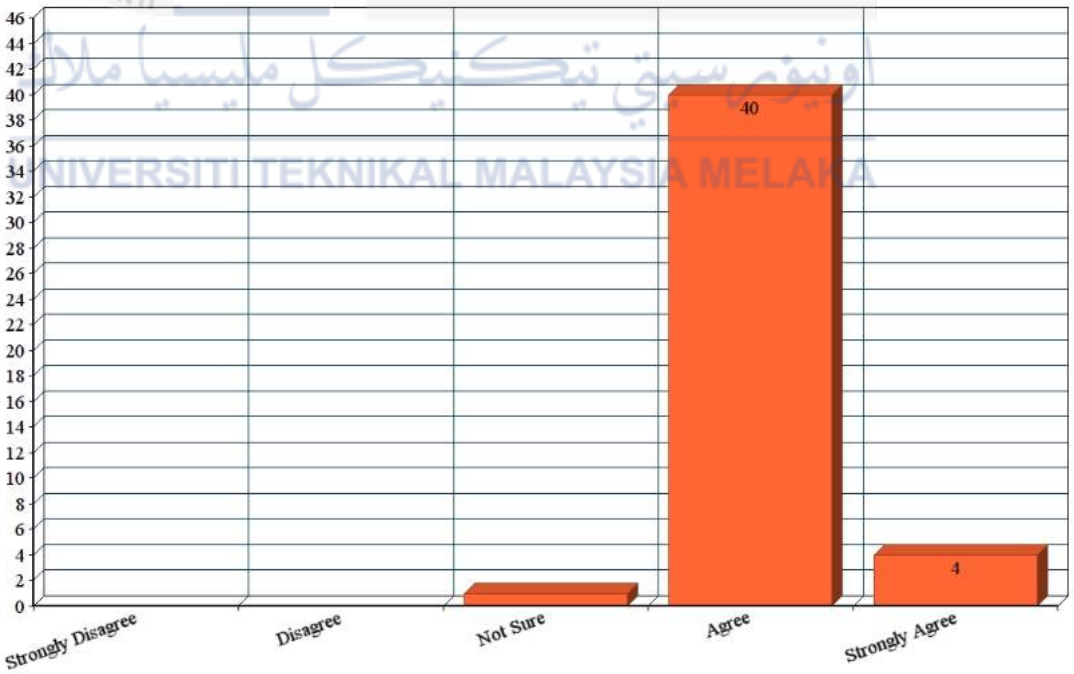
The teaching materials provided are easy to understand



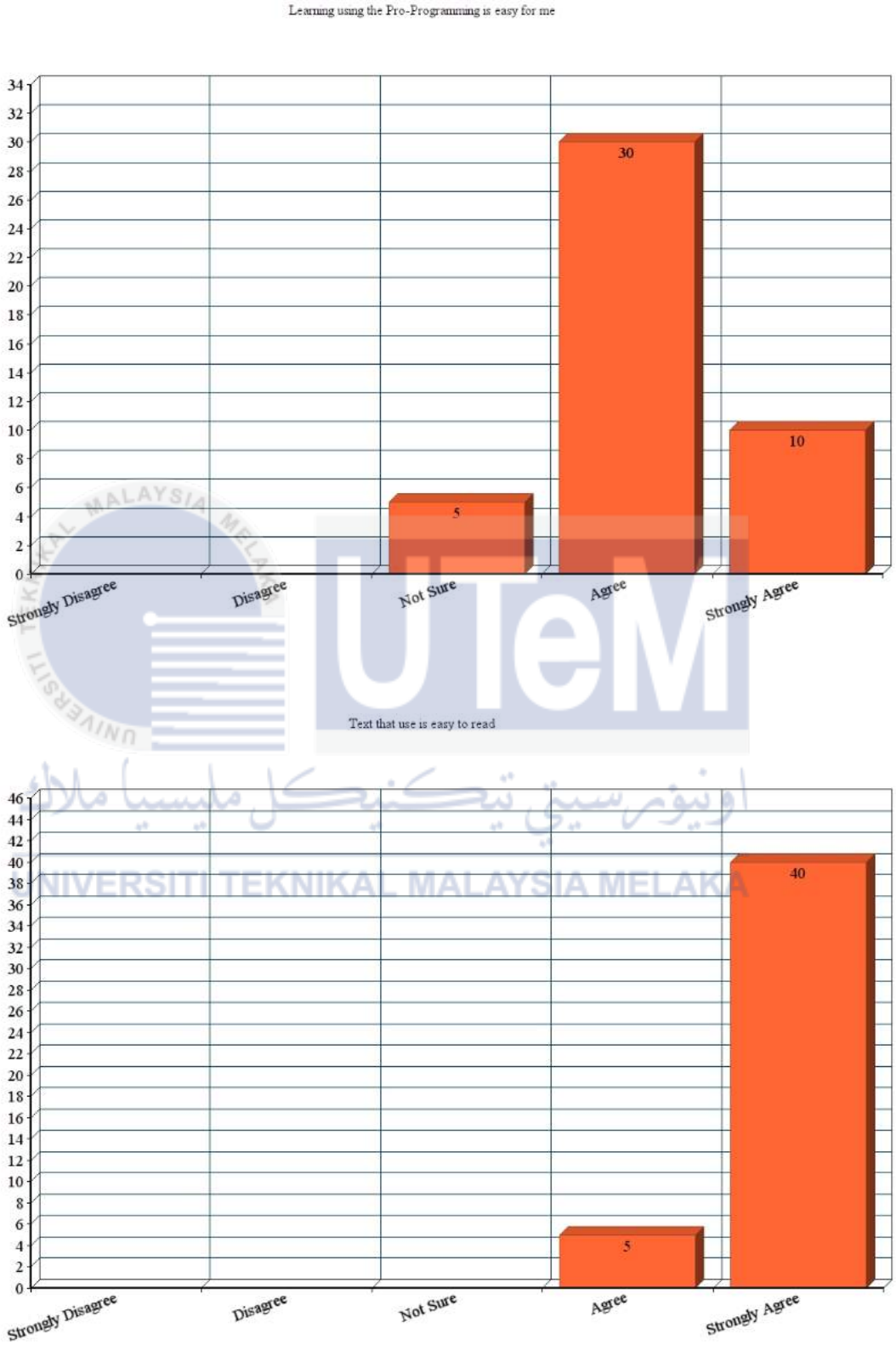
Interesting learning activities using the template provided



A variety of teaching activities make me interest to learn

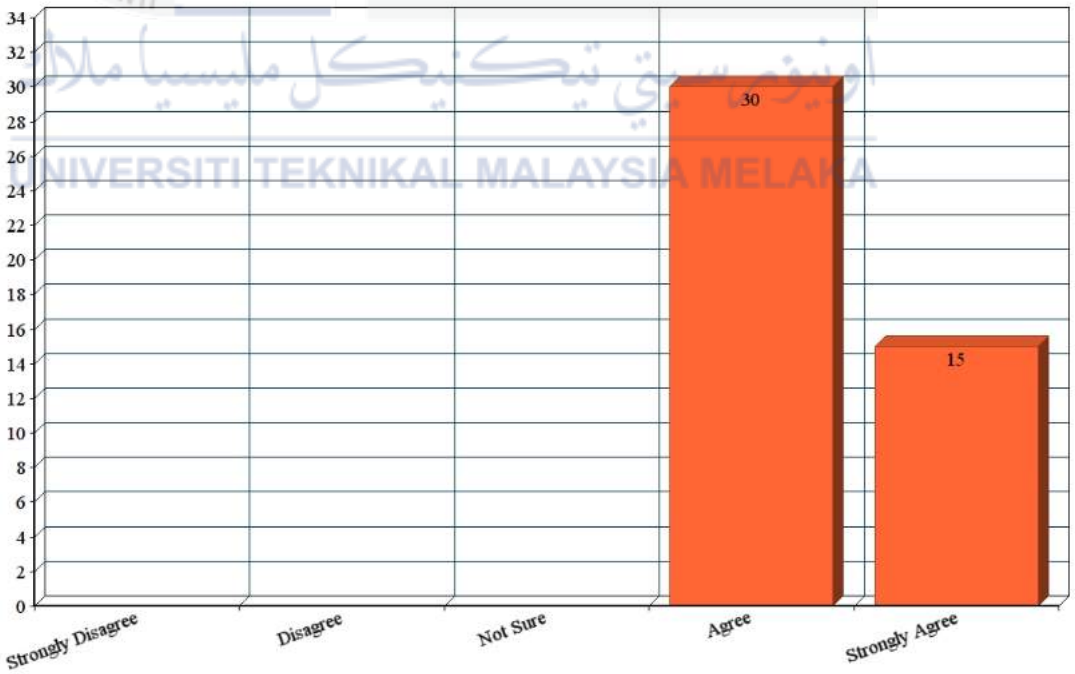


PERCEIVED EASE OF USE (EOU)

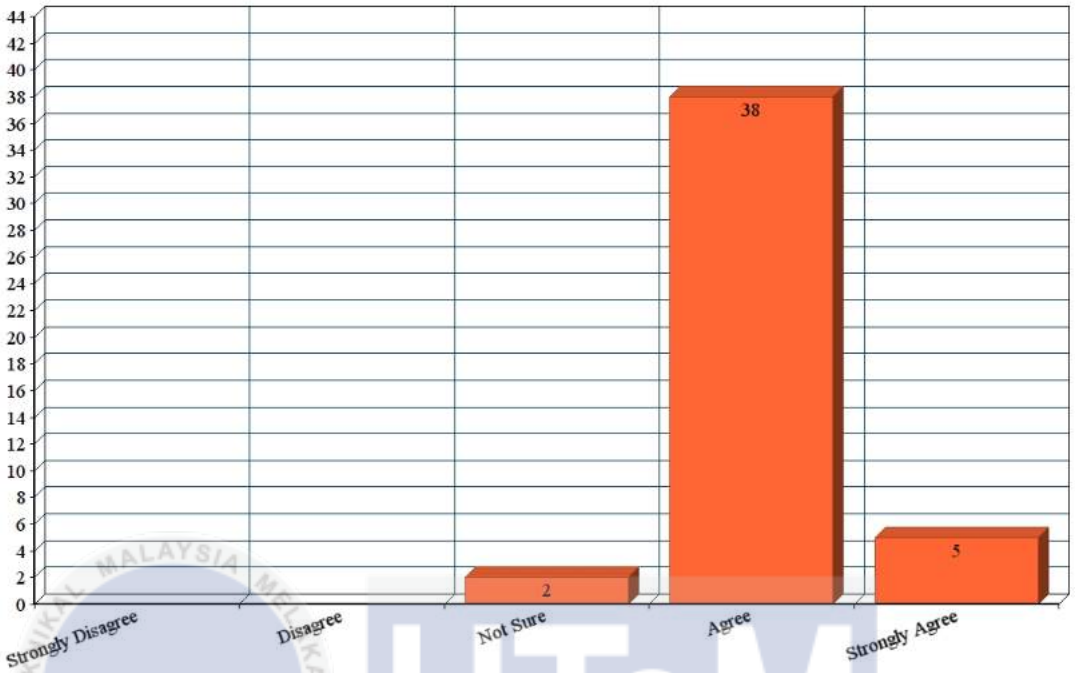


The learning material is equipped with interactive graphics

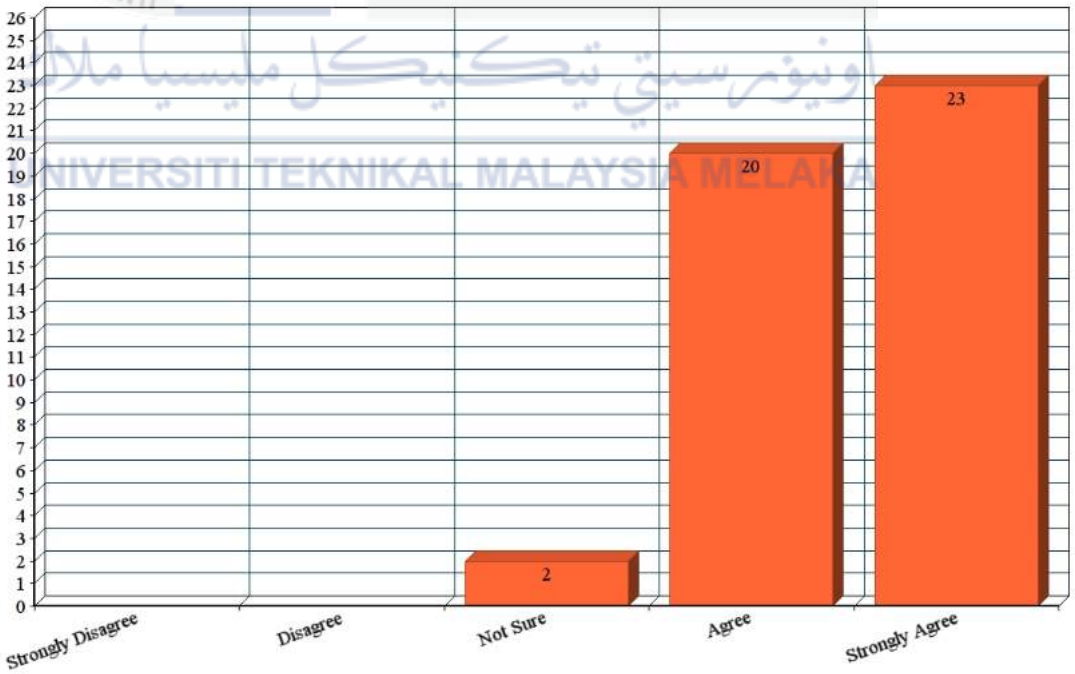
The template used is suitable for me



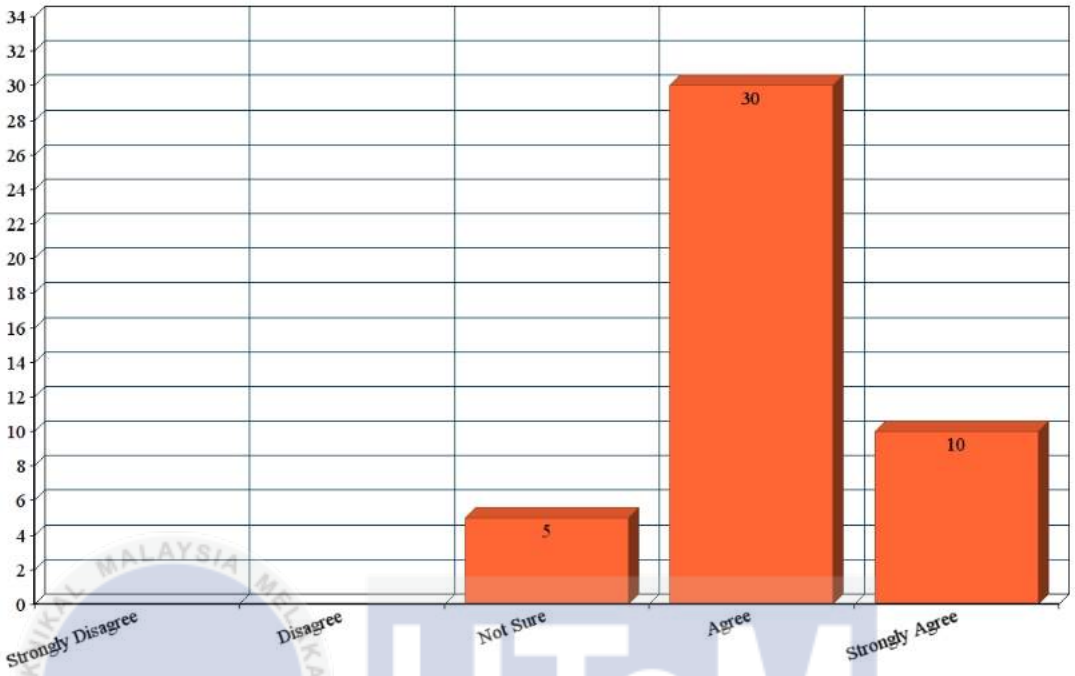
I love to study what I learn



I like to practise



I enjoy learning using all of the templates provided by the lecturers



TEST USER : MULTIMEDIA EXPERT

	Comment
Academia 1	Put something in the middle of the video learning to avoid user from skipping the learning process
Academia 2	Arrange the level and the mission accordingly
Academia 3	Add shortcut so that user can skip the first part (like skipping the tutorial)
Academia 4	Add time constraint for the quiz
Academia 5	It will be awesome if the user can log in back to the last part of his activity

6.7 Conclusion

This chapter itself give an overview of testing phase of this mobile application. Testing phase is important as it will determine of how the mobile application is fit the requirements or not. In this chapter, it also explains of which strategy should be used in test cases and expected result for each test separately. In the next chapter, it will discuss about weaknesses and advantages of this mobile application. It will also talk about conclusion for this mobile application project and system improvement if this mobile application is used for upgrade purposes to be made.

CHAPTER VII

CONCLUSION

7.1 Observation on Weaknesses and Strengths

In developing a project, it will have weaknesses and strengths. These weaknesses will be used in developing a better project and strengths can be used to determine what does the product offer the best. In every project, it is important to know weaknesses and strengths of the project. This will help to improve of the application.

7.1.1 The Weaknesses

Every mobile application has its own weaknesses. In this particular mobile application, one of the weaknesses is it required a strong internet connection. Some of us are not affordable to buy internet package and some of the places are not provided with the internet access. Furthermore, this mobile application has a quiz area which known as a mission. The quiz is not like a real programming. The lack in this quiz is it does not provide a real coding software. Other than that, this application also did not provide a time taken. Time constraint is important to make sure that the user is not cheating.

7.1.2 The Strength

As for this mobile application, it have full version of information provided inside. User does not need to refer to the manual book or printed notes anymore as this mobile application can cover variety of information. Besides that, one of the strengths is the information provided is in the simplest form but using specific explanation. The note which is known as the level, is using a mind map concept. Plus, user will find that this mobile application is so user friendly as it is using interactive button and clear logo for each data. Within this mobile application, it provides user with video which known as secret door. This video is generating for a short period of time and it is using an interactive information in it. This will basically attract user to explore more. The mobile application is to suitable play and based on the current syllabus.

7.2 Proposition for Improvement

There are several ways to improve the mobile application and make it more interesting to overcome the weaknesses. The improvement that can be done is making the video into 3D Maya animation. By modeling a 3D animation, it will attract user to focus as it will lead user to learn more. The content of this mobile application should be updated frequently as it to be more details and suitable along the era. In order to make the user to practise and understand more, a straight forward question and the simplest answer will need to be put in. This will require user to get an improvement by not facing challenging question. Other than that, the language used in this mobile application should have an option to change it as we are living in different races of country.

7.3 Contribution

This contribution of this mobile application is education. This mobile application is a free application to distribute of information center. The target user of this mobile application is to the university student especially for the one who want to take the Programming Language course. Besides that, this mobile application is using learning techniques as it will be able to help user to understand and memorize some of the important information.

7.4 Conclusion

In conclusion, the objectives of this mobile application are achieved. Although there is some deficiency on this mobile application, it is still can be improved later based on the weaknesses, suggestion and feedback that provided by the users, supervisor and evaluator The end product of this mobile application is useful for anyone where user can used it at anywhere and anytime they preferred. This will definitely help in producing a good student for the next generation.

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APPENDIX