

**DEVELOPMENT OF 2D GAME-BASED LEARNING ON  
HISTORICAL OF MALAYSIA**



**UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

**BORANG PENGESAHAN STATUS TESIS**

JUDUL: DEVELOPMENT OF 2D GAME-BASED LEARNING ON HISTORICAL OF MALAYSIA

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**DEVELOPMENT OF 2D GAME-BASED LEARNING ON  
HISTORICAL OF MALAYSIA**

**NUR AMIRAA BINTI NASIR**



**This report is submitted in partial fulfillment of the requirement for the**

**Bachelor of Information Technology (Game Technology)**  
الريورسيي تيمكيي كل مليسيا ملاك

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

**FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY**


**UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

**2016**

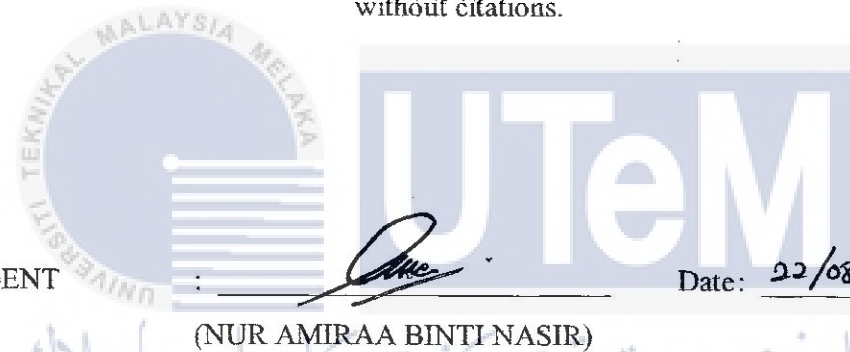
## DECLARATION

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## DEDICATION

This thesis is dedicated to my beloved parents, my father, Nasir Bin Sulaiman, and my mother, Norlaila Binti Abdullah Thani who taught me to keep fighting until the end and always think positive all the time. They also taught me that no matter how big your problem, it can't be solved without the effect. This thesis also to my friends and supervisor.



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## ABSTRACT

The purpose of this project is to help students understanding of the history of Malaysia that they have learned in school in more attractive, fun and interesting way. This project was developed to introduce the development of learning about the history of Malaysia based 2D platform game. The process for this project uses a Game Development Life Cycle and developed by using Unity 5 with C# programming language. Target user for this game product is developed for players who are between the ages of 13 to 15 years old who are studying in secondary school and also who are taking PT3. The test data is collected and analyzed through observation and survey from 20 respondents from secondary school and also 3 respondents who are expert in IT department. In conclusion, the use of game as a learning platform gives practice and training for player or secondary student to become more interactive with the Malaysia history.

## ABSTRAK

Projek ini telah dibangunkan untuk memperkenalkan pembangunan pembelajaran tentang sejarah Malaysia dengan berdasarkan platform 2 dimensi. Projek ini adalah bertujuan untuk membantu pelajar memahami topik sejarah yang dipelajari di sekolah secara lebih menarik dan menyeronokkan. Proses untuk projek ini menggunakan *Game Development Life Cycle* dan dibangunkan dengan menggunakan Unity 5 dengan Bahasa pengaturcaraan C #. Sasaran penggunaan produk permainan ini dibangunkan untuk pemain yang berumur di antara 13 hingga 15 tahun yang belajar di sekolah menengah dan juga yang mengambil PT3. Data ujian dikumpul dan dianalisis melalui pemerhatian dan kajian daripada 20 responden dari sekolah menengah dan juga 3 responden yang pakar dalam jabatan IT. Kesimpulannya, penggunaan permainan sebagai platform pembelajaran memberikan amalan dan latihan untuk pemain atau pelajar menengah untuk menjadi lebih interaktif dengan sejarah Malaysia.



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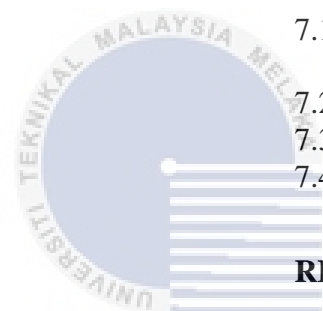
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## CHAPTER I



### 1.1 Project Background

Education is the process of facilitating learning, or the acquisition of knowledge, skills, values, beliefs, and habits. Educational methods include storytelling, discussion, teaching, training, and directed research. With the increase and availability of technologies devices, there has been a shift in what types of games people play.

According to Richard N. Van Eck (2008), there are three main approaches to creating software that simulates cognitive growth in the gamer. These three approaches are: building games from scratch created by educators and programmers; integrate commercial off-the-shelf (COTS); and creating games from scratch by the students. The most time-and cost-effective approach to designing these educational games is to incorporate COTS games into the classroom with the understanding of the learning outcomes the instructor has for the course.

History is about discovery, collection, organization, and presentation of information about past events. History can also mean the period of time after writing was invented (the beginning of recorded history). The progress a player makes in a game is through learning. The built-in learning process of history is makes a game enjoyable. Technology used in school operates usually to solve problems in a fun way. Generally, game-based learning is designed to balance subject matter with gameplay and the ability of the player to retain, and apply said subject matter to the real world and also know about the history of Malaysia.

Historical subjects have been a topic which is hard for many young children to remember and understand on what going on with this live, while games are an activity that people do for leisure. Therefore, a game based on learning is proposed to assist children's in secondary school in learning the history of Malaysia. The game is presented in an interactive style and in an exciting way which will attract the players and at the same time boost their learning.

## 1.2 Problem Statement

By reading and learning from books, are some of the way to generate our knowledge. Eventually students tend to feel bored, not interesting and will lose interested by using this method. This method is pretty unattractive, they can't interact with them and they lose focus toward them. Trying to get children's attention and interest is kind of hard because children have been thinking in different ways because they are so creative and unpredictable. Therefore, the games proposed is aimed to assist educators in teaching. It will make study become more fun, attractive and interesting.

### 1.3 Objectives

The objectives of this project are:

- a) To design the game about the history of Malaysia for secondary school.
  - History in Malaysia has a biggest scope of topics. In this project, it's just focus on history's text book of Form 2, which is chapter 7 - local people's struggle to restore the sovereignty of the nation.
- b) To develop the game architecture for making the game based on learning.
  - A research on ways to develop interesting educational games with good architecture will be carried out.
- c) To evaluate a game based learning on history of Malaysia.
  - Combining games with educational purpose where players will be able to learn things in an interesting way is cause by gamed base learning.

### 1.4 Goals and Genre

The purpose of this game project is to help students' understanding of the history topics they have learned in school in more attractive, fun and interesting way. The genre of this game project is action puzzle game. Games that offer intensity of action as the primary attraction to games.

## 1.5 Game Features

This game based learning product is developed for players who are between the ages of 13 to 15 years old who are studying in secondary school. This game developed by Unity 5.2 using C# script. This educational game consists of 3 different levels of puzzles games of this project. The game will have used computer base game platform (PC platform) and using a mouse and keyboard device as player controller. This game is enhancing eye and hand coordination and physical skill of the player. This game is a free game with no charge and no need internet required to play. The combination of the elements of educational and game is the concept of this project for players to experience new way of learning in an interesting way. Through this game, players will able to learn and understanding more about the history of Malaysia in an enjoyable way.



## 1.6 Conclusion

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In conclusion, this purpose of this educational game is to attract students whose have a weak to understand about history subject and have low interest in reading from the books. To make the game more challenging and exciting, this game will consist of different difficulties. The formal education world was needed for game based learning to grow. To affect positive learning, the vast potential was hold. It excites many people, but much research into their effectiveness remains. Generally, game-based learning is designed to balance subject matter with gameplay and the ability of the player to retain, and apply said subject matter to the real world and also know about the history of Malaysia. Therefore, to enhance learning of this sub topic, a game base learning is developed in an enjoyable way as teaching method. On the next chapter, will discuss about the literature review and project methodology of this project.

## CHAPTER II

### LITERATURE REVIEW AND PROJECT METHODOLOGY

#### 2.1 Introduction



This chapter described in details about a few literatures that has been written before related with my project. Literature reviews are secondary sources that has been published and also important to convey for researches about any the information that can be related of study. The references method such as books, person or an internet, researches needs to analyze the related data information when conducting a research. In this chapter, the method to collect data and analyze data will be explaining further and continue discussing on the research activities and methodology that is used.

## 2.2 Genre

This game genre is action puzzle game. According to Lindsay Grace (2005), action genre is games that offer intensity of action as the primary attraction. Reflex response is the primary skill needed to play these games well. Puzzle games genre is games that offer puzzles also as the primary attraction to games. The people who play these games tend to be the oldest population of the game playing community.

## 2.3 Existing Games

There are many existing educational games that have been developed. However, each of the learning tools comes with different platform and functionality. The chosen existing games were “Betul ke Salah Versi SPM APK”, “Q Quiz SMK” and “American Pickers Game”. This game is chosen to make comparison between them.

### 2.3.1 Comparison of Existing Games

Based on figure 2.1, the first game of existing games is Betul ke Salah Versi SPM APK. This game is a mobile game as a platform where it is designed for Android user. It can be downloaded from Play Store into mobile free and play without internet connection.

In this mobile game, the player should be decided whether the statement is true or false. Test of general knowledge as well as players and test your wits. But players need to be careful even if the questions are not in accordance with the specifications of the

Ministry of Education, no pass and fail, but false statements are mixed with the real facts to confuse the player.



**Figure 2.1: Betul ke Salah Versi SPM APK interface**

Based on figure 2.2, the second game of existing games is Q Quiz SMK. This game is compatible with some of devices. It is can be downloaded from Play Store into mobile free and using QR scanning for scan the QR code. This Q Quiz Interactive Bookmark application is specially designed to help students complete the digital and interactive quizzes. This hybrid application works well with the Q Quiz Interactive Bookmarks packs which are available in major bookshops. This application is prepared

for Form 1 to Form 3 students, especially for those who will be sitting for their examination.

In this application, the player can do their revision in advance and in fun way by using this application. The player can choose the topics in the Topical Challenges and do their practices in quiz form. Besides that, there is also an assessment which helps to test students' understanding of the topics they have learned, to prepare for their upcoming examination. With this application, the player will able do practices which can be done offline. It's will be able to save time because the answer are evaluated immediately and marks are given automatically and also can review the previous tests for revision purposes.



**Figure 2.2: Q Quiz SMK interface**



Based on figure 2.3, the third game of existing games is American Pickers Game based on figure 2.3. This game was published by History Channel. This game is for Android is very popular and thousands of gamers around the world would be glad to get it without any payments. This game is can free downloaded and can choose suitable APK files. It is also can enjoying full version of the game for tablet or mobile phone.




In this game, this game about puzzle game. Daily people throw out tons of garbage among which there're very valuable things. It is necessary to change somehow this situation and you are urged to help with this question. Being a qualified dustman, the player should rummage in garbage and collect useful things.



**Figure 2.3: American Pickers Game interface**

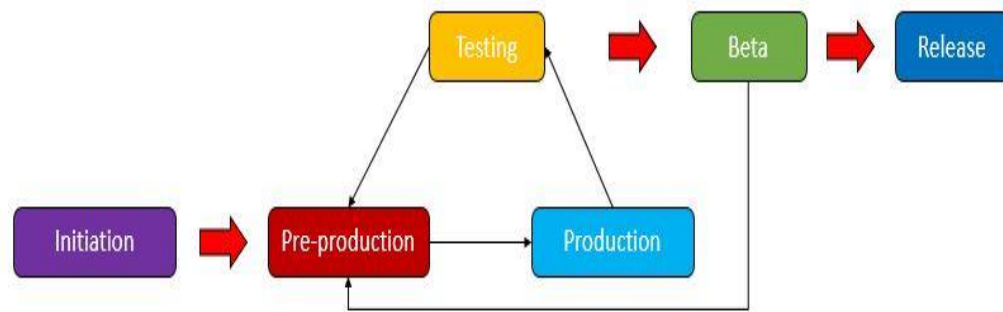
Based on table 2.1 shows the comparison table of the three existing game has been developed. There are many kind of platforms develop by different company.

**Table 2.1: Comparison of existing games**

	Betul ke Salah Versi SPM APK	Q Quiz SMK	American Pickers Game
<b>Screenshots</b>			
<b>Platform</b>	Mobile platform (Android)	Mobile platform (compatible with some of devices)	Mobile (Android) and Web Browser platform
<b>Genre</b>	Educational Game	Educational Game	Hidden Object Adventure Game
<b>Storyline</b>	Not Provided	Provided	Provided
<b>Price</b>	Free	Free	Free
<b>Audio</b>	Background Music and oral speaking	Background Music and oral speaking	Background Music and oral speaking
<b>Language</b>	Bahasa Malaysia	English	English

## 2.4 Project Methodology

Methodology is the discussion of method. It comprises the systematic, theoretical analysis of the methods applied to a field of study. Methodology that will be used to create this game is based upon Prototyping Model in Game Development Life Cycle based on figure 2.4.

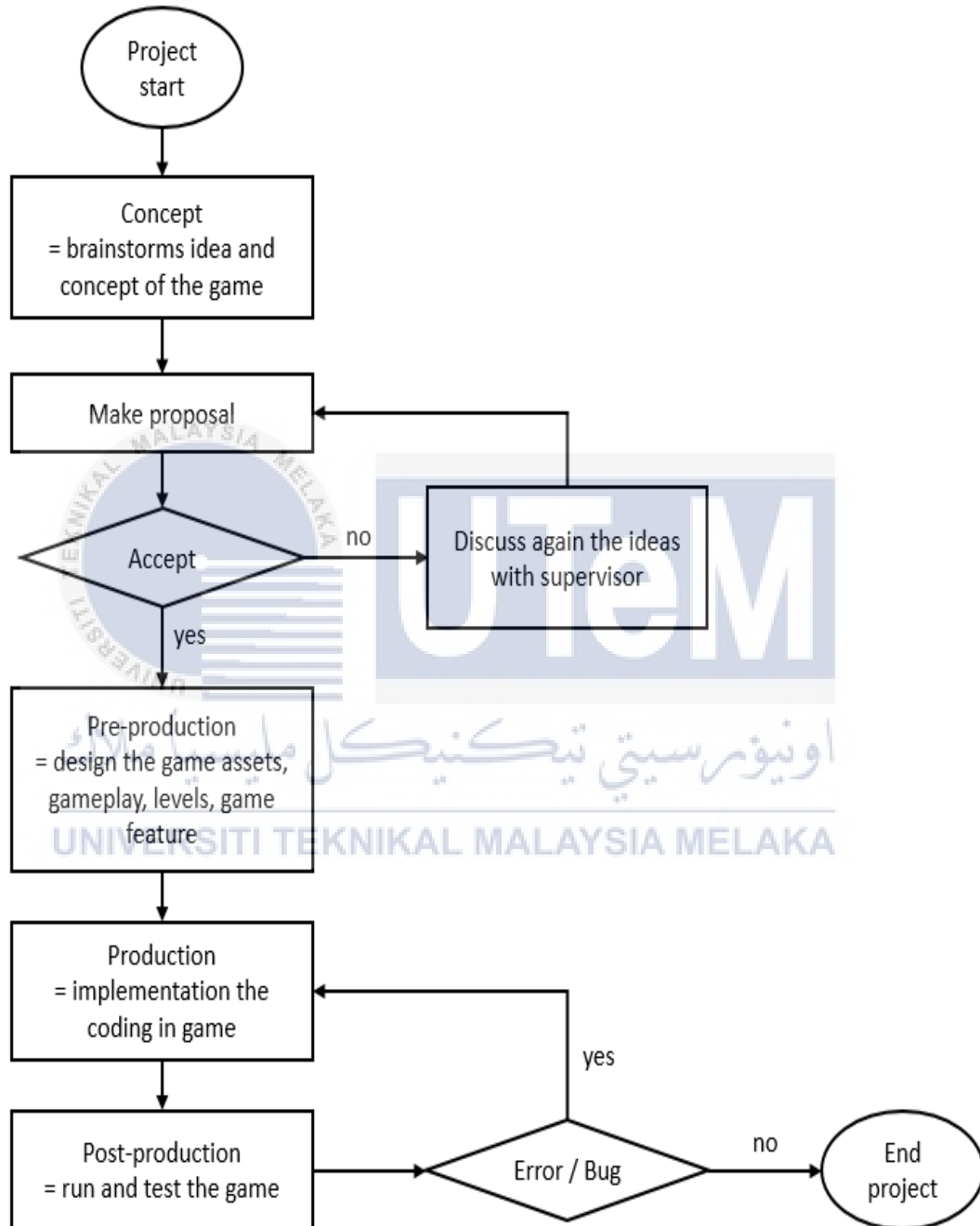


**Figure 2.4 Game Development Life Cycle**

Game Development Life Cycle it is an approach how to handle a game development project. In Game Development Life Cycle commonly adapt Prototyping Model but tailored to game dev specification. Prototyping Model is a systems development method (SDM) in which a prototype (an early approximation of a final product) is built, tested, and then reworked as necessary until an acceptable prototype is finally achieved from which the complete product (game) can now be developed. This model works best in scenarios where not all of the project requirements are known in detail ahead of time. It is an iterative, trial-and-error process that takes place between the developer and the users or players.

Learning games for children should consists of learning process and challenging but not boring. By using this prototype, the developer can get an “actual feel” of the games, since the interactions with prototype can enable the developer to better understand the requirements of the develop a games.

Based on figure 2.5 shows the flowchart of project activities during development for this project.



**Figure 2.5: Flowchart of Project Activities**

This table 2.2 shows the explanation of phase during development a game by using prototyping model in GDLC.

**Table 2.2: Explanation of Phase**

<b>Phase</b>	<b>Explanation</b>
<b>Concept Phase</b>	In this phase, brainstorming of idea will take place. The product requirement is identified define the game and followed by goal or vision synchronization of game. The purpose to develop of this product is to give the information through the game based learning.
<b>Pre-Production Phase</b>	In this phase, design the game assets, gameplay, levels, game feature, game mechanics and game world look like will be developed. The product requirement is identified define the software architecture to be developed and followed by the hardware to be implemented for this product.
<b>Production Phase</b>	In this phase, the game was developed. The planned features and interface progress followed the schedule and being demonstrated. The coding of this product is using C# as programming language is developed. The product is being prototype rather than a single distinct phase for the process.
<b>Post-production Phase</b>	In the last phase is releasing the prototype and also involve play testing to make sure that no bug and errors in the game. All the aspect from the feedback must be fixing and reanalyze. The bug fixing to complete the game and release the final product.

## 2.5 Conclusion

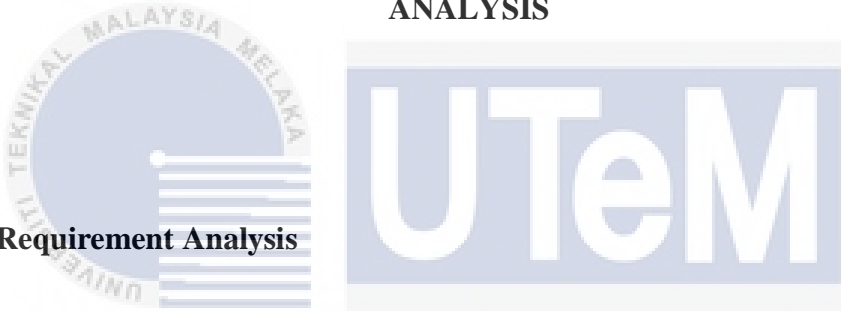
In conclusion, games as an educational technology is able to overcome teaching problems. Education is not just using traditional method only such as teaching in classroom, but it's also can be carried out anywhere and also learn it in an interesting way. The Game Development Life Cycle is applied in this project because this methodology is iterative, flexible and works best in scenarios where not all of the project requirements are known in detail ahead of time. On the next chapter, will discuss about the analysis which is product of this project.



## CHAPTER III

### ANALYSIS

#### 3.1 Requirement Analysis



In this requirement analysis there has project requirement, project schedule and milestone and conclusion. Project requirement is about analyze and discuss the differences of similar games that are related with this project. Project schedule and milestone is explaining about the project milestone and its status based on the activities listed in the milestone.

##### 3.1.1 Project Requirement

The idea in developing “Perjuangan Rakyat Tempatan” game is from “Q Quiz SMK” mobile application. In this “Q Quiz SMK” mobile application, this game has many

mini puzzle game. The player can choose the topics in the Topical Challenges and do their practices in quiz form. With this application, the player will be able to do practices which can be done offline. It will be able to save time because the answer is evaluated immediately and marks are given automatically and also can review the previous tests for revision purposes. Compare to “Perjuangan Rakyat Tempatan” game, this game has 3 levels which also have mini puzzle game. Each level has different time limit and challenges. The player can be able to know about the history of warrior and also can play the games.

Based on table 3.1 shows the game features which is explained about player roles, gameplay, core mechanics and game rules of this project.

**Table 3.1: Game Features**

Player roles	<ul style="list-style-type: none"> <li>• In easy level, player need to click the card to flip the card. Then, the player need to match it with the other card to get a score.</li> <li>• In medium level, player need to drag and drop the pieces of puzzle into the right place until get full of picture.</li> <li>• In hard level, player need to move the warrior character downward, upward, left or right to destroy the enemy</li> </ul>
Gameplay	<ul style="list-style-type: none"> <li>• Each level has 3 different gameplays which is easy, medium and hard level.</li> </ul>
Core Mechanics	<ul style="list-style-type: none"> <li>• Time: Each level has different time limit. In easy level, time given 20 seconds to complete the puzzle game. In medium level, time given 40 seconds to complete the puzzle game. In hard level, time given 60 seconds to complete the puzzle game.</li> </ul>
Game rules	<ul style="list-style-type: none"> <li>• The player can choose any challenges of puzzle games</li> <li>• The player must complete the challenges before times run out.</li> </ul>



### 3.1.2 Technical Requirement

This section will discuss about technology or devices that will be used in this game. In this project will use the personal computer. This game project is used Unity 5.2 as game engine to develop a game and use 2D platform by using C# script.

#### i. Software Requirement

The software required to carry out the development process are:

- Adobe Photoshop CS6
  - This project use to design the source material and will be used to photo editing and manipulation.
- Adobe Illustrator CS6
  - In this project, the source material of vector images will be used to create and design the game asset.
- Audacity
  - This project use to produce the source material of sound and will be used to editing, cutting and manipulation.
- Unity 5.2
  - This software will be used to develop an interface game.
- Visual Studio 2015
  - This software will be used C# script as a language to develop a game.



Submit Proposal to supervisor and JK PSM BITE	█																		
Discuss and revise project plan with Supervisor and Evaluator		█	█																
Work on Project & PSM 1 Project (Progress 1)				█	█	█	█												
Work on Project & PSM 1 Project (Progress 2)								█	█	█	█								
Demo Project & Update Student Status										█	█								
Demo Project & PSM Report												█	█						
Presentation Preparation													█						
PSM Presentation and Showcase														█					
Draft Report																█			
Submission overall marks JK PSM BITE																		█	█

Based on table 3.3 shows the milestone and dates during development for this project.

**Table 3.3: Milestone and Dates**

<b>Week / Date</b>	<b>Activity</b>
11 Dec 15	PSM Briefing
18 Dec 15	Register PSM on SMP
25 Dec 15	Discuss topic with supervisor
-	Prepare proposal
22 Jan 16	Submit proposal to supervisor and JK PSM BITE
05 Feb 16	Get proposal feedback from JK PSM BITE
22 Feb - 4 Mar 2016	Discuss and revise project plan with Supervisor and Evaluator
29 Jan - 8 Apr 2016	Work on Project & PSM 1 Project
14 Mar - 1 Apr 2016	Show the Progress 1
18 Apr - 3 Jun 2016	Work on Project & PSM 1 Project
18 Apr - 13 May 2016	Show the Progress 2
2 - 13 May 2016	Demo Project
14 - 27 May 2016	Demo Project & PSM Report
23 May 16	Check Presentation Schedule
30 May - 3 Jun 2016	PSM Presentation and Showcase
6 - 10 Jun 2016	Draft Report
13 - 24 Jun 2016	Submission overall marks JK PSM BITE

### 3.3 Conclusion

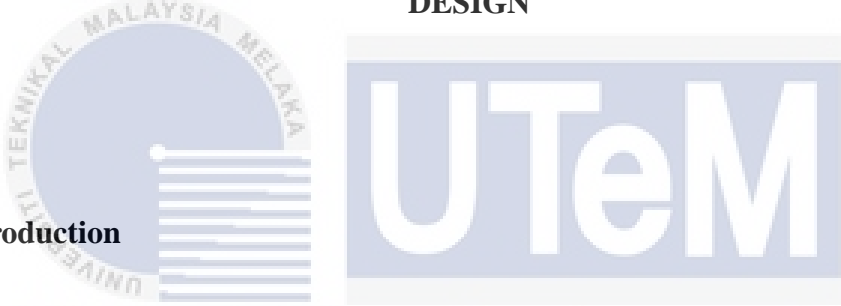
In conclusion, system analysis has been carried out in this chapter. In this chapter, project requirement has been covered. This requirement is important role in developing games which fulfilled user requirement and useful during development a games. However, project schedule and milestone also important role during developing the game project. It can help this game project always in keep on track of activity and can complete the project on time. On the next chapter, will discuss about the design which is product of this project.



## CHAPTER IV

### DESIGN

#### 4.1 Introduction

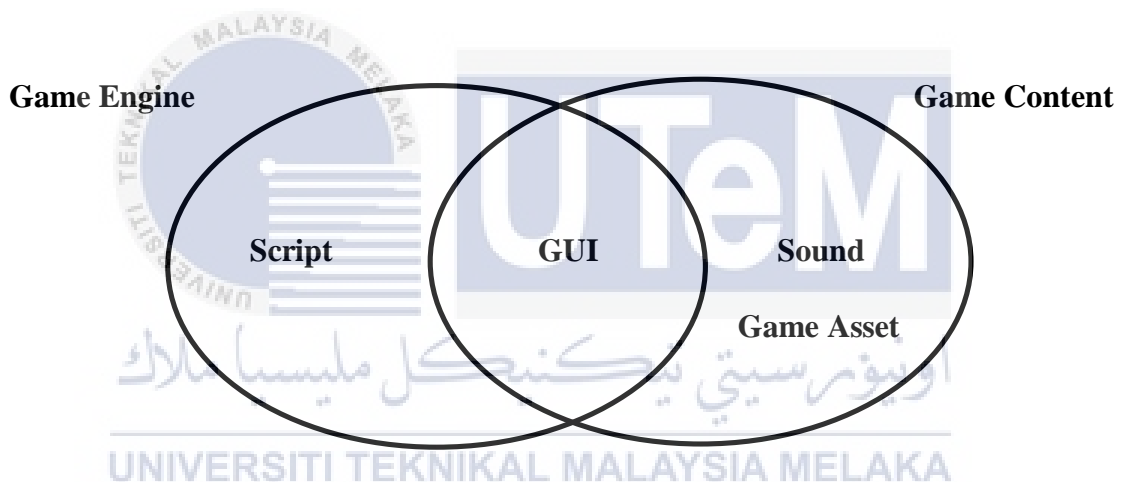


This chapter will discuss about the game architecture, game design and game art of this game project. According Staffan Bjork and Jussi Holopainen (2004), pattern in game design provides professional and aspiring game designers with a collection of practical design choices that are possible in all types of games.

Previous chapter, defines the result of the analysis of the preliminary design and the result of the detailed design. In this chapter, user will explain in details and give a clear picture about the functional game.

## 4.2 Game Architecture

Based on figure 4.1, this game project was used game architecture to develop a prototype. In this game, it has input device for player so that player can controlled the avatar or clicked by using mouse and keyboard device. Script for this game is used for programming the character and load game. By using C# script into Unity, the game can have programmed easily. The script is compiled by using Visual Studio 2015. The game asset is used into game content to make functional for game world. Sound effect and music background is used to feels fun when play the game. The sound effect has put it at sound button when clicked, win condition sound and lose condition sound.



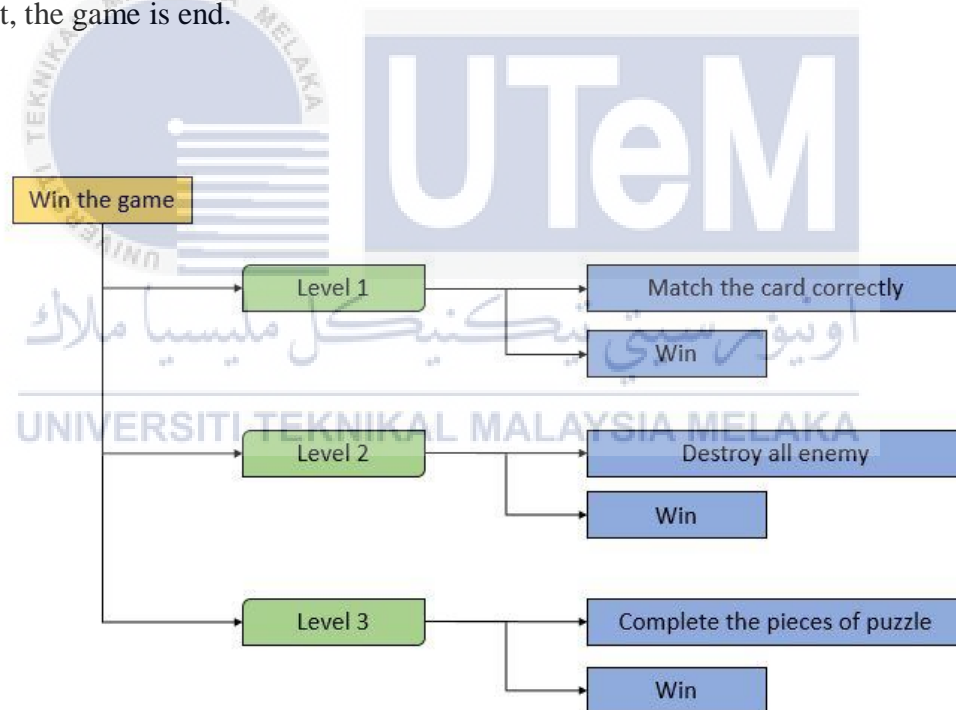
**Figure 4.1: Game Architecture**

## 4.3 Game Design

In this game design section there has gameplay, core mechanics, flowboard, level progression, storyline, and user interface for this project.

### 4.3.1 Gameplay

Figure 4.2 shows the hierarchy of challenge of this project. This game has 5 different characters which is has 3 different levels that consists of level 1, level 2 and level 3. This project is linear games, so that player must complete all the challenge before times run out. In first level, the player must be matching with the similar card before time runs out. Besides that, in seconds level, the player must complete the pieces of the puzzle game before time runs out. Lastly, in third level, the player must kill the enemy before time runs out. The victory condition, when player achieve to complete the first level, player will get information about the history and also can proceed to the next level until finish all levels in any from one character. In addition, player can't complete the challenge before times run out, the game is end.



**Figure 4.2: Hierarchy of challenges**



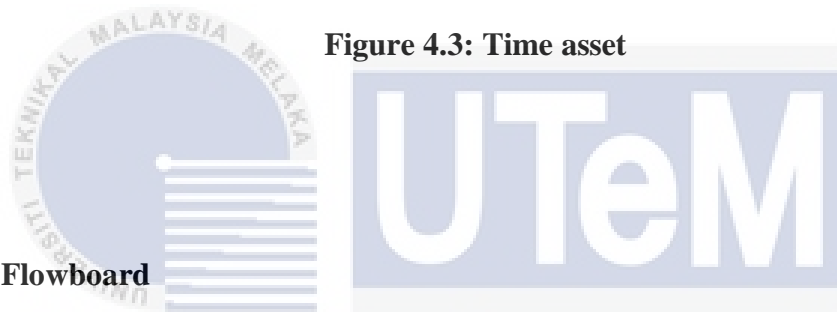
### 4.3.2 Core Mechanics

The game project has one core mechanics which is time limit based on figure 4.3. This mechanics are important to set up the gameplay. Time limit that represent the end of the game. All levels have same time limit which is 90 seconds to complete the challenges given.



Masa :

Figure 4.3: Time asset



### 4.3.3 Flowboard

Based on figure 4.4 shows the flowboard of game during development for this project. This flowboard has 7 scenes which is start scene, selections scene, information scene, game instructions scene, play mode scene, win condition scene and lose condition scene.



If player choose 'MENU UTAMA' button

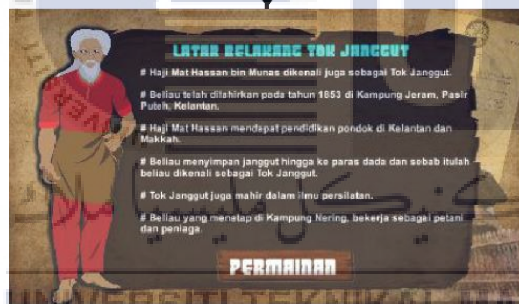
Start Scene  
 - 'MULA' button is to go the selection scene.  
 - 'KELUAR' button is for exit.

Go to warrior selection scene



Warrior Selection Scene  
 - Has 5 buttons which is a different of warriors.  
 - Player can choose any warriors.  
 - 'MENU UTAMA' button is to go back to start scene.

Go to level scene



Info Scene  
 - Information about the history of warrior.  
 - 'Permainan' button to play a game

Go to instructions scene.



Instructions Scene  
 - Instructions will be given to the player before start the game.  
 - 'MULA' button is to start a game.

Go to play mode scene.

continue

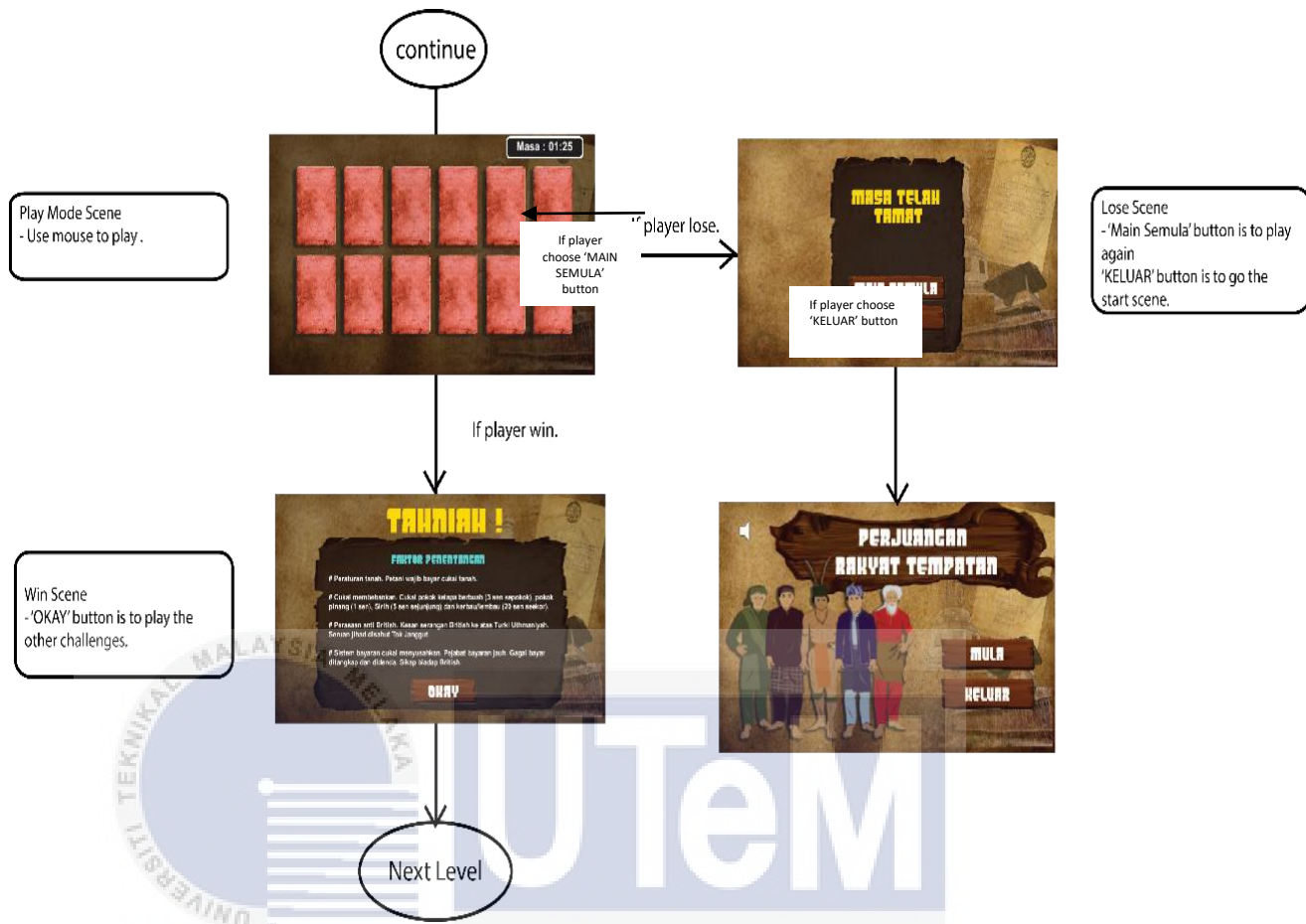
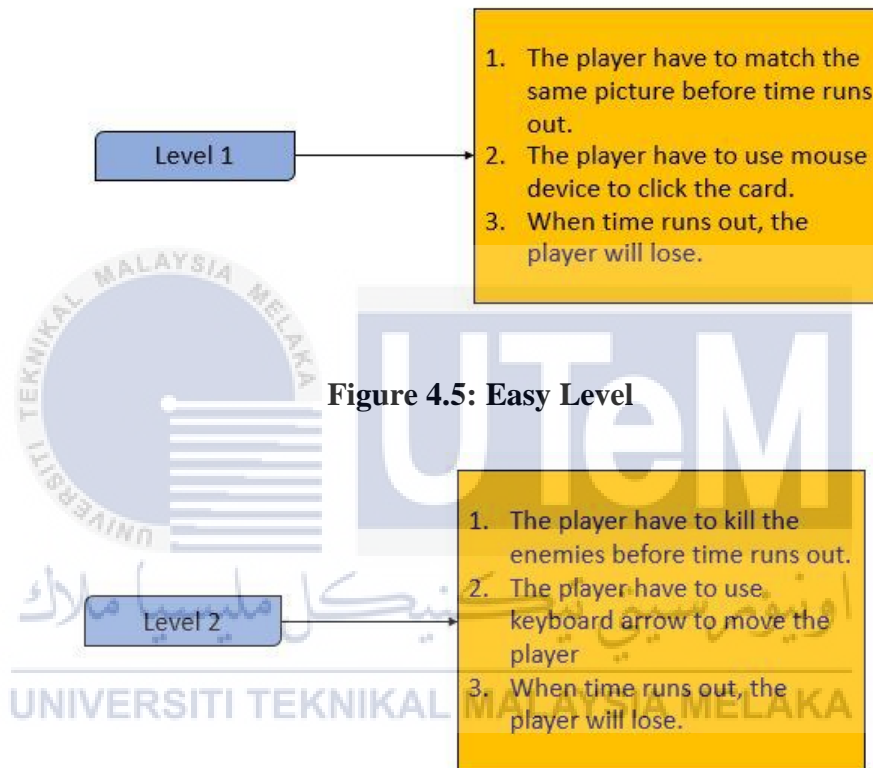


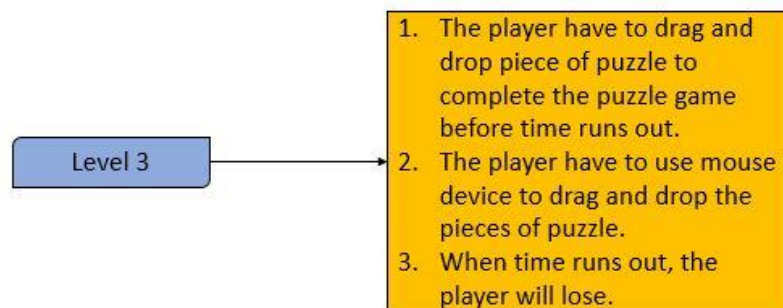
Figure 4.4: Flowboard of game

#### 4.3.4 Level Progression

In this game project, based on figure 4.5 to figure 4.7 shows the level progression of game that consists of 3 different levels which is easy, medium and hard levels.



**Figure 4.6: Medium Level**



**Figure 4.7: Hard Level**

#### 4.3.5 User Interface / Interaction Model



Figure 4.8: Main Menu Interface

This figure 4.8 shows the main menu scene for this game. Main menu scene contains buttons which is 'MULA' button for start game and 'KELUAR' button for exit game.



Figure 4.9: Character Selection Interface

This figure 4.9 shows the selection scene where has 5 buttons which is a different of warriors and also has 'MENU UTAMA' button for go back to Main Menu interface.





**Figure 4.10: Information Interface**

This figure 4.10 shows the information scene. The player will know about the warrior's history and also has 'PERMAINAN' button for play a game.



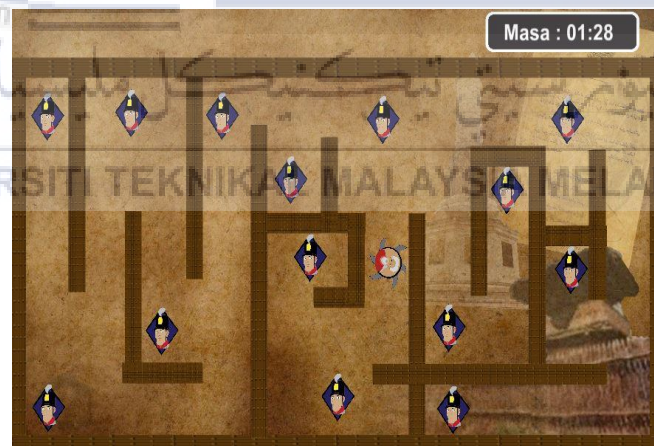
**Figure 4.11: How to Play Interface**

This figure 4.11 shows the instruction scene, player will know how to play a game for this challenges game. Instruction scene contains buttons which is 'MULA' button for start game.



**Figure 4.12: First Level Interface**

This figure 4.12 shows the first level scene of game. This scene has 12 cards which is contain different pictures. The gameplay for this first level is player have to match the card with the same card before times up.



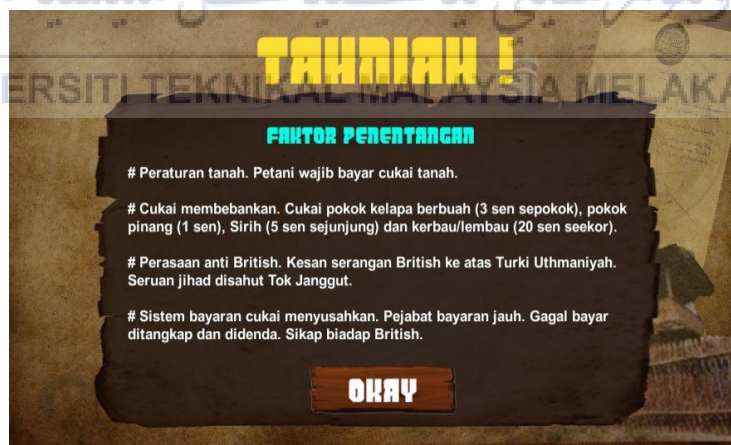
**Figure 4.13: Second Level Interface**

This figure 4.13 shows the second level scene of game. This scene has 12 character of enemies which is British Army and also 1 character of player. The gameplay for this second level is player have to destroy all the enemy before times run out.



**Figure 4.14: Third Level Interface**

This figure 4.14 shows the third level scene of game. This scene has 36 pieces of puzzle which is represent of warrior and also has 1 picture of warrior to make reference for player to complete the puzzles. The gameplay for this third level is player have to complete the pieces of puzzle before times up.



**Figure 4.15: Win Condition Interface**

After player successfully complete the challenge, victory condition scene will appear based on figure 4.15. 'OKAY' button is allowing player to play next level.





**Figure 4.16: Lose Condition Interface**

If player not successfully complete the challenge, lose condition scene will appear based on figure 4.16. 'MAIN SEMULA' button is allowing player to play again with the previous game and also 'KELUAR' button is allowing player to quit the game. Player can choose the button either want to play again or quit the game.

اوتنور سیتی تکنیکل ملیسیا ملاک  
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

#### 4.4 Game Art

This game project is used 2D graphic as game asset in 2D platform game. This game art section has game asset for main menu scene, selection scene and play mode scene.

**i. Main Menu Scene**



**Figure 4.17: Character for main menu scene**

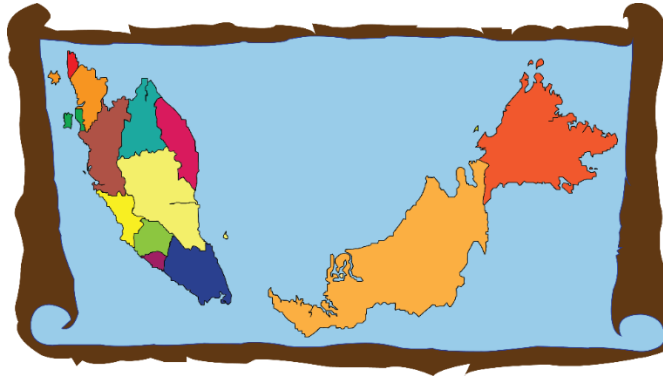
This figure 4.17 shows the characters for this game. Each characters have 3 different levels but same puzzle games. This game asset was created and design by using Adobe Illustrator.



**Figure 4.18: Main button asset**

This figure 4.18 shows the main game assets for button design for this game. This game asset was editing and manipulation by using Adobe Photoshop.

## ii. Selection Scene



**Figure 4.19: Malaysia's map in the warrior selected scene**

This figure 4.19 shows the Malaysia's map in the selection scene. This game asset was created and design for background for selected scene by using Adobe Illustrator.



**Figure 4.20: Buttons for warrior selection scene**

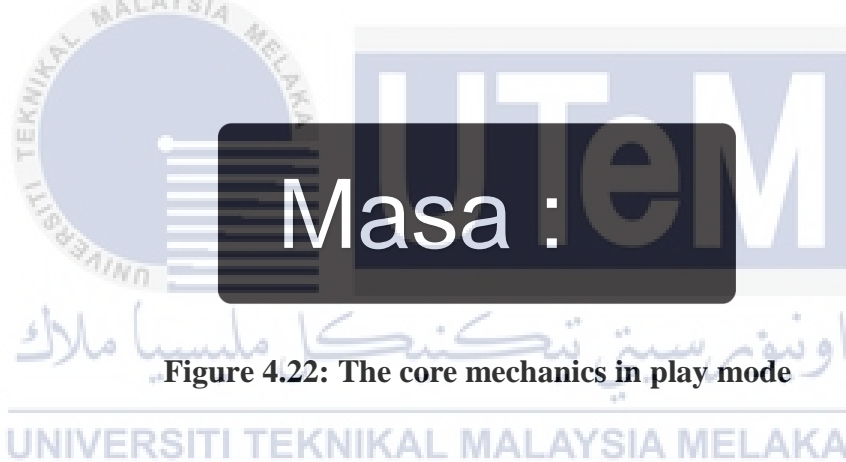
This figure 4.20 shows the button design for selection scene. This game asset was created and design for buttons for player to choose the character. This game asset was created and design by using Adobe Illustrator.



**Figure 4.21: Title header in warrior selected scene**

This figure 4.21 shows the title header in warrior selected scene. This game asset was editing and manipulation by using Adobe Photoshop.

**iii. Play Mode Scene**



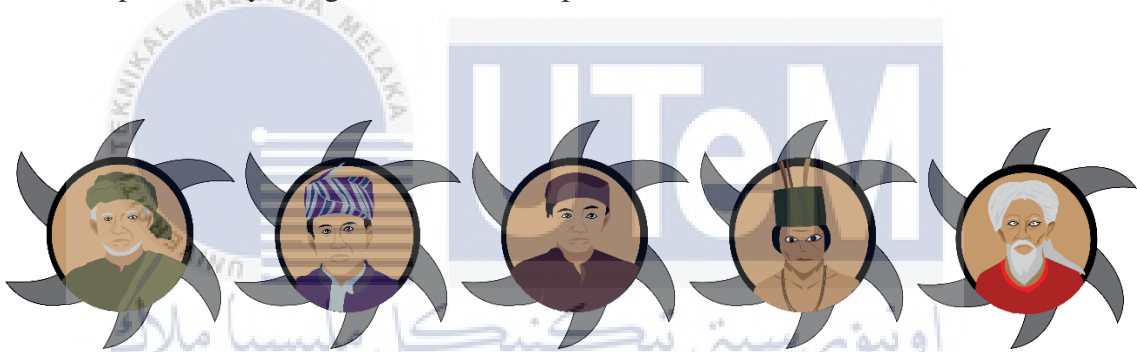
**Figure 4.22: The core mechanics in play mode**

This figure 4.22 shows the core mechanic in play mode. All levels have same time limit. The time limit given is 90 seconds. This game asset was editing and manipulation by using Adobe Photoshop.



**Figure 4.23: Card asset in the first level**

This figure 4.23 shows the game asset in the first level. This game asset was editing and manipulation by using Adobe Photoshop.



**Figure 4.24: Character for the player in second level**

This figure 4.24 shows the character for the player in second level. This game asset was created and design by using Adobe Illustrator.



**Figure 4.25: Enemy character in second level**

This figure 4.25 shows the character enemy in second level. This game asset was created and design by using Adobe Illustrator.



**Figure 4.26: The wall in second level**

This figure 4.26 shows the game asset of play mode in second level. This game asset was created and design by using Adobe Illustrator.

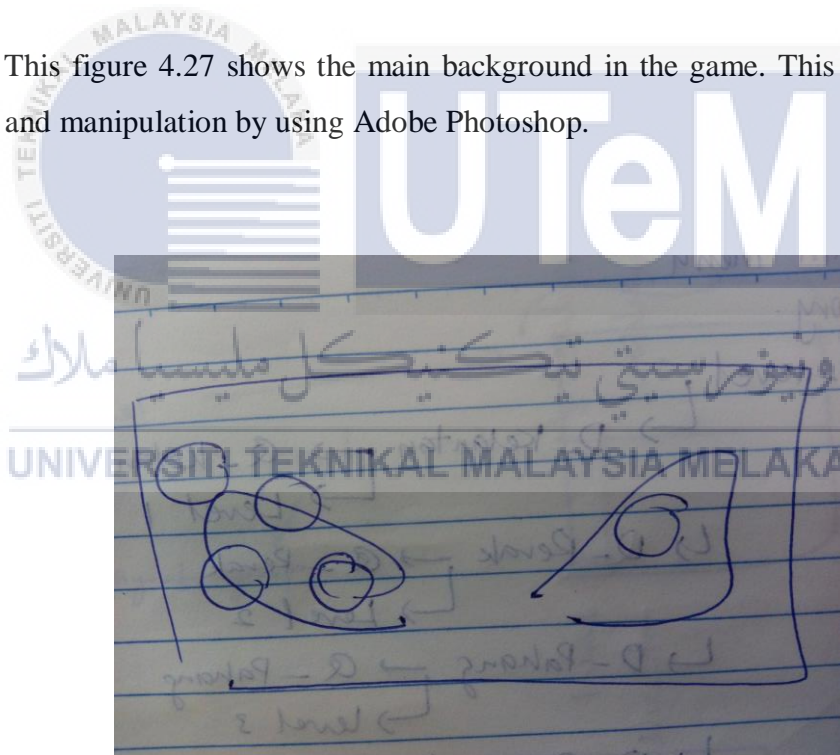
#### **4.4.1 Game World**

In this game is using old background as the main background. This is because want to make a classic background for the history game.



**Figure 4.27: The main background**

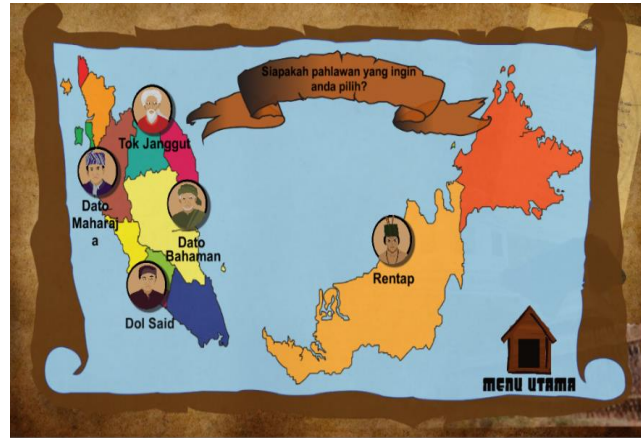
This figure 4.27 shows the main background in the game. This game asset was editing and manipulation by using Adobe Photoshop.



**Figure 4.28: Sketch of Warrior Selection scene**

This figure 4.28 shows the sketch of warrior Selection scene by using hand writing.





**Figure 4.29: Selection scene**

This figure 4.29 shows the warrior Selection scene. These game assets were imported into Unity 5 game engine.

#### 4.4.2 Character Design

In this game, character design was created with classic outfit. This game asset was created and designed by using Adobe Illustrator. Based on figure 4.30 shows the warrior's character in this game and figure 4.31 shows the enemy character.





Figure 4.30: Warrior's character



Figure 4.31: Enemy character

### 4.4.3 Camera Model

This game project is used 2D platform. Based on figure 4.32 shows the sketch of first person perspective by using hand writing. After sketch on paper, main menu was designed on Unity 5 game engine based on figure 4.33.

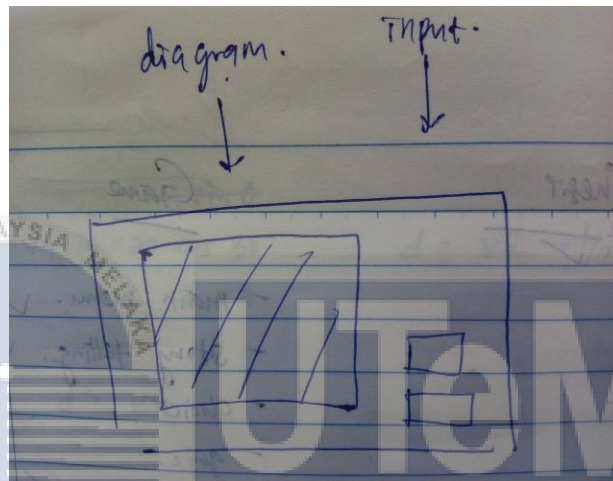


Figure 4.32: Sketch of first person perspective



Figure 4.33: 2D perspective

#### 4.4.4 Audio / Sound Effect

This game project is used sound effect and music background as feels fun when play the game. The sound effect has put it at sound button when clicked, win condition sound and lose condition sound. The music background for this game used a classic music which is Selendang Mak Inang. During this process, audacity is used to edit and cut the sound needed only. Based on figure 4.34 shows the main theme music for this game. The win sound effect when player finish the challenge on time is based on figure 4.35 while for lose sound effect for this game when player can't finish the challenge on time based on figure 4.36.

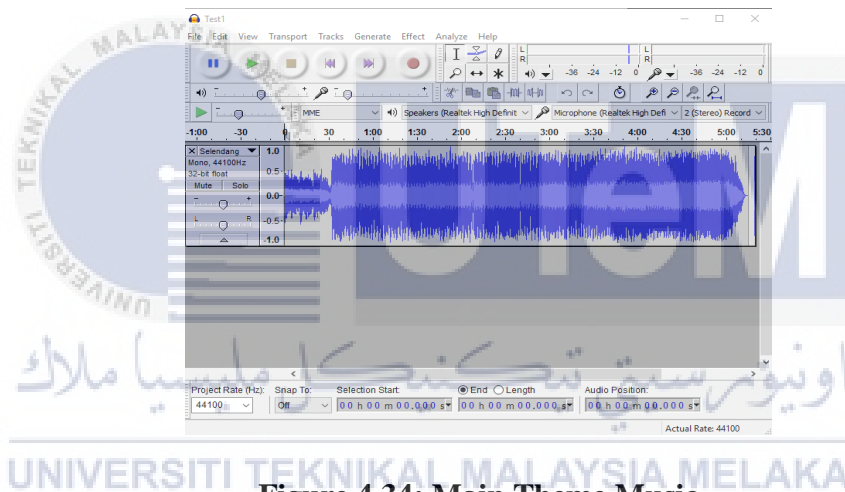


Figure 4.34: Main Theme Music

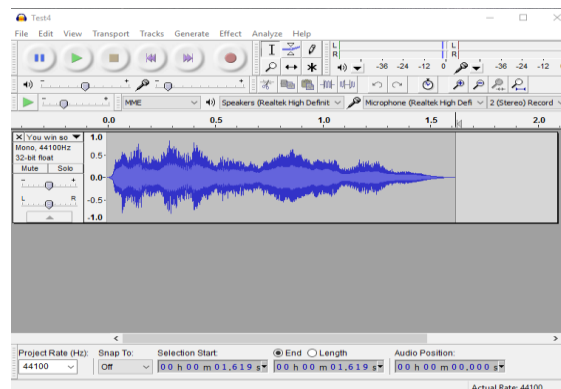
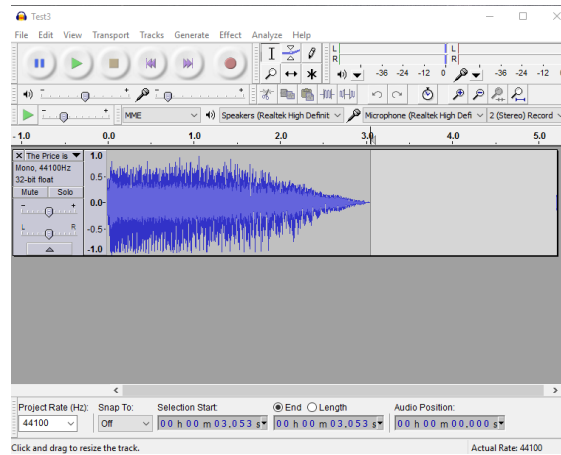


Figure 4.35: Win Sound Effect



**Figure 4.36: Lose Sound Effect**


## 4.5 Conclusion

In conclusion, the elements of design have been carried out in this chapter. In this chapter, game architecture has been explained. Game architecture are important role in developing games which is useful during of the process in the game engine. However, game design and game art also important role during developing the game project. Both are important during developing the game asset and game world in this project. This activity is doing during pre-production phase. On the next chapter, will discuss about the implementation which is product of this project.

## CHAPTER V

### IMPLEMENTATION

#### 5.1 Introduction



Previous chapter cover about the design of the game which also include the game architecture of the game. Moreover, the game design in terms of how the gameplay works, the hierarchy of challenge for each level, the core mechanic, a flowboard, the level progression of this project. Besides that, it's also cover about the design on game art which is explained about how the game world, character, camera mode, and also sound effect and background will be design into the game.

In this chapter described in details about the how the game art will be implement and integrate in the project while developing process. This chapter also explain about the production of each game art which include graphics, and audio. Moreover, this chapter also will focus about the game configuration management which is how this project will be setup and also how will be implement for testing purpose.

## 5.2 Creation of Game Art

This project is using 2D pipeline in creating game art. Based on figure 5.1, all the game assets that using 2D pipeline for this project which is a characters, game world, animation, sprites and UI layouts.

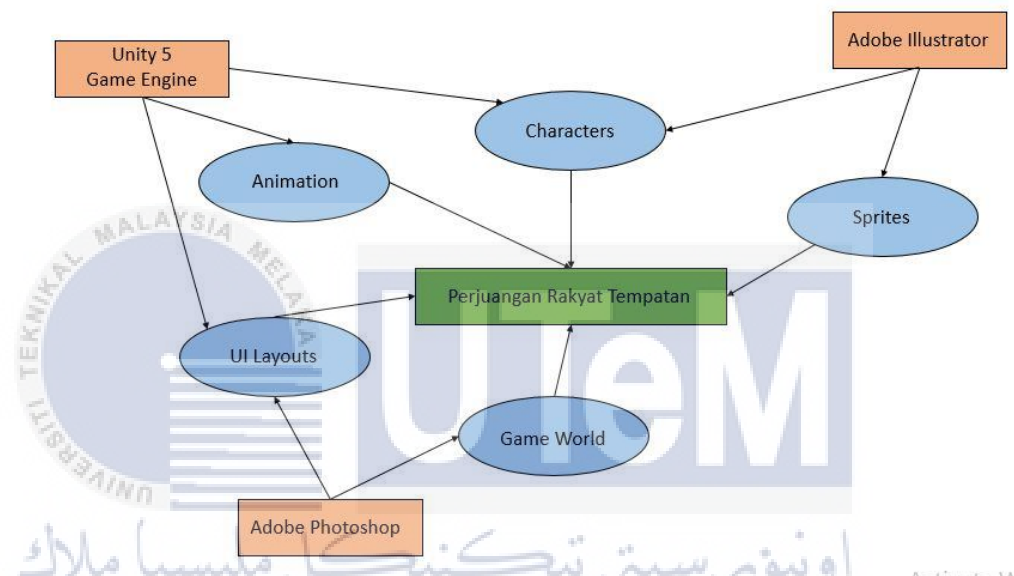


Figure 5.1: 2D Pipeline

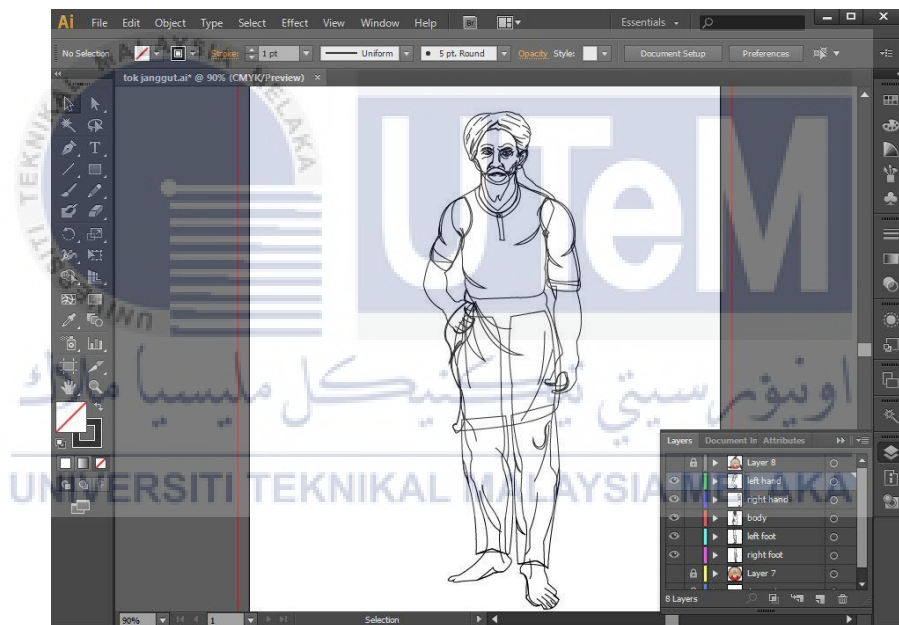
### 5.2.1 Production of Graphics

There a few steps of producing the game assets during production of graphics. These game assets are using bitmap image because bitmap image able to store color information for each pixel and also support complex drawing. This section will focus on two which is character and game world.

## i. Character

In this project, there will be 5 characters which represent the Malay warrior history. The process is using Adobe Illustrator for sketching until import the character into a Unity 5 game engine is explained step by step and displayed in figure which starts from figure 5.2 until figure 5.6. The character is taken as one of the 5 warriors as an example in explaining the process.

Step 1: Using Adobe Illustrator to trace the outline for the game character.



**Figure 5.2: Outline tracing of game asset**

Step 2: Using Adobe Illustrator to color and edit design for the game character.



Figure 5.3: Design and editing pattern of game asset

Step 3: Save as PNG file.

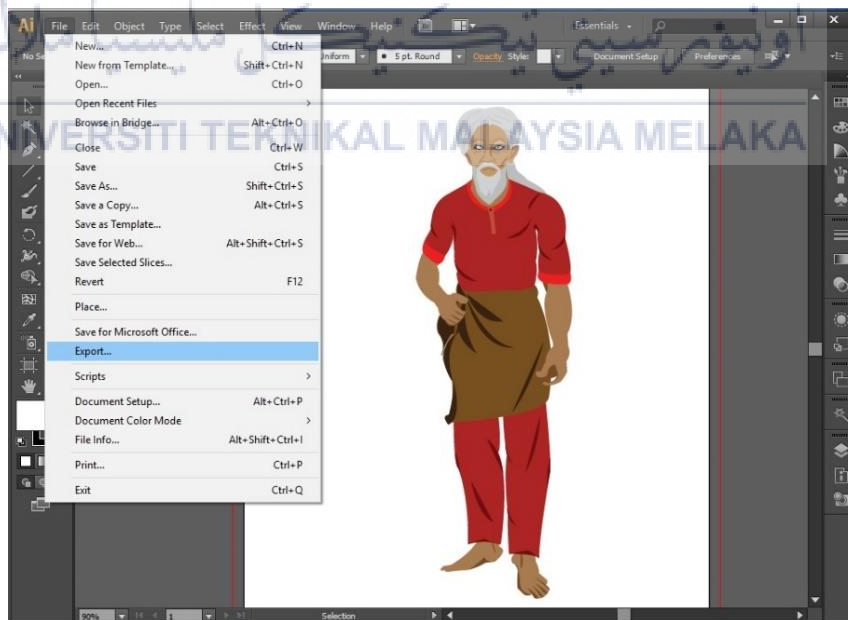


Figure 5.4: Save game asset to PNG file



Step 4: Game assets ready in PNG file and import into the Unity 5 game engine.

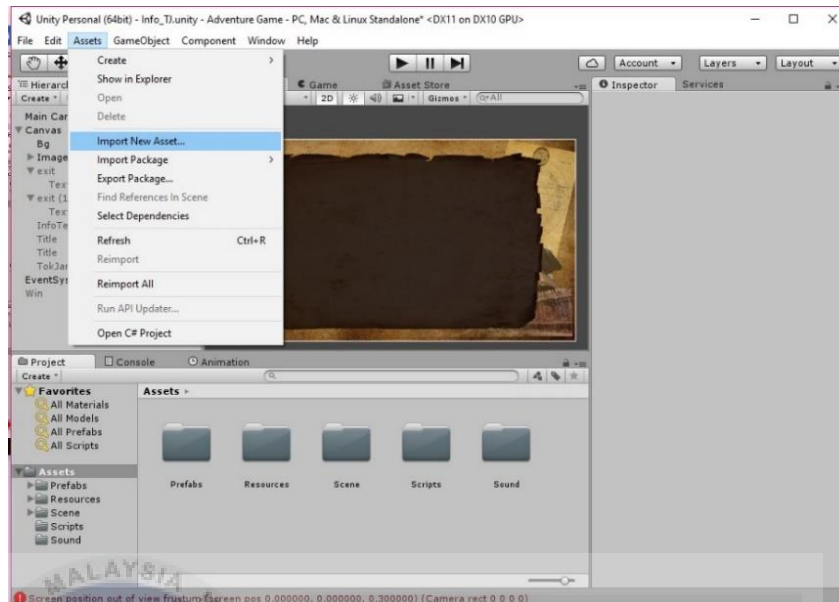


Figure 5.5: Import game asset into Unity 5

Step 5: Game assets is ready in Unity 5 game engine.

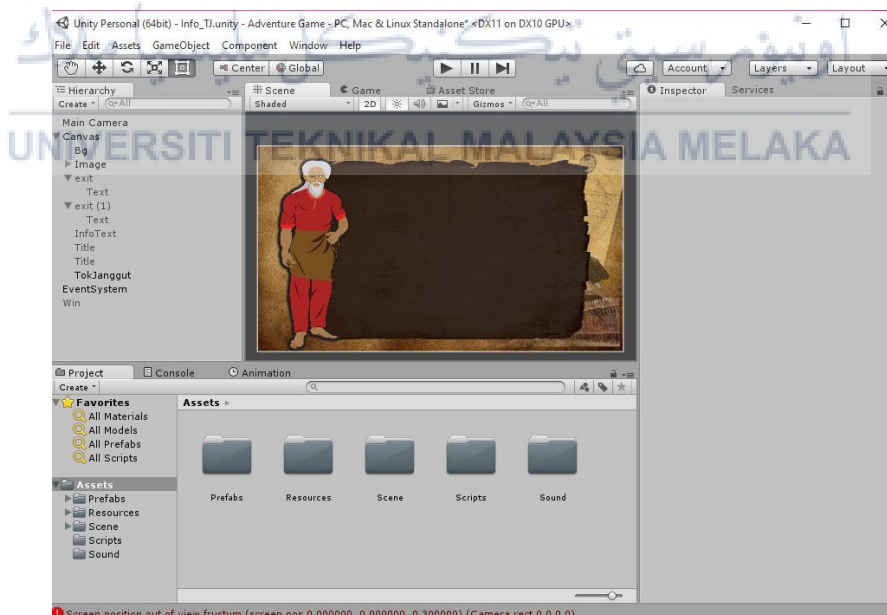
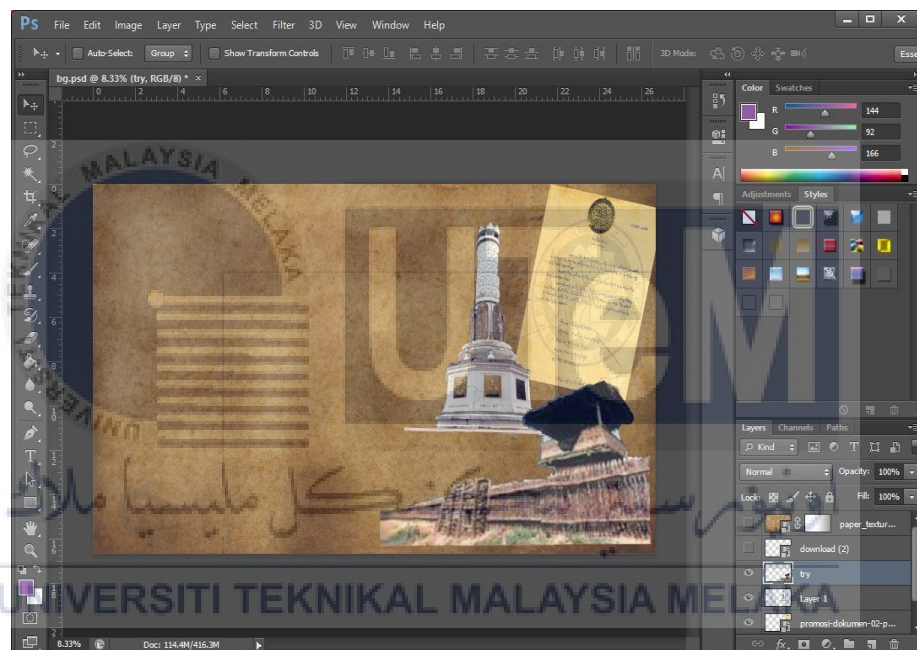


Figure 5.6: Game asset ready in Unity 5

## ii. Game World

In this project, the process is using Adobe Photoshop for editing the game world until import into a Unity 5 game engine is explained step by step and display in figure which is start from figure 5.7 until figure 5.11.

Step 1: Import photo that need to use into Adobe Photoshop.



**Figure 5.7: Design and editing pattern of game world**

Step 2: Make a vignette around the borders.

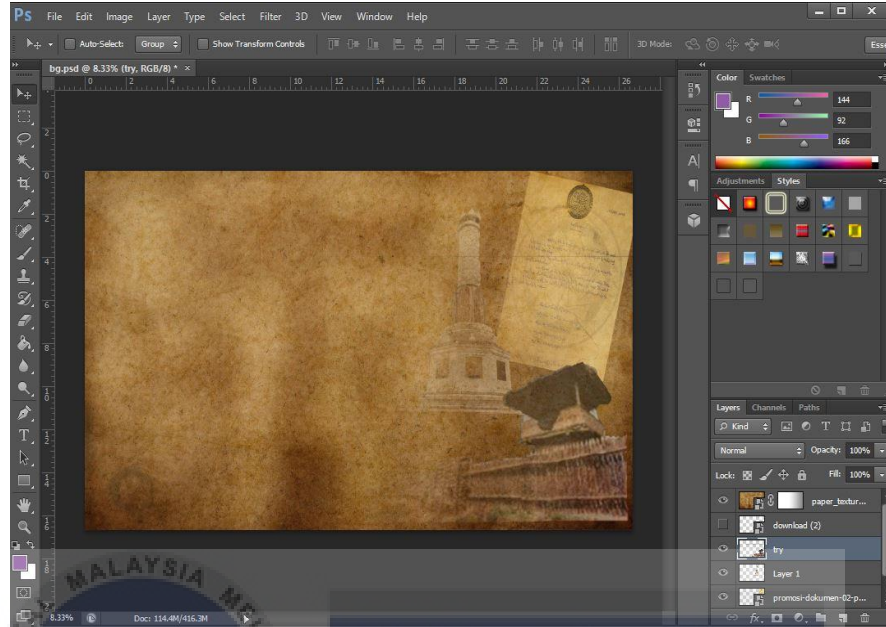


Figure 5.8: Set up for game world

Step 3: Save as PNG file.

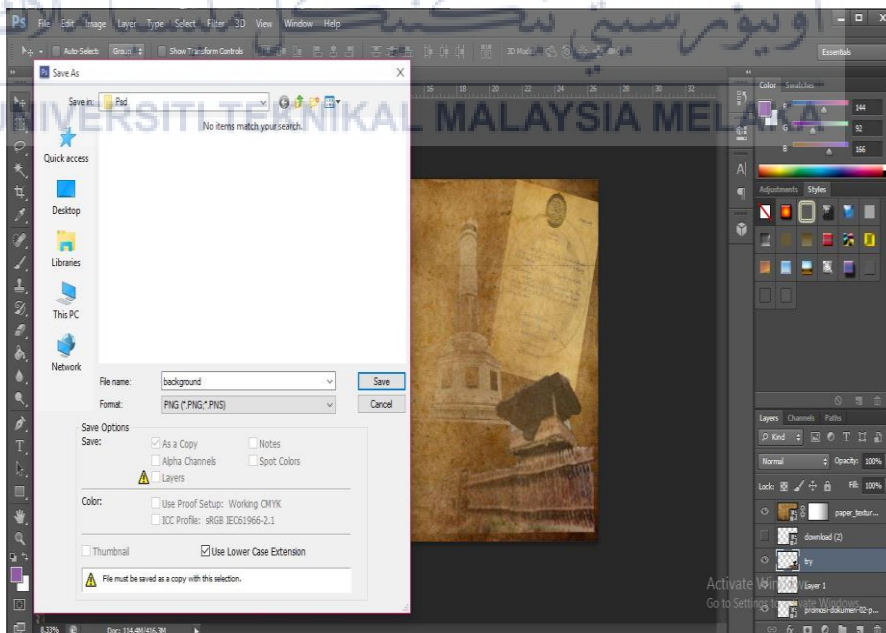


Figure 5.9: Save game world to PNG file

Step 4: Game world ready in PNG file and import into the Unity 5 game engine.

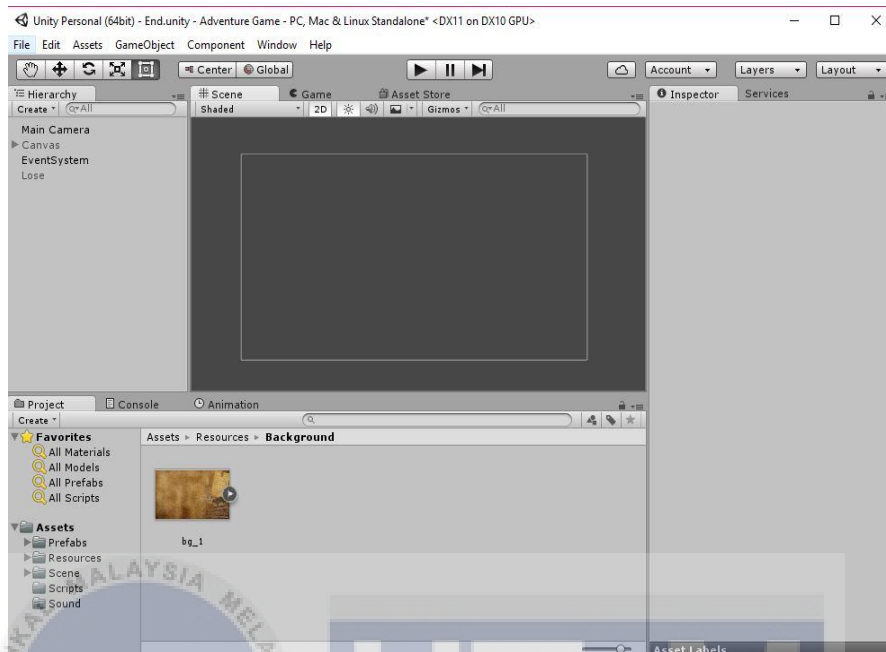


Figure 5.10: Import game world into Unity 5

Step 5: Game world is ready in Unity 5 game engine.

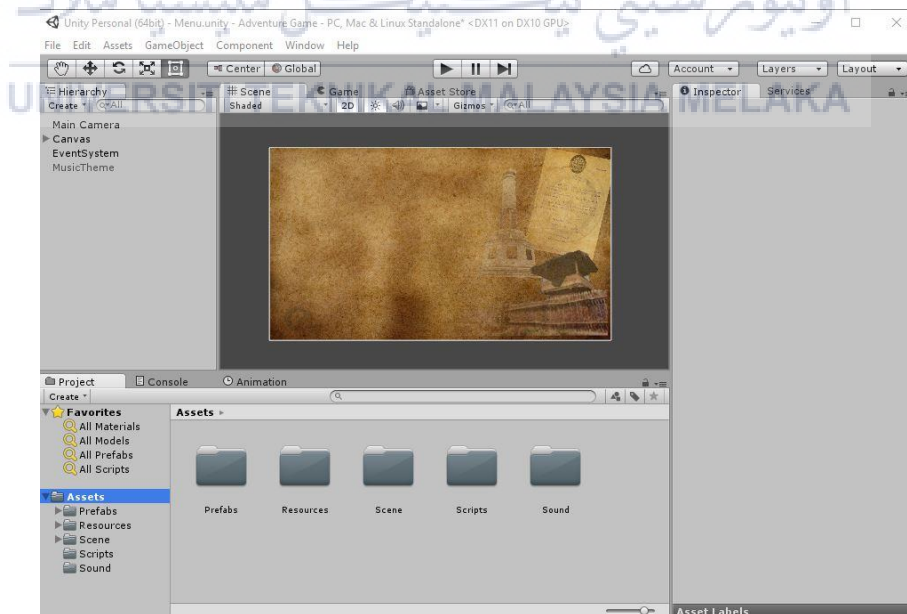
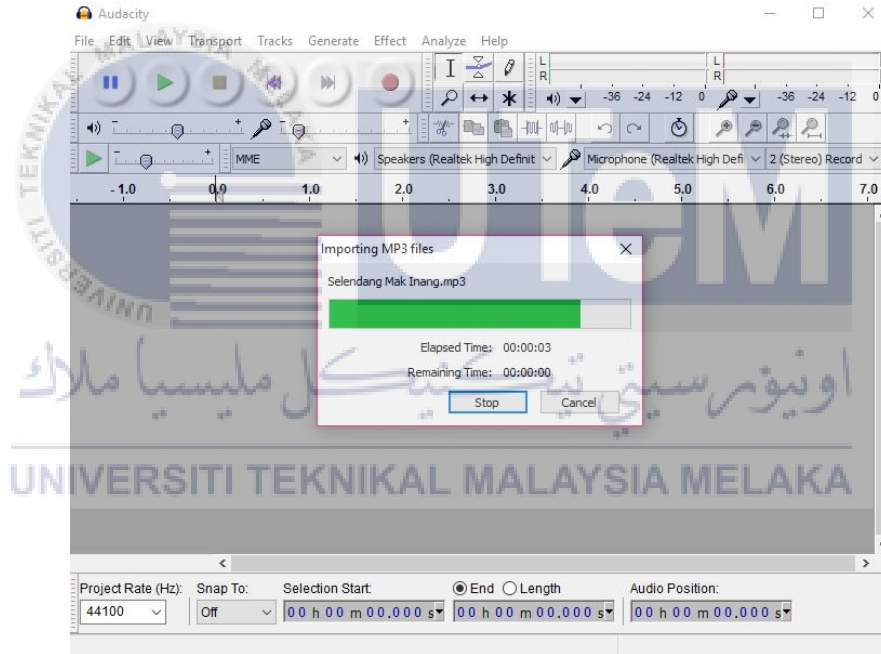


Figure 5.11: Game world ready in Unity 5

## 5.2.2 Production of Audio

This game project is used sound effect and music background as feels fun when play the game. There will be a few audios used in this project such as background music, and sound effect. During this process, audacity is used to edit and produce the sound needed only in new file format. The process explained step by step and display in figure which is start from figure 5.12 until figure 5.16.

### Step 1: Import audio file into Audacity



**Figure 5.12: Import Audio File**



Step 2: Change from stereo track to mono

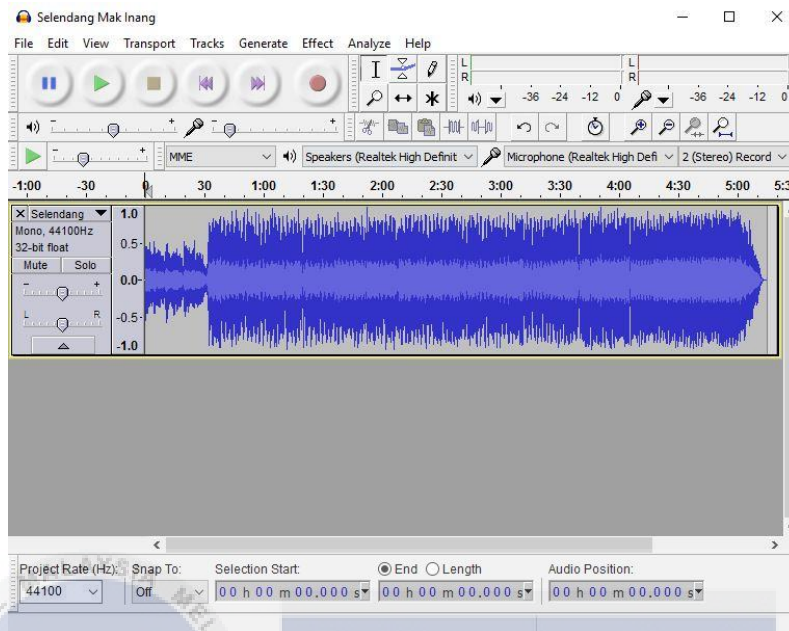


Figure 5.13: Mono track

Step 3: Edit audio file in Audacity

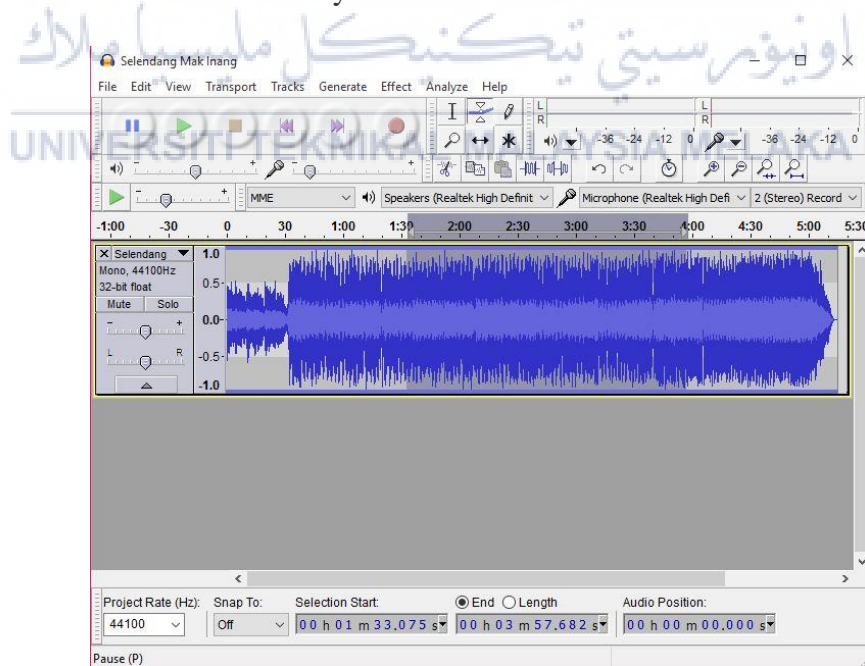


Figure 5.14: Edit Audio File

Step 4: Export audio file in wanted format after done editing

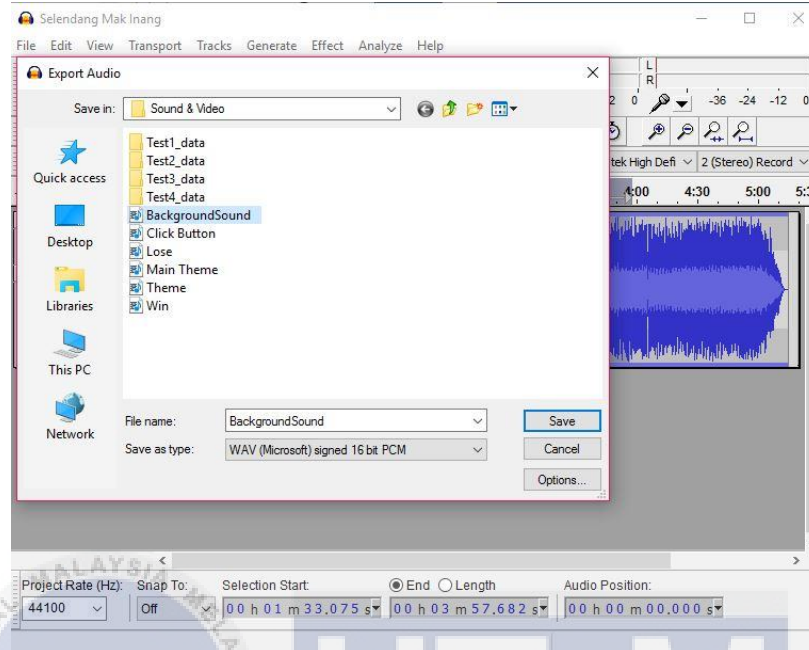


Figure 5.15: Export Audio File

Step 5: Import audio file to Unity 5 as audio source and play

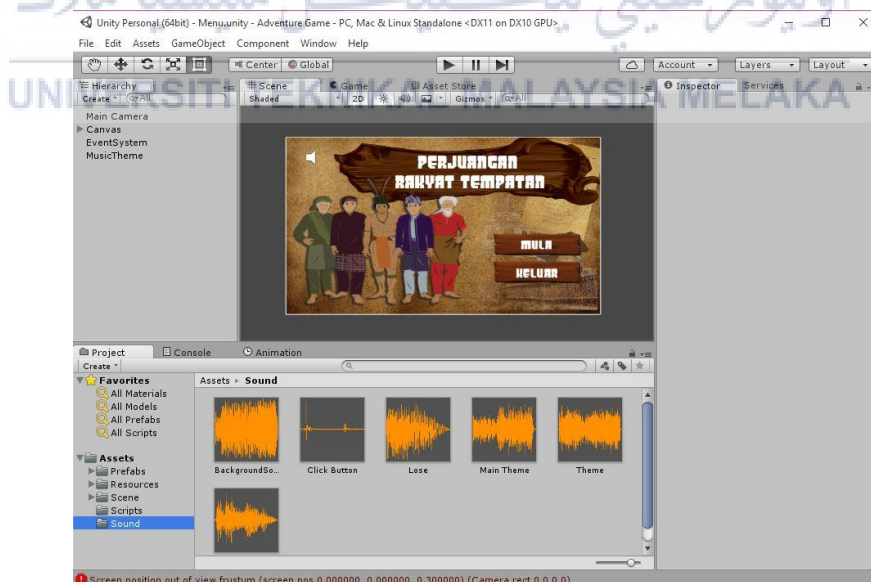


Figure 5.16: Import Audio File to Unity 5

### 5.3 Integration of Game Components

In this process, after all the game assets, characters, game world and audio were imported into Unity 5 game engine, C# programming is used to integrate both game engine and game assets also. Each levels have a few function used during the process of integration in this project.

#### 5.3.1 Control Characters Movement

```
void FixedUpdate()
{
    float moveHorizontal = Input.GetAxis("Horizontal");
    float moveVertical = Input.GetAxis("Vertical");
    Vector2 movement = new Vector2(moveHorizontal, moveVertical);
    rb2d.AddForce(movement * speed);
}
```

**Figure 5.17: Example code of Control Character Movement Function in Second Level**

Based on Figure 5.17, the update function is mainly to keep update the player input in controlling the character movement. The Input.GetAxis() as shown in figure is a function for control by using keyboard. In other word, the movement of the character can be control by using keyboard only. Besides that, the position of the character will be transform based on the direction control by the player and based on the speed had fixed, so this make the player have a sense of the character is moving from one place to another.




### 5.3.2 Array

```
void Start ()
{
    rb2d = GetComponent<Rigidbody2D>();
    count = 0;
    SetCountText();
    TimeCounterGo.GetComponent<TimeCounter>().StartTimeCounter();
}
```

**Figure 5.18: Example Code of Array in Second Level**

Based on figure 5.18, array function is used in order to store the Rigid body of the character, count the collider with enemy and time limit.

### 5.3.3 Classes



```
public class PlayerController : MonoBehaviour
{
    public float speed;
    public Text countText;

    public GameObject TimeCounterGo;
    public string winScene;

    private Rigidbody2D rb2d;
    private int count
```

**Figure 5.19: Example code of Object Oriented Class in Second Level**

Based on figure 5.19, shows the classes that able to use and refer variable from this classes. In other word, this class can be referring by various class.

### 5.3.4 Trigger Detection

```
void OnTriggerEnter2D(Collider2D other)
{
    if (other.gameObject.CompareTag("Enemy"))
    {
        other.gameObject.SetActive(false);
        count = count + 1;
        SetCountText();
    }
}
```

**Figure 5.20: Example code of Trigger Function in Second Level**

Based on figure 5.20, this function is used in order to allow enabling behaviors in response to collisions. OnTriggerEnter2D() is a one of the collision which when player collide with the enemy, it will enable to kill enemy.

## 5.4 Game Configuration Management

In this project, all game asset which is software, plans, and architecture is represented by a configuration of assets. Besides that, this product cannot be accurately recreating at any time and at any place. Every change to this project will be initiate by a change request. The developer should take responsible to keep updating on this project and based on the specific requirement that implement the feature.

### 5.4.1 Configuration Setup

This project will be using mouse and keyboard to play the game. This project will be using Unity 5 to build in PC standalone as a complete piece of game software. This project will be built in an executable file(.exe). Player can easily to play as long as they have the exe file.

### 5.4.2 Version Control Procedure

**Table 5.1 Version Prototype**

1 <sup>st</sup> version	- published in order to test the gameplay of the game.
2 <sup>nd</sup> version	- the project which combined the gameplay with the navigate menu.
3 <sup>rd</sup> version	- adding background sound and sound effect into the project.
Last version	- had compile the gameplay and navigate menu together.

This tables 5.1 shows the project had published in a few versions while developing this project. After testing and bug hunting process, this project had been update based on the feedback and comments from tester. The latest version is the nine version, which is a high fidelity prototype that had been complete and published in PC platform.

## 5.5 Implementation Status

**Table 5.2 Implementation Status of Project Development**

Tasks	Duration to complete	Date Completed	Status
Concept Art & Research	28 Feb - 5 Mar 2016	15 Mar 2016	On time
2D Design	6 Mar - 12 Mar 2016	20 Mar 2016	Delay
Design Gameplay	20 Mar - 28 Mar 2016	28 Mar 2016	On time
Construct Architecture	29 Mar – 16 Apr 2016	18 Apr 2016	Delay
Construct Hierarchy of Challenge	17 Apr - 23 Apr 2016	25 Apr 2016	Delay
Construct Flowboard	20 Apr - 30 Apr 2016	10 May 2016	Delay
Sound Production	1 May - 7 May 2016	7 May 2016	On time
Play Testing	21 July – 25 July 2016	25 July 2016	On time
Game Refinement	26 July – 30 July 2016	28 July 2016	On time
Project Presentation and Submission of report	8 Aug – 12 Aug 2016	12 Aug 2016	On time
Thesis Writing	1 July – 26 Aug 2016	26 Aug 2016	In time

The period for this project development is 27 weeks which is start from 28 February 2016 to 26 August 2016. Based on table 5.2, some task able to finish on time such as concept art and research, design gameplay, sound production, play testing, game refinement, project presentation and submission of report and thesis writing. However, for process of develop a game task such as construct architecture, construct hierarchy of challenge, construct flowboard will be delay due to the stuck with ideas and affect the process in completing the task.

## 5.6 Conclusion

In a conclusion, this chapter discuss about the process of implementation for this project. Besides that, this chapter explained about how to produce game art such as graphic and audio. In addition, integration of game component and game configuration management also discuss in this chapter which is include configuration setup and version control procedure of this project. Lastly, in this chapter also discuss about the implementation status of project management.

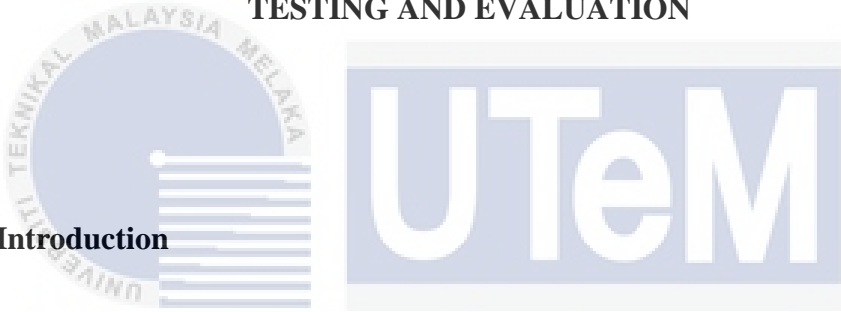
Next chapter will focus about testing and evaluation of this project, a test plan will be discussing and the test implementation also will cover in next chapter. The test result also will be discussing and analyze in next chapter.



## CHAPTER VI

### TESTING AND EVALUATION

#### 6.1 Introduction



Previous chapter is about the implementation of the game which is described in details about the how the game art will be implement and integrate in the project while developing process. Moreover, it's also explain about the production of each game art which include graphics and audio. Besides that, also will focus about the game configuration management which is how this project will be setup and how will be implement for testing purpose.

In this chapter records the testing process for this project. This application has to pass the testing phase to ensure it is well developed and fulfil the objectives started from the beginning. A test plan which is consists of several testing approaches was prepared and conducted to ensure that the application passes the entire test and meets the requirement. The testing approaches will be further discussed. At the end of this chapter, the collated testing result will be analyzed and reviewed on the efficiency and acceptance towards the application.

## 6.2 Testing plan

In this project, the test plan will now describe the condition of the test that was conducted while portraying the testing process in details. It acts as the main concept of all testing process. A good test plan can help the developer in enhancing their game project into the better. This test plan covered purpose, phase, target groups, testing methods and game features based on table 6.1.

**Table 6.1 Testing Plan**

<b>Purpose</b>	<b>Technical</b>	<b>Content</b>	<b>Functional</b>
<b>Phase</b>	Production Phase & Alpha Tester	Production Phase & Alpha Tester	Production Phase & Alpha Tester
<b>Target Groups</b>	Game Tester (13 – 15 y/o) & expert game tester	Game Tester (13 – 15 y/o) & expert game tester	Game Tester (13 – 15 y/o) & expert game tester
<b>Testing Method</b>	Bug hunting	Play Testing	Usability Testing
<b>Game Features</b>	Input	Gameplay	Graphics, Presentation, Sound

## 6.3 Test implementation

In this project, a detailed description of the test cases that were given out are discussed and also documented. During alpha phase, this prototype is had complete published. Each testing method has different testing plan. There are three type of testing which is play testing, usability testing and bug hunting.

### 6.3.1 Play Testing

In this project, play testing is used to test the gameplay for this project. This play testing is doing at SMK Putrajaya Presint 9 (2) with 20 secondary students who are lower form (from 1 to 3) and also 3 persons are from expert tester in IT department. This testing consists of with two testing plan as shown in table 6.2.

**Table 6.2: Play Testing**

	<b>Testing Plan 1</b>	<b>Testing Plan 2</b>
<b>Purpose</b>	To find out the gameplay about the game either is easy, medium or hard for player to play.	To find out the player interact with the gameplay either is fun or not fun for player to play.
<b>Testing Plan</b>	20 secondary students and 3 persons are from expert tester in IT department was invited to testing the game. All game tester is given 20 minutes to complete the game.	Game tester are given maximum 20 minutes to complete the game. All the game tester are response and action are recorded.
<b>Expected Result</b>	Game tester who are expert tester have only take 10 minutes or faster than secondary students that take 15 minutes to complete the game. The game is neither too easy not too difficult	Game tester will keep playing the game until complete the game.



### 6.3.2 Usability Testing

In this project, usability testing is used to test how the player interacts with the graphics, presentation and also sound of this project. This usability testing is doing at SMK Putrajaya Presint 9 (2) with 20 secondary students who are lower form (from 1 to 3) and also 3 persons are from expert tester in IT department. This testing consists of with two testing plan as shown in table 6.3.

**Table 6.3: Usability Testing**

	<b>Testing Plan 1</b>	<b>Testing Plan 2</b>
<b>Purpose</b>	To find out how the player interact with the graphic, user interface and sound	To find out the effective game in helping player to learn and know more about Malaysia history.
<b>Testing Plan</b>	20 secondary students and 3 persons are from expert tester in IT department was invited to testing the game. After they complete the game, the questionnaire and interview was conducted to collect feedback and comments from game tester.	Game tester are given questionnaire to answer after game tester complete the game.
<b>Expected Result</b>	Game tester who are secondary students and expert tester are attract with the graphics and interested to play a game. They easily understand all the functions of each of button in the game.	Game tester easily understand about the content of the game.

### 6.3.3 Bug Hunting

In this project, bug hunting is used to test a new bug and other to repair the bug that had been fixed. This bug hunting is doing at SMK Putrajaya Presint 9 (2) with 20 secondary students who are lower form (from 1 to 3) and also 3 persons are from expert tester in IT department. This testing consists of with two testing plan as shown in table 6.4.

**Table 6.4: Bug Hunting**

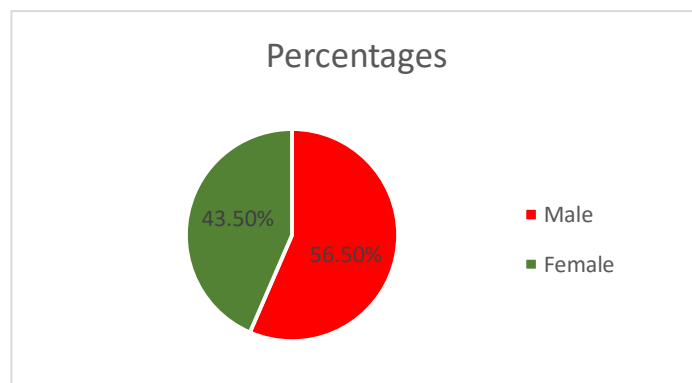
	<b>Testing Plan 1</b>	<b>Testing Plan 2</b>
<b>Purpose</b>	To find out a new bug in the game to make sure that there is no bug error while player is playing.	To repair the error with the controller bug after fixed and make sure the bug is solved properly.
<b>Testing Plan</b>	20 secondary students and 3 persons are from expert tester in IT department was invited to testing the game. All game tester is given 20 minutes to play a game by provide them a mouse device as a controller.	Game tester are using mouse device as a controller to click the button and a keyboard arrow to move the character.
<b>Expected Result</b>	All game tester is able to click button by using a mouse device and move character by using keyboard arrow are functional but there is only 1 person from expert tester was found the bug after complete the level 2.	Game tester able to move the character and navigate the game menu by keyboard arrow. There is no same bug occur after fixed the previous bug.

## 6.4 Test results and analysis

The test data is then collected in the form of a scale from questionnaire. This test data is then analyzed with 20 from secondary school and 3 expert tester from IT department. The questionnaire with the scaling method consists of 8 testing criteria questions with give set of answer through a scaled measurement to test the satisfaction level towards the game. The score 1 are very unsatisfactory and score 2 indicates that the user are unsatisfactory while scores 3 is neutral, 4 is satisfactory and 5 shows the user is very satisfactory with the game. The analysis data is divide into 4 parts which is part A, part B, part C and also part D. Part A is to identify the identity of game tester, part B is surveying the background of game tester, part C will be the feedback of game tester about this project, and part D is to test the effect of this project on game tester.

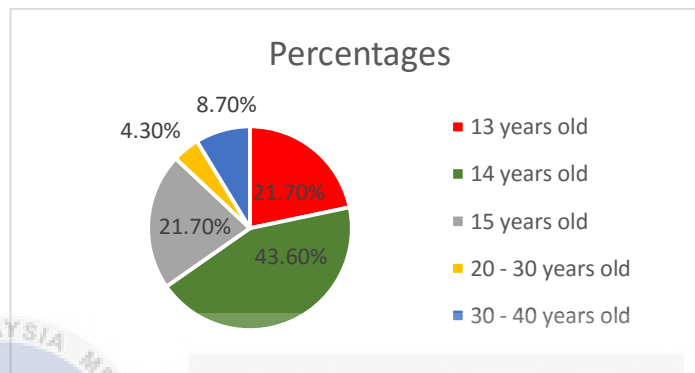
### 6.4.1 Part A: Identity of Game Tester

In this part, game tester about gender male and female, ages and race is collected and analyze and also data will be shown in figure 6.1 to figure 6.3.



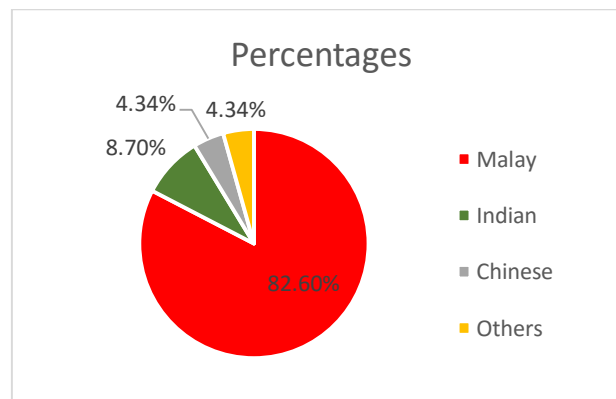
**Figure 6.1: Pie Chart for Gender of Game Tester**

Based on figure 6.1, there are total 23 game tester was invited. The number for game tester of female was 56.50% is greater than the number for game tester male game tester was 43.50%. This is because female is more interest to play a game about the history game than male.



**Figure 6.2: Pie Chart for Ages of Game Tester**

Based on figure 6.2, pie chart shows that there are same number of game tester among 13 years old and 15 years' old which is 21.7% are form 1 and 3. The number of game tester for 14 years old is greater than other ages which is 43.6%, this is because this game project are focusing for form 2 history topics. Besides that, the number for expert is just only 4.3% from 20 years old to 30 years old and 8.7% are from 30 years to 40 years old.



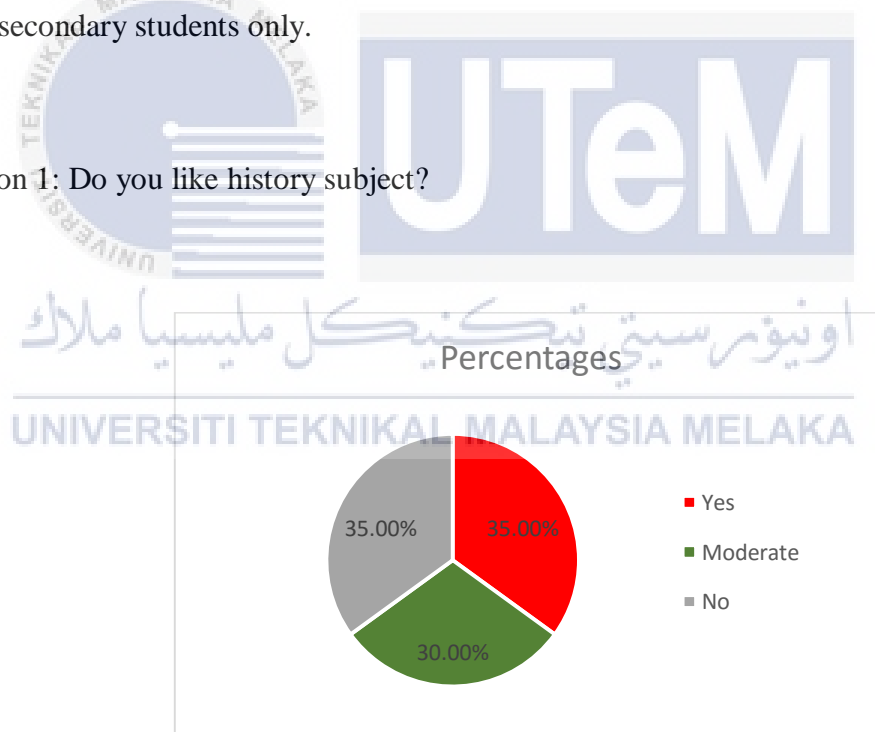
**Figure 6.3: Pie Chart for Race of Game Tester**

Based on figure 6.3, pie chart shows that there are number of Malay game tester is more than other race. Malay race is 82.6% while for Chinese and other race has same number which is 4.34% while Indian race is 8.70%. Its shows that, Malay student or from expert are more interest with the Malaysia history.

#### 6.4.2 Part B: Background of Game Tester

In this part, game tester about background of game tester is collected and analyze and also data will be shown in figure 6.4 to figure 6.8. This part are only collected data for 20 secondary students only.

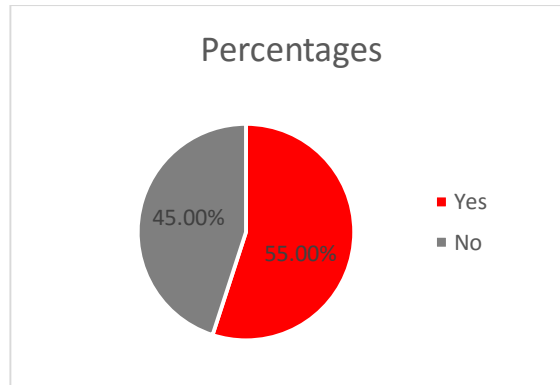
Question 1: Do you like history subject?



**Figure 6.4: Pie Chart for Questions 1**

Based on figure 6.4, pie chart shows that there are same number for Yes and No answer which is 35% greater than Moderate answer which is only 30%. This is shows that; students are like history subject but also the other does like for this history subject.

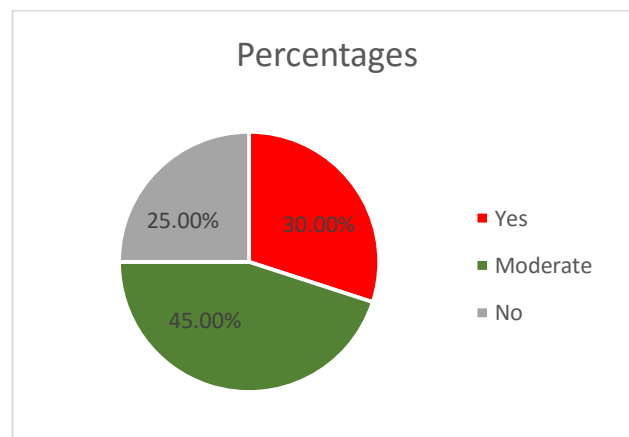
Question 2: Do you know/study about the history from History's textbook Form 2, Bab 7: *Perjuangan Rakyat Tempatan Mengembalikan Kedaulatan Bangsa?*



**Figure 6.5: Pie Chart for Questions 2**

Based on figure 6.5, pie chart shows that the Yes answer are more than No answer from 20 secondary students. 55% student are knowing about this history meanwhile 45% are does not know about this history subject.

Question 3: Do you understand the history from that chapter?



**Figure 6.6: Pie Chart for Questions 3**

Based on figure 6.6, pie chart shows that the Moderate answer are more than Yes and No answer from 20 secondary students. 30% student are understanding about this history meanwhile 45% are understanding a little bit and 25% are does not understand about this history.

Questions 4: Do you like reading a book?

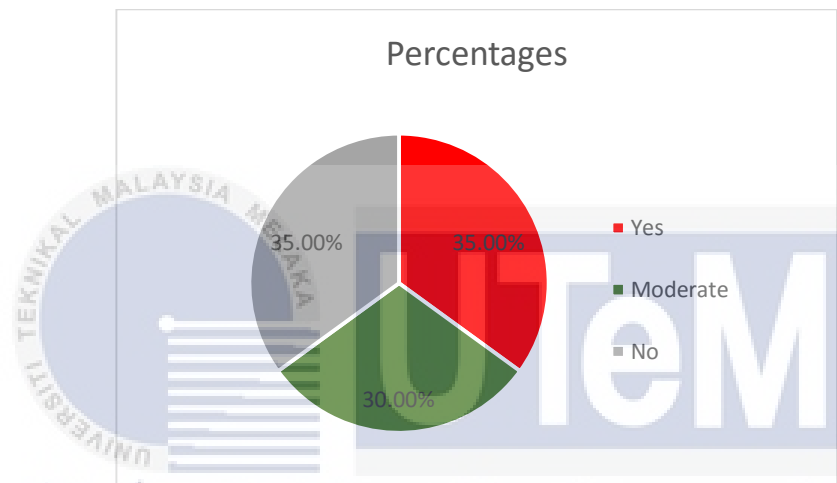
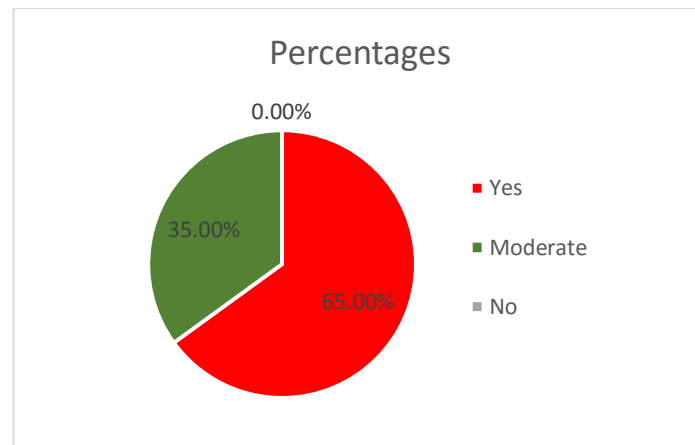


Figure 6.7: Pie Chart for Questions 4

Based on figure 6.7, pie chart shows that the same number for Yes and No answer from 20 secondary students. 35% students are like to reading books but also 35% students are does like to reading a books meanwhile only 30% student was answering moderate for this questions.

Questions 5: Do you like play a game?



**Figure 6.8: Pie Chart for Questions 5**

Based on figure 6.8, pie chart shows that the Yes answer are greater than Moderate answer from 20 secondary students. 65% students are like to play a games while only 35% student does like to play a games.



#### **6.4.2 Part C: Feedback of Game Tester**

In this part, game tester is given questionnaire and provide feedback by the rating scale for each criteria. There will be 8 criteria for tested which is comprehension, time limit, goal clarity, interface design, functionality, sound, immersion and gameplay. The data is collected and analyze that will be shown in figure 6.9 to figure 6.16. In this part, the data was calculated by a formula which is;



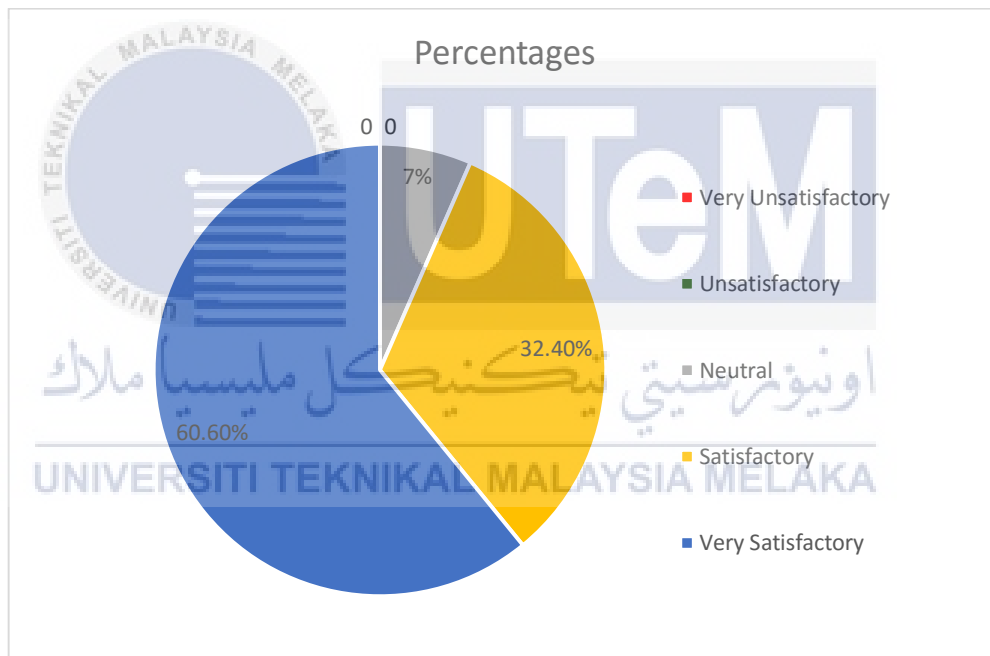
**Total Frequency in each scale:**

= Frequency A + Frequency B + Frequency n + ...

= [Total Frequency / (How many sub questions × Respondent)] × 100%

= **Data for each criterion (final answer will be collected into data)**

## Criteria 1: Comprehension



**Figure 6.9: Criteria 1**

This figure 6.9 shows that game tester is very satisfied with the criteria comprehension in the game. 7% is among of neutral, 32.4% is among of satisfactory while other 60.6% is among of very satisfactory.

## Criteria 2: Time limit

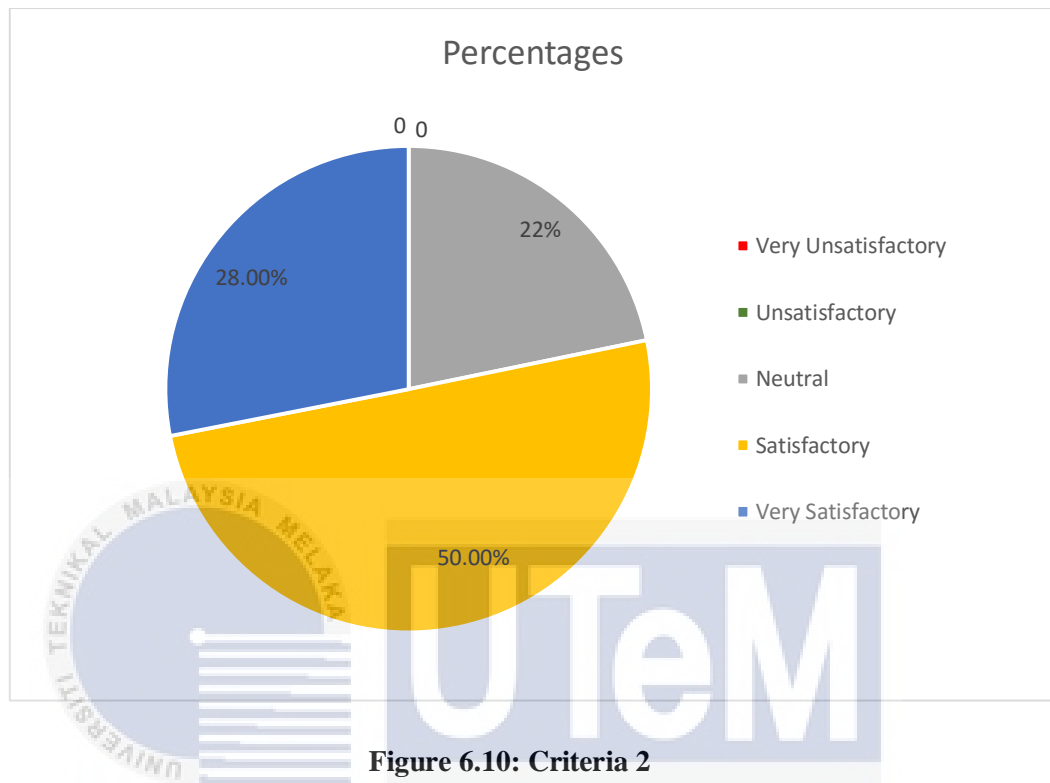
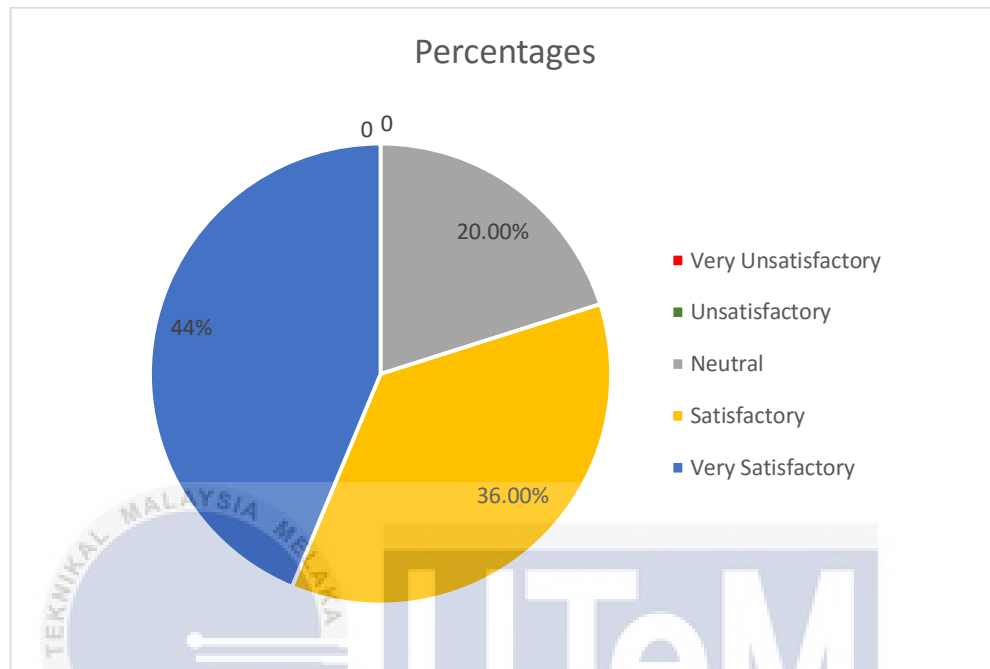


Figure 6.10: Criteria 2

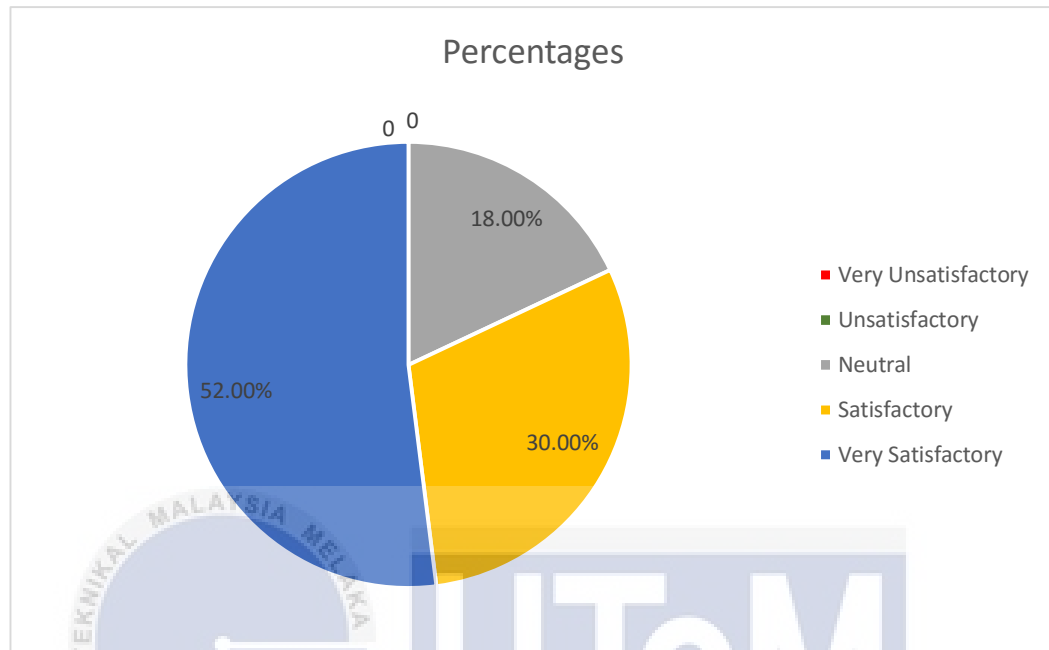
This figure 6.10 shows that game tester is satisfied with the criteria time limit in the game. 22% is among of neutral, 50% is among of satisfactory while other 28% is among of very satisfactory.

## Criteria 3: Goal Clarity

**Figure 6.11: Criteria 3**

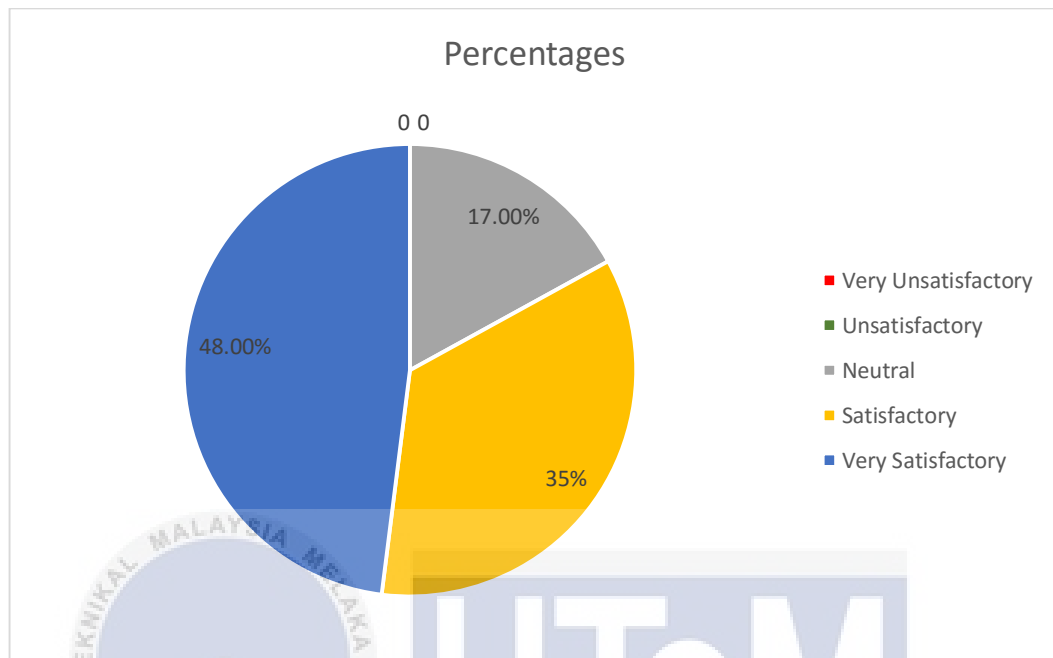
This figure 6.11 shows that game tester is very satisfied with the criteria goal clarity in the game. 20% is among of neutral, 36% is among of satisfactory while other 44% is among of very satisfactory.

## Criteria 4: Interface Design

**Figure 6.12: Criteria 4**

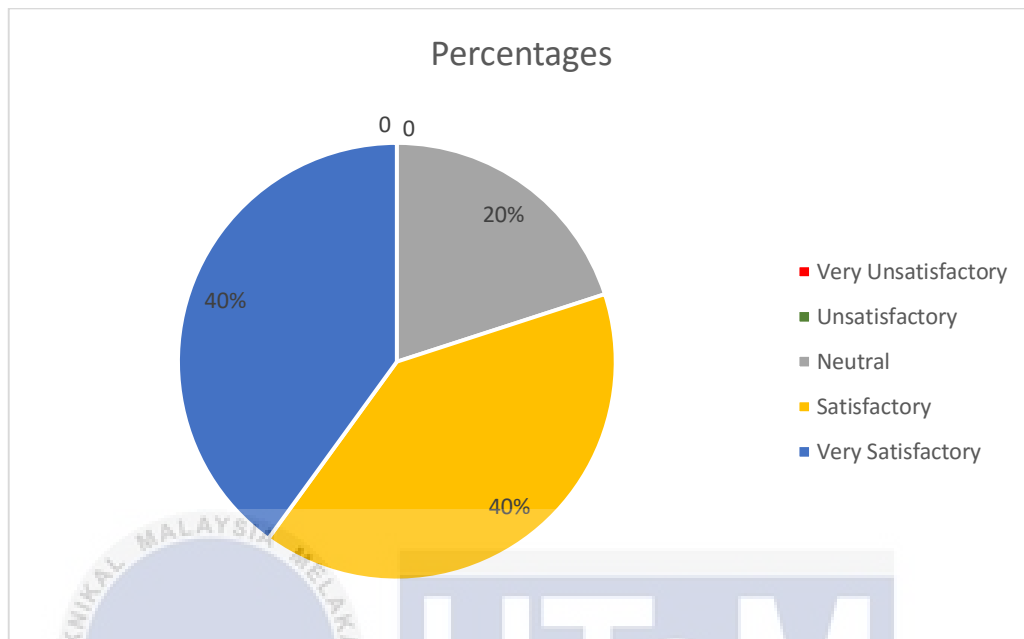
This figure 6.12 shows that game tester is very satisfied with the criteria interface design in the game. 18% is among of neutral, 30% is among of satisfactory while other 52% is among of very satisfactory.

## Criteria 5: Functions / Autonomy

**Figure 6.13: Criteria 5**

This figure 6.13 shows that game tester is very satisfied with the criteria functions or autonomy in the game. 17% is among of neutral, 35% is among of satisfactory while other 48% is among of very satisfactory.

## Criteria 6: Sound



**Figure 6.14: Criteria 6**

This figure 6.14 shows that game tester has same result for very satisfied and satisfactory with the sound in the game. 20% is among of neutral while other 40% is among of satisfactory and very satisfactory.

## Criteria 7: Immersion

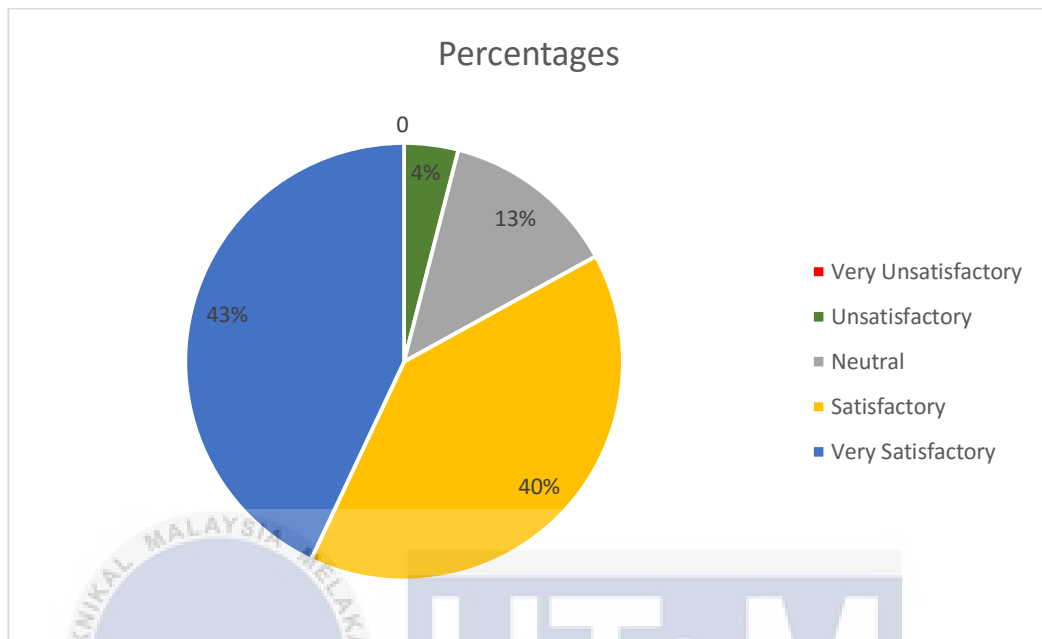
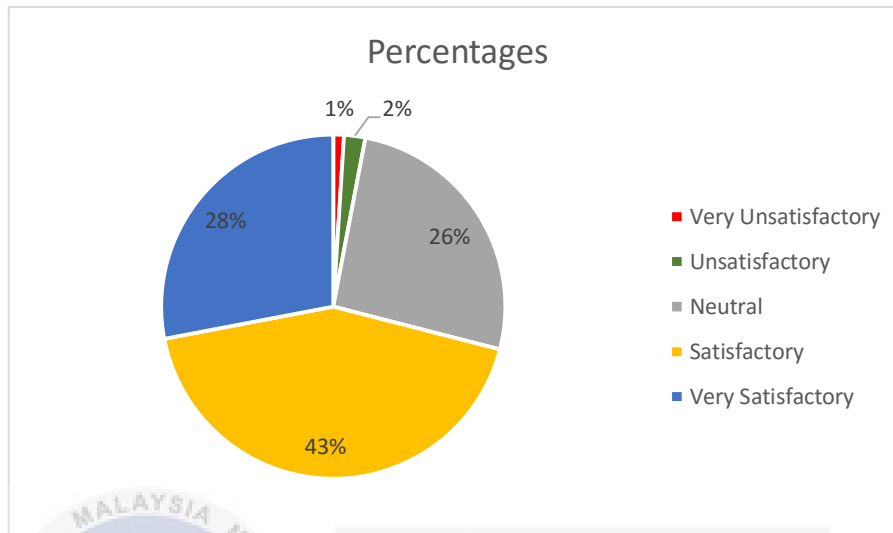


Figure 6.15: Criteria 7

This figure 6.15 shows that game tester is very satisfied with the criteria immersion in the game. 4% is among of unsatisfactory, 13% is among of neutral, 40% is among of satisfactory while other 43% is among of very satisfactory.

### Criteria 8: Gameplay / Challenges



**Figure 6.16: Criteria 8**

This figure 6.16 shows that game tester is satisfied with the criteria gameplay or challenges in the game. 1% is among of very unsatisfactory, 2% is among of unsatisfactory, 26% is among of neutral, 43% is among of satisfactory while other 28% is among of very satisfactory.

## 6.5 Conclusion

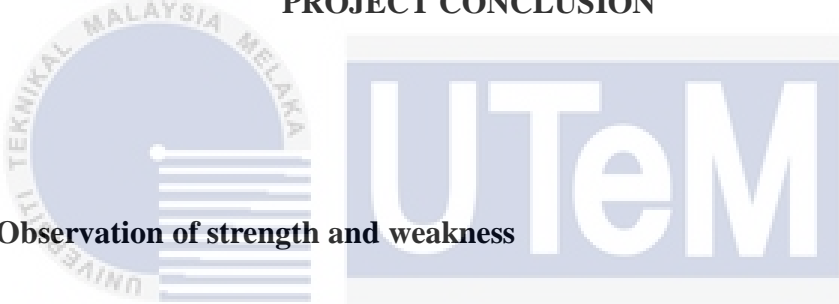
In conclusion, the results have shown that this project game is a success and a good platform for learning. Kids as well as other respondent gave good feedback towards this product. High percentage of respondent gave high scale level of satisfaction to the game. They were all able to play and navigate around without a problem. This concludes that this game has fulfilled all the requirements and achieved the objectives stated. In the next chapter, the overall conclusion of the entire project will be discussed accordingly.



## CHAPTER VII

### PROJECT CONCLUSION

#### 7.1 Observation of strength and weakness



Process during develop this project, there a few strength and weakness are found and also have some challenge during the process of development in this project. The problem and challenges will be explaining in this chapter as well as the limitation of this project.

##### 7.1.1 Strength of Project

The strength was found during the process of development for this project.

- i. This game able to play in PC platform. Free game with no charge. No need internet required to play.

- ii. The player able to play the game by using mouse device and also using keyboard.
- iii. This game has music background which is able to make player have fun for playing of the game.
- iv. This game has good graphics that can able make player feels immerse with the game while playing.

### 7.1.2 Weakness of project

The weakness of project was found during the process of development for this project.

- i. This project does not have a score to get high score.
- ii. Player can't choose other levels because this game is linear game. Player have to finish each level to go next level.
- iii. Player can't able to play by online.
- iv. Player cannot play any platform except PC platform only.

### 7.2 Proposition for improvement

This project has a few weakness during do a testing by the game tester. The improvement that had done is come out with information to player about the history of warriors during playing a game. Player will able get information about the history after finish the challenges of level. It's also can help player to know about the history warriors without reading some textbooks.

In addition, the improvement that had done is the bug was fixed completely. After fixed the bug, player able to play easily without have an error during play a game. Bug hunting was found during the process testing play.

Moreover, button exit also had added in scene game. The purpose adding the exit button is give flexibility to the player so that player not feel forced to play until finish.

### **7.3 Contribution**

Based on the result for this project, there have a few contributions that found out during development. Firstly, this can able help player easily to understand about the Malaysia history. The result from the responders, this shows that player a more interactive to study about the Malaysia history after playing a game-based learning. Besides that, this project also helps the player easily learning the history of Malaysia by used in gaming.

### **7.4 Conclusion**

In conclusion, the use of game as a learning platform gives practice and training for player or secondary student to become more interactive with the Malaysia history. Apart from the development, it is more effective and so much better to learn some knowledge through games while having fun at the same time.

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# Appendices A

## Testing Product



اونيورسيتي تيكنيكل مليسيا ملاك

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

**APPENDICES A: TESTING PRODUCT**









# Appendices B

## Questionnaire



اونيورسيتي تيكنيكل مليسيا ملاك

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

## APPENDICES B: QUESTIONNAIRE FOR USER

### TITLE: 2D GAME-BASED LEARNING HISTORICAL OF MALAYSIA

**Introduction:** This game is a 2D-based learning history of Malaysia depicting the history of the struggle of the local people.

**Part A:** Please tick (✓) to fill your identity.

1) Gender:

Male                       Female

2) Age:

13 years old

14 years old

15 years old

3) Race:

Malay                       Indian                       Chinese                       Others

**Part B:** Please tick (✓) to fill your answer.

1) Do you like history subject?

Yes     Moderate     No

2) Do you know/study about the history from History's textbook Form 2, Bab 7:  
*Perjuangan Rakyat Tempatan Mengembalikan Kedaulatan Bangsa?*

Yes     No

3) Do you understand the history from that chapter?

Yes     Moderate     No

4) Do you like reading a book?

Yes     Moderate     No

5) Do you like play a games?

Yes     Moderate     No

**Part C:** Please provide responses to the following item. Please circle ( O ) in the question box based on a selection from 1 to 5 points scale, which means as follow, namely:

1	2	3	4	5
<b>Very Unsatisfactory</b>	<b>Unsatisfactory</b>	<b>Neutral</b>	<b>Satisfactory</b>	<b>Very Satisfactory</b>

No.	Testing Criteria	1	2	3	4	5
1.	Comprehension					
	i) Use language that is easily understood.	1	2	3	4	5
	ii) Game instructions are easy to understand.	1	2	3	4	5
2.	Time limit and scores					
	i) The time limit function properly.	1	2	3	4	5
	ii) The time limit is too short.	1	2	3	4	5
3.	Goal Clarity					
	i) The overall goal of the game is clearly presented.	1	2	3	4	5
	ii) The goal of the game was presented in each scene.	1	2	3	4	5
4.	Interface Design					
	i) Design background looks nice game.	1	2	3	4	5
	ii) Writing appropriate in this game.	1	2	3	4	5
	iii) The layout of the display in order.	1	2	3	4	5
	iv) Design the game looks good.	1	2	3	4	5
	v) Coordination of the location is in a good position.	1	2	3	4	5
	vi) Character design looks interesting game.	1	2	3	4	5
5.	Functions / Autonomy					
	i) Button works properly.	1	2	3	4	5
	ii) Control of the object function properly.	1	2	3	4	5
	iii) Control interaction between objects function properly.	1	2	3	4	5

6.	Sound					
	i) Quality of background noise works well.	1	2	3	4	5
	ii) The sound quality of the work.	1	2	3	4	5
7.	Immersion					
	i) I forgot about the time limit given during game play.	1	2	3	4	5
	ii) I felt myself involved in the game.	1	2	3	4	5
8.	Gameplay / Challenges					
	i) The challenge is too easy.	1	2	3	4	5
	ii) The challenge is too difficult.	1	2	3	4	5
	iii) Gradient improve my skills.	1	2	3	4	5
	iv) The speed for each new challenge as appropriate.	1	2	3	4	5
	v) I enjoy this game without feeling bored or anxious.	1	2	3	4	5

**Part D:** Please answer the questions given below.

- 1) Does this game can help you to better understand the history of Malaysia well?  
 Yes  No
- 2) Does this game make you feel interested to learn about the history of Malaysia?  
 Yes  No
- 3) What is your opinion about this game's history?  
 Unsatisfactory  Satisfactory  Very Satisfactory
- 4) Do you think the play a game is more fun / easy to read books? Why? (Explain your opinion)

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5) Recommendation:

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**APPENDICES B: QUESTIONNAIRE FOR EXPERT IN IT DEPARTMENT**

**TITLE: 2D GAME-BASED LEARNING HISTORICAL OF MALAYSIA**

**Introduction:** This game is a 2D-based learning history of Malaysia depicting the history of the struggle of the local people.

**Part A:** Please fill your identity.

1) Name:

En. Nazreen Bin Abdullasim

---

2) Skills:

Playing a games

---

3) Experience: 30 Years

**Part B:** Please tick (√) to fill your identity.

1) Gender:

( √ ) Male                      ( ) Female

2) Age:

( ) 20 – 30 years old

( √ ) 30 – 40 years old

( ) 40 years old and above

3) Race:

( √ ) Malay      ( ) Indian      ( ) Chinese      ( ) Others

**Part C:** Please provide responses to the following item. Please circle ( O ) in the question box based on a selection from 1 to 5 points scale, which means as follow, namely:

1	2	3	4	5
<b>Very Unsatisfactory</b>	<b>Unsatisfactory</b>	<b>Neutral</b>	<b>Satisfactory</b>	<b>Very Satisfactory</b>

No.	Testing Criteria	1	2	3	4	5
1.	Comprehension					
	i) Use language that is easily understood.	1	2	3	4	5
	ii) Game instructions are easy to understand.	1	2	3	4	5
2.	Time limit and scores					
	i) The time limit function properly.	1	2	3	4	5
	ii) The time limit is too short.	1	2	3	4	5
3.	Goal Clarity					
	i) The overall goal of the game is clearly presented.	1	2	3	4	5
	ii) The goal of the game was presented in each scene.	1	2	3	4	5
4.	Interface Design					
	i) Design background looks nice game.	1	2	3	4	5
	ii) Writing appropriate in this game.	1	2	3	4	5
	iii) The layout of the display in order.	1	2	3	4	5
	iv) Design the game looks good.	1	2	3	4	5
	v) Coordination of the location is in a good position.	1	2	3	4	5
	vi) Character design looks interesting game.	1	2	3	4	5
5.	Functions / Autonomy					
	i) Button works properly.	1	2	3	4	5
	ii) Control of the object function properly.	1	2	3	4	5
	iii) Control interaction between objects function properly.	1	2	3	4	5

6.	Sound					
	i) Quality of background noise works well.	1	2	3	4	5
	ii) The sound quality of the work.	1	2	3	4	5
7.	Immersion					
	i) I forgot about the time limit given during game play.	1	2	3	4	5
	ii) I felt myself involved in the game.	1	2	3	4	5
8.	Gameplay / Challenges					
	i) The challenge is too easy.	1	2	3	4	5
	ii) The challenge is too difficult.	1	2	3	4	5
	iii) Gradient improve my skills.	1	2	3	4	5
	iv) The speed for each new challenge as appropriate.	1	2	3	4	5
	v) I enjoy this game without feeling bored or anxious.	1	2	3	4	5

**Part D:** Please answer the questions given below.

1) Does this game can help you to better understand the history of Malaysia well?

(  ) Yes (  ) No

2) Does this game make you feel interested to learn about the history of Malaysia?

(  ) Yes (  ) No

3) What is your opinion about this game's history?

(  ) Unsatisfactory (  ) Satisfactory (  ) Very

Satisfactory

4) Do you think the play a game is more fun / easy to read books? Why? (Explain your opinion)

Fun, has repetition, addiction leads, memorization and familiarization.

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## 5) Recommendation:

Make sure charge full battery of laptop during play testing.

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**APPENDICES B: QUESTIONNAIRE FOR EXPERT IN IT DEPARTMENT**

**TITLE: 2D GAME-BASED LEARNING HISTORICAL OF MALAYSIA**

**Introduction:** This game is a 2D-based learning history of Malaysia depicting the history of the struggle of the local people.

**Part A:** Please fill your identity.

1) Name:

Dr. Hamzah Asyrani Sulaiman

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2) Skills:

Games & Graphic

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3) Experience: 8 Years

**Part B:** Please tick (√) to fill your identity.

1) Gender:

(√) Male                      ( ) Female

2) Age:

( ) 20 – 30 years old

(√) 30 – 40 years old

( ) 40 years old and above

3) Race:

(√) Malay      ( ) Indian      ( ) Chinese      ( ) Others

**Part C:** Please provide responses to the following item. Please circle ( O ) in the question box based on a selection from 1 to 5 points scale, which means as follow, namely:

1	2	3	4	5
<b>Very Unsatisfactory</b>	<b>Unsatisfactory</b>	<b>Neutral</b>	<b>Satisfactory</b>	<b>Very Satisfactory</b>

No.	Testing Criteria	1	2	3	4	5
1.	Comprehension					
	i) Use language that is easily understood.	1	2	3	4	5
	ii) Game instructions are easy to understand.	1	2	3	4	5
2.	Time limit and scores					
	i) The time limit function properly.	1	2	3	4	5
	ii) The time limit is too short.	1	2	3	4	5
3.	Goal Clarity					
	i) The overall goal of the game is clearly presented.	1	2	3	4	5
	ii) The goal of the game was presented in each scene.	1	2	3	4	5
4.	Interface Design					
	i) Design background looks nice game.	1	2	3	4	5
	ii) Writing appropriate in this game.	1	2	3	4	5
	iii) The layout of the display in order.	1	2	3	4	5
	iv) Design the game looks good.	1	2	3	4	5
	v) Coordination of the location is in a good position.	1	2	3	4	5
	vi) Character design looks interesting game.	1	2	3	4	5
5.	Functions / Autonomy					
	i) Button works properly.	1	2	3	4	5
	ii) Control of the object function properly.	1	2	3	4	5
	iii) Control interaction between objects function properly.	1	2	3	4	5

6.	Sound					
	i) Quality of background noise works well.	1	2	3	4	5
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7.	Immersion					
	i) I forgot about the time limit given during game play.	1	2	3	4	5
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8.	Gameplay / Challenges					
	i) The challenge is too easy.	1	2	3	4	5
	ii) The challenge is too difficult.	1	2	3	4	5
	iii) Gradient improve my skills.	1	2	3	4	5
	iv) The speed for each new challenge as appropriate.	1	2	3	4	5
	v) I enjoy this game without feeling bored or anxious.	1	2	3	4	5

**Part D:** Please answer the questions given below.

- 1) Does this game can help you to better understand the history of Malaysia well?  
 Yes  No
  - 2) Does this game make you feel interested to learn about the history of Malaysia?  
 Yes  No
  - 3) What is your opinion about this game's history?  
 Unsatisfactory  Satisfactory  Very Satisfactory
  - 4) Do you think the play a game is more fun / easy to read books? Why? (Explain your opinion)  
 More interactive and has good interface.
- 
-

## 5) Recommendation:

Repair and debugging the which has damaged / error.

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**APPENDICES B: QUESTIONNAIRE FOR EXPERT IN IT DEPARTMENT**

**TITLE: 2D GAME-BASED LEARNING HISTORICAL OF MALAYSIA**

**Introduction:** This game is a 2D-based learning history of Malaysia depicting the history of the struggle of the local people.

**Part A:** Please fill your identity.

1) Name:

Tarisa Makina

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2) Skills:

Media Interactive

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3) Experience: 10 Years

**Part B:** Please tick (√) to fill your identity.

1) Gender:

( ) Male ( √ ) Female

2) Age:

( √ ) 20 – 30 years old

( ) 30 – 40 years old

( ) 40 years old and above

3) Race:

( ) Malay ( ) Indian ( ) Chinese ( √ ) Others

**Part C:** Please provide responses to the following item. Please circle ( O ) in the question box based on a selection from 1 to 5 points scale, which means as follow, namely:

1	2	3	4	5
<b>Very Unsatisfactory</b>	<b>Unsatisfactory</b>	<b>Neutral</b>	<b>Satisfactory</b>	<b>Very Satisfactory</b>

No.	Testing Criteria	1	2	3	4	5
1.	Comprehension					
	i) Use language that is easily understood.	1	2	3	4	5
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**Part D:** Please answer the questions given below.

1) Does this game can help you to better understand the history of Malaysia well?

(  ) Yes (  ) No

2) Does this game make you feel interested to learn about the history of Malaysia?

(  ) Yes (  ) No

3) What is your opinion about this game's history?

(  ) Unsatisfactory (  ) Satisfactory (  ) Very

Satisfactory

4) Do you think the play a game is more fun / easy to read books? Why? (Explain your opinion)

Yes.

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## 5) Recommendation:

- Add more information about the character.

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- In level 1, after matching a card, better static the pictures after matching a card.

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