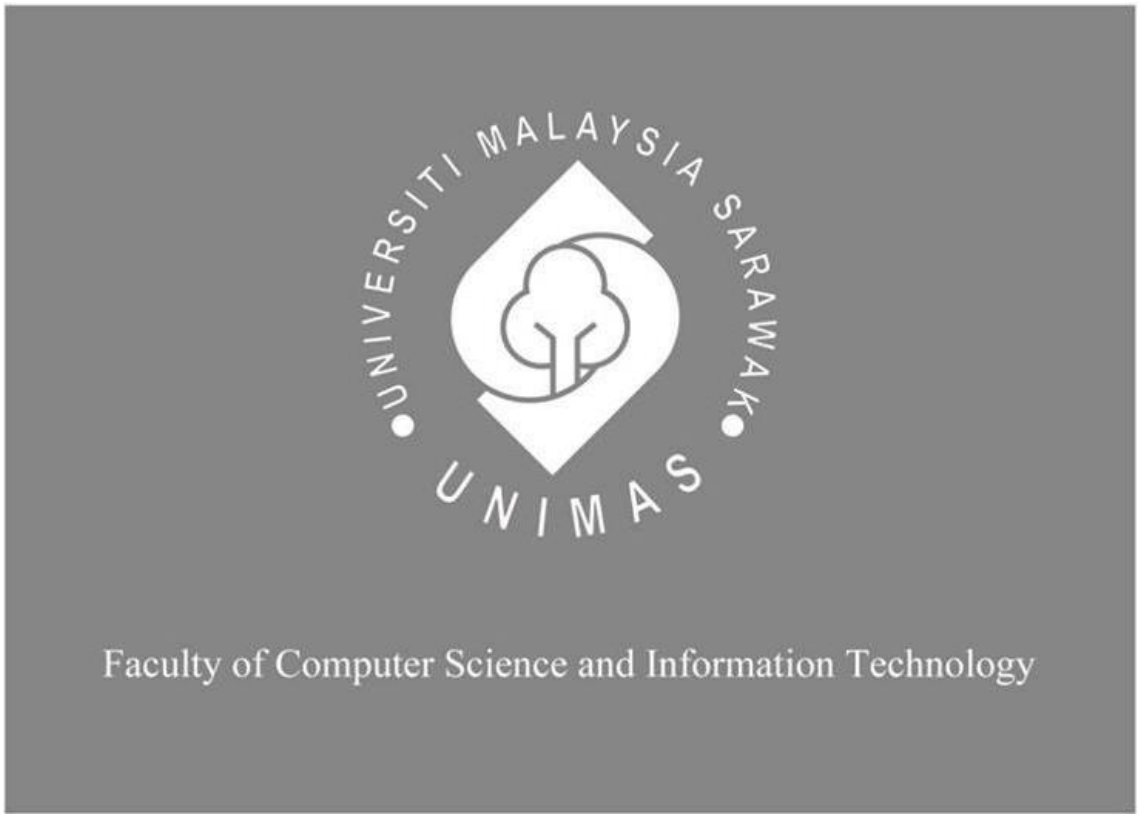

MALAYSIA ADVENTURE : A COGNITIVE TRIVIA QUIZ MOBILE GAME

KHAIRUL IKHWAN BIN JULAIHI

Bachelor of Computer Science with Honours

(Software Engineering)

2020

MALAYSIA ADVENTURE, A COGNITIVE TRIVIA QUIZ MOBILE GAME

KHAIRUL IKHWAN BIN JULAIHI

This project is submitted in partial fulfillment of the

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Faculty of Computer Science and Information Technology

Universiti Malaysia Sarawak

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ABSTRACT

Development of mobile games have grown rapidly since the turn of the century as the demands for entertaining mobile games risen sharply concurrent with the increase in number of mobile game users. As the years pass by, society have began to accept that mobile games are capable of leaving a significant impact to an individual's lives. The advancement achieved in mobile game development industry have lead to the introduction of many new mobile game categories/genres in the market. This discovery have also impacted the educational field regarding on how to teach millennial using mobile games. Educational mobile games is still relatively new to the mobile game industry and not many people know on how to implement a knowledge assessment method into a modern mobile games. One of the approach made over the last decade involves implementing cognitive theory / evaluation in side various mobile game categories. However, the application of Revised Bloom's Taxonomy in mobile games have not been popularised yet since it is normally used for setting up questions that is commonly applied in school or university assessments. Revised Bloom's Taxonomy can easily be implemented in mobile games if the methods and steps are applied correctly. Educational mobile games that implements Revised Bloom's Taxonomy holds great potential for society to assess and gain knowledge in a fun and interactive ways.

ABSTRAK

Perkembangan dunia permainan mudah alih telah berkembang dengan pesat sejak pertukaran abad ini dan permintaan untuk permainan mudah alih yang menghiburkan telah meningkat secara mendadak seiring dengan peningkatan jumlah pengguna permainan mudah alih. Sejak itu, masyarakat telah mula menerima bahawa permainan mudah alih inin mampu meninggalkan impak yang besar kepada kehidupan seseorang individu. Kemajuan yang dicapai dalam industri pembangunan permainan mudah alih telah menuju kepada pengenalan banyak kategori / genre permainan mudah alih yang baru di dalam pasaran. Penemuan ini juga telah memberi kesan kepada bidang pendidikan kerana mereka kini mencari cara untuk mempraktikkan cara mengajar ke dalam permainan mudah alih untuk golongan milenium. Permainan mudah alih untuk pendidikan masih lagi baru di dalam industri permainan mudah alih dan tidak banyak orang yang tahu bagaimana caranya untuk mengaplikasikan kaedah untuk menilai peguasaan ilmu pengetahuan ke dalam permainan mudah alih moden tersebut. Salah satu pendekatan yang dilakukan pada dekad yang lalu adalah melibatkan pelaksanaan teori / penilaian kognitif dalam pelbagai kategori permainan mudah alih yang sedia ada. Walau bagaimanapun, penggunaan Taksonomi Bloom yang dikemaskini belum lagi dipopularkan ke dalam permainan mudah alih kerana taksonomi itu biasanya digunakan untuk membuat soalan yang lazimnya digunakan dalam penilaian sekolah atau universiti. Taksonomi Bloom yang dikemaskini boleh diapplikasikan dengan mudah ke dalam permainan mudah alih jika kaedah dan langkah diterapkan adalah betul. Permainan mudah alih dalam pendidikan yang menggunakan Taksonomi Bloom yang dikemaskini mempunyai potensi yang besar untuk menarik minat masyarakat untuk menilai dan memperoleh ilmu pengetahuan dengan cara yang menyeronokkan.

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CHAPTER 1

INTRODUCTION

1.1 Background

Our modern era have witness the increasing growth of mobile games and their significance in affecting the way people think and grow. The application of mobile games as a tool for knowledge evaluation have gain a lot of attention over the years and the developments are growing rapidly according to the demands of the market.

Malaysia Adventure mobile game is a cognitive trivia quiz mobile game that serves as a mobile application for people to test their knowledge about Malaysia and ignite their spirit of patriotism. Promoting Malaysia through a mobile game is more effective because people of the current era have coexist with mobile devices in their daily lives and more exposed to learn from smartphones and tablets rather that reading books and magazines.

A cognitive trivia quiz mobile game will prompt the gain of interest of the user as the questions will help users to assess their level of cognitive skills through the implementation the Revised Bloom's Taxonomy of Cognitive Learning Domain (Boller, 2017). At the end of the game, users are able to know which cognitive levels that they excels in and help them in improving their own cognitive skills.

1.2 Problem Statement

The general problem statement for this project is there are only a few number of mobile games that utilizes the Revised Bloom's Taxonomy of Cognitive Learning in its gameplay. Most mobile game of the current market revolves around competitive gaming where users are more focused on their psychomotor skills instead of their cognitive skills. The rise of competitive mobile game has lead to the introduction of Electronic Sports (E-sports) in the gaming community. This has lead the mobile game developers to focus their attention to develop competitive mobile game rather than mobile games that implements Revised Bloom's Taxonomy.

The development of mobile games regrading on knowledge about Malaysia are usually overlooked by local mobile game developers. The increasing popularity of mobile games in the Malaysian society has lead to the demands of having a mobile game that can introduce players to Malaysia. The current ,mobile game market are still lacking of mobile games that represents Malaysia. Having a mobile game about Malaysia can help people to know more about the country and evaluate their current knowledge regarding Malaysia.

In the current mobile game trends, the trivia quiz mobile games are not very popular choice among millennial users due to its simple and common scoring and evaluating system. Most trivia quiz mobile games emphasis on the score of correctly answered questions. Players are not able to know more about their improvement and progress since the result of the quiz in one dimensional. Furthermore, the scoring system current trivia quiz mobile rarely has a scoring system to evaluate the cognitive skills of players when they are testing their knowledge by answering questions.

1.3 Scope

The scope of this project focuses on the use of mobile game for evaluating the general knowledge regarding Malaysia and evaluating the cognitive skills of players by implementing Revised Taxonomy of Cognitive Learning Domain to assess their effectiveness in learning and solving problems.

1.4 Aims and Objectives

There are three objectives in developing this project. The objectives are:

1. To design and develop a mobile game that test the general knowledge of the user about Malaysia.
2. To design question database by applying Revised Bloom's Taxonomy of Cognitive Learning Domain.
3. To evaluate the the effectiveness of a mobile game in assessing cognitive skills..

1.5 Brief Methodology

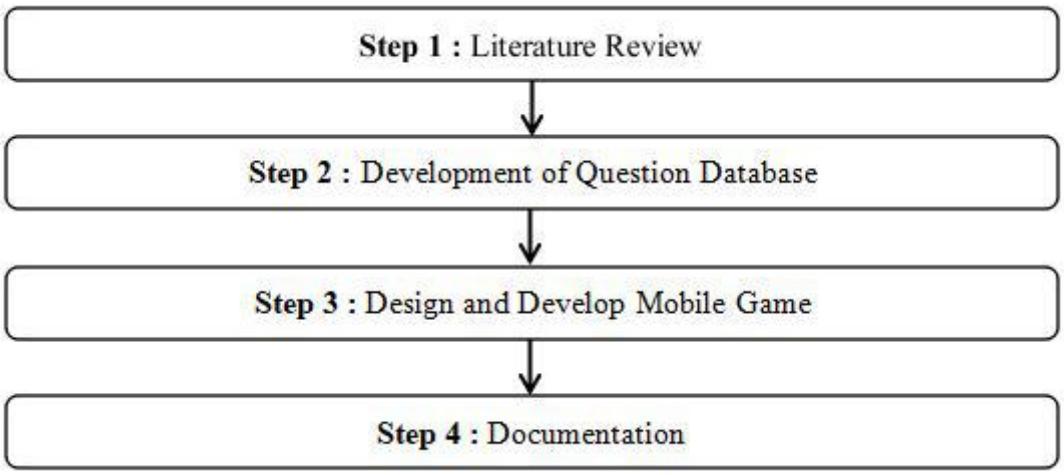


Figure 1.1 : Project Methodology

Project methodology are the step-by-step procedure in completing this project. Each steps are further discussed in upcoming chapters.

1. Literature Review

For the purpose of this project, thorough research is conducted on cognitive-based mobile game and related mobile games that are used as a platform for knowledge assessment. The research includes books, articles and journals that discussed the application of cognitive theory in edutainment field. Furthermore, Bloom's Taxonomy are also highlighted in this research regarding on its uses in educational field and how the questions are designed based on the six cognitive level of learning.

2. Development of Questions and Database

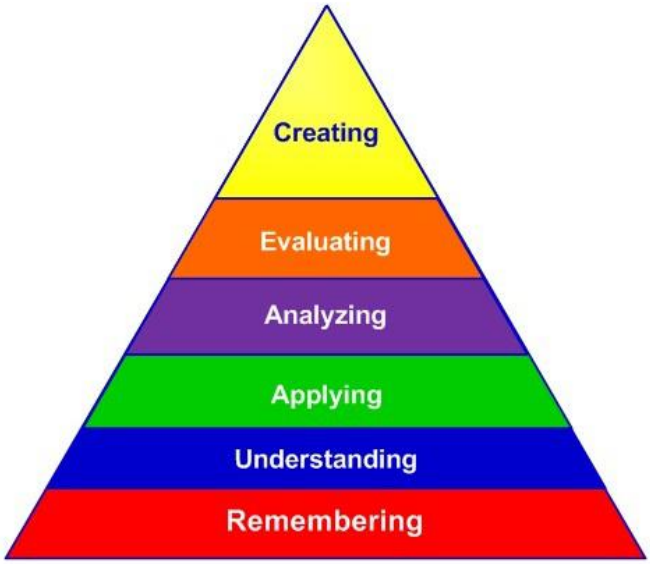


Figure 1.2 : Revised Bloom's Taxonomy of Learning Domain (Berger, 2018)

.Bloom's Taxonomy of Learning Domain is a classification of cognitive skills introduced by Benjamin Bloom to evaluate learning progress and providing guide in constructing questions and assessments but was later revised by Lorin Anderson and David Krathwohl (Heick, 2018). The Revised Bloom's Taxonomy of Learning Domain will be implemented in this project for developing questions in the mobile game and help evaluate the user's cognitive skills in learning and solving problems. The questions for the mobile game will be developed based on three levels from Bloom's Taxonomy which are "Remembering" and "Understanding".

Remembering level defines the user's ability to recall or retrieved previous learned information. The questions implemented in the mobile game will prompt the user to extract the correct information from their memory and apply the knowledge related to the topic given by the game.

Understanding level defines the user's ability to determine the meaning of instructional messages including oral, written and graphical communication. User will be given confusing

and tricky questions and unrelated choices of answers to determine whether the user are able generate reasoning with the knowledge in hand.

Applying level defines the user's ability to use information or a skill in new situation. User will be given questions that requires them, to utilizes the various knowledge they possess and implement it on the given demands of the questions.

3. Design and Develop Mobile Game

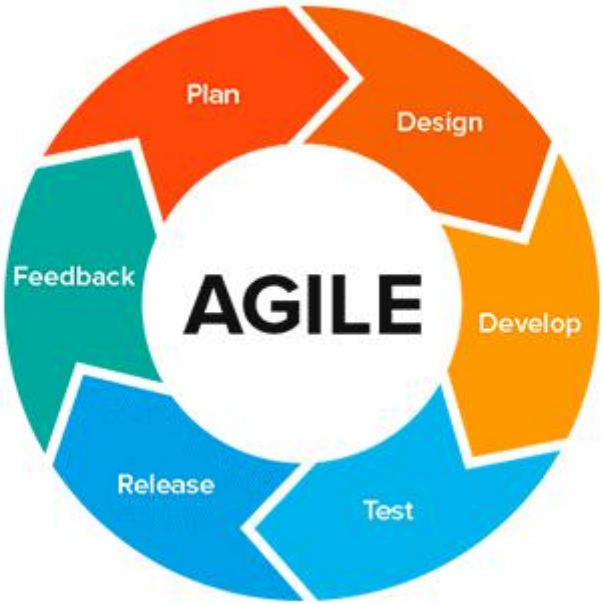


Figure 1.3 : Agile Methodology Processes (Del Pino, 2018)

Agile model is an approach of developing product from its overall process into a series of development cycles (Hornostaiev, 2017). This project will implement the agile model of software development methodology for developing the mobile game application. Agile methodology is suitable for mobile game development due to the flexibility in handling changes in requirements based on the feedback received from the users.

In planning phase, developers will gather information from potential users to obtain the requirements needed for this project. The process of information gathering is conducted

through a survey. Recommendations from possible users will help to refined the game features that will be implemented in the mobile game. Any requirements that is deemed irrelevant can be exempted to avoid any potential loss of resources.

In design and development phase, mobile game will be develop quickly for an early deployment. The questions in the mobile game will be designed and developed based on the the remembering level and understanding level of Revised Bloom's Taxonomy. Rapid release of mobile app will provide more room and time for any possible changes or addition to the requirements.

In test and release phase, the mobile game will undergo testing and evaluation to determine whether the initial requirements has been fulfilled before the mobile game is released to potential users. The mobile game will also be tested for any bugs and errors to avoid crashing and lag as well as increasing the efficiency of the user experience.

In feedback phase, potential users are able to suggest changes or additions to the mobile game after they have tested the gameplay. Any changes to the mobile game will lead the project to undergo sprints for improvements until the users are satisfied. The mobile game will be completed according to the time frame of the project and the final delivery will be a working cognitive trivia quiz mobile game that will apply Revised Bloom's Taxonomy to learn general knowledge about Malaysia.

4. Documentation

The last step in the project methodology is documentation. In this phase, the overall writing of the project is compiled together into a complete project report. The complete project report will consists of Chapter 1 through Chapter 5 as well as the log book of game development progress.

1.6 Significance of Project

The significance of this project is focused the potential the mobile game to benefit four different sectors. Those sectors are :

1. Body of knowledge

This project can help people to test their general knowledge about Malaysia through mobile games. The knowledge conveyed in the mobile game is constructed and designed based on the Revised Bloom' Taxonomy and the questions implemented are structured conveniently in aiding the understanding on knowledge about Malaysia. Cognitive skills of an individual are also evaluated to help them identify their cognitive strengths and weaknesses.

2. Society/community/nation/international

Learning and evaluating knowledge through mobile games can open up a new perspective for the new generations in finding the ways to make question answering an enjoyable experience. This project is developed to help people of different ages to evaluate the knowledge about Malaysia and assess their cognitive ability in obtaining those knowledge. This project also has the potential to be an alternative source for foreigners to explore Malaysia.

3. Economy

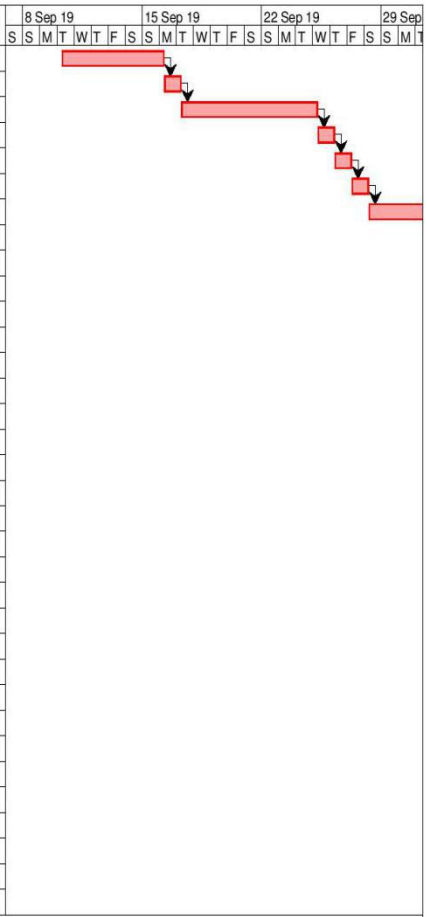
This project can help to save cost in knowledge evaluation as the mobile game is available for free and able to play in most android devices. This project will also help to popularize the trivia and quiz genre in the mobile game market and boost the amount of user playing the game from those genre.

4. Education

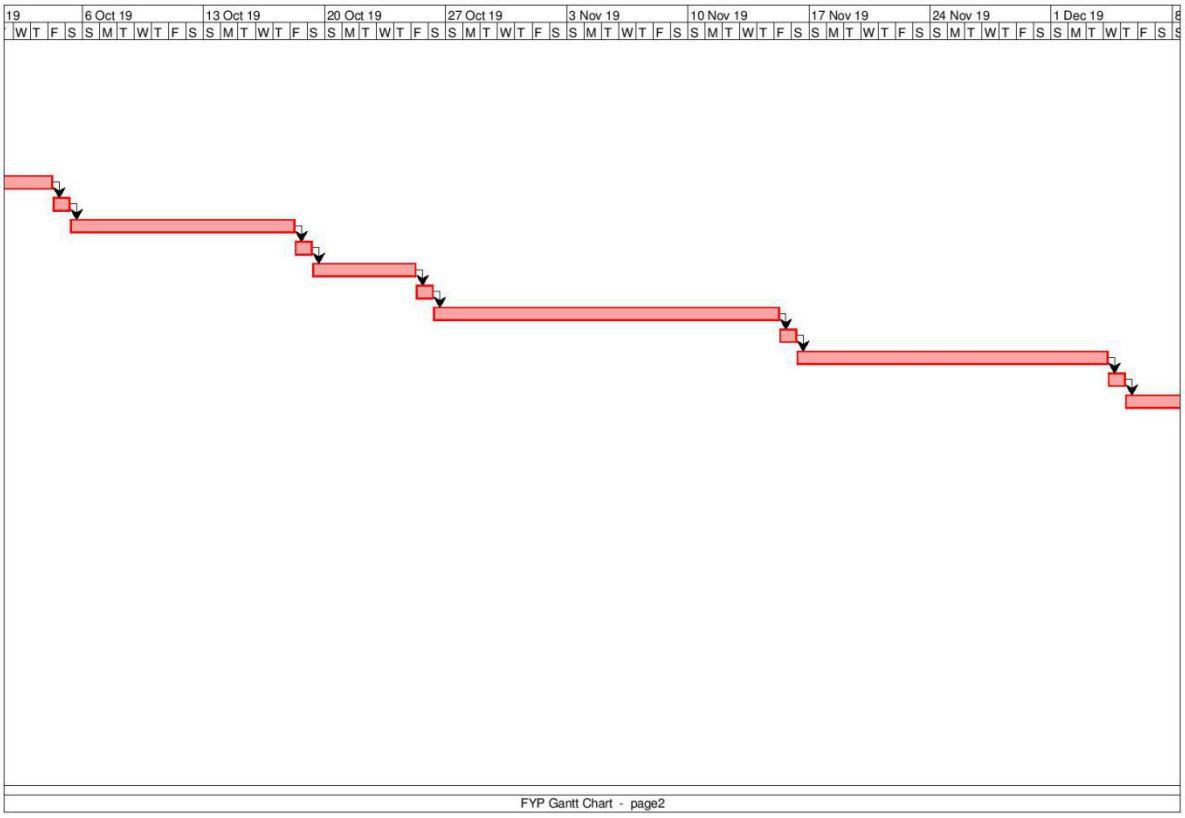
This project is developed with the purpose of introducing a new knowledge assessment method that is well suited with modern education. The increase usage of mobile device among students have introduce the opportunity to evaluate the effectiveness of evaluating their knowledge through a mobile game. Teachers and students can benefit their time outside of class by testing their current knowledge using a mobile game in an environment that is not critical in its delivery.

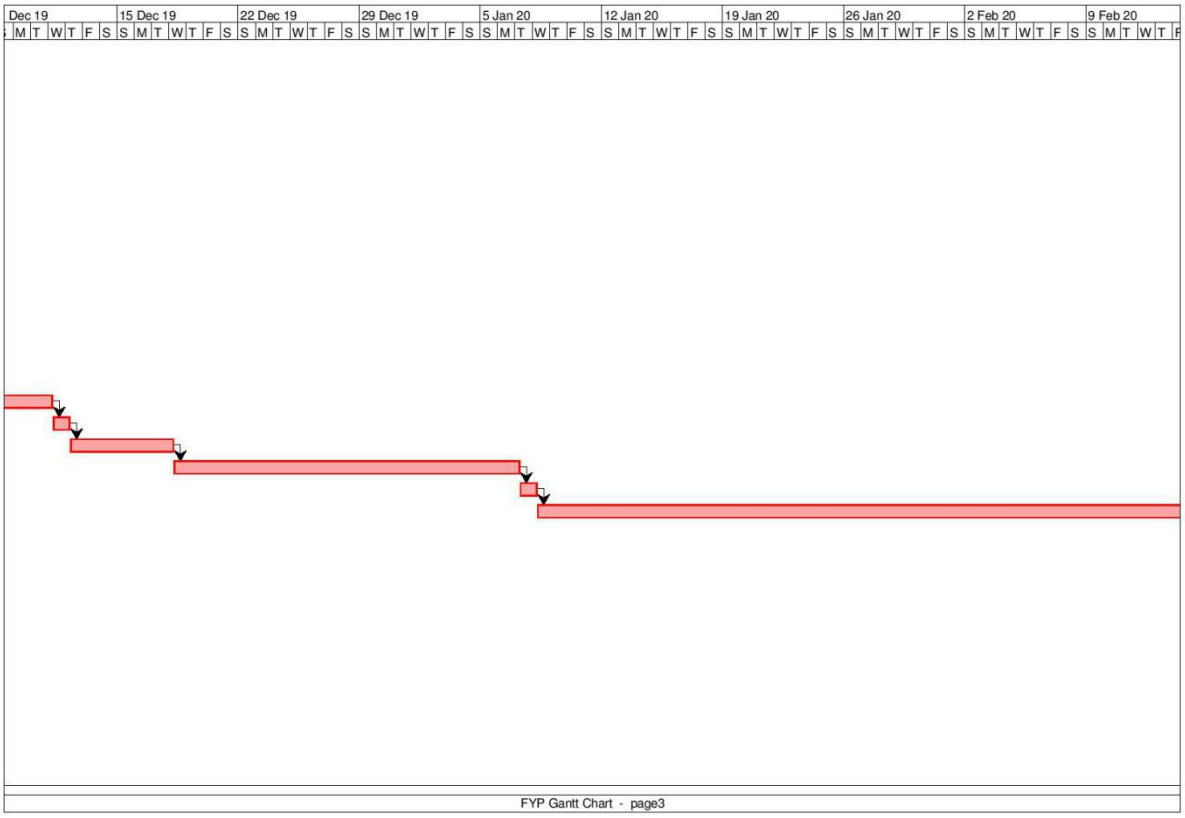
1.7 Project Schedule

	Name	Duration	Start	Finish	Predecessors
1	Identify project title	6 days	9/10/19 8:00 AM	9/16/19 8:00 AM	
2	First meeting with supervisor	1 day	9/16/19 8:00 AM	9/17/19 8:00 AM	1
3	Prepare brief proposal	8 days	9/17/19 8:00 AM	9/25/19 8:00 AM	2
4	Follow up discussion with supervisor	1 day	9/25/19 8:00 AM	9/26/19 8:00 AM	3
5	Modify brief proposal after feedback	1 day	9/26/19 8:00 AM	9/27/19 8:00 AM	4
6	Submission of brief proposal	1 day	9/27/19 8:00 AM	9/28/19 8:00 AM	5
7	Waiting for approval	6 days	9/28/19 8:00 AM	10/4/19 8:00 AM	6
8	Approval and feedback by supervisor	1 day	10/4/19 8:00 AM	10/5/19 8:00 AM	7
9	Prepare full proposal	13 days	10/5/19 8:00 AM	10/18/19 8:00 AM	8
10	Submission of full proposal	1 day	10/18/19 8:00 AM	10/19/19 8:00 AM	9
11	Prepare Chapter 1	6 days	10/19/19 8:00 AM	10/25/19 8:00 AM	10
12	Submission of Chapter 1	1 day	10/25/19 8:00 AM	10/26/19 8:00 AM	11
13	Prepare Chapter 2	20 days	10/26/19 8:00 AM	11/15/19 8:00 AM	12
14	Submission of Chapter 2	1 day	11/15/19 8:00 AM	11/16/19 8:00 AM	13
15	Prepare Chapter 3	18 days	11/16/19 8:00 AM	12/4/19 8:00 AM	14
16	Submission of Chapter 3	1 day	12/4/19 8:00 AM	12/5/19 8:00 AM	15
17	Prepare FYP 1 Full Report	6 days	12/5/19 8:00 AM	12/11/19 8:00 AM	16
18	Submission of FYP 1 Full Report	1 day	12/11/19 8:00 AM	12/12/19 8:00 AM	17
19	Presentation of FYP 1 Symposium	6 days	12/12/19 8:00 AM	12/18/19 8:00 AM	18
20	Amendment and Modification	20 days	12/18/19 8:00 AM	1/7/20 8:00 AM	19
21	Submission of FYP 1 Final Report	1 day	1/7/20 8:00 AM	1/8/20 8:00 AM	20
22	Constructing questions	39 days	1/8/20 8:00 AM	2/16/20 8:00 AM	21
23	Submission of Reviewed Structure	1 day	2/16/20 8:00 AM	2/17/20 8:00 AM	22
24	Prepare Chapter 4	34 days	2/17/20 8:00 AM	3/22/20 8:00 AM	23
25	Submission of Chapter 4	1 day	3/22/20 8:00 AM	3/23/20 8:00 AM	24
26	Prepare Chapter 5	13 days	3/23/20 8:00 AM	4/5/20 8:00 AM	25
27	Submission of Chapter 5	1 day	4/5/20 8:00 AM	4/6/20 8:00 AM	26
28	Prepare FYP 2 Full Report	8 days	4/6/20 8:00 AM	4/14/20 8:00 AM	27
29	Submission of FYP 2 Full Report	1 day	4/14/20 8:00 AM	4/15/20 8:00 AM	28
30	Prepare FYP Final Report with prototype	13 days	4/15/20 8:00 AM	4/28/20 8:00 AM	29
31	Submission of FYP Final Report with protoype	1 day	4/28/20 8:00 AM	4/29/20 8:00 AM	30
32	Presentation of FYP 2 Symposium	6 days	4/29/20 8:00 AM	5/5/20 8:00 AM	31
33	Amendment and Modification	23 days	5/5/20 8:00 AM	5/28/20 8:00 AM	32
34	Submission of FYP Final Report after amendment	1 day	5/28/20 8:00 AM	5/29/20 8:00 AM	33



FYP Gantt Chart - page1


19
6 Oct 19
13 Oct 19
20 Oct 19
27 Oct 19
3 Nov 19
10 Nov 19
17 Nov 19
24 Nov 19
1 Dec 19
FYP Gantt Chart - page2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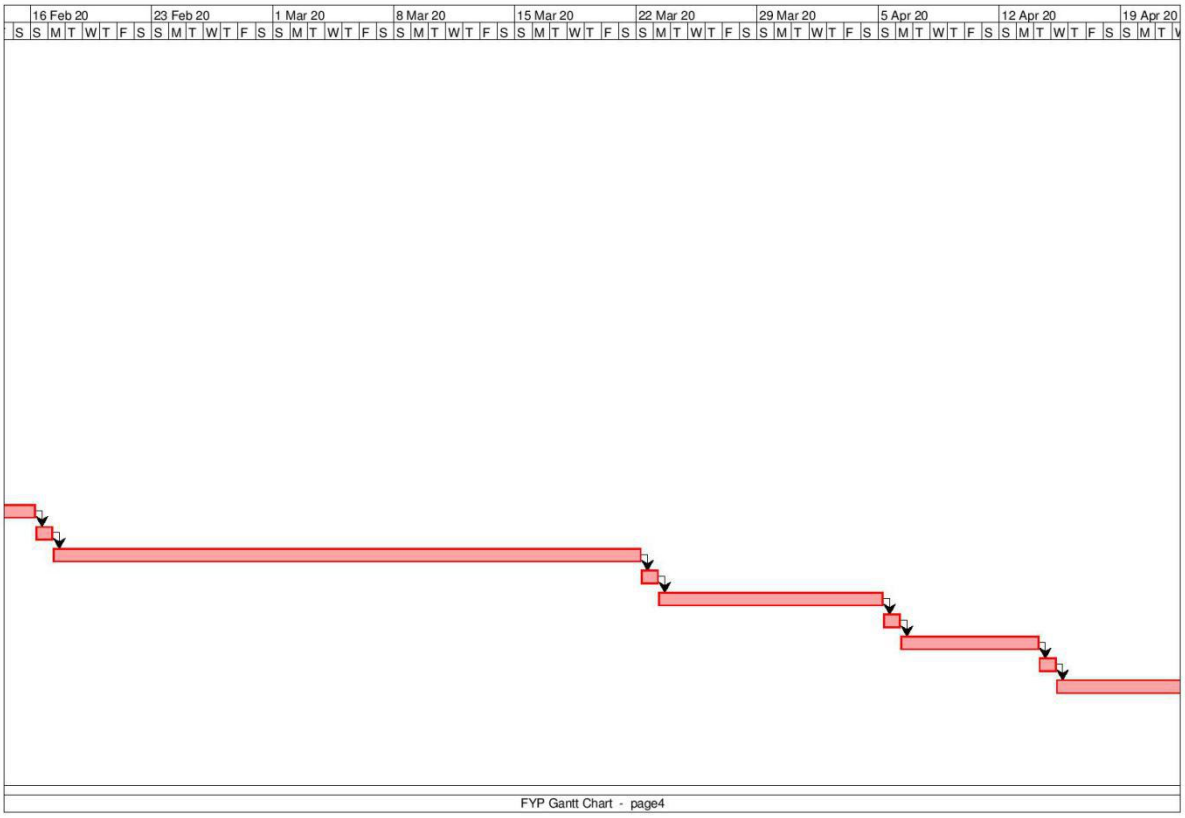
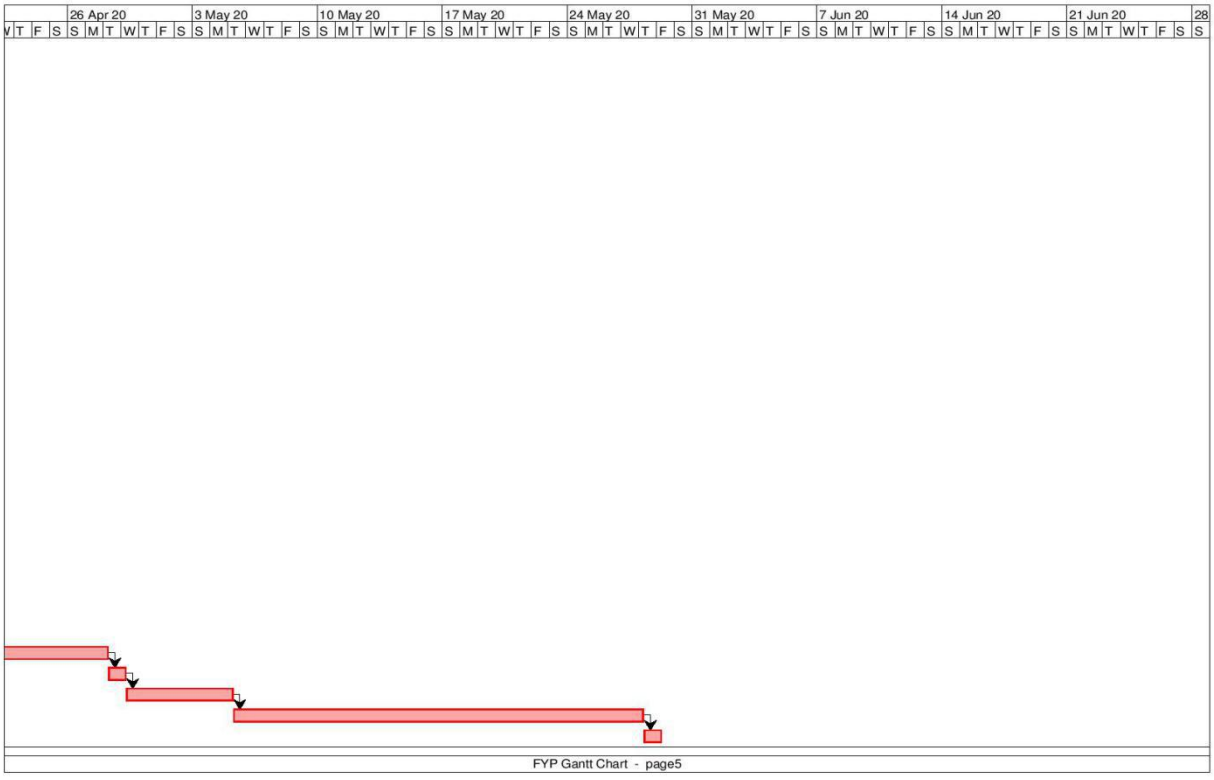
15 Dec 19
22 Dec 19
29 Dec 19
5 Jan 20
12 Jan 20
19 Jan 20
26 Jan 20
2 Feb 20
9 Feb 20
FYP Gantt Chart - page3


16 Feb 20
23 Feb 20
1 Mar 20
8 Mar 20
15 Mar 20
22 Mar 20
29 Mar 20
5 Apr 20
12 Apr 20
19 Apr 20
FYP Gantt Chart - page4


26 Apr 20
3 May 20
10 May 20
17 May 20
24 May 20
31 May 20
7 Jun 20
14 Jun 20
21 Jun 20
FYP Gantt Chart - page5

1.8 Expected Outcome

At the end of this project, it is expected to have a fully develop cognitive trivia quiz mobile game that allows user to test and evaluate people's knowledge without sacrificing the value of fun and excitement. This mobile game will provide interesting and enjoyable facts about Malaysia along with the implementation of Revised Bloom's Taxonomy to train their cognitive skills and evaluate their cognitive level based on "Remembering" level and "Understanding" level.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

In this chapter, three existing systems is selected and will be reviewed and analysed on the relation and relevancy to the proposed project. Criteria of the chosen system is focused on mobile games that are used for educational purposes and application of cognitive theory. The functionality and features of the four selected existing systems will be discussed and compared with the proposed game of this project.

2.2 Review of Bloom's Taxonomy and Revised Bloom' Taxonomy

Bloom's Taxonomy is one of the early educational taxonomies introduced by Benjamin Bloom which promoted a common vocabulary for thinking about learning goals (Lasley II, 2014). This discovery has led to the introduction of a framework for educators to create their learning objectives in a teaching session. According to Soozandehfar and Adeli (2016), Bloom's Taxonomy serves as a critical model that contributes to the development of curriculum in the 21st century. The taxonomy is widely used in educational fields mainly as solution to improve curriculum performance in school and universities. However, Marzano and Kendall (2007) argued that Bloom's Taxonomy had minimal influence curriculum but had significant impact on evaluation. The taxonomy emphasis on cognitive processes by studying the student's thinking mechanism when answering various questions with conjunction of their prior knowledge. The results will help educators to understand on how to incorporate teaching methods with student cognitive capabilities to create an effective learning environment. The early Bloom's Taxonomy consists of six levels namely Knowledge, Comprehension, Application, Analysis, Synthesis and Evaluation.