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THE DESIGN AND GRAPHIC USER INTERFACE OF MR HACK: INFORMATION & DATA SECURITY DIGITAL GAMES

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THESIS SUBMITTED IN FULFILMENT FOR THE DEGREE OF DESIGN (DIGITAL GAMES)

FACULTY ART, COMPUTING AND CREATIVE INDUSTRY
UNIVERSITI PENDIDIKAN SULTAN IDRIS
TANJONG MALIM PERAK

2022

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REKA BENTUK DAN ANTARAMUKA PENGGUNA GRAFIK MR HACK: PERMAINAN DIGITAL KESELAMATAN MAKLUMAT & DATA

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TESIS YANG DIKEMUKAKAN UNTUK MEMPEROLEH
IJAZAH SARJANA MUDA REKABENTUK (PERMAINAN DIGITAL)

FAKULTI SENI, KOMPUTERAN DAN INDUSTRI KREATIF
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DECLARATION

I hereby declare that the work in this thesis is my own except for quotations and summaries which have been duly acknowledged.

07 August 2022

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ABSTRAK

Kepentingan keselamatan siber masih kurang diketahui oleh orang ramai dalam masyarakat Malaysia. Pada masa yang sama, masyarakat Malaysia tidak sedar bahawa keselamatan siber membawa malang apabila penggodam siber menyerang. Mr Hack ialah permainan digital yang dibangunkan untuk meningkatkan kesedaran keselamatan siber dalam kalangan masyarakat Malaysia. Permainan Mr Hack ialah jenis permainan strategi digital 3D dan permainan dunia terbuka dengan konsep keselamatan siber. Permainan digital ini dibangunkan untuk platform komputer windows dan mensasarkan pemain daripada kanak-kanak berumur sepuluh tahun dan ke atas. Dalam permainan ini, pemain sebagai watak utama, Mr Hack, akan menghadapi beberapa situasi di mana pemain akan menjadi penggodam siber untuk menceroboh maklumat atau data peribadi seseorang untuk mencapai matlamat. Setiap situasi ini akan memaparkan situasi sebenar dalam kehidupan kita: cara menyimpan kata kunci komputer riba penting secara sekata, pendedahan rawak data peribadi di tempat awam, dan sebagainya. Pemain mesti mencari kata kunci dari seluruh kawasan untuk memasuki sistem maklumat komputer. Pada masa yang sama, pemain memahami bahawa krisis keselamatan siber sentiasa berlaku di sekeliling kita. Menurut konsep reka bentuk watak utama Mr Hack, Mr Hack adalah seorang yang misteri. Untuk memenuhi ciri-ciri seorang penggodam, penggunaan warna, pakaian dan aksesori watak telah dikaji dari konsep ke output reka bentuk karekter. Daripada hasil ujian main, Mr Hack memenuhi semua elemen kebolehgunaan yang diuji. Majoriti pemain berpendapat bahagian terbaik permainan ini ialah jalan cerita dan set reka bentuk watak kerana permainan menarik dan baru bagi mereka. Pemain perlu menyelesaikan tugas dengan mengingati kata laluan dan mencari kebocoran data dalam dunia permainan. Selain itu, pemain bersetuju bahawa permainan itu harus mengandungi lebih banyak pengetahuan pembelajaran tentang keselamatan siber. Permainan ini membantu pemain mudah mempelajari pengetahuan semasa bermain permainan. Walau bagaimanapun, permainan ini masih perlu meningkatkan elemen kecekapan, seperti menjadikan paparan kamera dengan lebih lancar dan kelajuan berjalan watak utama. Sebaliknya, permainan Mr Hack boleh menjadi alat promosi untuk program atau kempen kesedaran keselamatan siber.

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ABSTRACT

The importance of cyber security is still little known by the public in Malaysian society. At the same time, Malaysian society is unaware that cyber security brings misfortune when cyber hackers attack. Mr Hack is a digital game developed to increase cyber security awareness among the Malaysian community. This Mr Hack game is a 3D digital strategy and open-world game with a cyber security concept. This digital game is developed for windows computer platforms and targets players from children aged ten and up to adults. In this digital game, the player, as the main character, Mr Hack, will face several situations where the player will become a cyber hacker to intrude on someone's information or personal data to achieve the goal. Each of these situations will display the actual situation in our lives: how to store essential laptop keywords evenly, random disclosure of personal data in public places, and so on. Players must find keywords from around the area to enter the computer information system. At the same time, players understand that cyber security crises are always happening around us. According to Mr Hack's main character design concept, Mr Hack is a mysterious person. The following is the idea of the characters' colours, costumes, and accessories to fulfil the characteristics of the hacker. From the playtesting results, Mr Hack meets all the tested usability elements. Most players think this game's best part is the storyline and character design set. There felt quite attractive and new to them. Players need to solve the task by memories the password and finding the data leak in the game world. Also, players agree that the game should contain more learning knowledge about cybersecurity. The game help players easy to learn the knowledge while playing the game. However, the game still needs to improve the efficiency element, like making the camera oof view more smoothly and the walking speed of the main character. Otherwise, Mr Hack's game could be a promoting tool for cybersecurity awareness programmes or campaigns.

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LIST OF ABBREVIATIONS

3D	Three Dimensional
SUMI	Software Usability Measurement Inventory
UPSI	Universiti Pendidikan Sultan Idris
CSM	Cyber Security Malaysia
NPC	Non-player character

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CHAPTER I

INTRODUCTION

1.1 PROJECT OVERVIEW

In the evolving century of metaverse technology, the importance of cyber security is still little known by the public in Malaysian society. At the same time, Malaysian society is not aware that cyber security brings misfortune when attacked by cyber hackers. Hackers will steal crucial personal information and data from them for criminal purposes. Victims are not only invaded privacy but will incur a loss of cash. Furthermore, cyber security agencies in Malaysia have always worked with the government to disseminate cyber security awareness in an online or digital way but are less effective. We can see that society needs other ways to draw attention to this problem—for example, digital games with the concept of cyber security.

Mr Hack is a digital game that developed to aid in increasing cyber security awareness among the Malaysian community. This Mr Hack game is a 3D digital strategy and open-world game with a cyber security concept. This digital game is developed for windows computer platforms and targets players from children aged ten and up to adults. In this digital game, the player as the main character, Mr Hack, will face several situations where the player will become a cyber hacker to intrude on someone's information or personal data to achieve the goal. Each of these situations will display the actual situation in our lives: how to store essential laptop keywords evenly, random disclosure of personal data in public places, and so on. Players need to find keywords from around the area to enter the computer information system. At the same time, players understand that cyber security crises are always happening around us.

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1.2 RATIONALE OF THE PROJECT

We have developed Mr Hack digital game to increase cyber security awareness among the Malaysian community. This game has several levels of play that show the actual situation in Malaysian society that is the weakness of storing crucial personal information in any place and easy to be stolen by others. The game can also remind players to choose a secure way to store critical personal data. In addition, these games can educate and cultivate interest in cyber security in children at an early age.

1.3 PROBLEM STATEMENT

Knowledge of cyber security in this world of cyber technology is increasingly important and much needed. The effects of the COVID-19 pandemic that hit the world have changed almost the entire lifestyle of society, one of the noticeable changes being the use of digital technology as the new norm. For example, the emergence of new media such as WhatsApp, Messenger, Google Meet, Zoom Meeting and other communication applications is easy to use while working at home, conducting classes, or learning virtually. These online activities cause communication processes such as dissemination, processing, and receiving information to happen so fast regardless of the boundaries of an area.

According to (Adnan Bin Pitchan, 2018), “a lack of understanding and awareness on the safety of Internet use through electronic equipment has caused cybercrime syndicates to have deceived many people in the country. The fact is many Internet users have ignored the principles of security on the internet and consider it a trivial matter." Through these factors, we are aware that these changes need to be noticed by the society as awareness of cyber security is still weak. According to (Bernama, 2021), "said Datuk Zahidi Zainul Abidin, Deputy Minister of Communications and Multimedia (KKMM), the level of cyber security awareness among the people in this country is still low so that many become victims of cybercrime."

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Cyber security awareness not only focuses on adults, but the younger generation also needs to be taken seriously. The reason is that the understanding of cyber security among the younger generation is still lacking. According to (Abdul Karim, 2021) "There are netizens who use technology and the internet without restrictions and control to be exposed to risks and threats such as cyberbullying, fraud and online gambling, cyberbullying, identity theft, copyright infringement. There is also interaction with groups that can affect children and adolescents in particular so that negative symptoms such as self-injury, violent treatment and troubled adolescents are involved." Many cybercrime cases occur between children and teenagers because they do not know how to protect themselves.

Further, most internet users or social media applications are unaware that they have shared important information or personal data publicly online. This issue becomes a serious matter because the public does not know themselves will experience intruders of information and personal data privacy. “The awareness of Malaysians on cyber security is still low. Many do not practice the methods or procedures of using technology and the internet in a positive, ethical and responsible manner. The proof is that the number of cyber security incidents in Malaysia increases, seeing netizens become victims of various cyber security incidents. The authorities also recorded losses involving millions of ringgits.” (Abdul Karim, 2021). Frequent cybercrime not only invades the personal privacy of digital technology users but creates a severe crisis for society as it can cause national security to be a threat.

Cybercrimes involving the stealing of personal info, including identity crime and scams, significantly influence Malaysians' lives away with the growth in online commerce. From January to July 2019, 3,127 cases of cyber fraud were reported to myCERT. Since 2008, cyber fraud complaints have been the highest every year compared to other cybercrimes. Throughout 2018, cyber fraud became the highest type of cybercrime reported to MyCERT with 5,123 complaints apart from the intrusion of 1,805 and malicious code of 1,700 complaints. (myMetro, 2019) Cybercriminals will continue to make use of various tactics to scam e-wallet users. One such method is to trick them into downloading fake, legitimate-looking e-wallet apps, which are malware aiming to infect smartphones used for digital payments,” says Chris Connell, managing

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director at Kaspersky for Asia-Pacific. (Zhai Yun, 2022) E-wallet transactions surged by 131 per cent to about 600 million last year. The rise of e-wallet transactions provides scammers with an additional touchpoint for fraudulent activities. The Federation of Malaysian Consumers (Fomca) reported that scammers are increasingly more creative with their tactics and has since received approximately 450 complaints and enquiries related to scams since January 2021. Scammers are taking advantage of vulnerable consumers amidst the rise of increasingly sophisticated scamming tactics, with even the highly educated falling prey. (Buxton & U'ren, 2021)

In terms of promotion and dissemination of information on the importance of cyber security, our country still suffers from the lack of new media such as digital games as an aid medium in disseminating knowledge on cyber security. Malaysia has a growing new media industry and has experts in this industry. The Malaysian community knows many animations and digital games, but we do not use this expertise to promote cyber security information. But still, lack of developed a digital game with the concept of cyber security as a promotional medium. In the google play store have found some of the cyber security games. However, most games are more focused on entertainment, not promoting cyber security awareness, for example; Enter-IT Security Game, Hacking Hero-Cyber Adventure Clicker, and Hackers. According to (Nazrul et al., 2021), "educational approaches should change to be more proactive towards educational technology in curriculum development. Among the effective approaches is generalized blended learning, a combination that will offer high educational value in information dissemination and interactive engagement. The rise of head-mounted display technology and digital applications and games is bringing consumers closer to the latest digital technology." The lack of new technical assistance as a tool for disseminating information makes the community now less understanding of the cyber security crisis.

Cyber security cases or crimes often occur around us as well as abroad. Although we always care about this matter, we still do not understand or are less clear on cybersecurity information. Here we are aware that resources related to cyber security are difficult to comprehend by society, especially the elderly and young. "In this context, Malaysians are not fully cyber literate, especially cyber risks and threats. They need to be given exposure through cyber security education and awareness programs

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from time to time." (Abdul Karim, 2021). Although families have constantly urged young people and the elderly to equip themselves with cybersecurity knowledge, they need time to learn and understand cybersecurity basics. For example, build strong passwords, install antivirus software on digital gadgets, log out of social media after use and don't click unfamiliar links from junk email. These things are easy to know but not to them.

1.4 OBJECTIVES

Based on the problem mentioned in the previous section, the following are the research objectives (RO). This study was formulated to reach the following purposes.

RO1. To identify gameplay suitability for a 3D open-world game to gain cybersecurity awareness for players above ten years old.

RO2. To develop a 3D open-world game titled Mr Hack to give awareness to players to learn cyber security knowledge.

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RO3. To conduct the playtesting of the 3D open-world game titled Mr Hack.

1.5 RESEARCH QUESTIONS

There are three primary research questions formulated in the study. These questions have to assess the current cyber security awareness game Mr Hack. The following are research questions (RQ) for each research objective (RO) outlined in more specific terms:

RQ1. What elements of game design are suitable for serious games to gain awareness in cyber security among children and adults?

RQ2. What is the best game platform and game engine to develop a serious game to gain awareness in cyber security among children and adults?

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RQ3. How to measure the playability of 3D open-world game, Mr Hack?

1.6 GANTT CHART

A Gantt chart is a visualization that helps in scheduling, managing, and monitoring specific tasks and resources in a project. The following shows this project Gantt chart from the period of final year project I (Figure) to final year project II (Figure). In the final year project 1 provides a 14-week duration in the pre-production and production phases. Following the final year project 2, offers 20 weeks in the production phase and post-production phase. This project will use this Gantt chart as a project production period guideline.

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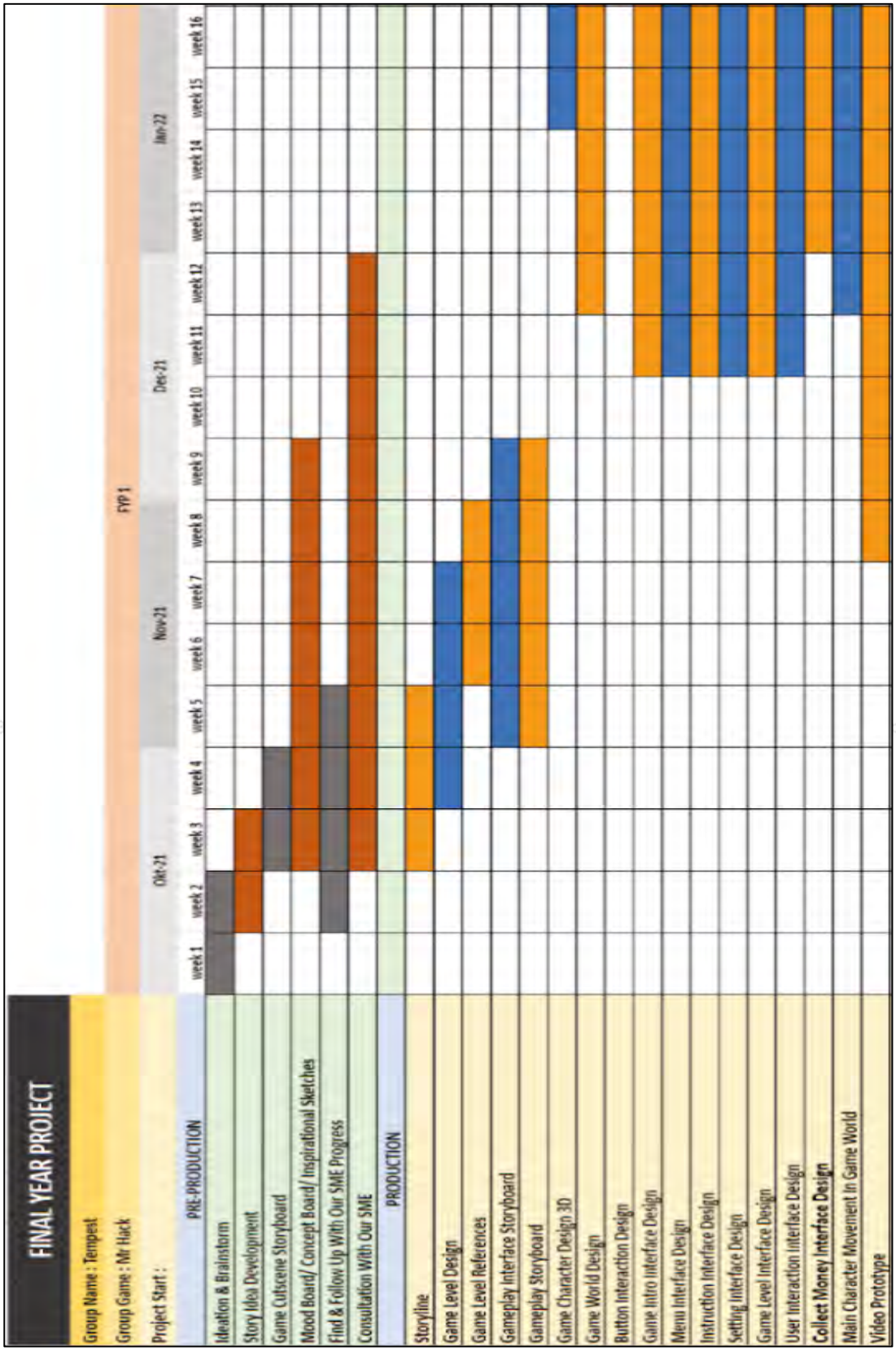

Figure 1.1 Gantt chart final year project I

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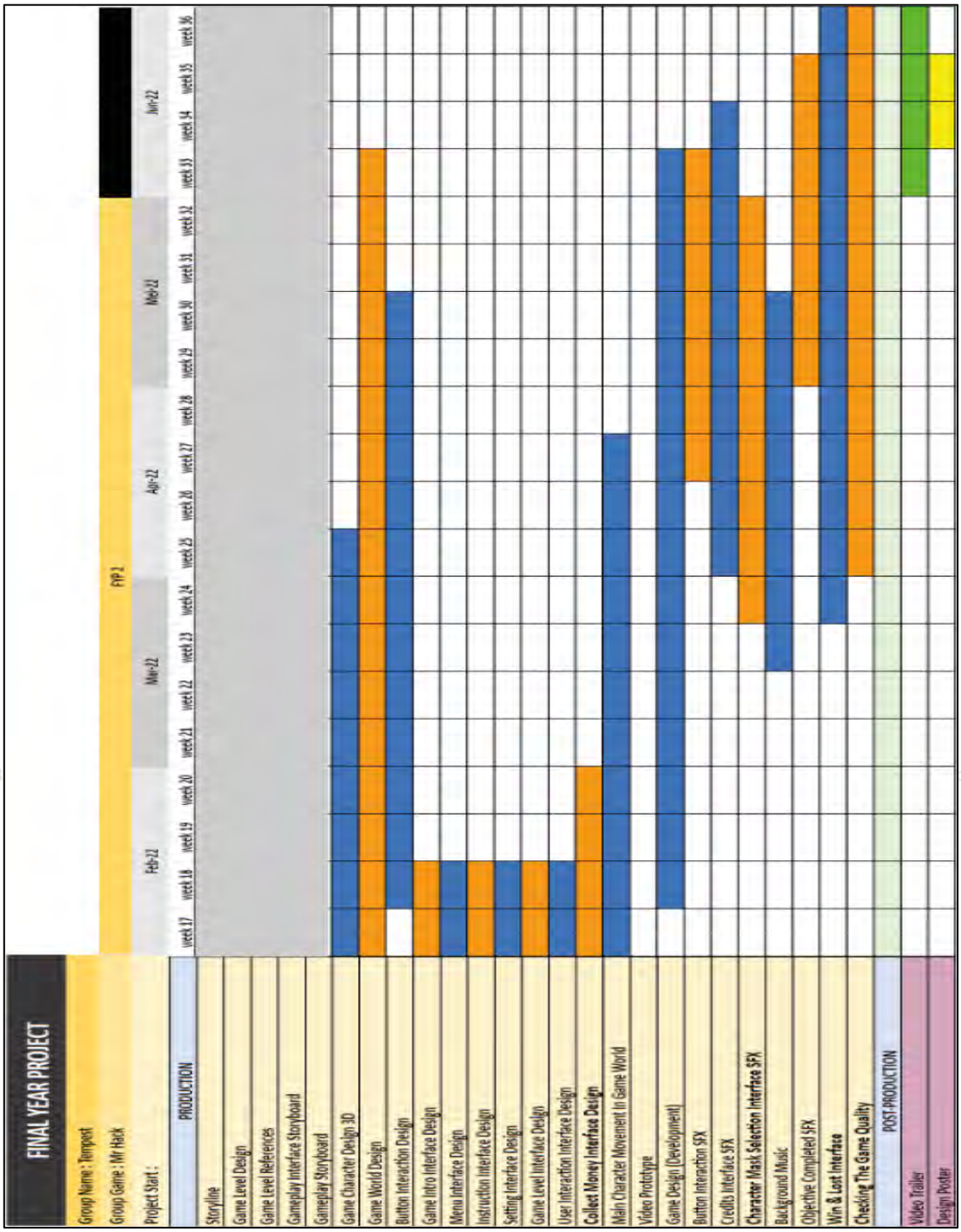

Figure 1.2 Gantt chart final year project II

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1.7 OPERATIONAL DEFINITIONS

Cyber security

Computer security, cybersecurity, or information technology security protects computer systems and networks from information disclosure, theft of or damage to their hardware, software, or electronic data, and disrupting or misdirection of their services. Users must understand and comply with basic data security principles like choosing strong passwords, being wary of attachments in email, and backing up data.

Cybercrime

Cybercrime is a crime that involves a computer and a network. The computer may have been used to commission a crime, or it may be the target. Cybercrime may harm someone's security and financial health. Most, but not all, cybercrime is committed by cybercriminals or hackers who want to make money. Cybercrime is carried out by individuals or organizations. Some cybercriminals are organised, use advanced techniques and are highly technically skilled. Others are novice hackers. Rarely, cybercrime aims to damage computers for reasons other than profit. These could be political or personal—for example, email and internet fraud.

Open-world Game

In video games, an open world is a game mechanic of using a virtual world that the player can explore and approach objectives freely, instead of a world with more linear and structured gameplay. Games with open or free-roaming worlds typically lack level structures like walls and locked doors, or the invisible walls in more open areas that prevent the player from venturing beyond them; only at the bounds of an open-world game will players be limited by geographic features like vast oceans or impassable mountains. While games have used open-world designs since the 1980s, the implementation in Grand Theft Auto III (2001) set a standard that has been used since.

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Three-Dimensional Game

In computers, 3-D (three-dimension or three-dimensional) describes an image that provides depth perception. In the third stage of 3D modelling, the transformed images are rendered into objects with excellent detail. A video game featuring 3D game graphics, which are computed in three directional dimensions called 3D game. 3D games usually render the Scene using perspective, so objects appear larger on screen as they get closer to the camera. Examples of 3D games made with Unity recently include Praey for the Gods by No Matter Studios, Osiris: New Dawn by Fenix Fire, and Eastshade by Eastshade Studios.

Serious Game

A serious game or applied game is a game designed for a primary purpose other than pure entertainment. The "serious" adjective is generally prepended to refer to video games used by industries like defense, education, scientific exploration, health care, emergency management, city planning, engineering, and politics. Example in healthcare, serious games can be used as a training measure for patients who acquire knowledge about their clinical pictures and possible therapy options.

1.8 STRUCTURE OF THE REPORT

This thesis is structured into five chapters:

Chapter 1 is the project overview that discusses the contents of this project. Followed by the project's rationale, describe the overview situation of cyber security in Malaysia. This chapter also introduces the problem statement regarding the data and information security awareness among Malaysians. The project objectives and research questions are included in the chapter. The last part of this chapter provides the Gantt chart of the project and the operational definitions.

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Chapter 2 presents the detail of the project and discusses what a 3D open-world game is, how 3D open-world is used in a serious game, cyber security themed games and cyber security issues.

Chapter 3 is presented the overall game design and development process for the cyber security game-Mr Hack. This process is included the pre-production, production and post-production comprehensive contents.

Chapter 4 shows the playtesting and result of the project. In this chapter, usability testing will start and collect the result, and we will analyze data.

Chapter 5, In the final chapter, we will discuss overall of the project and explain more about the future of this project.

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