



Faculty of Computer Science and Information Technology

***DESIGN AND DEVELOP  
A METAVERSE OF THE FYP SYMPOSIUM***

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**Bachelor of Computer Science with  
Honours (Computational Science)**

**2023**

**DESIGN AND DEVELOP  
A METAVERSE OF THE FYP SYMPOSIUM**

Toh Jie Xing

This project is submitted in partial fulfillment of the  
requirements for the degree of  
Bachelor of Computer Science and Information Technology

Faculty of Computer Science and Information Technology  
UNIVERSITI MALAYSIA SARAWAK

2023

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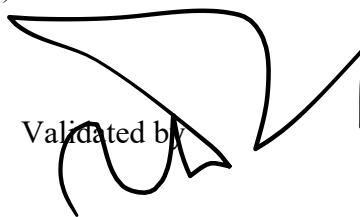
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## TABLE OF CONTENTS

<b>Declaration.....</b>	<b>i</b>
<b>Thesis Status Endorsement Form .....</b>	<b>ii</b>
<b>Acknowledgment.....</b>	<b>iii</b>
<b>Table of Contents .....</b>	<b>iv-vii</b>
<b>List of Figures.....</b>	<b>viii-x</b>
<b>List of Tables .....</b>	<b>xi</b>
<b>List of Abbreviations .....</b>	<b>xii</b>
<b>Abstract.....</b>	<b>xiii</b>
<b>Abstrak .....</b>	<b>xiv</b>
<b>Chapter 1: Introduction.....</b>	<b>1</b>
1.1 Introduction .....	1-2
1.2 Problem Statement .....	3
1.3 Objectives.....	3
1.4 Methodology .....	4-5
1.5 Scope .....	6
1.6 Significance of Project .....	7
1.7 Project Schedule .....	7
1.8 Project Outcome .....	7
1.9 Project Outline.....	8-9
<b>Chapter 2: Literature Review .....</b>	<b>10</b>
2.1 Introduction .....	10
2.2 Background Study .....	10-11
2.3 Physical FYP Symposium.....	12-14
2.4 Review on Similar Existing System.....	15
2.4.1 Microsoft Teams .....	15-16
2.4.2 Gather Town.....	17-19
2.4.3 NextMeet® CORE .....	20-21
2.5 Overall Analysis.....	22-23

2.6 Summary .....	23
<b>Chapter 3: Requirement Analysis and Design.....</b>	<b>24</b>
3.1 Introduction .....	24
3.2 Requirement Analysis.....	25
3.2.1 Hardware Requirements.....	25
3.2.2 Software Requirements .....	26
3.2.3 Functional Requirements .....	27
3.2.4 Non-Functional Requirements .....	28
3.2.5 User Requirements and Analysis .....	28-35
3.3 Logical Design.....	36
3.3.1 System Architecture .....	36
3.3.2 Use Case Diagram.....	37
3.3.3 Entity Relationship Diagram (ERD) .....	38
3.4 Design .....	39
3.4.1 Icon Design .....	39-40
3.4.2 User Interface Design.....	41
3.4.3 Homepage Design .....	42
3.4.4 Avatar Design.....	43
3.4.5 3D Model Design .....	44
3.4.5.1 Symposium Hall .....	44
3.4.5.2 Poster Exhibition Hall .....	45
3.4.5.3 Presentation Room.....	46
3.4.5.4 Consultation Room .....	47
3.5 Summary .....	48
<b>Chapter 4: Implementation.....</b>	<b>49</b>
4.1 Introduction .....	49
4.2 Installation and Configuration .....	49
4.2.1 Unity.....	49-50
4.2.2 XAMPP for database / PHPMyAdmin .....	50-51

4.2.3 Microsoft Visual Studio .....	52
4.3 Package Imported .....	53
4.3.1 Input System.....	53
4.3.2 Multiplayer Tools.....	54
4.3.3 Netcode for GameObjects .....	54-55
4.3.4 PUN 2 - FREE.....	55-56
4.3.5 Agora Video SDK for Unity .....	56
4.4 Assets .....	57
4.4.1 Animations .....	57
4.4.2 Prefab .....	58
4.4.3 Scenes.....	59
4.4.4 Materials.....	59
4.4.5 3D Models .....	60
4.4.5.1 Avatar Models .....	60-62
4.4.5.2 Room Models .....	62-63
4.5 User Interface and Interaction.....	64
4.5.1 Login and Registration Page .....	64-65
4.5.2 Homepage .....	66-67
4.5.3 Blockchain Page.....	67-69
4.5.4 Avatar Creation Page .....	69-70
4.5.5 Loading Page.....	70
4.5.6 Virtual Space.....	71-73
4.6 Database .....	73
4.6.1 Login System .....	74
4.6.2 Event Management.....	74
4.6.3 Avatar Management .....	75
4.6.4 Poster Management.....	76
4.6.4 Ticket Management.....	76-77
4.7 Coding Implementation .....	77
4.7.1 Change Scene .....	77
4.7.2 Login .....	78-79
4.7.3 Avatar Creation .....	79-83



4.7.4 Ticket Creation and Transfer .....	83-84
4.7.5 Input Manager .....	84-85
4.7.6 Screen Sharing .....	86-87
4.8 Summary .....	88
<b>Chapter 5: Testing .....</b>	<b>89</b>
5.1 Introduction .....	89
5.2 Functional Testing .....	89
5.2.1 Test Cases.....	90-101
5.3 Non-Functional Testing .....	102
5.3.1 Usability Testing .....	102-103
5.4 Conclusion.....	104
<b>Chapter 6: Conclusion and Future Work.....</b>	<b>105</b>
6.1 Introduction .....	105
6.2 Achievements .....	105-106
6.3 Limitations.....	107-108
6.4 Future Work .....	108-109
6.5 Conclusion.....	109-110
<b>References.....</b>	<b>111-112</b>
<b>Appendices .....</b>	<b>113-120</b>

## LIST OF FIGURES

Figure 1.1: Phases of Agile Methodology (DevCom, 2021).....	4
Figure 2.1: Attendance QR code of FYP Symposium (FCSIT Final Year Project Symposium of Unimas, 2018) .....	12
Figure 2.2: Opening Ceremony of FYP Symposium (FCSIT Final Year Project Symposium of Unimas, 2018) .....	13
Figure 2.3: Poster Presentation of FYP Symposium (FCSIT Final Year Project Symposium of Unimas, 2018) .....	13
Figure 2.4: FYP Project Presentation (FCSIT Final Year Project Symposium of Unimas, 2018).....	14
Figure 2.5: Closing Ceremony of FYP Symposium (FCSIT Final Year Project Symposium of Unimas, 2018) .....	14
Figure 2.6: Logo of Microsoft Teams .....	15
Figure 2.7: Meeting in Microsoft Teams.....	16
Figure 2.8: Logo of Gather Town.....	17
Figure 2.9: Customization of avatar in Gather Town.....	18
Figure 2.10: Creative example of decoration in Gather space (javahello, 2021) .....	18
Figure 2.11: Remote Office in Gather space .....	19
Figure 2.12: Logo of NextMeet® CORE .....	20
Figure 2.13: Create avatar in NextMeet® CORE.....	20
Figure 2.14: Multiple Environment provided by NextMeet® CORE .....	21
Figure 3.1: Statistic of Respondents' Gender .....	28
Figure 3.2: Statistic of Background of Respondents .....	29
Figure 3.3: Statistic of Respondents that are Knowing Metaverse.....	29
Figure 3.4: Statistic of Years of Metaverse Known by Respondents.....	30
Figure 3.5: Statistic of Respondents' Understanding of Difference between VR and Metaverse.....	30
Figure 3.6: Statistic of Respondents' Experience of Using Any Metaverse Platform .....	31
Figure 3.7: Statistic of Respondents Preferred Online Meeting Platform.....	31
Figure 3.8: Statistic of Network Issue Faced by Respondents .....	32
Figure 3.9: Statistic of Interactivity of Current Online Meeting Platform .....	32
Figure:3.10: Statistic of Ease of Use of Current Online Meeting Platform .....	32
Figure 3.11: Statistic of Access or Control Issue Faced by Respondents .....	33
Figure 3.12: Statistic of Respondents that ever Attended A FYP Symposium .....	33
Figure 3.13: Statistic of Respondents' Interest in using Metaverse for FYP Symposium .....	34
Figure 3.14: Statistic of Convenience of Metaverse Compare with Physical Symposium .....	34
Figure 3.15: Statistic of Time-Saving of Metaverse compared to Physical Symposium .....	34
Figure 3.16: Statistic of Respondents Preferred Electronic Devices to Access to FYP Symposium .....	35
Figure 3.17 System Architecture of Metaverse .....	36

Figure 3.18 Use Case Diagram of Metaverse for FYP symposium .....	37
Figure 3.19 ERD of Metaverse for FYP symposium .....	38
Figure 3.20 User Interface Design in Metaverse .....	41
Figure 3.21 Homepage Design of Metaverse for FYP Symposium .....	42
Figure 3.22 Avatar Design of Metaverse for FYP Symposium .....	43
Figure 3.23 Three Dimensions Model of Symposium Hall.....	44
Figure 3.24 Three Dimensions Model of Poster Exhibition Hall.....	45
Figure 3.25 Three Dimensions Model of Presentation Room .....	46
Figure 3.26 Three Dimensions Model of Consultation Room .....	47
Figure 4.1 New Project of Unity .....	50
Figure 4.2 XAMPP Control Panel.....	51
Figure 4.3 PHPMyAdmin.....	51
Figure 4.4 Microsoft Visual Studio .....	52
Figure 4.5 ‘Input System’ package.....	53
Figure 4.6 ‘Multiplayer Tools’ package .....	54
Figure 4.7 ‘Netcode for GameObjects’ package .....	55
Figure 4.8 ‘PUN 2 (Photon Unity Networking) – FREE’ package .....	56
Figure 4.9 ‘Agora Video SDK’ package .....	56
Figure 4.10 Movement Animations for Avatars.....	57
Figure 4.11 Prefabs Folder .....	58
Figure 4.12 Scenes Folder .....	59
Figure 4.13 Material Folder.....	59
Figure 4.14 Male Avatars with a Game Engine Armature .....	61
Figure 4.15 Female Avatars with a Game Engine Armature .....	61
Figure 4.16 Default Female Avatar with Activated Objects .....	62
Figure 4.17 Symposium Hall 3D Modelling in Blender .....	63
Figure 4.18 Consultation Room 3D Modelling with Textures in Unity.....	63
Figure 4.19 Login Interface .....	65
Figure 4.20 Registration Interface .....	65
Figure 4.21 Admin Homepage .....	66
Figure 4.22 Other Users Homepage .....	67
Figure 4.23 Blockchain Page for Admin.....	68
Figure 4.24 Blockchain Page for Other Users.....	69
Figure 4.25 Avatar Creation Page .....	70
Figure 4.26 Loading Page.....	70
Figure 4.27 Symposium Hall with UI interations.....	71
Figure 4.28 Poster Exhibition Hall with UI interations.....	72
Figure 4.29 Presentation room with UI interations .....	72
Figure 4.30 Consultation room with UI interations.....	73
Figure 4.31 Login System Database.....	74

Figure 4.32 Event Management Database .....	74
Figure 4.33 Avatar Management Database .....	75
Figure 4.34 Poster Management Database .....	76
Figure 4.35 Ticket Management Database .....	77
Figure 4.36 Change Scene Code.....	77
Figure 4.37 Login PHP Code .....	78
Figure 4.38 Login Coroutine .....	79
Figure 4.39 Create and Update Avatar Coroutine .....	80
Figure 4.40 Create and Update Avatar PHP Code .....	80
Figure 4.41 Update Avatar Attributes on Network Script.....	81
Figure 4.42 Set Avatar Attributes on Network Script .....	82
Figure 4.43 Event Handlers for Network Player's Avatar .....	82
Figure 4.44 Window Onload Functions .....	83
Figure 4.45 Mint NFTs Functions .....	84
Figure 4.46 Transfer NFTs Functions .....	84
Figure 4.47 Input Manager Script.....	85
Figure 4.48 Setup Agora SDK Engine Function .....	86
Figure 4.49 Share Screen Function.....	87
Figure 5.1 System Usability Score .....	103

## LIST OF TABLES

Table 2.1: Comparison of existing systems and proposed project .....	22-23
Table 3.1 Hardware Requirement for Developer .....	25
Table 3.2 Hardware Requirement for Users .....	25
Table 3.3 Software Requirement to Develop Metaverse for FYP Symposium.....	26
Table 3.4 Functional Requirements of Metaverse for FYP Symposium.....	27
Table 3.5 Gestures Design used in Metaverse for FYP Symposium.....	39
Table 3.6 Icon Design of Metaverse for FYP Symposium.....	39-40
Table 4.1 Test Case 1: Register/Login Page.....	91-92
Table 4.2 Test Case 2: Homepage .....	93-95
Table 4.3 Test Case 3: Avatar Creation Page .....	96
Table 4.4 Test Case 4: Blockchain Page .....	97
Table 4.5 Test Case 5: Virtual environment.....	98-101

## LIST OF ABBREVIATIONS

AR	Augmented Reality
COVID-19	Coronavirus disease
ERD	Entity Relationship Diagram
FCSIT	Faculty of Computer Science and Information Technology
FYP	Final Year Project
IDE	Integrated Development Environment
MCO	Movement Control Order
MMORPG	Massively Multiplayer Online Role-Playing Games
NFTs	Non-fungible tokens
RPC	Remote Procedure Call
RPG	Role-Playing Games
UI	User Interface
UNIMAS	University Malaysia Sarawak
VR	Virtual Reality
XR	Extended Reality
3D	Three-dimensional

## **ABSTRACT**

*This project focuses on the design and development of a metaverse for the Final Year Project (FYP) Symposium of the Faculty of Computer Science and Information Technology (FCSIT) at the University Malaysia Sarawak (UNIMAS). The FYP Symposium provides a platform for FCSIT final-year students to present their project results to their supervisors and examiners. The goal of the metaverse in this project is to create a virtual world accessible to all FCSIT final-year students, regardless of their physical location. It aims to offer an immersive and interactive three-dimensional environment where students can showcase their work, receive feedback, and share knowledge with others. In the metaverse, users can interact with their customization avatars and virtual environments in a realistic and engaging manner. The metaverse serves as a dynamic space for students to explore, collaborate, and connect with each other virtually. To ensure security and authenticity, this project incorporates blockchain technology with non-fungible tokens (NFTs) which serve as digital tickets for entry into the metaverse. This integration enhances transparency, accountability, and the overall security of the virtual symposium. The main outcome of this project is an enhanced and inclusive virtual symposium experience that fosters greater collaboration, networking, and knowledge-sharing among FCSIT final-year students. The developed metaverse will provide a novel platform for students to present their projects in a visually engaging manner and receive real-time feedback from an audience, further enriching their academic and professional growth. By transcending physical boundaries, the metaverse will enable students to participate in the FYP Symposium from any location, promoting accessibility and inclusivity. This metaverse will establish a dynamic and interactive space, facilitating meaningful interactions and academic exchanges, making it a valuable and sustainable asset for FYP Symposiums at FCSIT, UNIMAS.*

## ABSTRAK

Projek ini memberi tumpuan kepada reka bentuk dan pembangunan metaverse untuk Simposium Projek Tahun Akhir (FYP) Fakulti Sains Komputer dan Teknologi Maklumat (FCSIT) di Universiti Malaysia Sarawak (UNIMAS). Simposium FYP menyediakan platform untuk pelajar tahun akhir FCSIT membentangkan hasil projek mereka kepada penyelia dan pemeriksa mereka. Matlamat metaverse dalam projek ini adalah untuk mewujudkan dunia maya yang boleh diakses oleh semua pelajar tahun akhir FCSIT, tanpa mengira lokasi fizikal mereka. Ia bertujuan untuk menawarkan persekitaran tiga dimensi yang mengasyikkan dan interaktif di mana pelajar boleh mempamerkan hasil kerja mereka, menerima maklum balas dan berkongsi pengetahuan dengan orang lain. Dalam metaverse, pengguna boleh berinteraksi dengan avatar penyesuaian dan persekitaran maya mereka. Untuk memastikan keselamatan dan ketulenan, projek ini menggabungkan teknologi blockchain dengan token tidak boleh digunakan (NFT) yang berfungsi sebagai tiket digital untuk masuk ke metaverse. Penyepaduan ini meningkatkan ketelusan, akauntabiliti dan keselamatan keseluruhan simposium maya. Hasil utama projek ini ialah pengalaman simposium maya yang dipertingkatkan dan inklusif yang memupuk kerjasama, rangkaian dan perkongsian pengetahuan yang lebih besar dalam kalangan pelajar tahun akhir FCSIT. Metaverse yang dibangunkan akan menyediakan platform baharu untuk pelajar mempersembahkan projek mereka dengan cara yang menarik secara visual dan menerima maklum balas masa nyata daripada penonton, memperkayakan lagi pertumbuhan akademik dan profesional mereka. Dengan melangkaui sempadan fizikal, metaverse akan membolehkan pelajar mengambil bahagian dalam Simposium FYP dari mana-mana lokasi, mempromosikan kebolehcapaian dan keterangkuman. Metaverse ini akan mewujudkan ruang yang dinamik dan interaktif, memudahkan interaksi bermakna dan pertukaran akademik, menjadikannya aset yang berharga dan mampan untuk Simposium FYP di FCSIT, UNIMAS.



# CHAPTER 1

## INTRODUCTION

### 1.1 Introduction

Metaverse is an integrated network of 3D virtual worlds that combines aspects of the digital and physical worlds due to increasing demands for immersion. It enables the user to explore the 3D real-world environment that makes users feel like a real-world sensation. According to Marr (2022),

the CEO of Nvidia, Jensen Huang said, “The metaverse is coming. Metaverse is not only a place to game. Future worlds will be photorealistic, obey the laws of physics, and be inhabited by human avatars and AI beings. We will create a future in these metaverses before actually downloading the blueprints to be fab’ed in the physical world.”

The concept of the metaverse has a long history that can be traced back to the early days of science fiction and virtual reality. The term "metaverse" was first coined by science fiction author Neal Stephenson in his 1992 novel "Snow Crash." According to Reed (2022),

The novel depicts people using virtual reality technology and digital avatars of themselves to explore an online, digital world. In this world, the characters can walk down the street, visit shops, offices, amusement parks, and other forms of entertainment.

The idea of virtual worlds and cyberspaces gained popularity in the late 20th century with the rise of the internet and computer graphics.

Metaverse is believed to have a huge impact on the economy when more technologies are developed and widely adopted. There are several potential areas where the metaverse could have a significant economic impact, including e-commerce, virtual real estate, gaming and entertainment, work and collaboration, and advertising and marketing. Undoubtedly, Metaverse

could enhance virtual reality (VR) workplace processes and environments for remote working to encourage employee interaction and chat, boost collaborative activities, and others. Besides, the development and operation of the metaverse can provide more job opportunities in areas such as virtual world design, virtual event planning, and virtual product development which lead to a boost in the overall economy. In addition, the creation of a metaverse will lead to the development of new markets and industries, such as virtual real estate, virtual goods and services, and virtual tourism. People can participate and make businesses such as buying and selling virtual assets in the Metaverse.

In consequence, this project will focus on designing and developing a metaverse of the Final Year Project (FYP) Symposium. The concept of the metaverse is used as a 3D virtual presentation platform that allows all final-year students to present their FYP in a virtual world. All the users will need to get their own tickets to enter the metaverse. All the tickets will be created uniquely and securely by using NFTs and blockchain technology.

Apart from that, students can also watch and listen to any project presentation they are interested in the metaverse remotely. It will be more attractive and interesting when students interact with 3D virtual avatars, and it will increase the involvement of the students in other FYP presentations. It can also build out the community virtually as students communicate with each other and exchange their thoughts in the metaverse.

## **1.2 Problem Statement**

Since November 2019, the pandemic of COVID-19 was spreading across the world, the government of Malaysia implemented the plan of Movement Control Order (MCO). Therefore, all UNIMAS students stayed at home and started their online classes for 2 years. After using various online meeting applications for classes, it was found that the current online environment lacked interaction and control, especially in the exhibition of the outcome and identification of participants who cannot reach the symposium venue in time.

After UNIMAS implemented the plan of 100% physical class, all the UNIMAS students must come back to the university for studying, it was again found that the physical FYP symposium may not provide a safe environment. This is because some of the students may have been exposed to coronavirus but still come to the symposium due to no symptoms.

Besides, the physical FYP symposium may be more time-consuming as well. This is due to the reason that all the final year students will need to reach the symposium venue earlier and wait until their turn to present their FYP. It will also need more time for each student to set up the devices for the presentation.

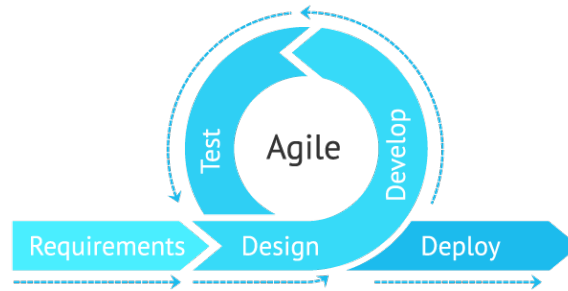
## **1.3 Aims and Objectives**

The aims and objectives of the project include:

- a) To identify the requirement of the FYP symposium in the metaverse.
- b) To design a Metaverse of FYP symposium by integrating NFTs and Blockchain technologies based on the requirement identified.
- c) To develop a metaverse prototype of the FYP symposium using the proposed design.

## 1.4 Methodology

In this project, the methodology being used is agile methodology. This approach provides the developer with greater clarity and flexibility because it enables the developer to improve the refinement and review of system requirements at each stage.



*Figure 1.1: Phases of Agile Methodology (DevCom, 2021)*

Based on Figure 1.1, this methodology can be broken down into 5 stages which are:

1. Requirements

In this phase, the objective and scope of the project will be defined. The questionnaire will be given to the target user to gather information about the project. The result of the questionnaire will be analysed to identify the problems and requirements of the target users. The project schedule will also be defined and shown in the Gantt Chart. The features that should be included will be determined and prioritized as well based on the users' requirements.

2. Design

During this second stage, the system architecture of Metaverse will be defined. The use case diagram will be developed to show the functionality of the project and how it relates to this project. The Entity Relationship Diagram (ERD) will be designed to model the relational database of the system as well. The resources and tools that

need to be used in this project will be compared and selected. The architecture of the project such as the 3D model of the exhibition hall and avatar will be designed.

### 3. Development

This stage is also known as the iteration phase which includes confirming the requirements, developing the system, conducting testing, producing the system, and gathering feedback. All the requirements and the design will be gathered and combined, then turned into a real workable metaverse. The unit testing will be carried out in this phase to ensure that there are no bugs and that every feature works as expected. The feedback will be gathered from the target user for refinement purposes.

### 4. Testing

This stage focuses on quality assurance testing and documentation development. User acceptance testing, usability testing, and system testing will be implemented to ensure the system is reliable and fully functional. The installation guide and user manual will be created to guide the users on how to install and use the system.

### 5. Deployment

During this stage, a final product will be fully deployed and available for all end users.

## 1.5 Scope

The metaverse of the FYP symposium is designed and developed for all FCSIT final year students to present their FYP to their supervisor and examiner. Users can access the metaverse anytime and anywhere. Below is the list of scopes identified:

- a) The ticket will be provided to users through a link, allowing them to request for the ticket to enter the metaverse.
- b) Shared screen functions will be provided for students to present their work.
- c) Text chat and video call functions will be provided to facilitate communication and interaction among users within the metaverse, allowing them to exchange messages, share information, and ask questions.
- d) Users will be able to create and customize their 3D virtual avatars within the metaverse, allowing them to personalize their virtual presence.
- e) There will be a poster exhibition hall for students to upload their project-related poster regarding the project title and description. This allows other participants to browse and select projects of their interest, facilitating the viewing of project presentations within the metaverse environment.
- f) The presentation rooms will be provided in the metaverse for FYP presentation purposes.
- g) The consultation rooms will be provided in the metaverse for students, supervisors and examiners to use after the presentation for evaluation and feedback purposes.

## **1.6 Significance of Project**

The significance of this project is to provide an interactive and secure FYP presentation platform for all final-year students. This project can increase the accessibility for remote students, especially for those who are quarantined at home due to COVID-19. The metaverse also maintains the physical safety of users because it does not need to have face-to-face interactions, so it will not have the spread of virus issue occur. In the metaverse, users can experience virtual interactions similar to real-world interactions. It overcomes the limitations of the traditional online video meeting software, and it will increase the interest and involvement of the students at the same time.

## **1.7 Project Schedule**

The project schedule acts as a guideline and timeline for the project to reach completion which can be adjusted according to the need of developing the metaverse. A detailed project schedule is constructed and attached in Appendix A of this project report.

## **1.8 Expected Outcome**

A metaverse for FYP Symposium will be designed and developed. This system can be used for a long-term period as well as able to meet the users' needs and requirements. The system should be fully functional and handled smoothly. It should also overcome the problems stated previously, especially avoid the spreading of the virus. Students will be able to access the metaverse with tickets given at any time and any location via their computers.

## **1.9 Project Outlines**

### **Chapter 1: Introduction**

This chapter provides an overview of the project with precise detail. It includes the problem statement, objectives, project scope, methodology, expected outcome, the significance of the project, project schedules, and project outline.

### **Chapter 2: Literature Review**

This chapter consists of a comprehensive review of literature related to a proposed project. It will be used to identify potential problems and areas for further development and implementation. Similar systems will be compared to evaluate their advantages and shortcomings, thereby providing a clear view of the features and functionalities of the proposed project that should be included.

### **Chapter 3: Requirement Analysis and Design**

This chapter covers the analysis and design of the proposed project. The detailed requirements will be identified and analysed. The design will meet the identified requirements and it will consist of conceptual level design. The design of functions, features, and interface are created and act as guidelines for the whole project.

### **Chapter 4: Implementation**

This chapter discusses realizing the design of the metaverse by the implementation. All the requirements and designs identified and created in the previous chapter are developed into a metaverse system.