LIBRARY MANAGEMENT SYSTEM

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UNIVERSITI TEKNIKAL MALAYSIA MELAKA

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This report is submitted in partial fulfillment of the requirements for the Bachelor of [Computer Science (Software Development)] with Honours.

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2021

DECLARATION

I hereby declare that this project report entitled

[LIBRARY MANAGEMENT SYSTEM

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

STUDENT : _____ _____ Date : 23/06/2021
(NURUL AQILAH SHAHIRAH BINTI AMIRUDIN)

I hereby declare that I have read this project report and found this project report is sufficient in term of the scope and quality for the award of Bachelor of [Computer Science (Software Development)] with Honours.

SUPERVISOR : _____ Date : 12/9/2021
(DR.RAJA RINA BINTI RAJA IKRAM)

DEDICATION

I dedicated this project for my family, and my friends that always support and actively encourage me throughout this project. Thank you for supporting me and praise to Allah, I have finished this project.

ACKNOWLEDGEMENTS

In this project, I have been working. Without the aid and guidance from many people and our supervisor, Dr.Raja Rina Binti Raja Ikram this would not have been possible. Our heartfelt appreciation to all of them is extended. We are very obliged to Dr.Raja Rina Binti Raja Ikram for her encouragement, continuous supervision and knowledge about the project and support for it in the completion of the project. We thank our parents for their support and motivation that will enable us to complete this project. We also thank our colleagues for their contributions and the individuals who have helped us voluntarily with their expertise.

ABSTRACT

Library Management System is a system to helps admin of library to manage the library by ease their task by develop a few modules that can change their task from manual to web-based system. This system also adds one module for user to reserve books from user part. This report will include the analysis and the design of the system such as user interface design and database design. The current system is record all of the data manually and the redundancy data, data is not organized are becoming issues. Thus, the Library Management System is being proposed to reduce the redundancy of data and data will be organized. Through the process research that have been made, the library system is develop to ease the admin manage the library whenever admin need to keyed in, view, edit and remove data.

ABSTRAK

Sistem Pengurusan Perpustakaan(SPP) adalah sebuah sistem untuk membantu pentadbir perpustakan menguruskan perpustakaan melalui membina beberapa modul yang mengubah sistem manual kepada sistem berasaskan web. Sistem ini juga menambah satu modul untuk pengguna iaitu pengguna boleh menempah buku secara awal sebelum pergi ke perpustakaan. Laporan ini adalah untuk melaporkan tentang analisis dan reka bentuk system seperti 'user interface design' dan 'database design'. Sistem yang sekarang adalah menggunakan buku. Iaitu merekodkan data secara manual menyebakan data adalah tidak tersusun dan berlakunya pertindihan data. Sehubungan dengan itu, melalui cadangan membina Sistem Pengurusan Perpustakaan ini adalah untuk mengurangkan pertindihan data dan untuk menjadikan data lebih tersusun. Melalui proses pencarian yang telah kami lakukan, Sistem Pengurusan Perpustakaan adalah dibina untuk menyenangkan pentadbir untuk menguruskan perpustakaan.

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LIST OF ABBREVIATIONS

FYP	**-**	**Final Year Project**
LMS	**-**	**Library Management System**

LIST OF ATTACHMENTS

CHAPTER 1: INTRODUCTION

1.1 INTRODUCTION

Library Management system is developed because the current system is having difficulties to organize the book data and the user details. Day by day the user is increasing so it is become more complicated to organize the data resulting the duplication of data and searching data also is become harder. Therefore, the purpose of introduce the Library Management System is to organized the data properly and to avoid the duplication of data. This is to make it easier for the admin to search and view the details all the data such as books and user.

1.2 PROBLEM STATEMENT

i. The data in current system is not organized.

ii. Difficulties in detecting the borrowed book and the book that already return to the library.

iii. Takes time to detect user that borrow book due to date duplication.

1.3 Objective

The following are the objectives of this system:

i. To make sure all of the data such as books details, borrowed date and user details are organized properly.

ii. To ease the admin to insert the data of borrowed and return book without having redundancy of data

iii. To allow user to book their book in advance

1.4 Scope

1.4.1 Scope of Project

The scope of the project is identifying module and build module to develop the system. In this section scope of user and scope of functionality were discussed as stated below.

1.4.2 Scope of User

There are two of target user for LMS:

i. Admin

- Authenticate User
- Manage Book
- Manage User
- Manage Booking
- Manage Borrow Books
- Generate report
- Logout

ii. Consumer

- Login

- Booking book
- Manage profile
- Logout

1.4.3 Scope of Functionality

Module to be developed:

i. Authenticate Module

- To allow admin and consumer to login into the system

ii. Manage Book Module

- Admin will insert, view, edit, and delete book in the system.

iii. Manage User Module

- Allow admin to insert, view, edit and delete user.

iv. Manage Booking Module

- Allow admin to approve or deny the request of booking book.

v. Manage Borrow Book Module

- Allow admin to insert ISBN and user information as record when borrowing book.

vi. Manage Profile Module

- Allow consumer to edit their profile information.

vii. Booking Book Module

- Allow consumer to booking book and view books.

viii. Generate Report Module

- Allow admin to generate report of the system such as the list of monthly top borrower.

1.5 Project Significance

LMS project is designed to ensure that the library of the employees can correctly organize the data. It also helps personnel insert borrowing and returning books so that data are not redundant. In addition, without going to library, the consumer can reserve his book in advance.

1.6 Expected Output

LMS can support the organization of data by library staff, and LMS also gets the management of the borrowing books without the redundancy of data compared to the manual system. In addition, consumers will have no worry about booking their book in advance.

1.7 Conclusion

In order to solve the problem, LMS will be designed and developed according to the project objective. The results of this project and the project methodology are discussed next.

CHAPTER 2: LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

This chapter will discuss regarding the facts and findings that related to the systems. We made a research regarding the of existing system that are similar to this system. The purpose of these research is to identify problems and things that can be avoided when developed the system. It also to helps to reached our goals by completing the system that is none in other system.

2.2 Facts and Findings

2.2.1 Domain

The domain for this project is Library Management System. Library Management System is a system to assist admin or staff of the library to manage the library. In the Library Management System allows admin insert the data of the books, user and the borrowed book details such as the ISBN Number, book title, quantity of books, username, name for the user and date for the borrowed details. Furthermore, the system as platform for the user to view the list book and reserve them in advance. The system is save time, make it admin jobs easier as they can view the all of the data in the system directly compared to the previous system.

2.2.2 Existing System

Case Study 1: Perpustakaan Awam Johor

Figure 2. 1: Case Study Website of Perpustakaan Awam Johor

Figure 2. 2: Information of Borrowing Books

The purpose of Perpustakaan Awam Johor is to provide all of information related to Perpustakaan Awam Johor. User also can get the information of certain books. This website also provides information such as their map, contacts information, their strategic and etc. This system is not allowing user to view list of books and reserve books.

Case Study 2: Perpustakaan Awam Terengganu

Figure 2. 3 : Login Page of E-Perpustakann Terengganu

Figure 2. 4: Search Page

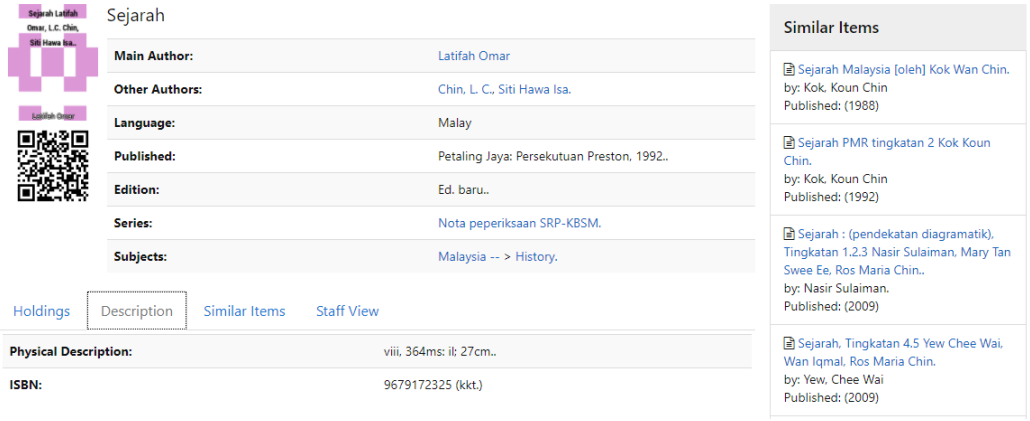

Figure 2. 5: Display Page of Book Details

The system of Perpustakaan Awam Terengganu is providing the information of related to all of Library in Terengganu. This website also provides E-Perpustakaan. E-Perpustakaan is to allow user to log in into the system to view their user information. However, the system not provide a clear instruction on how the new user to register into the system. Thus, it is hard to navigate the system.

Case Study 3: Laman Web Rasmi Perbadanan Perpustakaan Pahang

Figure 2. 6: Case Study Perpustakaan Awam Pahang

The official website for Perpustakaan in Pahang is Awam Pahang. The system provides library information such as code clothing, organizational chart, vision, mission and so on. Users may look for and review books for book and giver rates. All in all, this system provides information for users such as and allows users to view and review the book.

2.2.3 Technique

Case Study	Case Study 1: Perpustakaan Awam Johor	Case Study 2: Perpustakaan Awam Terengganu	Case Study 3: Perpustakaan Awam Pahang	Proposed System: Library Management System
List of books	X	✔	✔	✔
Able to reserve books	X	X	X	✔
Information for each books.	X	✔	X	✔
Able to view reserve status	X	X	X	✔
Easy to navigate	✔	X	✔	✔

Table 2. 1: Technique Comparison

2.3 Project Methodology

Agile Methodology:

To develop Library Management System, agile methodology is applied into the system. This is because the Agile method is one of the simplest and most effective processes to turn a vision of business requirements into software solutions and it promotes flexible solutions for change. We choose Scrum as framework of Agile method. Using the Scrum framework, it will keep us focus for the goals.

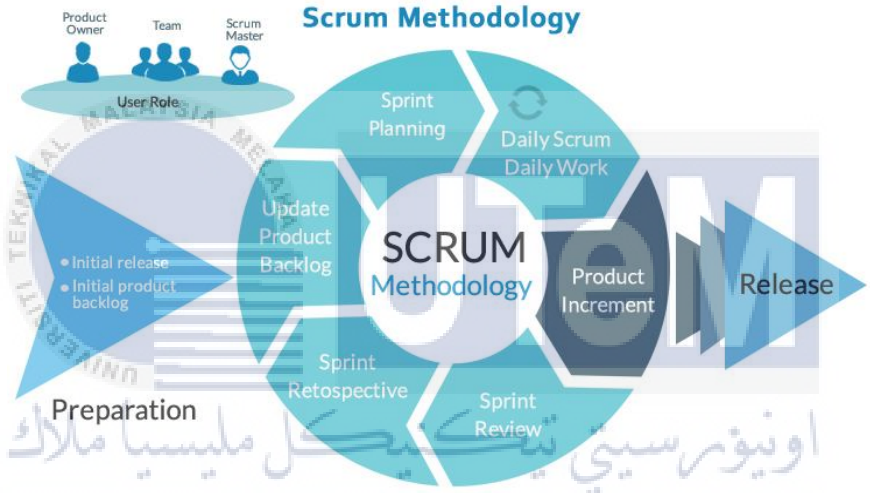

Figure 2. 7 Scrum Methodology

2.4 Project Requirements

In the project requirements we will discuss regarding of software and hardware requirements.

2.4.1 Software Requirements

Table 2. 2: List of Software

Windows 10	A Microsoft operating system for personal computers, tablets, embedded devices and internet of things devices.

Atom	Atom is a free and open-source text and source code editor for macOS, Linux, and Microsoft Windows. Atom is for the coding.
Xampp	Xampp act as web server .
Microsoft Word	Microsoft Word is to
Draw.io	As software to help in create the drawing.

2.4.2 Hardware Requirements

Table 2. 3: List of Hardware

Laptop	Laptop is required to build the website because Atom and Xampp server only can be use on laptop or PC

2.5 Project Schedule and Milestone

Figure 2.7 below shows the schedule of the project starting from 15 March 2021 and expected to end on 10 September 2021

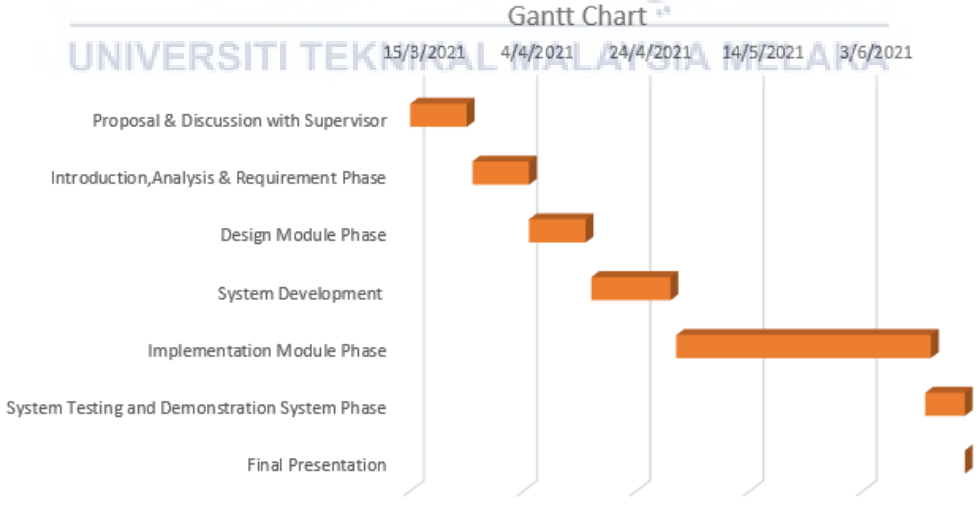

Figure 2. 8: Gantt Chart

2.6 Conclusion

In conclusion, this chapter is the literature review of the system, we need to identify and make a research of the system. The project methodology, software and hardware requirements were explained in this chapter. Next, we will discuss the analysis of the system.

CHAPTER 3: ANALYSIS

3.1 Introduction

In this chapter we will discuss the analytical phase, which divides the deliverables into more detailed business requirements in the high level Project Charter. The analysis phase is also the part of the project in which you define the overall direction the project will take when the project strategy documents are created.

3.2 Problem Analysis

3.2.1 Current business flow of staff.

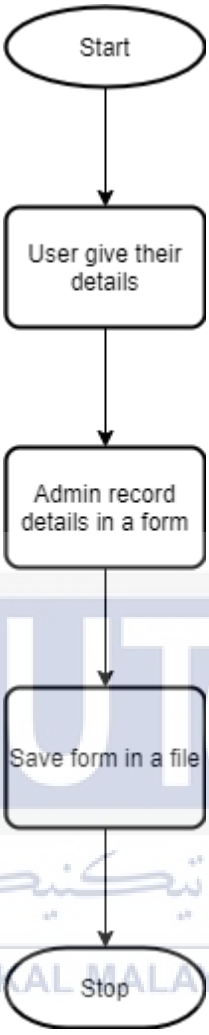

Figure 3. 1: Current system for Add User

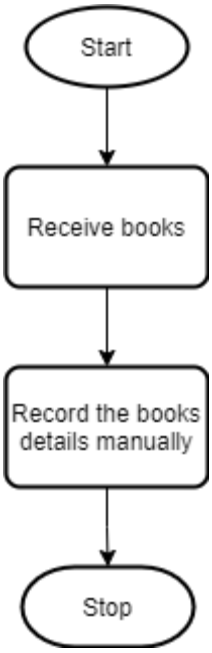

Figure 3. 2: Current system for Add Books

Figure 3. 3: Current System for Manage Borrower

3.2.2 Problem Statement

Based on the problem statement that we have mentioned earlier, first the data is not organized. This is because all of the data users and books are recorded in a piece of paper and staff save it in a file and cause of data redundancy. Besides the data is not organized, it also causing the searching of information in a short time is become harder. Next, using the current system, it is difficult to detect the borrowed book and book that already return in library. It is because of the redundancy just now and it also in involving borrow and return book. The staff only record it in a book thus, it hard to trace the book. Furthermore, due to the date and name duplication, it will take time to detect user that borrow books.

3.3 Requirement Analysis

Analysis of requirements involves regular communication with system users to determine specific feature expectations, resolve conflict or ambiguity in requirements as demanded by different users or user groups, avoiding the feature creep and documenting from start to finish all aspects of the project development process.

3.3.1 Data Requirement

Table 3.1 to 3.6 show the data dictionary of tables created in the system.

Table 3. 1:Data Dictionary of Admin Table

Field Name	Data Type	Field Length	Constraint	Description
adminID	Int	50	Primary key	ID of admin
Name	Varchar	100	Not null	Name of the admin
Username	Varchar	100	Unique	Username of admin

password	Varchar	100	Not null	Password of admin
Phone_No	Varchar	11	Not null	Phone Number of admin

Table 3. 2:Data Dictionary of Book Table

Field Name	Data Type	Field Length	Constraint	Description
ISBN_NO	Varchar	50	Primary Key	ISBN of books.
book_title	Varchar	100	Not null	Title of books
description	Varchar	425	Not null	Description of books
genre	Varchar	50	Not null	Genre of books
author	Varchar	55	Not null	Author name of every books
quantity	Int	10	Not null	Book quantity
bookStatus	Varchar	25	Not null	Status of every book
image	Varchar	100	Not null	Image for books

Table 3. 3:Data dictionary of Booking Table

Field Name	Data Type	Field Length	Constraint	Description
bookingID	Int	100	Primary key	Id of booking
bookingDate	Date		Not null	Date of the booking
bookingStatus	Varchar	50	Not null	Booking Status
ISBN_NO	Varchar	50	Foreign key	ISBN of books

Table 3. 4: Data Dictionary of booking_user Table

Field Name	Data Type	Field Length	Constraint	Description
userID	Int	11	Foreign key	ID of user
bookingID	Int	100	Foreign key	ID of booking

Table 3. 5: Data Dictionary of borrow_return Table

Field Name	Data Type	Field Length	Constraint	Description
borrowReturnID	Int	10	Primary key	ID of borrow return
ISBN_NO	Varchar	50	Foreign key	ISBN of books
userID	Int	11	Foreign key	ID of user
Borrowed_date	Date		Not null	Start borrow date
Returned_date	Date		Not null	Return date of books

Table 3. 6: Data Dictionary of user Table

Field Name	Data Type	Field Length	Constraint	Description
userID	Int	11	Primary key	ID of user
name	Varchar	100	Not null	Name of user
username	Varchar	30	Unique	Username of user
user_age	Int	3	Not null	Age of user
phoneNo	Varchar	12	Not null	Phone number of user

User_status	Varchar	30	Not null	Status of user

3.3.2 Functional Requirement

3.3.2.1 Use Case View

Use case as summary of functional requirement. Use case view is as below:

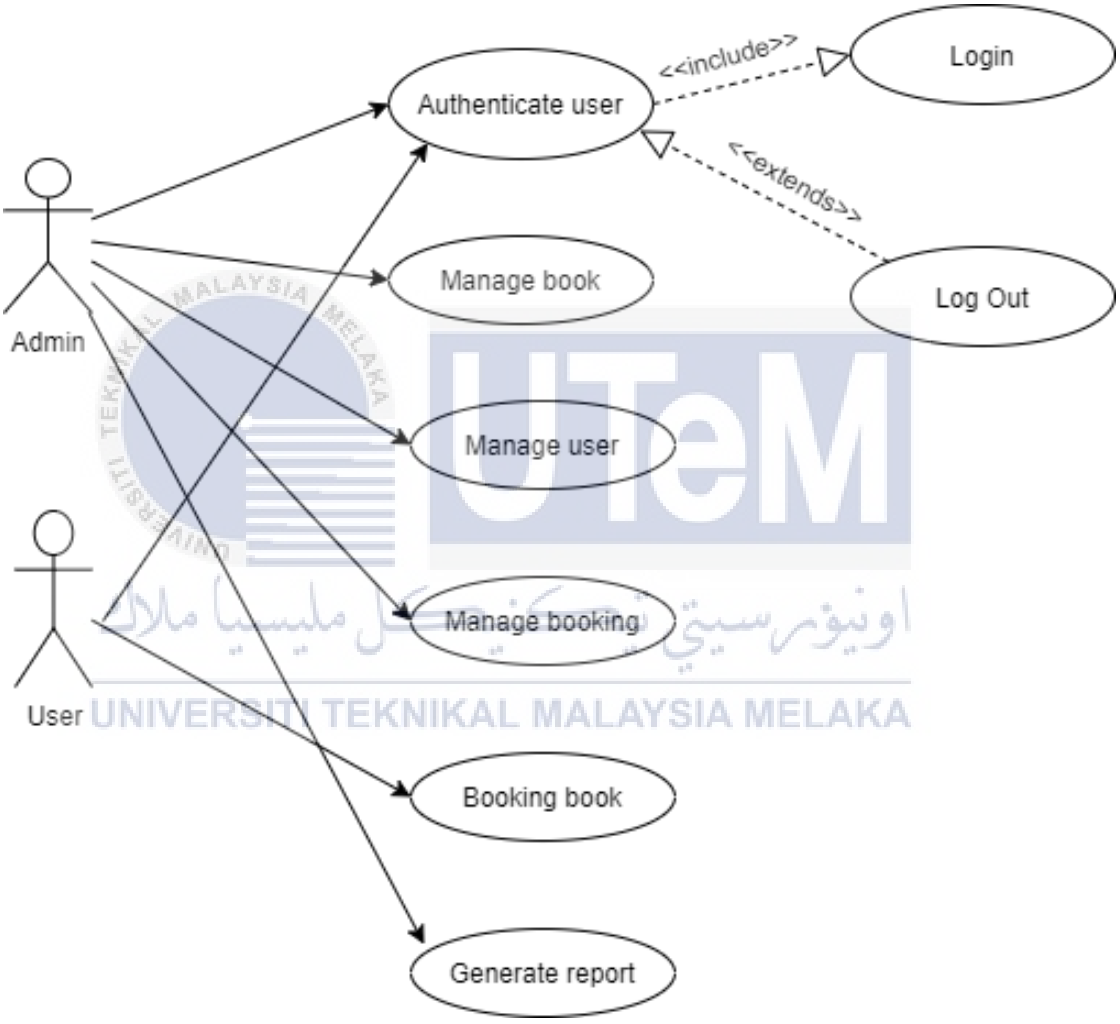

Figure 3. 4:Use Case View

3.3.2.2 Functional Requirement Table

Functional requirement table is the details of every task of the system should be working.

Table 3. 7: Functional requirement of system

Functional Requirement	Description
Login	Users should be able access to their account.
	The system shouldn't allow user leave an empty field
Register	System should allow user register into the system
	The system shouldn't allow user leave an empty field
View(User, Book, Borrower)	The system should allow user to view their account information such as name, username, age and phone number.
	The system should allow admin to view user information such as name, username, age and phone number.
	The system should allow admin to view book and borrower details such as ISBN, title of books, quantity of books and etc.
Edit(Book, User, Borrower)	The system should allow user to edit their information such as name, username, age and phone number.

	The system should allow admin to edit book details such as image, quantity and status.
	The system should allow admin to edit borrower details such as return date
Add(User, Books, Borrower)	The system should allow user to add book, user and borrower details such as the username, name and the return date for borrowed details
	The system should allow user to upload image for the book image.
	The system should keep the data into the database.
Generate Report	The system should allow admin to generate report

3.3.3 Non-Functional Requirement

Table 3. 8: Non-Functional Requirements of system

Non-Functional Requirements	Description
Availability	The system will always available 24/7
Usability	System can be use easily.

3.4 Conclusion

This chapter discussed analysis issues and listed a few problems and identified the cause of the problems. The functional and non-functional requirements have been identified; they are both important in planning system flow. The developer can design

the database correctly so that the database needs to be planned also early. In the next issue, we discussed system design for high level design, system architecture and user interface design. We will discuss this topic.

CHAPTER 4: DESIGN

4.1 Introduction

This chapter explain the details of preliminary-design and next the result of the detailed design. System architecture, User Interface Design and Database Design will be discussed under High-Level Design while in the Detailed design is discussing regarding software and Physical Database Design.

4.2 High-Level Design

4.2.1 System Architecture

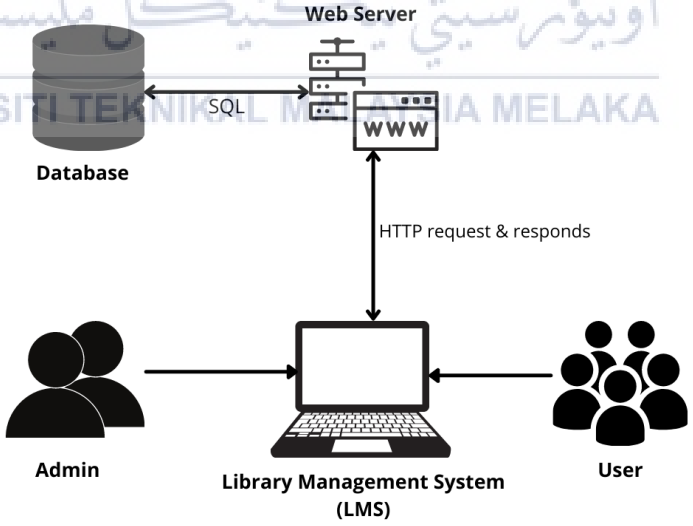

Figure 4. 1: System Architecture of Library Management System

This system architecture is show how the user and the administration interacts with the system. Admin and user will insert the input and store it in the database using the Web based.

4.2.2 User Interface Design

In this section user interface design of every module are showed below. There are two parts for the user interface design which are admin and user.

4.2.2.1 User Interface Design(Admin)

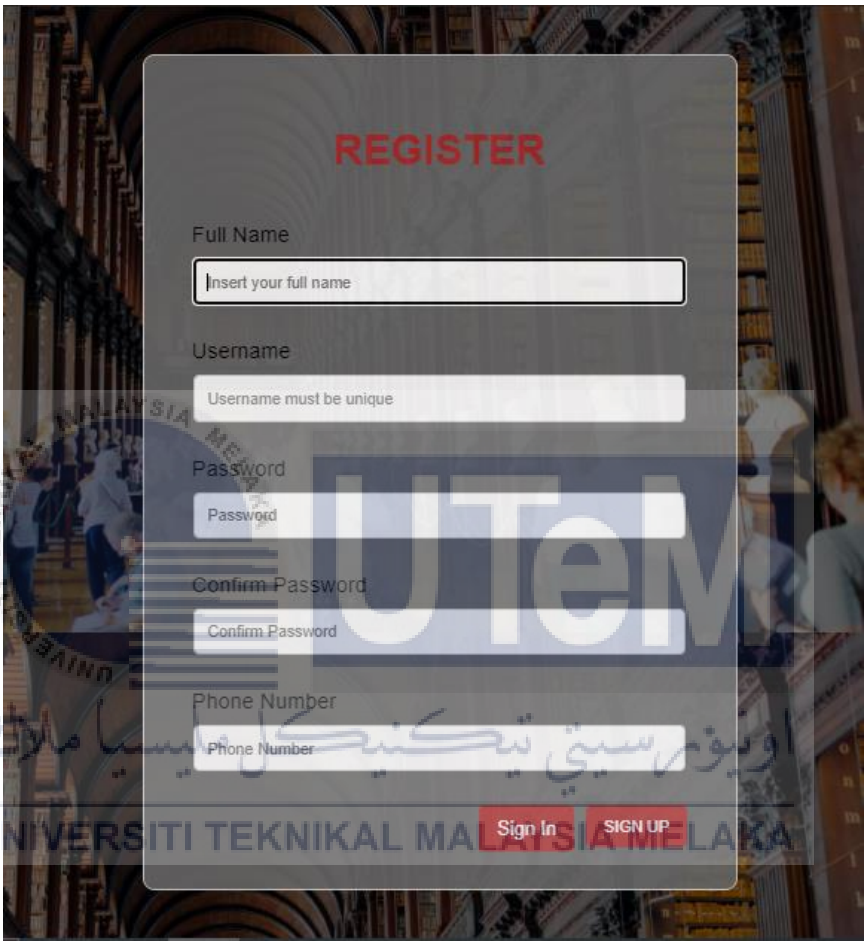

Figure 4. 2: Register Page

Figure 4.2 show the registration page of both part. Users need to fill in all of the fields which are full name, username (must be unique), password and phone number. Password and confirm password must be the same for them get to continue the registration and users must enter the right format of phone number. After success register into the system, users will get login into the system.

Figure 4. 3: Login Page

Figure 4.3 show the login page of admin and user. Users need to enter the username and password. Field cannot be null or else the error message will be display.

Figure 4. 4: Add Book Page

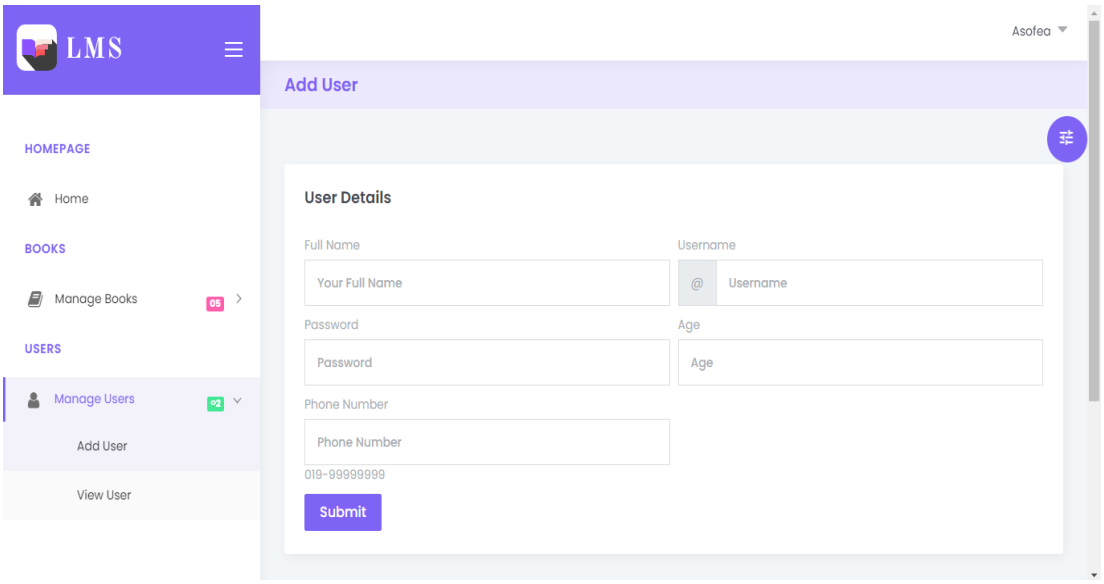

Figure 4. 5: Add User Page

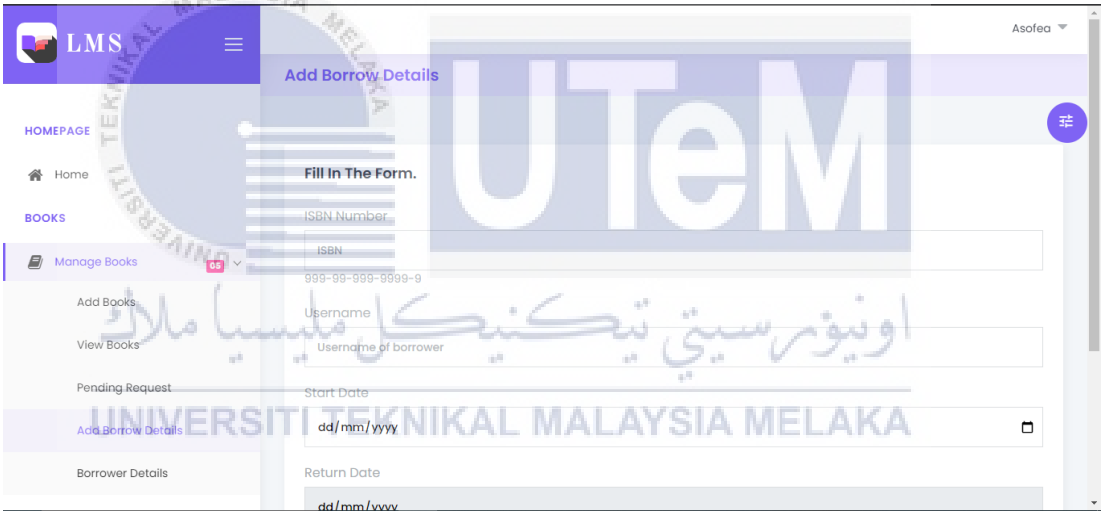

Figure 4. 6: Add Borrower Page

Figure 4.4, 4.5 and 4.6 shows the add book, add user and add borrower page. Admin need to fill in all of the fields and the data will be validating and error message will be display if the input is in wrong format or have a null value.

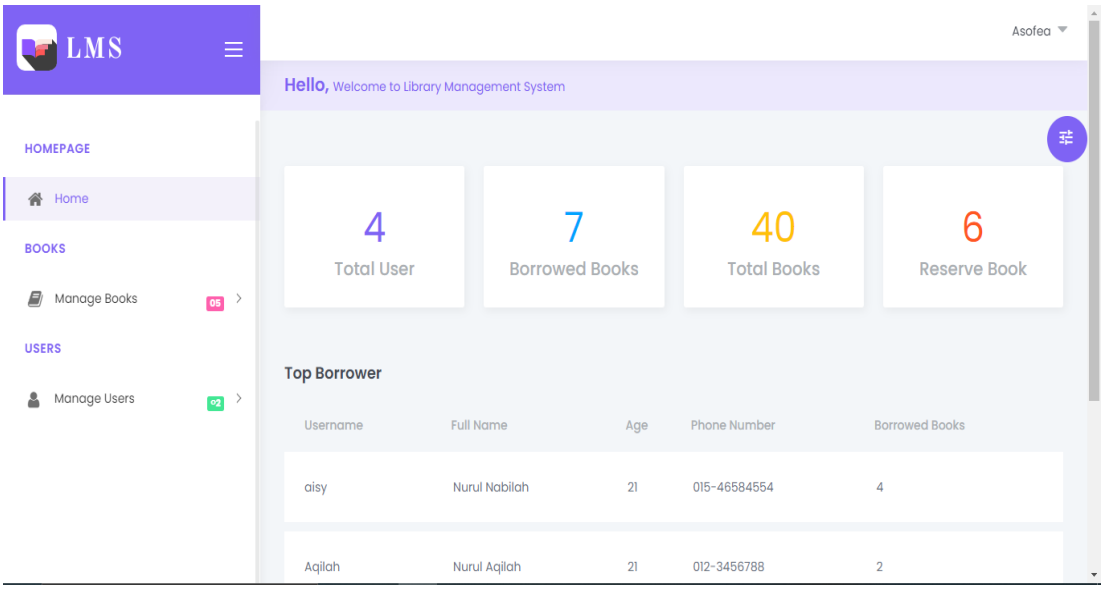

Figure 4. 7: Dashboard Page

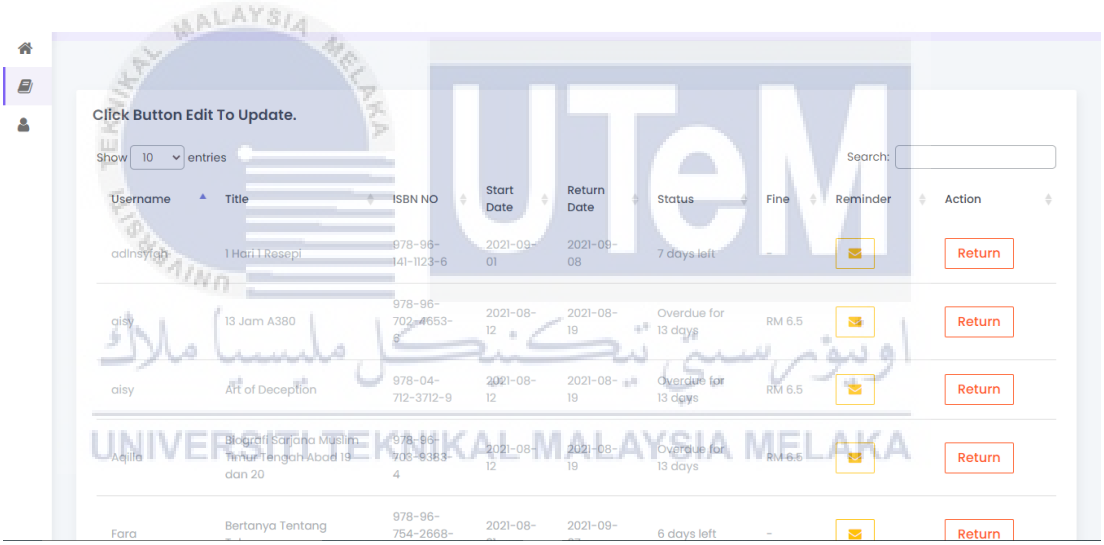

Figure 4. 8: List of Borrowed Books Page

Figure 4.8 shows list of borrow books. Here admin can view the list of username and their borrowed books, start date and return date. There they can click Reminder and return button. Reminder button is to send email to the user if they have reached limit days to borrow. Return button use when the user return book.

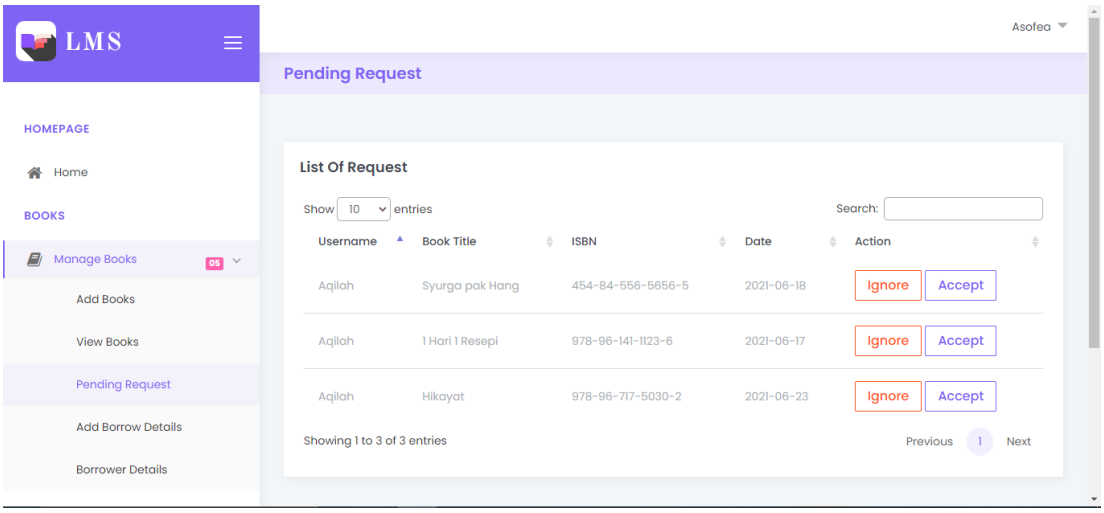

Figure 4. 9: List of Pending Request Page

Figure 4.9 show the pending request page. In this page admin is required to give the permission to the user to reserve the book. If admin click 'ignore' button the booking status will be changed to 'rejected' but if admin click the 'accept' button the status will change to 'accepted'.

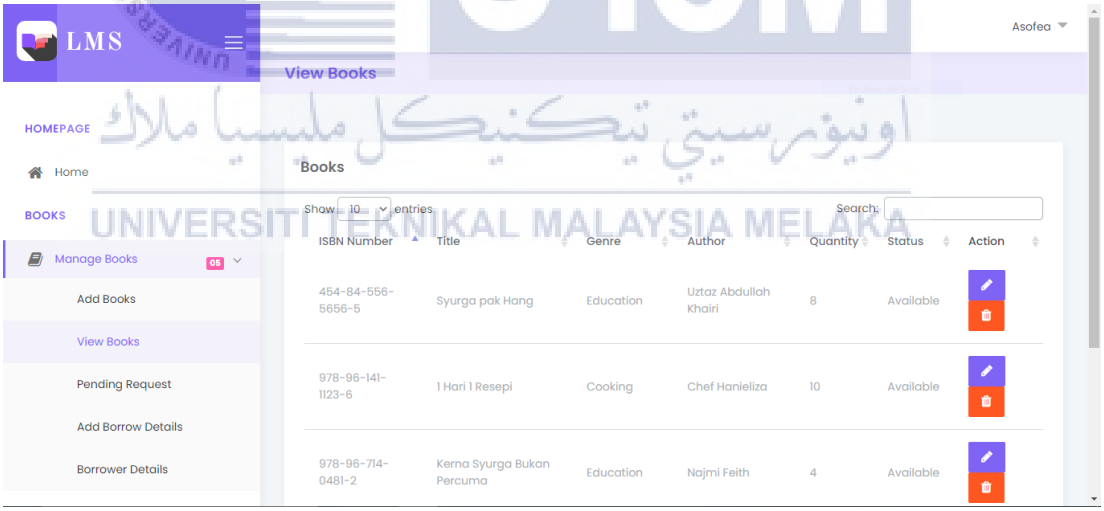

Figure 4. 10: List of Book

Figure 4.10 shows list of books. Here admin can view the list of books and their details such as ISBN number, title, genre, author, quantity and status. There they can click edit or delete button. Edit button is to edit the quantity, status and book's image while delete button is for admin to update the status of the book into unavailable if the book is not in use at the moment.

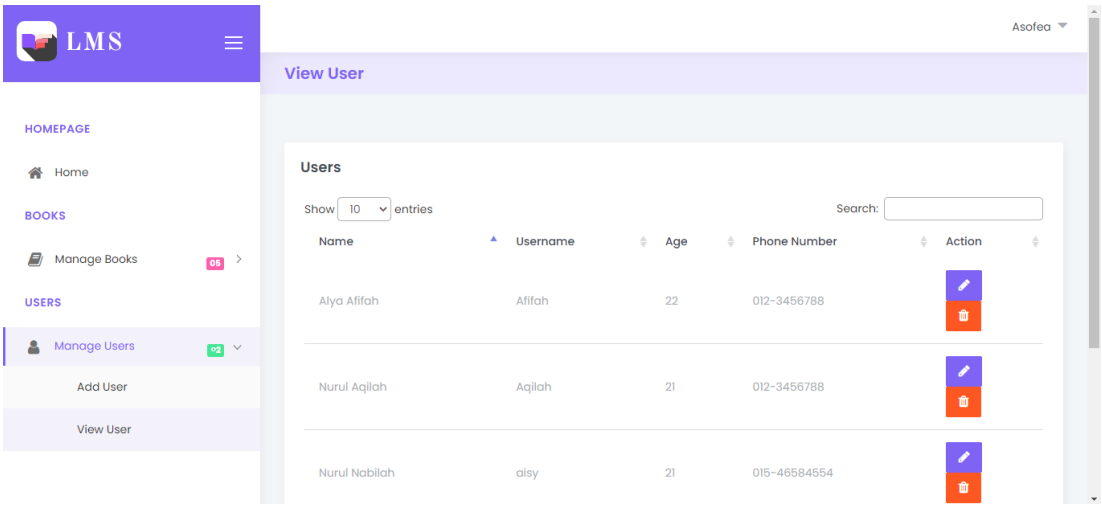

Figure 4. 11: List of User

Figure 4.11 shows list of users. Here admin can view the list of users and their details such as name, username, age and phone number. There they can click edit or delete button. Edit button is to edit user's information while delete button is for admin remove users from the system.

Figure 4. 12: Update Profile Page

Figure 4.11 and 4.12 shows list of users and edit page. In Figure 4.11, admin can view the list of users and their details such as name, username, age and phone number. There they can click edit or delete button. Edit button is to edit user's information while delete button is for admin remove users from the system.

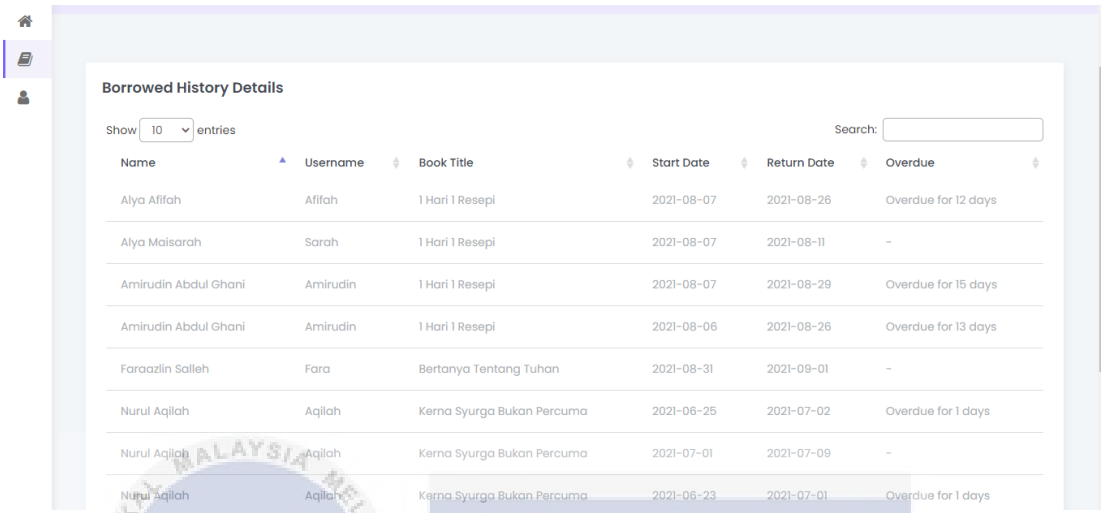

Figure 4. 13 : Borrowed History

Figure 4.13 shows the list of user that have returned book. There will display user details such as name, username along with book title, start date, and return date. If user return late, the list also will display days of user return late.

4.2.2.2 User Interface Design(User)

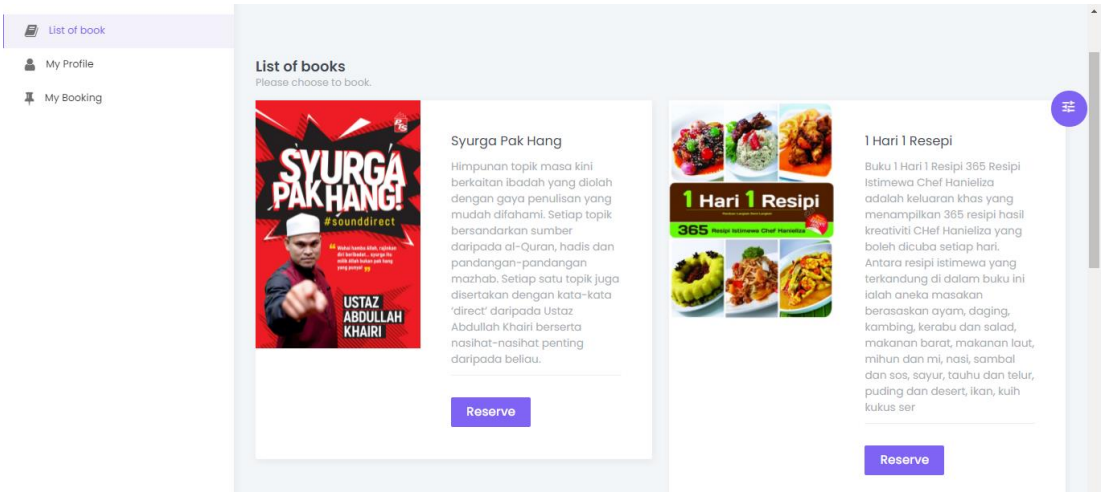

Figure 4. 14: List of Books Page

Figure 4.13 show shows the list of books. Here user can view the book title include with their description and book's image.

Figure 4. 15: Book Details Page

Figure 4.14 is the book details page where allow user to click reserve button to send request to admin to allow them reserve the books.

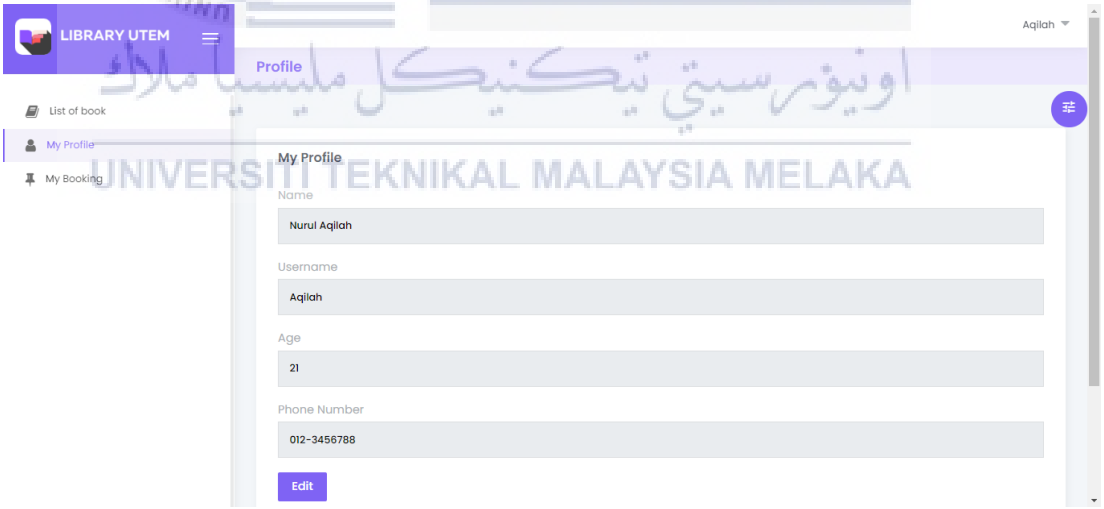

Figure 4. 16: View Profile Page

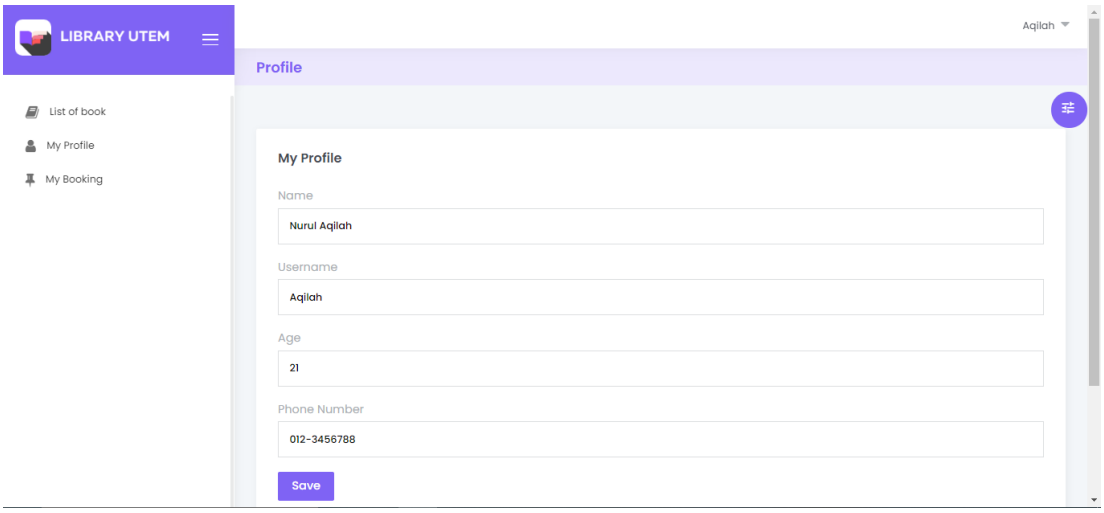

Figure 4. 17: Update Profile Page

Figure 4.15 and 4.16 is update profile page. This page will allow user to view their information and if they wish to edit their information they can click 'Edit' button that is shown in the Figure 4.15. and will bring them to Figure 4.16. they can edit and update their information by clicking the 'Save' button.

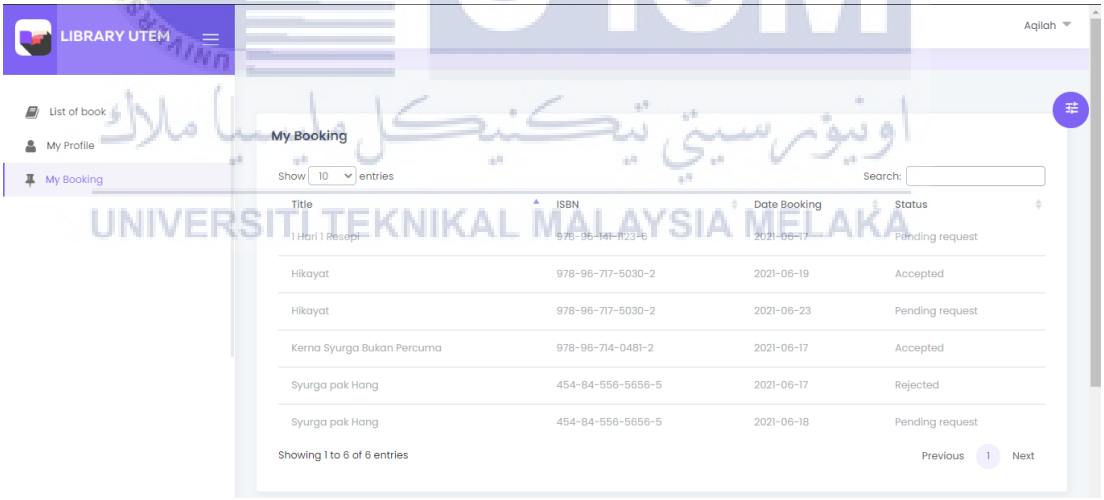

Figure 4. 18: Reserve Books Page

Figure 4.17 is show the booking status of every book that they have send request to admin. If the request is accepted, the status will state 'accepted' else the status will have written as 'pending request' or 'rejected'.

4.2.3 Database Design

The design of a database is defined as a collection of measures for the design, development, implementation and maintenance of the data management systems in a company. The main aim of a database design is to create physical and logical design models for the proposed database system.

4.2.3.1 Conceptual and Logical Database Design

Figure 4.1 and 4.2 is the conceptual and logical database design. For the Figure 4.1, is to identify the entities, attributes and the relationships for each of the table while Figure 4.2 is to defines the structure of the data elements and set the relationships between them.

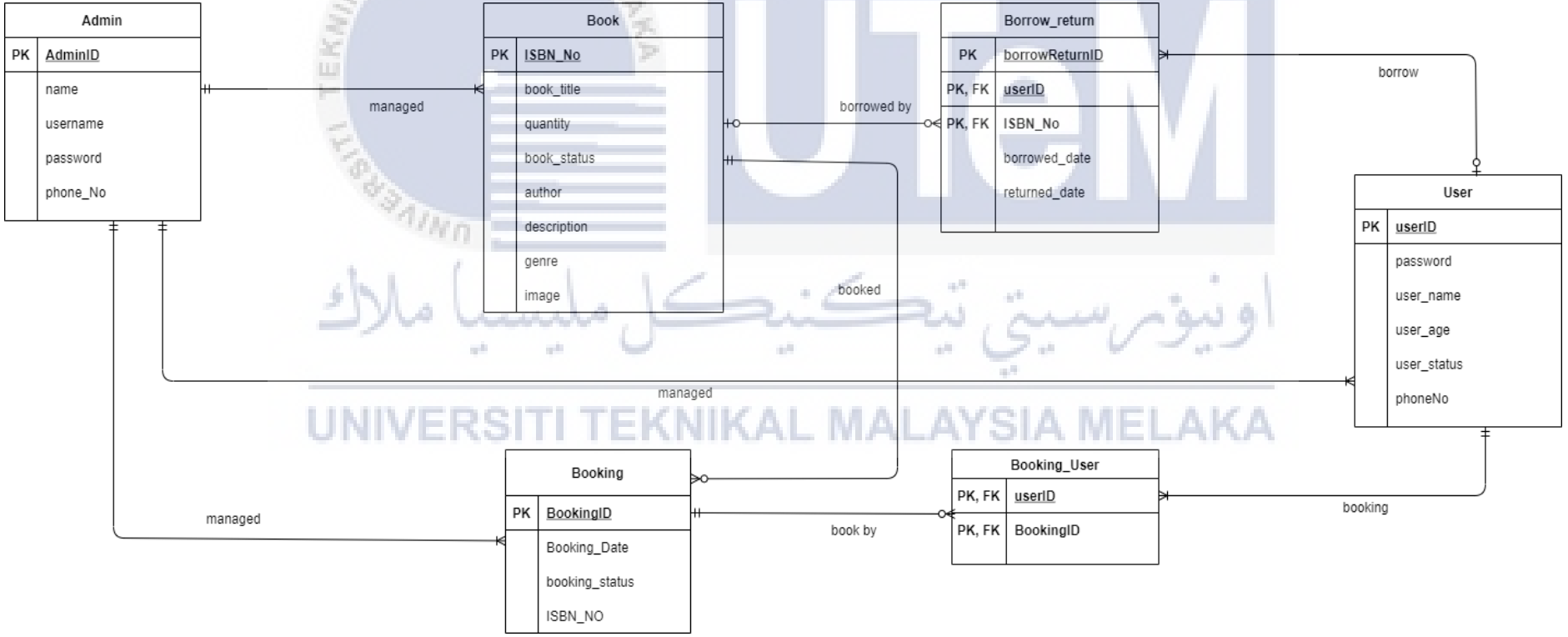

Figure 4. 19: Conceptual Database Design

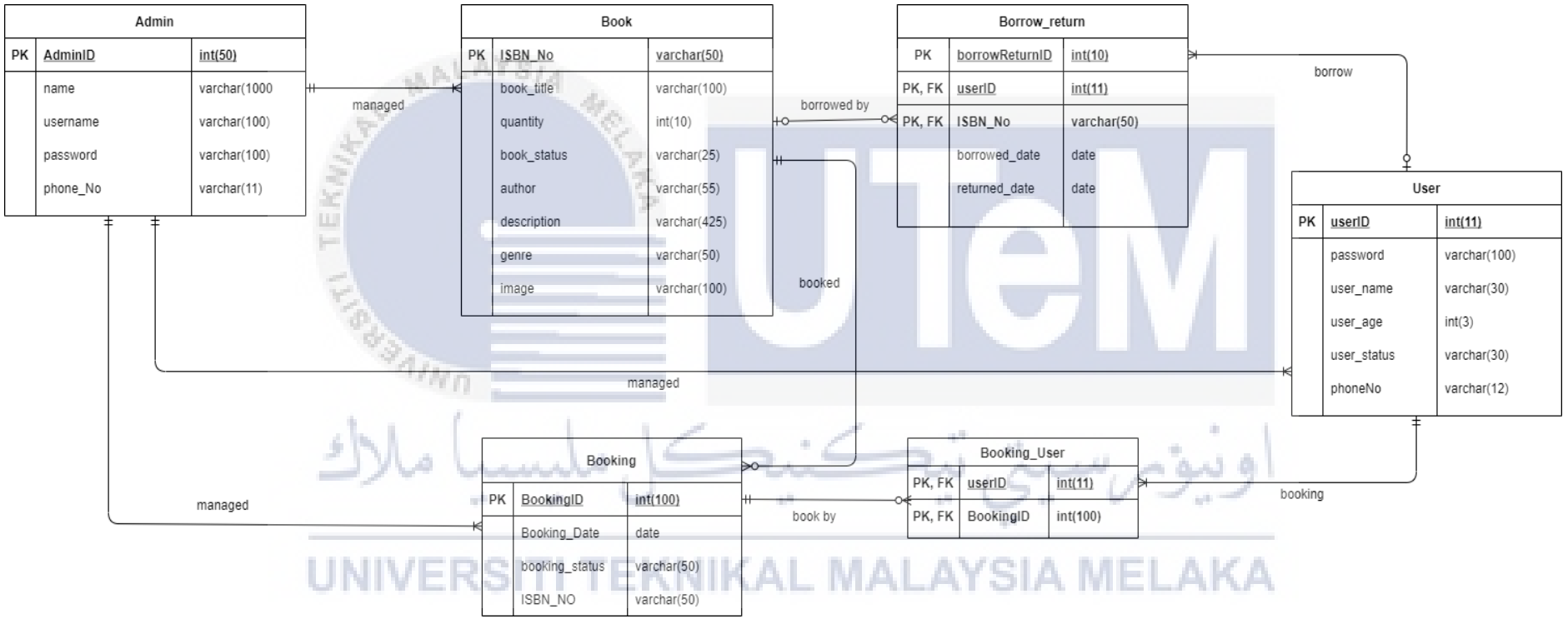

Figure 4. 20: Logical Database Design

4.3 Detailed Design

4.3.1 Software Design

4.3.1.1 Use Case Specification

Table 4. 1: Use case of Authenticate User

Use Case Name	Authenticate User
Description	This use case describes the process of authenticate user
Pre-Condition	Validate username and password
Post-Condition	User login into the system
Flow of Events	Primary flow: i. The use case starts when user go to login page ii. User will insert their username and password iii. The data will be validating iv. User will enter the main page v. Use case ends. Alternative Flow: i. User click sign up button ii. User go to register page. iii. User will insert required information details iv. User click sign up v. A message "Successfully registered" will be prompt. Exception flow: i. The user inserts wrong credentials for the username or password. ii. Error message will prompts iii. Back to the primary flow

Table 4. 2:Use Case of Manage Book

Use Case Name	Manage Book
Description	This use case describes the process of admin managing the book start from add, edit and deleting books.
Pre-Condition	There is no books data is save
Post-Condition	Books details will be added and can be edit and delete.
Flow of Events	Primary flow: i. The use case starts when admin to add books ii. The admin need to enter the books details. [E1] iii. Book detail is recorded into database iv. Admin view list of books. v. Admin have an option to update or delete book details [A1] [A2] vi. Use case ends Alternative flow: [A1] i. Admin click update button ii. Go to update page iii. Enter data to update iv. Click save [A2] i. Admin click delete button ii. Data is deleted Exception flow: [E1] i. User enter wrong format of ISBN ii. System prompt message ISBN format wrong iii. Back to primary flow

Table 4. 3:Use Case of Manage User

Use Case Name	Manage User

Description	This use case describes the process of admin managing the user start from add, edit and deleting books.
Pre-Condition	There is no user is registered.
Post-Condition	User details will be added and can be edit and delete.
Flow of Events	Primary flow: i. The use case starts when admin to add user ii. The admin need to enter the user details. [E1] iii. User details is recorded into database iv. Admin view list of users v. Admin have an option to update or delete user details [A1] [A2] vi. Use case ends Alternative flow: [A1] i. Admin click update button ii. Go to update page iii. Enter data to update iv. Click save [A2] i. Admin click delete button ii. Data is deleted Exception flow: [E1] i. Admin enter username that already exist ii. System prompt message username already exist iii. Back to primary flow

Table 4. 4:Use Case of Manage Booking

Use Case Name	Manage Booking
Description	This use case describes the process of admin managing the booking request

Pre-Condition	There is request of booking book
Post-Condition	The request will be either accept or reject.
Flow of Events	Primary flow: i. The use case starts when there is request for booking book ii. The admin need to click either accept or reject button[A1] [A2] iii. Booking status is updated iv. Use case ends Alternative flow: [A1] i. Admin click accept button ii. Data is updated in user part [A2] i. Admin click reject button ii. Data is updated in user part

Table 4. 5: Use Case of Reserve Book

Use Case Name	Reserve Books
Description	This use case describes the process of user to reserve books.
Pre-Condition	Not reserve any books
Post-Condition	The request is sent to admin part
Flow of Events	Primary flow: i. The use case starts when user view list of books. ii. The user chooses books to reserve iii. View book details iv. Choose date to reserve v. Send request vi. Use case ends

Table 4. 6: Use Case of Generate Report

Use Case Name	Generate Report
Description	This use case describes the process of admin to generate report.
Pre-Condition	There is no report generated.
Post-Condition	Report system such as top borrower, quantity of books, and total reserved books is generated
Flow of Events	Primary flow: i. The use case starts when admin view dashboard ii. View report of quantity of book, user, borrowed books and reserve book details iii. Use case ends

4.3.1.2 Sequence Diagram – Authenticate User

Figure 4.21 shows the interaction of user that successful login into the system. Figure 4.22 shows the interaction of user to register new account into the system. Figure 4.23 shows the interaction of login account with invalid input.

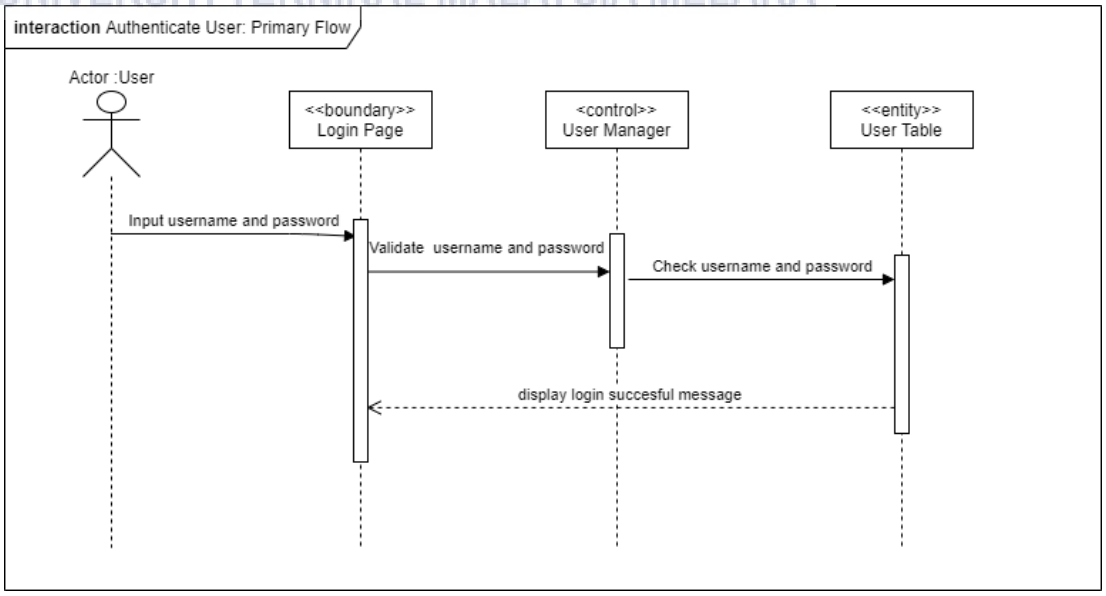

Figure 4. 21 : Primary Flow for Authenticate User

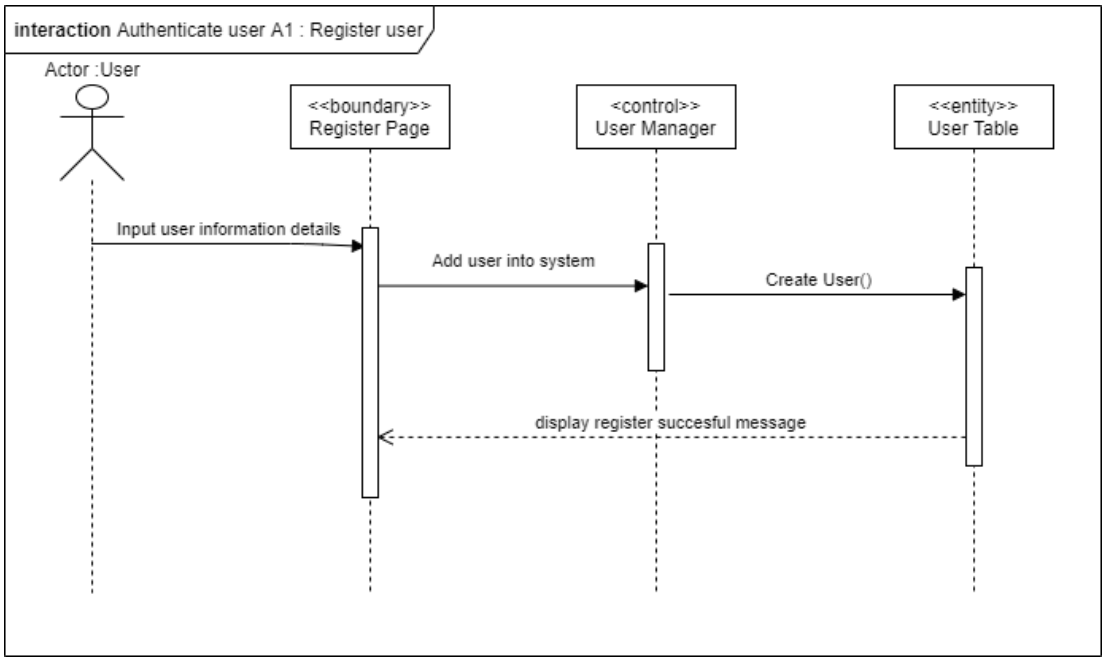

Figure 4. 22 : Alternative Flow for Authenticate User

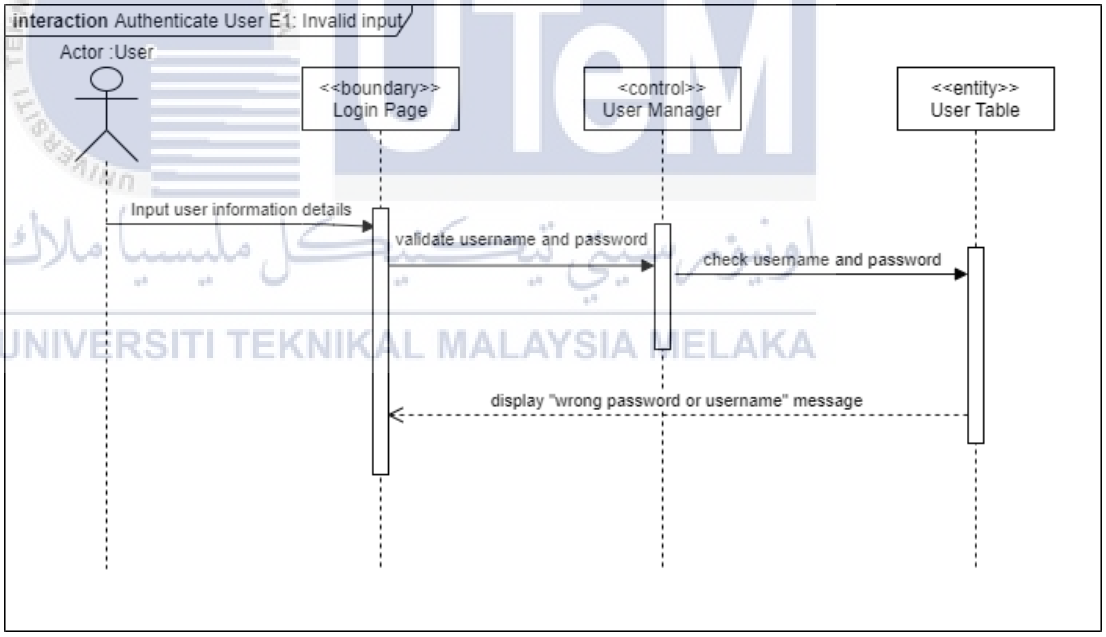

Figure 4. 23 : Exception Flow for Authenticate User

4.3.1.3 Sequence Diagram – Manage Book

Figure 4.24 show the interaction of admin to add book into the system. Figure 4.25 shows the interaction of admin to edit and update book that have been added into the system. Figure 4.26 shows the interaction of admin to delete book record from the

system. Figure 4.27 shows the interaction of admin insert book with wrong ISBN format.

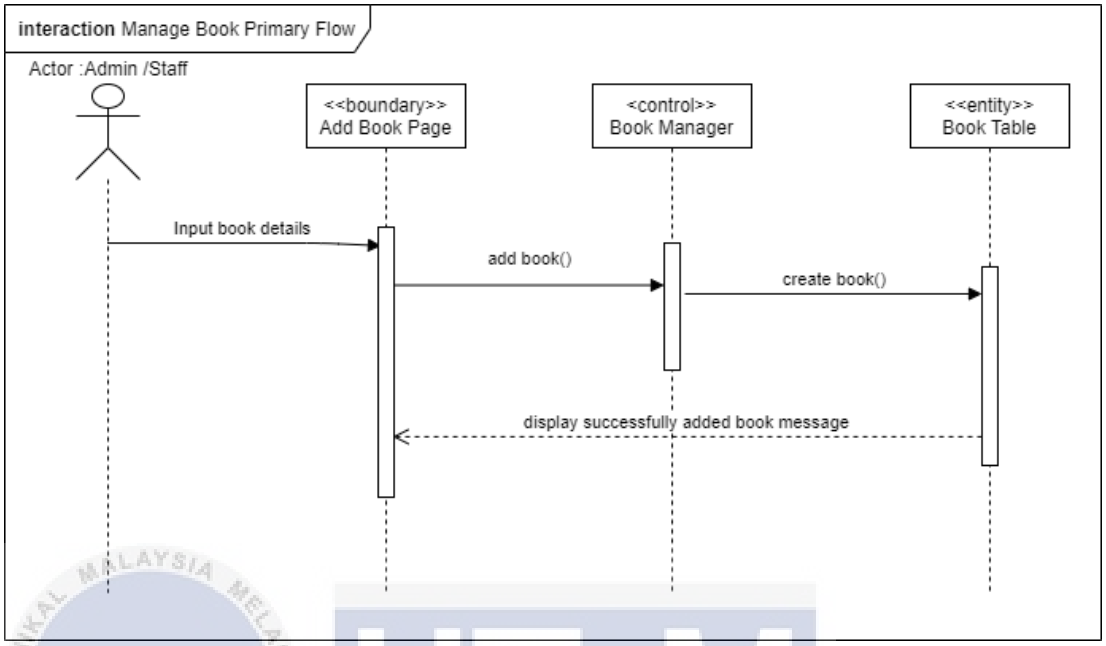

Figure 4. 24 : Primary Flow for Manage Book

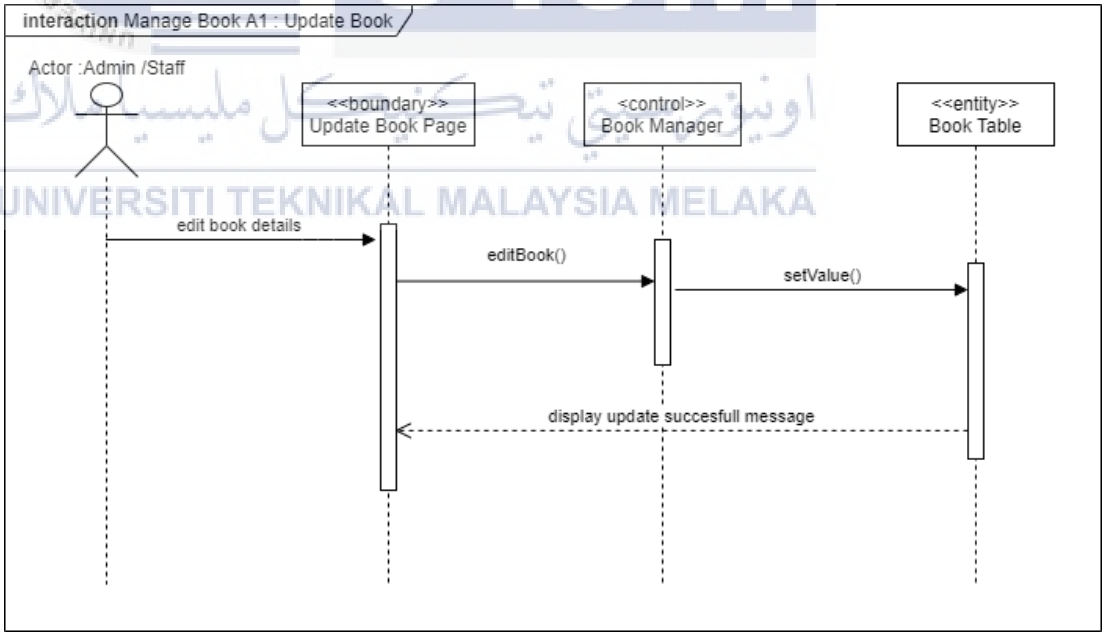

Figure 4. 25 : Alternative Flow for Manage Book

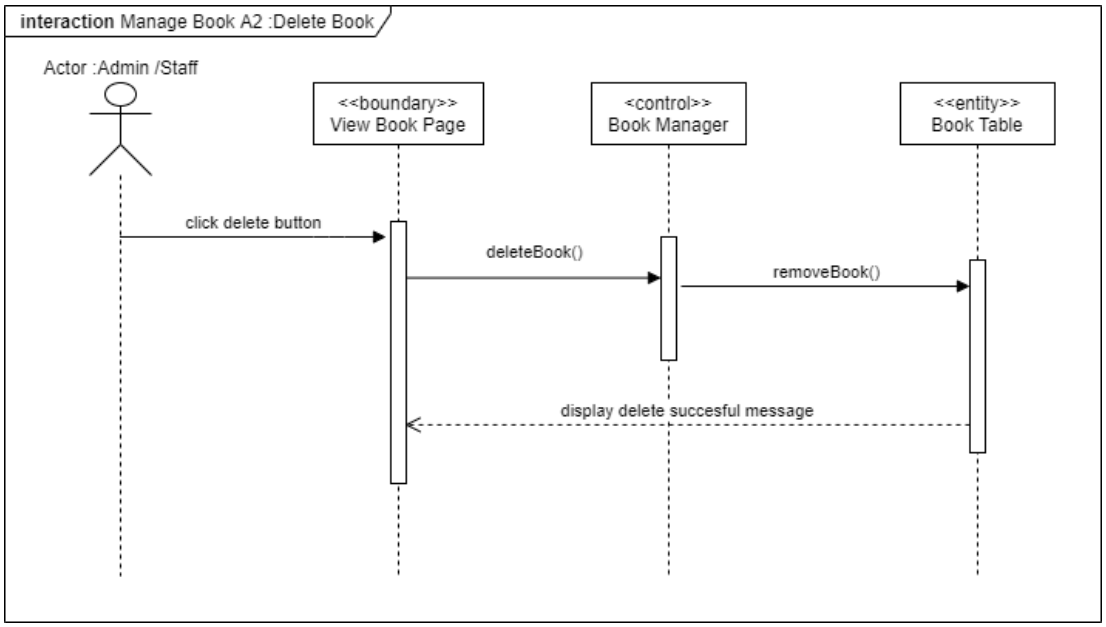

Figure 4. 26 : Alternative Flow(A2) for Manage Book

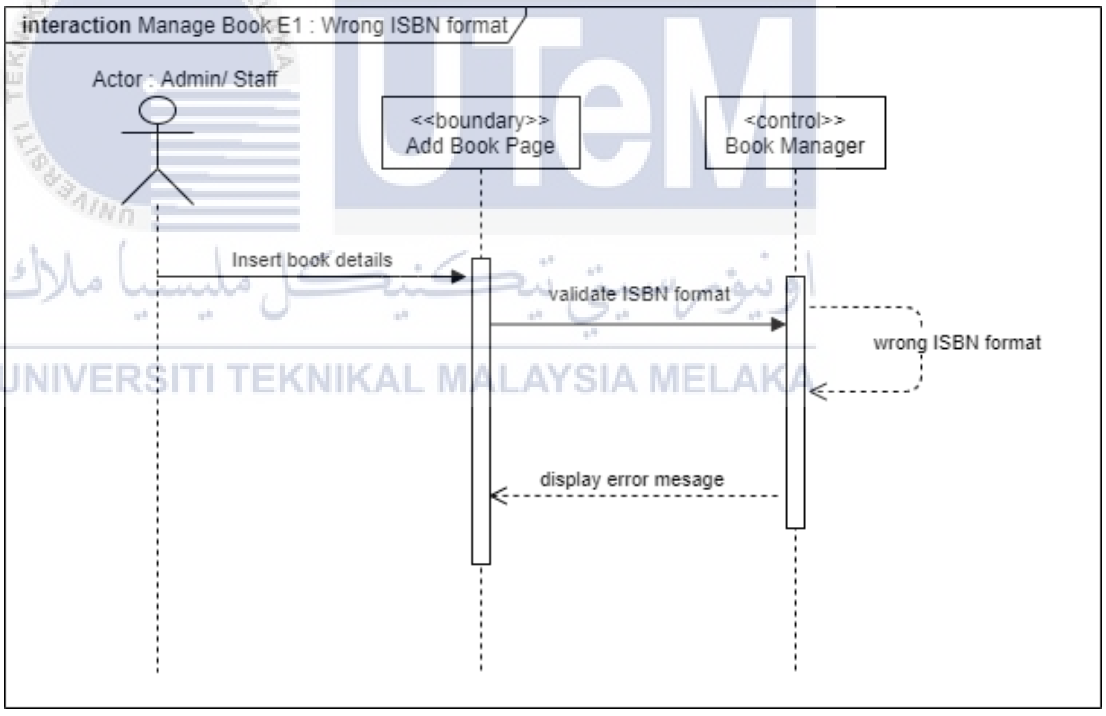

Figure 4. 27 : Exception Flow for Manage Book

4.3.1.4 Sequence Diagram – Manage User

Figure 4.28 shows the interaction of admin register new user into the system. figure 4.29 show the interaction of admin to edit and update user into the system.

Figure 4.30 shows the interaction of admin to delete user from the system. Figure 4.31 shows the interaction when admin insert existed username in the system.

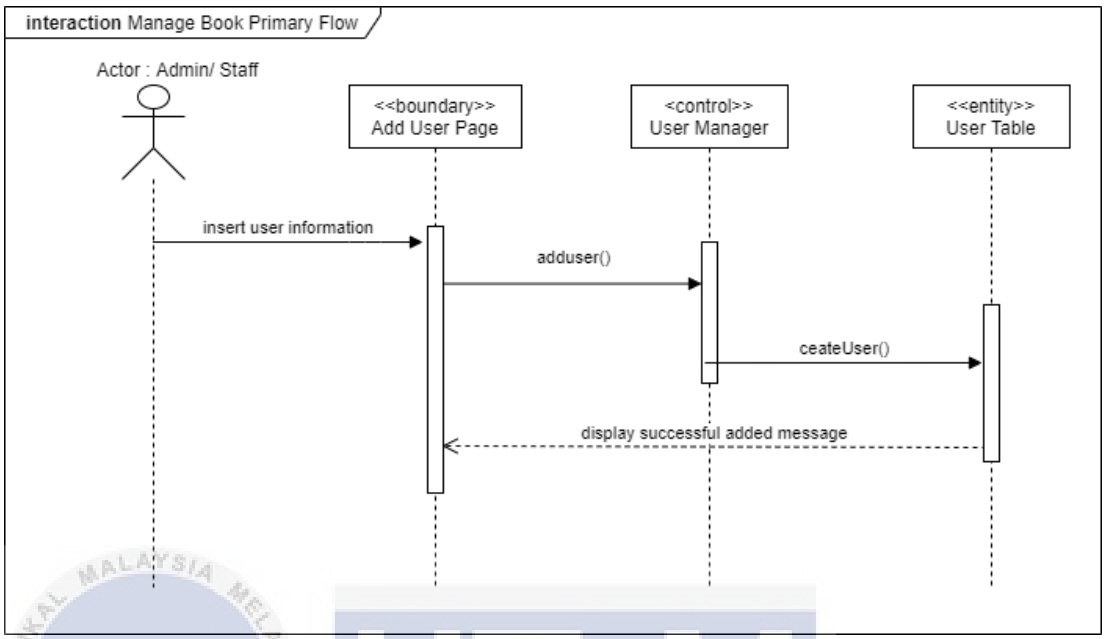

Figure 4. 28 : Primary Flow for Manage User

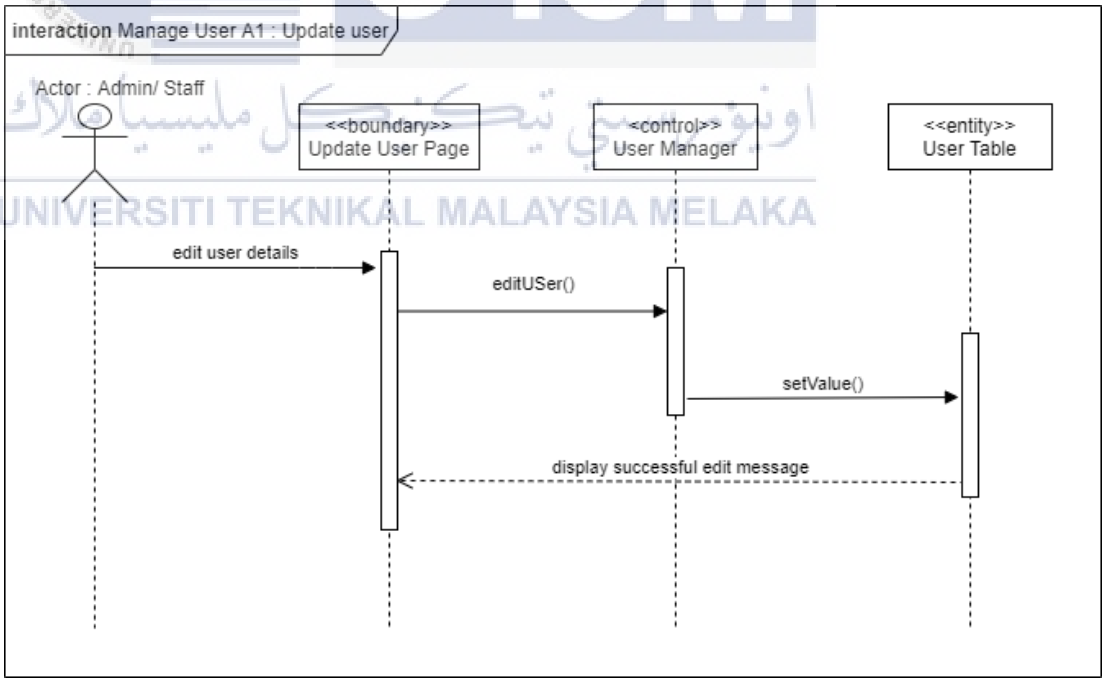

Figure 4. 29 : Alternative Flow for Manage User

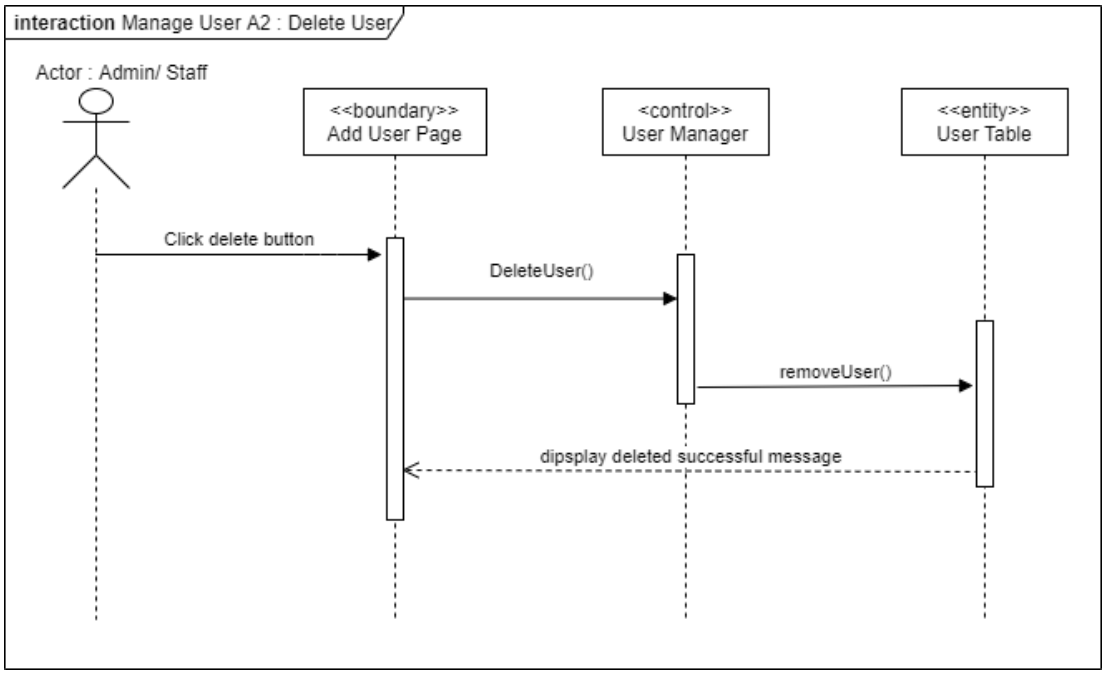

Figure 4. 30 : Alternative Flow (A2) for Manage User

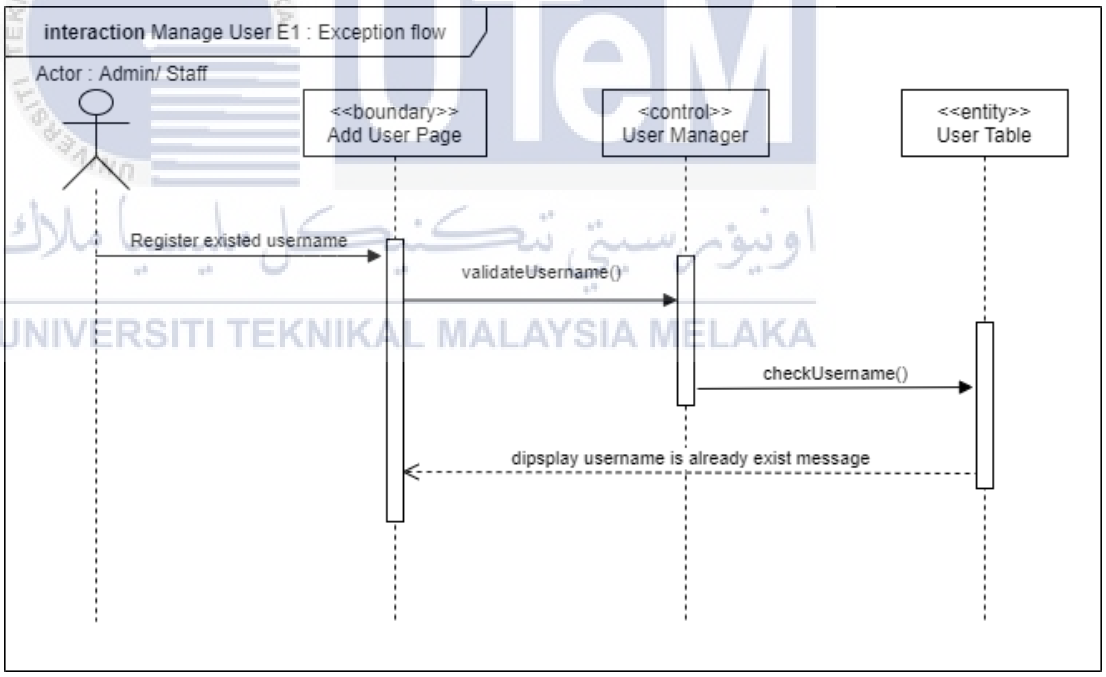

Figure 4. 31 : Exception Flow for Manage User

4.3.1.5 Sequence Diagram – Manage Booking

Figure 4.32 shows interaction of admin to manage the pending request from the user. Figure 4.33 shows interaction of admin to accept the request of user and

update the booking status. Figure 4.34 shows interaction of admin to ignore request of user.

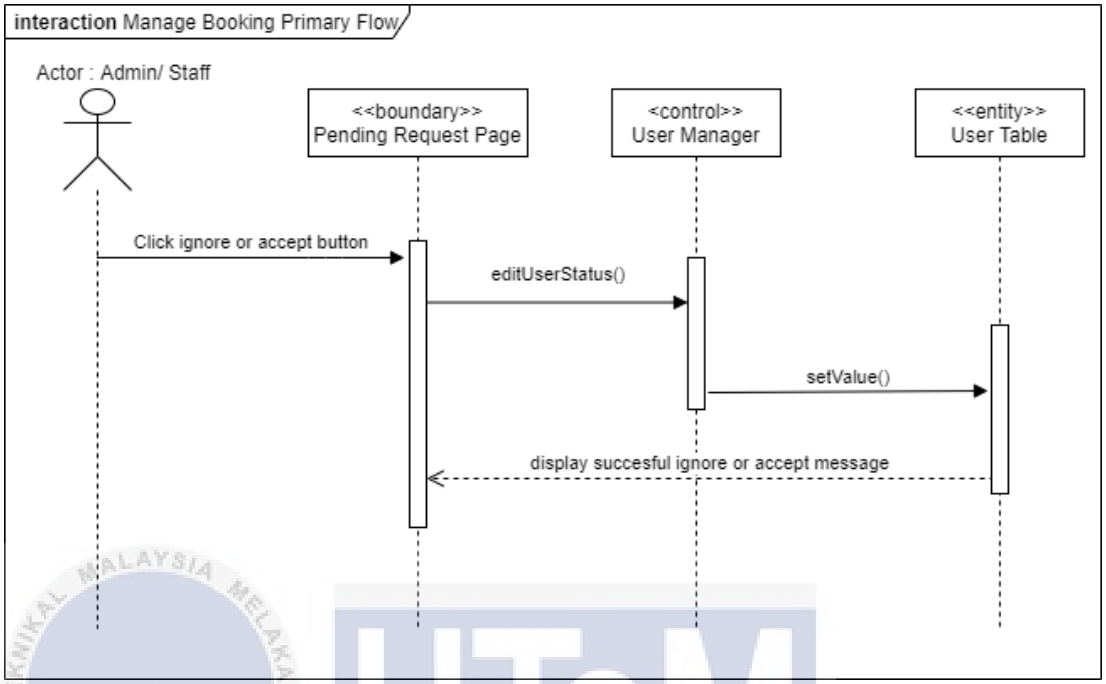

Figure 4. 32 : Primary Flow for Manage Booking

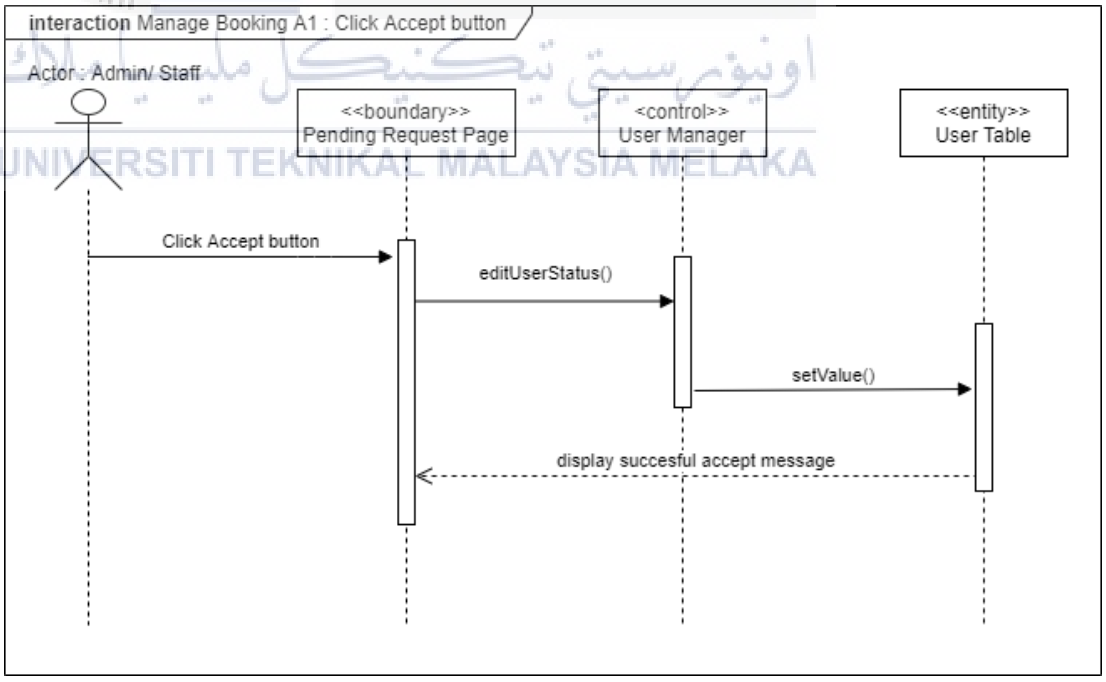

Figure 4. 33 : Alternative Flow for Manage Booking

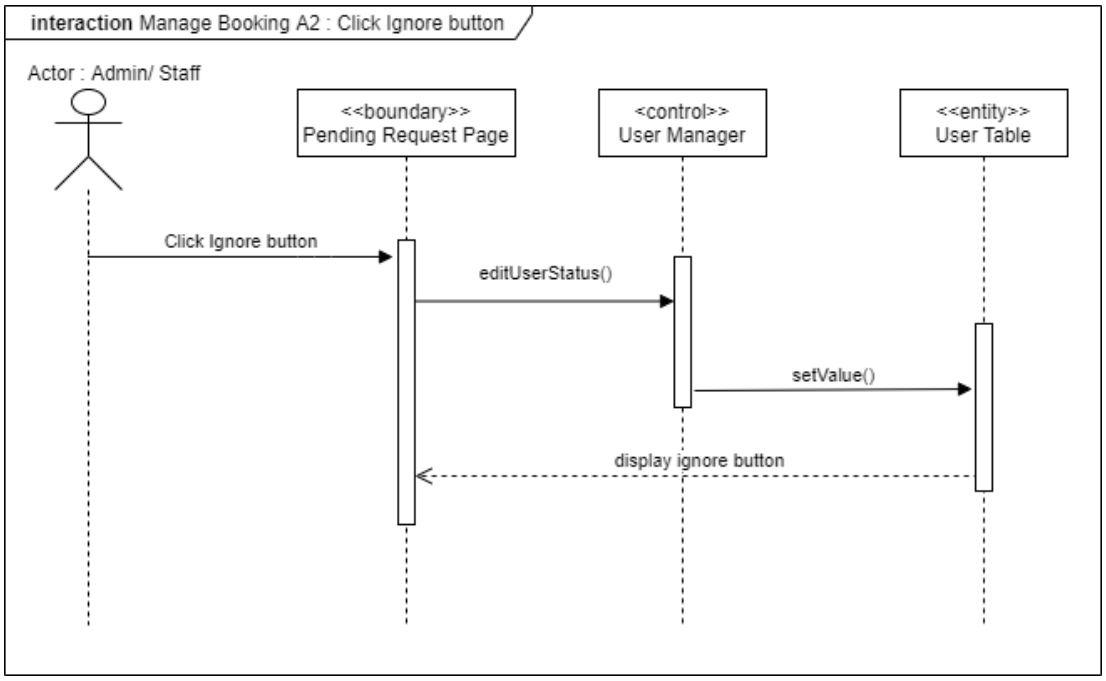

Figure 4. 34 : Alternative Flow (A2) for Manage Booking

4.3.1.6 Sequence Diagram – Reserve Book

Figure 4.35 shows interaction of user to reserve books in the homepage.

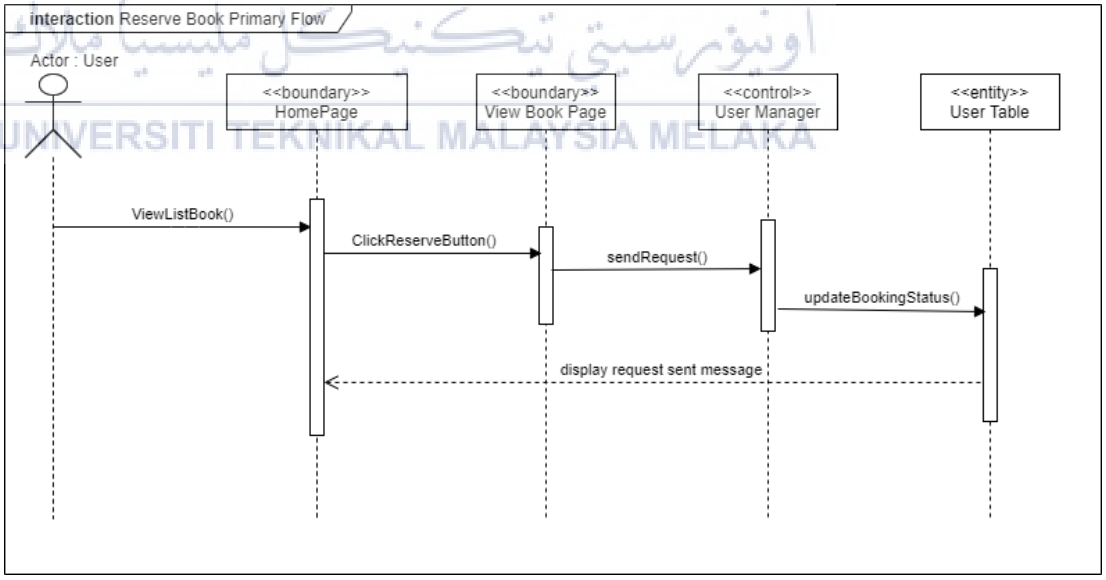

Figure 4. 35 : Primary Flow for Reserve Book

4.3.1.7 Sequence Diagram – Generate Report

Figure 4.36 shows interaction of admin to view the report for quantity of books, user, borrowed books and reserve books and the top borrower.

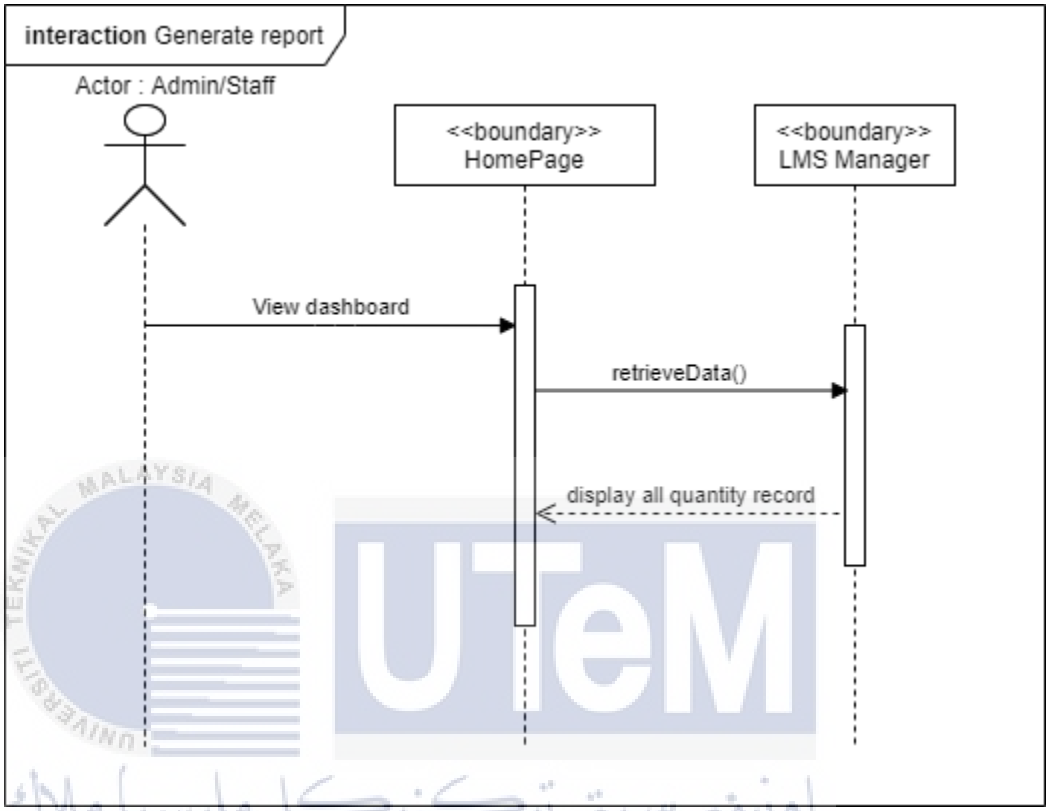

Figure 4. 36 : Primary Flow for Generate Report

4.3.2 Physical Database Design

In Physical Database Design, logical database is translated into target database.

Table 4. 7: Admin Table

Name	SQL
Table Structured	CREATE TABLE `admin` (`adminID` int(50) NOT NULL, `name` varchar(100) NOT NULL, `username` varchar(100) NOT NULL, `password` varchar(100) NOT NULL,

	`phone_No` varchar(11) NOT NULL)
Constraints	-
Indexes	ALTER TABLE `admin` ADD PRIMARY KEY (`adminID`), ADD UNIQUE KEY `username` (`username`);

Table 4. 8:Book Table

Name	SQL
Table Structured	CREATE TABLE `book` (`ISBN_NO` varchar(50) NOT NULL, `book_title` varchar(100) NOT NULL, `description` varchar(425) NOT NULL, `genre` varchar(50) NOT NULL, `author` varchar(55) NOT NULL, `quantity` int(10) NOT NULL, `bookStatus` varchar(25) NOT NULL, `image` varchar(100) NOT NULL)
Constraints	-
Indexes	ALTER TABLE `book` ADD PRIMARY KEY (`ISBN_NO`);

Table 4. 9: Booking Table

Name	SQL
Table Structured	CREATE TABLE `booking` (`bookingID` int(100) NOT NULL, `bookingDate` date NOT NULL, `bookingStatus` varchar(50) NOT NULL, `ISBN_NO` varchar(50) NOT NULL)
Constraints	ALTER TABLE `booking` ADD CONSTRAINT `booking_ibfk_1` FOREIGN KEY (`ISBN_NO`) REFERENCES `book` (`ISBN_NO`);
Indexes	ALTER TABLE `booking`

	ADD PRIMARY KEY (`bookingID`), ADD KEY `ISBN_NO` (`ISBN_NO`);

Table 4. 10: booking_user Table

Name	SQL
Table Structured	CREATE TABLE `booking_user` (`userID` int(11) NOT NULL, `bookingID` int(100) NOT NULL)
Constraints	ALTER TABLE `booking_user` ADD CONSTRAINT `FK_bookingID` FOREIGN KEY (`bookingID`) REFERENCES `booking` (`bookingID`), ADD CONSTRAINT `FK_userID_booking` FOREIGN KEY (`userID`) REFERENCES `user` (`userID`);
Indexes	ALTER TABLE `booking_user` ADD KEY `FK_userID_booking` (`userID`), ADD KEY `FK_bookingID` (`bookingID`);

Table 4. 11: borrow_return Table

Name	SQL
Table Structured	CREATE TABLE `borrow_return` (`borrowReturnID` int(10) NOT NULL, `ISBN_NO` varchar(50) NOT NULL, `userID` int(11) NOT NULL, `borrowed_date` date NOT NULL, `returned_date` date NOT NULL)

Constraints	ALTER TABLE `borrow_return` ADD CONSTRAINT `FK_ISBN_NO` FOREIGN KEY (`ISBN_NO`) REFERENCES `book` (`ISBN_NO`), ADD CONSTRAINT `FK_userId` FOREIGN KEY (`userID`) REFERENCES `user` (`userID`); COMMIT;
Indexes	ALTER TABLE `borrow_return` ADD PRIMARY KEY (`borrowReturnID`), ADD KEY `FK_ISBN_NO` (`ISBN_NO`), ADD KEY `FK_userId` (`userID`);

Table 4. 12: User Table

Name	SQL
Table Structured	CREATE TABLE `user` (`userID` int(11) NOT NULL, `name` varchar(100) NOT NULL, `username` varchar(30) NOT NULL, `password` varchar(255) NOT NULL, `user_age` int(3) NOT NULL, `phoneNo` varchar(12) NOT NULL, `user_status` varchar(30) NOT NULL)
Constraints	-
Indexes	ALTER TABLE `user` ADD PRIMARY KEY (`userID`), ADD UNIQUE KEY `username` (`username`);

4.4 Conclusion

As a summary, in this chapter high-level design were inserted. The conceptual and logical database as the references to design the database. Later in the physical database design is the translation of logical database to the target DBMS. Use case description is created in the software design section. It is to identify the program specification of program description.

CHAPTER 5: IMPLEMENTATION

5.1 Introduction

In this section, implementation phase is being explained. The implementation phase is where project is start to develop by team, developers will start putting the project plan into action. In implementation phase is where project is coordinated to meet the objectives of the project plan. The implementation phase is where Library Management System(LMS) developed.

5.2 Software Development Environment setup

The SDE is an environment that automatically automates or enhances routines in software development cycles. Software development environment is including many programming tasks such as team and project management, as well as many programming tasks such as configuration management. Thus, the deployment diagram is as to illustrate for the software development environment setup:

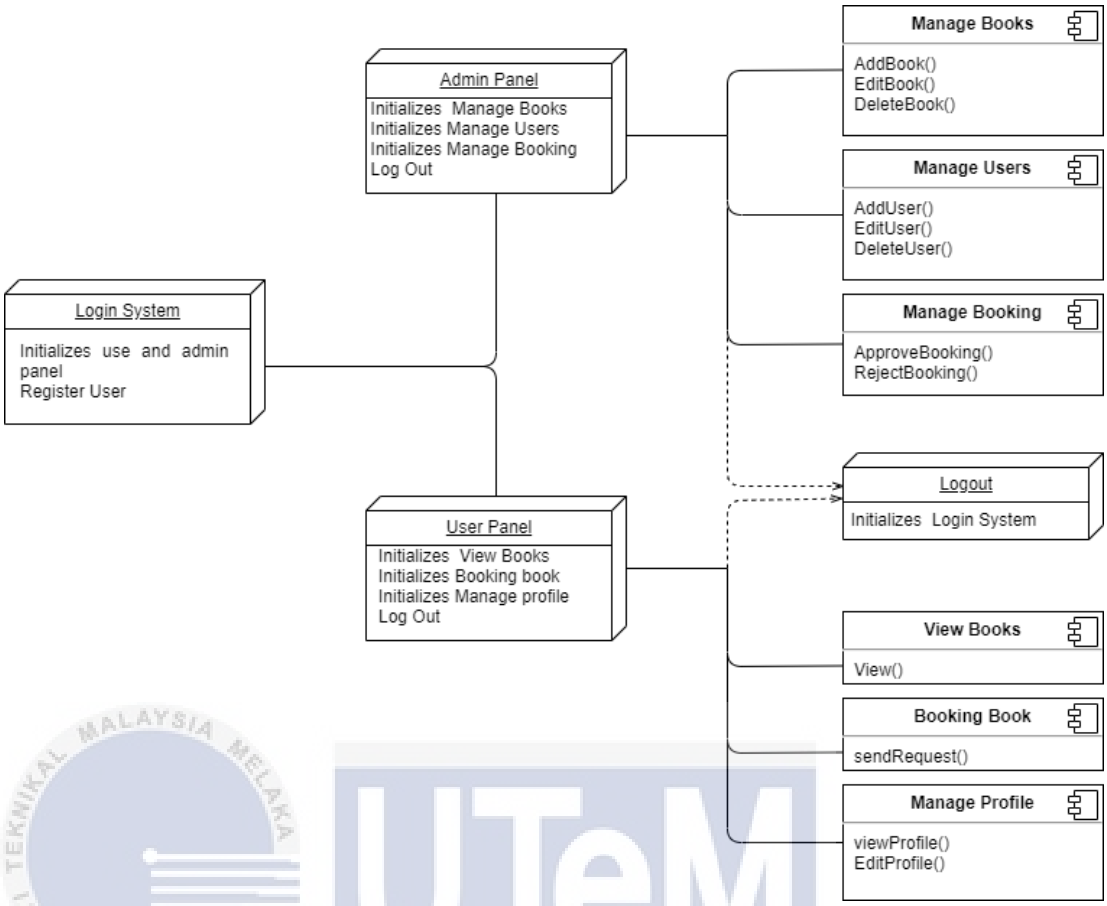

Figure 5. 1: Deployment Diagram

5.3 Software Configuration Management

SCM is a process used to systemically manage, organize, and control changes in documents, codes and others during the life cycle of Software Development. Software Configuration Management(SCM). The main objective is to increase productivity with minimal errors.

5.3.1 Configuration Environment Setup

To develop Library Management System, a few application need to be setup. For this project XAMPP (V 3.2.4) and Atom (Version 1.57.0) is used to develop the project. XAMPP is reliable to setting up environment for PHP programming. Library Management System develop using PHP, and XAMPP provides all the components needed for PHP applications in term of running, developing, debugging and unit testing. While for Atom, Atom applications provides many packages to extend and writing PHP code thus, Atom is a corresponding application to PHP.

Figure 5. 2: XAMPP and Atom

5.3.2 Version Control Procedure

Version control enables file change to be managed over time and stored in a database. To keep track of changes, the version control is important. Version control is also intended to improve visibility of the project and speed up product delivery. Thus, the version control system is implemented in the Library Management System to enable us to follow up all the changes made to the source code. Figure 5.3 shows a localhost index dashboard that shows the latest modification system date.

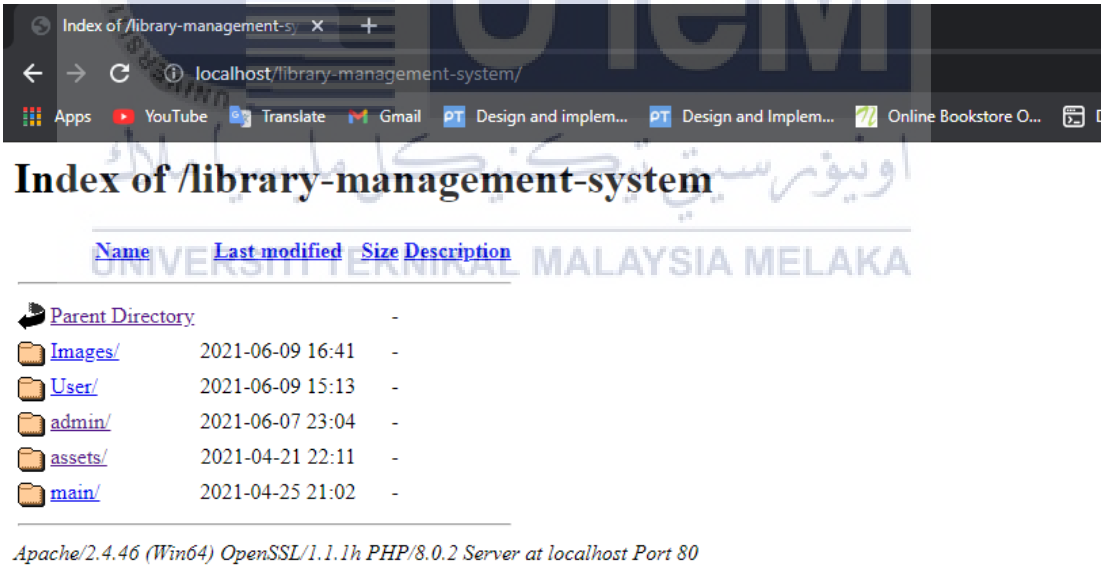

Figure 5. 3: Localhost Index Dashboard

5.4 Implementation Status

Table 5. 1: Implementation Status

Component/Module Name	Description	Duration to complete	Date Completed
Authenticate User	This module is authenticating user where user insert their username and password to go to main page.	6 days	06/05/2021
Manage Book	This module is for admin to add, view, edit and delete book using the ISBN. For these page, is taking some time to develop.	7 days	13/05/2021
Manage User	This module is for admin to add, view, edit and delete user based on their userID	7 days	20/05/2021
Manage Booking	This module to is for admin to manage the request from user. This page is taking some time because need to understand the flow thoroughly.	9 days	29/05/2021

Booking Book	This module is for user to send request from user part to admin part. For this module, have some calculation to make sure book quantity is correct.	10 days	09/06/2021
Generate Report	This module is for admin to generate report of system monthly.	6 days	14/06/2021

5.5 Conclusion

As a conclusion in the implementation phase, system is developed based on the requirements and design that have been stated. Software development environment setup have been illustrated through deployment diagram to display the programming tasks. Configuration management setup also discussed where explanation on how software and hardware is setup to developed the system. Lastly, implementation status is to update the status of developing every module.

CHAPTER 6: TESTING

6.1 Introduction

The testing phases of the software development lifecycle help to identify all the bugs and errors in the software before the implementation phase begins. If software bugs are not resolved before deployment, developer can adversely affect the business. Investigation and discovery are key components of testing as part of the software development lifecycle (SDLC). Testers check to see if their code and programming meet system requirements. It is necessary for the team to create a test plan before testing can begin.

For the Library Management System, a few testing will be run to make sure the system is meet all of the requirements that have been stated before.

6.2 Test Plan

Testing strategy, objectives, schedule, estimations, deadlines, and the resources required to complete a project are all listed in a test plan, which is a very detailed document. Test plan can be as a blueprint for running the tests necessary to ensure that the software is working well. There are various tests that can be run on a system after it has been coded, which are in most cases, a test plan is drafted by or with significant input from test engineers. One of the benefits of a test plan is that it serves as a guide for testing throughout the development process, which is incredibly. Secondly, the test points only need to be defined during the test phase. It's important to note that a test plan will give you a good idea about the specifics of your tests including test environment, strategy, schedule, etc.

6.2.1 Test Organization

The test organization is to identify the task of Library Management System in testing phase. It is to determines the person that is responsible to every case testing.

We will a few test classes such as unit testing, system testing, usability testing and acceptance testing. Below are the requirements for testing to be happen:

Table 6. 1 : Test Organization

Type of test	Tester	Tester ID
Unit Testing	Nurul Aqilah Shahirah Binti Amirudin	TLMS_01
System testing	Nurul Syaidatul Aqilla Binti Mazlan	TLMS_02
Beta Testing	Library 's user and staff	TLMS_03

6.2.2 Test Environment

A testing environment is a combination of software and hardware that enables testing teams to execute test cases. As a result, it allows for the execution of tests with the necessary hardware, software and network. In order to ensure software testing success, it's important to set up the test environment right.

Table 6. 2 : Test Environment

Tools Specification	Minimum tools specification	Amount
Operating System	Windows 10	1
Memory Capacity	4GB or higher	1
Input Device	Keyboard	1
Output Device	Acer Notebook	1
Internet Connection	Wide Area Network	-
Database	MySQL	-
Web Server	Apache XAMPP	-
Web Browser	Google Chrome	-

6.2.3 Test Schedule

Test schedule is the duration for every testing will be done. Test duration in Library Management System will be done as below:

Table 6. 3 : Test Schedule

Test type	Description	Start Date	End Date
Unit Testing	To ensure all of the logic, boundary conditions for input and output data in the Library Management System as per the design.	11/8/2020	13/8/2020
System Testing	To determine all of the software and hardware components of the Library Management System are integrated and tested as whole.	17/8/2020	20/8/2020
Beta Testing	Beta Testing helps to identify if the Library Management System (LMS) is ready for delivery and meets the business requirements.	21/8/2020	23/8/2020

6.3 Test Strategy

The test strategy is a set of instructions or protocols that explain the test design and determine how the test should be conducted. As a result of a test strategy, it is possible to gain a better understanding of the overall target, approach, tools and timing test activities to be done and should be able to describe in detail the major challenges and tasks of the test project.

The test strategy for the Library Management System (LMS), black-box testing has been applied as the test strategy. Black-box testing is an approach which is used to test the software without the knowledge of the internal structure of program or application which is less time consuming. The main purpose of applying the black box testing is to check the functionality of the system under test.

6.3.1 Classes of Test

There are 3 types of classes test that will be applied which are unit testing, system testing, usability testing and beta testing.

a) Unit Testing

Software components, or individual units, are tested in unit testing. To ensure that internal data structures, logic, and boundary conditions for input and output are working as intended by the designer, unit testing is conducted.

b) System Testing

In system testing, the goal is to verify that all system elements have been tested and that the system's overall function and performance meet the specific requirements. The hardware and software components of the system are integrated and tested as a whole in this approach.

c) Beta Testing

The intended real user validates functionality, usability, reliability, and compatibility of a product before it is released to the public.

6.4 Test Design

The test design revolves around the tests themselves, including how many will need to be performed, the test conditions, and how the testing will be approached. Designing good test cases ensure that every aspect of the software gets tested so that the issues can be fix as soon as possible. Test design is to test the functionalities and features of the software with the help of effective test cases and the result of test cases will be recorded.

6.4.1 Test Data

For the Library Management System (LMS) to be tested, test data is used as input. Assemble the necessary test data and verify its accuracy. Other users and developers may find it useful to know what the system returned for the given inputs. When fixing a bug, test data helps the developers find the problem.

6.4.1.1 System Testing

In System Testing, an entire and fully integrated software product is tested to ensure it's safe and secure. When performing a system test, the entire system's specs is evaluated from start to finish. The table below show how the test is run:

I. Username

The username should be unique.

Table 6. 4 : Test Cases for Username

Test Cases	Test ID	Input Data	Expected Results
Insert non-exist username.	LMS_01	Input non-exist username: Shahirah	Success
Insert existed username	LMS_02	Input existed username: Aqilah	"Username is already exist" will be prompt

II. Password

During register, password must be match to the confirm password to successful register into the system.

Table 6. 5 : Test Cases for Password

Test Cases	Test ID	Input Data	Expected Results

Insert same password in password and confirm password field.	LMS_03	Password: Qilah98 Confirm Password: Qilah98	Success
Insert unmatched password in password and confirm password field.	LMS_04	Password: Qilah98 Confirm Password: ilah98	"The password did not match" will be prompt

III. Email

Email must be in correct format.

Table 6. 6 : Test Cases for Email

Test Cases	Test ID	Input Data	Expected Results
Insert the right email format.	LMS_05	Email: qilahshahirah1@gmail.com	Success
Insert the wrong email format.	LMS_06	Email: qilahshahirah1	"Please include an '@' in the email address" will be prompt

IV. Phone Number

Phone number should be in correct format.

Table 6. 7 : Test Cases for Phone Number

Test Cases	Test ID	Input Data	Expected Results
Correct format of phone number.	LMS_07	012-3456789	Success
	LMS_08	012-34567890	Success
Incorrect format of phone number.	LMS_08	0199999999	"Phone number in incorrect format" will be prompt
	LMS_09	019-999	
	LMS_10	019-9999qs	

V. ISBN Number

ISBN number must be in correct format.

Table 6. 8 : Test Cases for ISBN Number

Test Cases	Test ID	Input Data	Expected Results
Correct format of ISBN Number	LMS_11	978-12-666-6666-1	Success
Incorrect format of ISBN Number.	LMS_12	978-12-666-6	The wrong format will automatic be erase.

Table 6. 9 : Test Cases for Login

Test ID	Test Cases	Expected result
LMS_13	Leave all the field empty	"Please insert data" will be prompt as error message.
LMS_13.1	Leave username field empty	"Please insert data" will be prompt as error message.
LMS_13.2	Leave password field empty	"Please insert data" will be prompt as error message.
LMS_13.3	Insert invalid username or password	"Username or password wrong" will be prompt as error message.
LMS_13.4	Insert valid username and password	User will go to main page.

Table 6. 10 : Test Cases for Register New User

Test ID	Test Cases	Expected result
LMS_14	Leave all field empty	"Please fill out this field" as error message
LMS_14.1	Leave the username field empty	"Please fill out this field" as error message
LMS_14.2	Insert invalid email format	"Please include an '@' in the email address" as error message.
LMS_14.3	Insert unmatched password for the password and confirm password field	"Password did not match" as error message
LMS_14.4	Insert invalid format of phone number	"Phone number is incorrect format" as error message.
LMS_14.5	Insert registered username	"Username already exist" as error message.
LMS_14.6	Insert valid data for every field.	"You are successfully register into the system" is shown and login page will display.

Table 6. 11 : Test Cases for Add New Book

Test ID	Test Cases	Expected result

LMS_15	Leave all the field empty.	Invalid feedback for every field are appear.
LMS_15.1	Insert invalid format of ISBN Number format.	Show error message "Invalid ISBN format"
LMS_15.2	Leave ISBN Number field empty.	Show invalid feedback message "Invalid ISBN Number !"
LMS_15.3	Leave Book Title field empty.	Show invalid feedback message "Please insert book title."
LMS_15.4	Leave Description field empty.	Show invalid feedback message "Please provide a book description."
LMS_15.5	Leave Genre field empty.	Show invalid feedback message "Please select a genre."
LMS_15.6	Leave Author field empty.	Show invalid feedback message "Please insert book author."
LMS_15.7	Leave Quantity field empty.	Show invalid feedback message "Please insert quantity of book."
LMS_15.8	Leave Status field empty.	Show invalid feedback message "Please insert the status of the book."
LMS_15.9	Leave Upload Picture field empty.	Show invalid feedback message "Insert picture of the book"

LMS_15.2	Insert valid data for every field.	Show message "Book is successfully added".

Table 6. 12 :Test Cases for View Books

Test ID	Test Cases	Expected result
LMS_16	Click Edit button	System will navigate user to update page.
LMS_16.1	Click Delete button	The chosen data will be deleted.
LMS_16.2	Edit Status field and click Save button	Show message "Information updated"
LMS_16.3	Edit Quantity field and click Save button	Show message "Information updated"
LMS_16.4	Substitute new photo of book and click save	Show message "Information updated"

Table 6. 13 : Test Cases for Add Borrower

Test ID	Test Cases	Expected result
LMS_17	Leave all the field empty.	Invalid feedback for every field appear.
LMS_17.1	Leave the ISBN Number field empty.	Show invalid feedback message "Invalid ISBN Number!"

LMS_17.2	Leave the username field empty	Show invalid feedback message "Please insert the username."
LMS_17.3	Leave the Start Date field empty	Show invalid feedback message "Please insert start date of borrowing."
LMS_17.4	Insert unregistered ISBN Number	Show error message "Username or ISBN is incorrect"
LMS_17.5	Insert unregistered username	Show error message "Username or ISBN is incorrect"
LMS_17.6	Insert registered username, ISBN Number and Start Date	Show message "Book is recorded"

Table 6. 14 : Test Cases for Pending Request

Test ID	Test Cases	Expected result
LMS_18	Click 'Ignore' button	Show message "Ignored"
LMS_18.1	Click 'Accept' button	Show message "Request Accepted"

Table 6. 15 : Test Cases for Borrow Book Details

Test ID	Test Cases	Expected result
LMS_19	Click the icon reminder	Show message "Email sent"

LMS_19.1	Click "Return' button	Show message "Successful returned"

Table 6. 16 : Test Cases for View User

Test ID	Test Cases	Expected result
LMS_20	Click Edit icon	The system will navigate user to update page.
LMS_20.1	Click Delete icon	The chosen data will be deleted.
LMS_20.2	Update one or more field	Show message "Information updated"

Table 6. 17 : Test Cases for Reserve Books

Test ID	Test Cases	Expected result
LMS_21	Click Reserve Button	Show message "Your request has been processed"

Table 6. 18 : Test Cases for Update Profile

Test ID	Test Cases	Expected result

LMS_22	Click Edit icon	The system will navigate user to update page.
LMS_22.1	Click Save icon	Show message "Profile is updated"

6.5 Test Result and Analysis

In this section, all of the result in the testing cases will be recorded. The test result will conclude whether Library Management System has fulfilled their objectives. All of the test cases has been test by Nurul Aqilah Shahirah (developer) as TLMS_01, Nurul Syaidatul Aqilla (Developer) as TLMS_02, TLMS_03 is tester ID for the end-user such as library's staff, admin, and user. The table result as below:

Table 6. 19 : Test Result and Analysis

Test ID	Tester ID	Test Case Result
LMS_01	TLMS_01	Success
LMS_02	TLMS_01	Success
LMS_03	TLMS_01	Success
LMS_04	TLMS_01	Success
LMS_05	TLMS_01	Success
LMS_06	TLMS_01	Success
LMS_07	TLMS_01	Success
LMS_08	TLMS_01	Success
LMS_09	TLMS_01	Success
LMS_10	TLMS_01	Success
LMS_11	TLMS_01	Success
LMS_12	TLMS_01	Success

LMS_13	TLMS_02	Success
LMS_13.1	TLMS_02	Success
LMS_13.2	TLMS_02	Success
LMS_13.3	TLMS_02	Success
LMS_13.4	TLMS_02	Success
LMS_14	TLMS_02	Success
LMS_14.1	TLMS_02	Success
LMS_14.2	TLMS_02	Success
LMS_14.3	TLMS_02	Success
LMS_14.4	TLMS_02	Success
LMS_14.5	TLMS_02	Success
LMS_14.6	TLMS_02	Success
LMS_15	TLMS_02	Success
LMS_15.1	TLMS_02	Success
LMS_15.2	TLMS_02	Success
LMS_15.3	TLMS_02	Success
LMS_15.4	TLMS_02	Success

LMS_15.5	TLMS_02	Success
LMS_15.6	TLMS_02	Success
LMS_15.7	TLMS_02	Success
LMS_15.8	TLMS_02	Success
LMS_15.9	TLMS_02	Success
LMS_15.2	TLMS_02	Success
LMS_16	TLMS_02	Success
LMS_16.1	TLMS_02	Success
LMS_16.2	TLMS_02	Success
LMS_16.3	TLMS_02	Success
LMS_16.4	TLMS_02	Success
LMS_17	TLMS_02	Success
LMS_17.1	TLMS_02	Success
LMS_17.2	TLMS_02	Success
LMS_17.3	TLMS_02	Success
LMS_17.4	TLMS_02	Success
LMS_17.5	TLMS_02	Success

LMS_17.6	TLMS_02	Success
LMS_18	TLMS_02	Success
LMS_18.1	TLMS_02	Success
LMS_19	TLMS_02	Success
LMS_19.1	TLMS_02	Success
LMS_20	TLMS_02	Success
LMS_20.1	TLMS_02	Success
LMS_20.2	TLMS_02	Success
LMS_21	TLMS_02	Success
LMS_22	TLMS_02	Success
LMS_22.1	TLMS_02	Success

6.5.1 Beta Testing

No	Requirements	Tester	Result	Average of Satisfaction 1- Extremely Dissatisfied 2- Dissatisfied 3- Neutral 4- Satisfied 5- Very Satisfying
1.	Is Library Management System ease you to manage library ?	TLMS_03	Pass	5
2.	The system is easy to navigate between the pages.	TLMS_03	Pass	5
3.	Photos of book can be uploaded into the system.	TLMS_03	Pass	5

4.	Email notification are received (Overdue Reminder)	TLMS_03	Pass	5
5.	Do you find the Library Management System is easy to use ?	TLMS_03	Pass	5
6.	Library Management System is suitable to be use in the organization.	TLMS_03	Pass	5
7.	Library Management System has user-friendly interface.	TLMS_03	Pass	5
8.	Library Management System does not have error that will interfere system operation.	TLMS_03	Pass	5
9.	Library Management System has achieved the objectives of the development.	TLMS_03	Pass	5

10.	All functions in Library Management System are functioning well.	TLMS_03	Pass	5

6.6 Conclusion

In conclusion, testing phase helped Library Management System in identify all of the error. Fortunately, along the process of testing, Library Management System run smoothly without problems. The testing is run according to the test case design to make sure the system fulfilled the objectives and requirements. This is to ensure Library Management System can be use by the organization without facing any problems during the operations. Consequently, the Library Management System has successfully passed the testing phase as the system run smoothly.

CHAPTER 7: CONCLUSION

7.1 Observation on Weakness and Strength

Library Management System has gone through many of processes to achieve to this level. It is time to observe on the system weakness after the testing phase. Library Management System has been built according to the objectives and the requirements that have been stated in Chapter 1. However, there are a few weaknesses of Library Management System.

One of the weaknesses of Library Management System is lacking in user-experience. When it comes to user-experience (UX), the goal is to create interfaces that are extremely user-friendly. User may find the interface of Library Management System lack user friendly as the user need to take time to fully understand the system. Next, Library Management System is more suitable using laptop or PC instead of using mobile phone. User also may find Library Management System less interactive and user may lose interest to keep updated of the system.

For the strength of Library Management System, as the system has fulfilled all of the requirements that is essential for the business to operate. Thus, Library Management System helps staff in library to manage library such as manage book, borrowed and return book and others. The system is sufficient to ease the staff to manage library. User may find Library Management System easy to navigate between the pages, and the interface also easy for user to understand each function.

7.2 Propositions for Improvement

As a result of testing phase, there are a few things could be added into the system that can improve in terms of usability and more features could be added to get the system more interactive, for example, for the user part, the features like online news or article could be added as it can attract more users to keep to use the Library Management System.

Next, Library Management System will improve for the user-experience (UX). The system may improve to have notification, it is to let user know their booking status has been change, like for example, from 'Pending request' to 'Accepted'. This will become more efficient for the user. Furthermore, in the admin part, we could improve on how admin insert books information into system, using the barcode scan. It can reduce time of the admin.

7.3 Project Contribution

Library Management System can contribute to library staff and library user. The contribution of Library Management System is briefly describing as below:

i. Library Staff (Admin)

For the library staff, Library Management System will help them to manage the library such as manage book, borrower and user which are sufficient for the staff to manage and reduce their time.

ii. User

For the user, Library Management System ease the user to reserve book in advance before coming to the library. They also can view their booking and update profile themselves.

7.4 Conclusion

As conclusion, to develop a system there are many processes need to go through as many as the research. It is to ensure that system that will be develop is fulfilling the requirements and objectives of the system. For the Library Management System, after going through all of the processes Library Management System managed to fulfill the requirements and achieved the objectives of this project. While develop the project, it is essential for developer to achieve the user satisfaction. Thus, developer required to plan, design well for the system to meets the user satisfaction because the system is developed to solve problems.

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