# UNIVERSITI TEKNIKAL MALAYSIA MELAKA

# DEVELOPMENT OF LIBRARY BOOK LOCATION TRACKING APPLICATION USING XAMARIN SOFTWARE

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Electronics Engineering Technology (Telecommunication) with Honours.

by

**MUHAMMAD IZZUDDIN BIN SARIMAN**

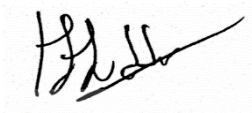
FACULTY OF ELECTRICAL AND ELECTRONIC ENGINEERING

TECHNOLOGY

2021

**DECLARATION**

I hereby, declared this report entitled DEVELOPMENT OF LIBRARY BOOK LOCATION TRACKING APPLICATION USING XAMARIN SOFTWARE is the results of my own research except as cited in references.



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Author : MUHAMMAD IZZUDDIN BIN SARIMAN

Date: 8/3/2021

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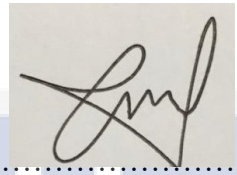
**APPROVAL**

This report is submitted to the Faculty of Electrical and Electronic Engineering Technology of Universiti Teknikal Malaysia Melaka (UTeM) as a partial fulfilment of the requirements for the degree of Bachelor of Electronic Engineering Technology (Telecommunication) with Honours. The member of the supervisory is as follow:

Signature:  .....

Supervisor: NORLEZAH BINTI HASHIM

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# ABSTRAK

Pada masa kini, perpustakaan adalah tempat yang paling utama bagi semua orang terutama bagi pelajar kerana di perpustakaan terdapat pelbagai sumber maklumat yang diperlukan oleh pengguna. Di perpustakaan terdapat banyak sangat koleksi buku di setiap rak. Walaupun buku-buku tersebut disusun mengikut kategori, tetapi untuk mencari lokasi setiap buku memerlukan masa yang lama kerana di kawasan perpustakaan mempunyai ruang yang besar dan menyukarkan pengguna terutama bagi para pelajar untuk mencari buku yang diperlukan. Untuk mengatasi masalah ini, ia memerlukan beberapa sistem yang dapat membantu pengguna untuk menentukan lokasi buku dengan tepat dengan cara mencari tajuk buku. Oleh itu, tujuan projek ini adalah untuk membangunkan sistem pengesanan lokasi buku di perpustakaan menggunakan applikasi. Hasil daripada projek sistem pengesanan lokasi buku perpustakaan, aplikasi ini akan dikembangkan dan dibuat dengan menggunakan perisian Xamarin dan aplikasi android di mana ia dapat mengesan kedudukan buku di kawasan rak buku. Akhir sekali, untuk kesimpulan aplikasi ini dapat membantu pengguna untuk mengesan kedudukan buku dengan mencari nama buku dan dapat meningkatkan aplikasi ini untuk kegunaan masa hadapan.

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# ABSTRACT

Nowadays, the library is the most important place for everyone especially for students because in library there have a various source of information that are required for the user. In library, there have a lot collection of books on every shelf. Even the books are arranged according to the category, but for finding the location of each book is takes a long time because in library area, there have a huge space and makes it difficult for the users especially for the students to find the book that are required. To overcome this problem, it needs some of the system that can helps the user to precisely location of books by search the title of books. Therefore, the purpose of this project is to develop a system of library book location tracking by using application. As a result of the project of library book location tracking system, this application will develop and create by using Xamarin software and an android application where it can track the position of book at bookshelf area. Lastly, for the conclusion of this application can help the users to track the position of books by search the name of books and can upgrade this application for the future use.

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## DEDICATION

I dedicate this project report to my beloved parents, my supervisor and my BEET classmate. A special thanks to my father Mr. Sariman Bin Tasmin and my mother Mrs. Jamilah Bini Awang who always give me courage and being support my idea to do this project. Furthermore, I would like to say thank you to my supervisor, Mrs Norlezah Binti Hashim for the guidance, advices, encouragement, inspiration and attention given throughout the day for development of my final project and writing this report. Lastly, I would like to say thank you to my BEET classmate that who always support me to complete and developed this project.

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Special thanks to Allah S.W.T for the blessful and gift because giving me the ability to finish my Projek Sarjana Muda (PSM). This report is as a mark of my sincere appreciation to Universiti Teknikal Malaysia Melaka (UTeM) for giving me this chance to further study on Bachelor's Degree in Electronics Engineering Technology (Telecommunication) in Faculty of Electrical and Electronic Engineering Technology (FTKEE). I would like to express my sincere acknowledgment to my supervisor Mrs. Norlezah Binti Hashim for the guidance, advices, encouragement, inspiration and attention given throughout the day for development of my final project and help for completing the writing report. With this continuous support and interest, she was guiding me to complete this project with full commitment and dedication. My gratitude goes to my beloved parents Mr. Sariman Bin Tasmin and Mrs. Jamilah Binti Awang, my family, and my BEET classmates that always give courage and support me to complete my project. Thanks to their moral support and care they had given to me up until this project is done. Finally, I would also to say thank you to all lecturer and staff who was involved directly or indirectly in helping me to completing this project.

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

## TABLE OF CONTENTS




UNIVERSITI TEKNIKAL MALAYSIA MELAKA

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

# LIST OF TABLES




UNIVERSITI TEKNIKAL MALAYSIA MELAKA

# LIST OF FIGURES



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

# CHAPTER 1

# INTRODUCTION

## 1.0 Introduction

This chapter is focus about the creation of the frameworks on this project. Basically, this chapter is including about the objectives that needed to achieve by the researcher. Furthermore, in this chapter also includes about the main information such as research background, problem statements, objective of this study and scopes of works.

## 1.1 Research Background

The research of this project is about "Library book location tracking application using Xamarin Software". This system will help the users to easily find the book's location in the library through the map in applications. The library is a comprehensive list of information resources that are accessible to the public from various communities, especially students. Libraries usually have a large collection of materials and require good organization of books and make it easier for users to find specific books. Although the library has a large collection of books, finding a book is one of the problems.

Since all the books are arranged according with categories, the location of book must be identified for user gets to know where some of the book category are placed. This is become a main issue especially for the students for finding the book and waste of time. Under this

situation, there needs to find the solution that user can specifically find the location of each books directly by using an application. Thus, such a technology is required that can access the information in library efficiently. It should be easy to use and can tracking the location of books. This information can be accessed the material for only from the interfaces that present within the library. While a reader might use the knowledge from it to quickly locate the book's position. If the library is big, the maps that are showing in the configuration are very complicated and ask for help to the library staff.

To overcome this problem, the method that are used to develop this project is using an android application. This system includes functionality to find and track a book, access library services and update information in real time. This provide the interfaces for the library users and the common user can quickly get the details information from interface of the android applications.

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## 1.2 Problem Statement

The problem that are faced for the user is having a problem to find the specific books they are need because there have a lot and large of bookshelves in library. Sometimes, the books in library bookshelves is arranged based on the category. Because of that, it can make the students spending more time and need some effort to find the books they are require. Furthermore, some of the books that are required for students are not in the systems because of lacks of system to update the new books. Next, Wide Library administration requires quality. The administration gets more complicated and dynamic as the Library becomes through.

Lastly, the location of the books sometimes is uncertain because of there have some of students are not responsible for placing the books on the proper bookshelf.

To overcome this problem, the solution that are proposed to develop this project is create an applications of library book location tracking system by using android application. This developed project can help the users to find a particular book more easily in the library through an android application. Furthermore, this system also enabled to the track the locations of books at bookshelf by using an application. Lastly, this system will create and developed by using simulation of Microsoft Visual Studio (Xamarin Software) and android Xamarin.

The libraries are used to store books which need a process to navigate a specific book with different information. This library system is an interface that can enables the users to access the details information about library for example find, add or remove, and update chosen books and other materials. Furthermore, the user can get know where the particular book by searching the name of the book and click "OK". Next, the user also can access the list information of books according to their category. This proposed system will help to save the time for the user as they don't need to find the particular book in every shelf and every row.

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## 1.3 Objectives

The main objectives of this project are:

a) To develop the system for library book location tracking using android application.

b) To analyse the developed applications in term of its functionality.

## 1.4 Scopes of Projects

This project is about software developments that are used to create an android application of the system by using Microsoft Visual Studio 2019 (Xamarin Software). This project will cover on the software part, where it is including about the design of projects, coding and develop an application by using android.

To develop this project, the researcher will use the software of Microsoft Visual Studio (2019). Furthermore, in this software, the researcher will develop and create this application by using android Xamarin app.

## 1.5 Thesis Outline

This report consists of five chapters which are include of introduction, literature review, methodology, results and discussion and lastly a conclusion and recommendation. Each of this chapter will be discuss depends with own aspects that are related to the projects.

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Firstly, is about chapter one. Chapter one is the introduction about the project or case study. In this chapter, it consists of research projects, problem statements, objectives, and scope of projects. All of the summary information that are related for this project will be discussed and presented in this chapter.

Next, it will proceed to chapter two which is literature review. In this chapter, it will do the research about the previous studies and case study that are related to projects. This chapter is discussed about the approaches and also the methods that are used from other researcher in

previous studies of projects. This is important to analyse the comparison of strength and weakness that can be used as the guidelines to develop about the related projects. The own idea that are proposed from related project can also justified in this chapter.

Furthermore, for chapter 3 that are focused on the methodology and approaches about the related projects. In this chapter, it will be discussed about the flow charts of projects, the software and hardware that are used, how the process are work and lastly about how to development and implement the projects.

Moreover, chapter four is present about the results and discussion. For this chapter, it will show about the function and output results of the projects. Meanwhile, for discussion part is about analysis of result which is the condition before and after results. Lastly, for the chapter five is about conclusion and recommendation. In this chapter, it will explain about the summary of the projects and give some suggestion and recommendation for the future to improve about the project.

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# CHAPTER 2

# LITERATURE REVIEW

## 2.0 Introduction

This chapter will discuss about the literature review section with the primary purpose being to considerably study various experimental studies an initiative that have been successfully carried out in this field of analysis by different researchers. The objectives of this literature review will be discussed about all the method that are proposed to developed the project of library book location tracking system from other researcher. The studies and research that are approach should provide the methods of this project depending on the literature analysis.

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## 2.1 Previous Related Work

Previous related work is about the similarity project that have been developed from previous researcher by using different methods. The projects that have been developed by previous researchers have the advantages and disadvantages that can be used as a reference to improve the project and change some of methods that are used to make it better. Furthermore, the purpose of previous related work is to study about how to develop the projects by using different method. There are several of similarity projects that can help as a reference based on the research and case study.

## 2.2 "Book Tracking Application in Android for library by using GPS system" from Akhil Choudari, Sankalp Joshi, Akshay Bembalkar, Nainesh Marathe and L.J Sankpal

This project has been developed by Akhil Choudari, Sankalp Joshi in 2013 and consists of 3 Engineer. According to the researcher (Choudari et al. 2013), this book tracking application is the idea of support the physical reality with an extra information sheet. The project was built based on the creative by used GPS (Global Positioning System) in library to navigate the people in library. This will require the library to live any time of day or season by using smartphone. Furthermore, it also can update the data that are collated by librarian upon the introduction of new books that would provide the raw material for producing layers of graphical and multimedia content by using compatible smartphone. Next in this project, there have a system architecture that are used as a method to develop this project. To develop this project, the researcher divided the process into two parts which is input process and the output process. The user characteristics as the input and module characteristics as an output. The system architecture for this project is shown in figure below.

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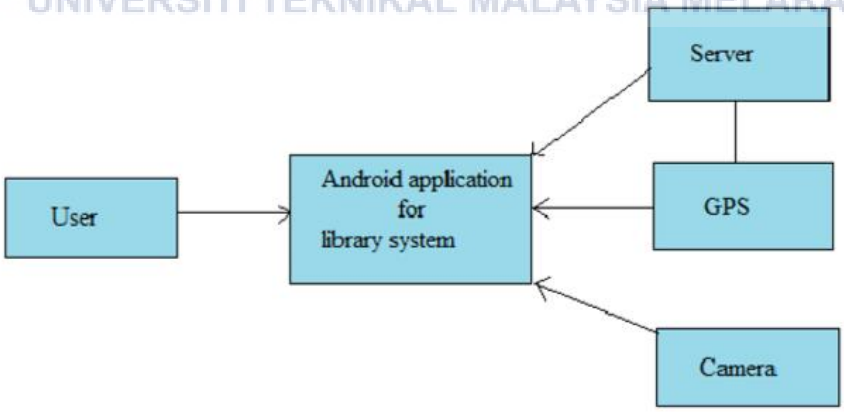


**Figure 2.1: System Architecture**

Each parts of system architecture have a functionality and process to develop this project. First part is about the input process which is user characteristic. In user interface, the user can find the name of book, the author's name and the publishing name of books that are need. Next, after providing the book details, the application would give notify to the user regarding the books that are availability along with the supplementary information such as the amount of copies available in the library. If the book can accessible, then the program can navigates that application to user for easily to find books.

Meanwhile, for the module characteristic is used as a part of output process. For the output process there are divided into 4 parts which is server, database, Global Positioning System (GPS) and camera. For the first part is about the server process. A server is a physical machine (a mechanical operating system that can devoted to manage one or more servers (as a host) to meet and that are needs of other devices users on a network. The server side technology for this program can allow the users side technology to navigate pre-stored database. The application must be loaded on the client side, and then linked with server side technologies, and data will be collected and saved on the server side. In this application, it can use Apache Tomcat Application server in the code to store the in database. Apache Tomcat is an open source software applications of the Java Servlet and Java Server Site.

Next process is about database. A database is used for collect the information that can be organized to maintained and modified. For this project, the researcher was used MySQL database in this application. It is used as open source platform and this database relational of it. The database will help the user for composed of details concerning for example name of publication, author, quantity and GPS coordinates of the books.

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Furthermore, the third process is about Global Positioning System (GPS). The Global Positioning System is a space-based satellite navigation device that can delivers the position and time details under all atmospheric situations. Anywhere there is an unbroken line of sight to four or more GPS satellites or around the earth. By using this application, it can use this technology to help the user to navigate from (user current position) to destination (where the book is located). Lastly, the four parts is about camera. This application uses the camera to give the application a practical touch by through the user vision of arrows. Furthermore, camera can help the user to give the directions towards to the book in real time. It is easily for the users to find the location book in library.

### 2.2.1 Working of android application in smart phone

Firstly, a UI fields enter the name of the book, author of the book and name of publication that are provided to the user. The first field is necessary in this while the second and third fields are available. The user can hit submit button after entering the required details. Then comes for a new interface that indicates book selection and quantity. After that, the user can decide whether to get the book or not. Next, after this step is successful, then the process makes a calculation of current GPS location of users and finds the co-ordinates of the books that present in the online database. Thus, it determining a path from source (user) to destination (book) using the shortest path algorithm. Lastly, the incoming UI consists of an integrated camera system combined with simple arrows that will inform the customer where the book is placed and help users to find the book in the library using GPS technology.

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## 2.3 "Library access system smartphone application using android" by R Dinesh, S.R Arun Pravin, M. Aravindhan and D. Rajeswari

This project has been developed by R Dinesh, S. R. Arun Pravin in 2015 and helped by assistant professor which is M. Aravindhan and D. Rajeswari. According to researcher (Dinesh et al. 2015), the android application has become more popular and carrying as many users as possible relative to any other application. Before, the introduction of Android Operating System, the library documents was done only by the librarian. This paper proposes a system for using the library access by using database system. The Library Access Application can helps the users to access their required information and queries without computers or librarians, because there can access through by smart phone which can saves their times and energy to find the books. This application retrieves the contained in the library database from the library server for example, it can verify the books that are accessible in the library or borrowed without someone interfering. Next, user can access to library for suggestion will be stored in the database during a book search. This software will inform about the due date for the users who borrowed books from a library as a reminder until the deadline. The users are entitled to recommend library books and the librarian must remind them of their request. This project is giving a new idea for the users to access the library.

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### 2.3.1 Proposed Work

Android application is a powerful operating system that was primarily introduced to meet market needs. Furthermore, it is an open source running on a Linux kernel designed primarily for smart phones and tablets. Each Android Operating system can use its own libraries and even the embedded SQLite database. As the phrase "TIME AND TIDE WAITS

FOR NONE" this project focused on mobile device that created can be used for library purpose. Library Management System initially took more time to access the details information. The library access program software can offer a simple user experience that helps the users to access the dates or hold the books in the library open.

### 2.3.2 Working Modules

This library access system application will initially be loaded into the Google Play Store and the users will be able to download it via play store. Once the user has installed this application in their android device, the users will be notified of the current version and updates available for this application. As long as the user logins their systems, there can appears the list of books that are available in the library and the search option is allowed for scan to the requested book. The book will show its name and present in their respective category. The users can confirm the books they have taken and due date their borrowed the books. The working modules is showing about how the process are work. In working modules, there are contains that are used in application. Each of working module is divided into 5 parts which is login module, signup module, user module, admin module and book details.

First part is about login module. The Login module is used for signed up the detail's information for example user name and password. The login module is added for an authentication purpose if the user enters the incorrect information which make the user would not be allowed to enter. The username is commonly categorized into two types which is user login and admin login. The example of login module for this application project will be shown in figure below.

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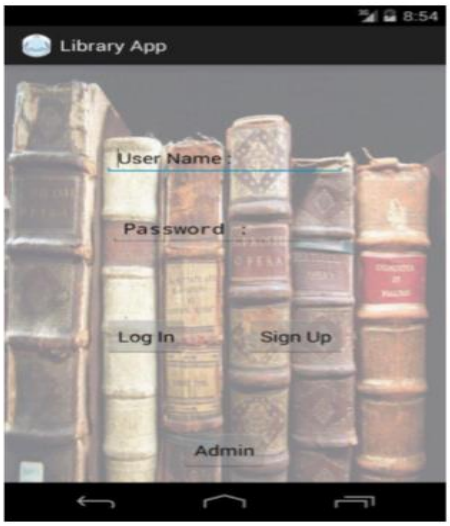


**Figure 2.2: Login Module**

Next, for the second part is about signup module. The purpose of sign up module is used for the user who is new in this application to access this program. The users should access all applicable that are specified in sign up module. After all the information details are filled with correct, the user gives the choice to sign up for the next time login authentication which saves all the information in database. This sign up module will be shown in figure below.

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**Figure 2.3: Signup Module**

Furthermore, the third part is about user module. User Module is used when the user enters the name and password in the login module. If the authentication is efficient, it can direct through the app module where it can scan the book through out to library or pick the books in the available category. After selecting the certain book there want, it will press on the button named for borrow books. By clicking on the user account, the user would be gives notification about the due dates of the books. The user module part for this application will be shown in figure below.

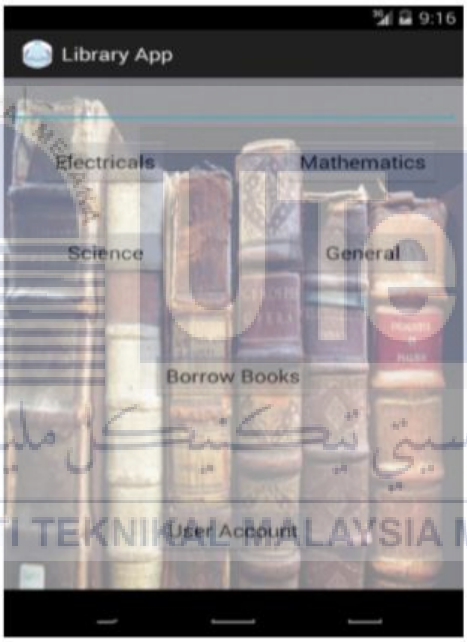


**Figure 2.4: User Module**

Forth part is about Admin module is used when the admin has entered the right user name and password. It is guided based through the page above. The find button is used to test if the book in the library are available for the user. The user also can access the current book descriptions by press the insert new book in information tab. The admin module for this application will be shown in figure below.

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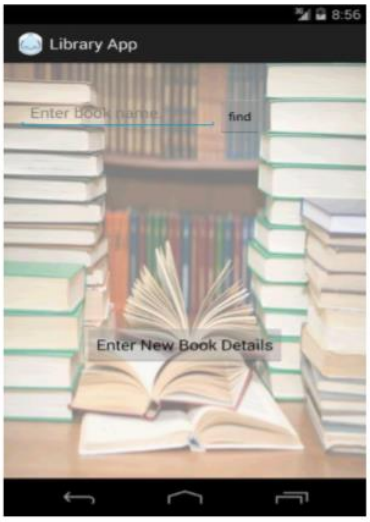


**Figure 2.5: Admin Module**

Lastly is about book details. If the admin clicks insert new book information, it will enter the fields such as no book, name of author and publication. The users will press the attach button to the library after entering all the fields to include the book information in the database and also allow the books accessible to the users. The part applications of books detail will be shown in figure below.

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**Figure 2.6: Book Details**

## 2.4 "Library Management System" by Prabhakar Kumar, Rahul Kumar, Rajat Singh and Vikram pratap singh

This project has been developed by Prabhakar Kumar and Rahul Kumar in 2014. Researcher (Singh 2014) stated the library management system is a project that aimed to creating a software program to handle much of operations library every day. This software includes the certain capabilities that are usually not present in standard library management system such as student login, facility, and staff login facility. It eve provides an executive login facility from which the administrator may control the whole program. This also has an electronic notice board where instructors can put up details regarding workshops or seminars that can organized in the collages or surrounding collages. Furthermore, librarians can add it to the notice board as a sufficient review by the seminar coordinating institution concerned. It also has a facility where students can see the list of books provided and their date of issue and date of return after logging into their accounts. Next, the students also may allow the librarian to provide new books by filing out the book request form. Lastly, the librarian may produce numerous report such as student report, instructor report and book report after logging into the account. Overall for this project is developed and help the students as well as librarian to maintain the best way for the library and also reduce the human effort. The process diagram for the project of library management system is shown in figure below.

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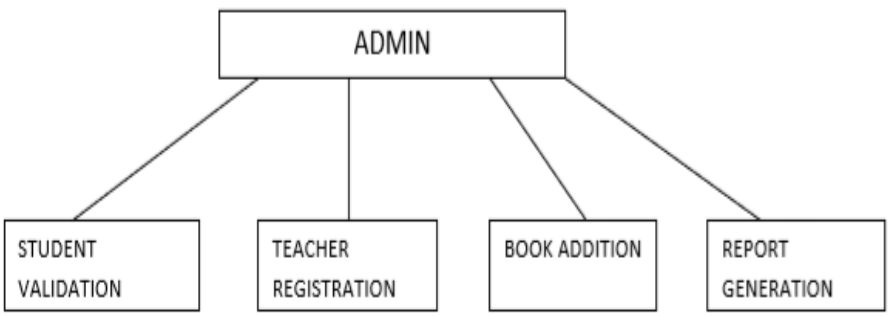


**Figure 2.7: Process diagram of the projects**

## 2.5 "Library's Smart Bookshelf and Book Positioning System based on ultra-high frequency RFID Technology" by Wang Xiaoyang, Pan Hui and Ou Ruixiang

According to researcher (Wang et al. 2017), this project is created by using the application of smart shelves through the application of RFID technology. The library of ultra-high frequency RFID technology is a set of high performance of real-time management system. As the conventional library existence recovery method cannot include the book position details correctly, which contributes to books and other issues, the book search quality is very low. The exponential growth of the "Internet of Things" and ultra-high frequency technologies, architecture of smart bookshelves and intelligent book positioning device may be used in recent years to solve this issue. In early 1990, the National Library of Singapore was implemented the RFID technologies to develop smart libraries. However, the technology that are used in smart libraries has been controlled by high frequency RFID, where the system cannot identify the precise position of books. The ultra-high frequency RFID system has several other benefits compared to high- frequency RFID system which is the read and write range is larger, the read speed is better, and the number of labels is higher.

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Smart book positioning system was built up by using the ultra-high frequency RFID technology with book labels, bookshelf labels, readers, computers and base stations. It was designed the smart bookshelves and completed the whole system mostly by the coding principle and the localization algorithm. It also solved the problems which cannot accurately provide the book location information. Furthermore, the reader cannot only precise the true location of library collection, but still can identify the necessary books to increase the library inventory productivity easily and reliably, and also can reduce time.

### 2.5.1 Working principles of smart bookshelf system

Smart book positioning focuses on ultra-high-frequency RFID electronic tags, writers, connects each book and retrieval device, and then exchanges the data, finally through the book positioning method to achieve smart recognition, positioning and book management. The label becomes suitable for book and literature management can brings new opportunities for library industry growth. Compared with bar code technology, high frequency RFID technology has more advanced. Furthermore, uses of ultra-high frequency technologies are not possible to limit read and write space. It also more useful for distributing books and handling literature. Next, the coding theory and the positioning method cleverly completed the specific location for the extract of book details. The whole process provides the report a location for better book management.

The working principle of the smart bookshelf device and book positioning method which is the system's electronic tag ID length is 24-bit hexadecimal number. The electronic tag code uses the top 10 bits and the first bit is the identifying bit.0 which indicates the shelf label 1 which indicates the book label. The remaining nine parts include surface, number of shelves, number of columns and other detail. The reader will read all the labels on the sheet, identify the shelf label from the identifying bit, and read the location details that has the positioning purpose. The main components of the whole system include the smart book location retrieval method built by C++ language based on the location algorithm, computers configured with the device, base station, ultra-high frequency RFID reader, the bookshelf mark used to classify the shelf layer location. The ultra-high frequency RFID module is the core of the whole smart bookshelf, which includes of electronic tags, readers and computers.

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

## 2.6 "Locating book in library using WI-FI" by N.Thulasi Chitra, R.Anusha, G. Roja and B. Dhana Lakshmi

This article is written by N. Thulasi Chitra, R.Anusha, G.Roja and B.Dhana Lakshmi in 2019. According to researcher (Chitra et al. 2019), Library is a large collection of books and it required the proper approach with book condition in a request which make it easier for the user to find a specific books. However, locating a single book be a major undertaking in large libraries that have an enormous gathering. This project is proposing a server-based architecture that can be used an android application to develop the system using software and WI-FI. The library administrator obviously needs to include a books area according to category. Nowadays, individuals are given an android application to fills the book that are discover. The user can type the book name through the android gadget and it will send a demand to user to find the book in specific area.

The main objectives of this research are to find the book in the library using WI-FI that can easily to accessed compared to find the book as manually. This application is used to develop a system that can help the user to find a particular book in library by using a personal computer or using a gadget. However, the user needs a mini gadget with the WI-FI that can possibility help the user to access the application regarding to requirement. By using this method, it can help the users to find a particular book exactly in a specific location. Furthermore, the library staff may not know the specific location of the books that the individual scanning. In this situation, the android Wi-Fi library can help the system to search book through an application with the picture.

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## 2.7 "Android application for WIFI based library book locator" by Anand Gujja, Irshad Husain, and Hrishikesh Kukarni

This journal paper is written by Anand Gujja, Irshad Husain, and Hrishikesh Kukarni in 2019. Researcher (Gujja et al. 2019) stated the android application is an essential application that is used as a basis of the library book locator. The proposed method is the difficulty of the manual work in locating the book by navigating through each bookshelf. It is connecting through WI-FI access and points to the local server that are existing in library. Furthermore, it also combines the database information and performs the function for the user. Next, it allows the user with the specific locations along with the leads to the books and the system is enables to monitoring the status of several books in library.

Therefore, such a technology is required that can help to access the data in library efficiently and also should be simple to use and provide the monitoring. Nowadays, the library can contain information from the entire library on the database servers. This information can be accessed only from the interfaces present inside the library. Based on the scale of library, the user interface lacks mobility and real time updates. Through user that can use to access the information from it and could easily to find the book location. When the library is big, the maps to indicating the systems are very complicated. Thus, the user can lose the direction route and end up before he can get hold of the map or a library staff again

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Moreover, this system includes functionality to find and trace a book, access library resources and monitor details in real time. Since the library have a main problem is funding our program is low-cost. For the purpose of mobility, the system support on serve-based in android application. This includes Library Staff and Common User interface. Common users

can quickly get the information from the interface of the android application. Lastly, the user can use for tracking device to find the book and updates to it in real time. QR technology is used for place the system to maintain the device low cost and stable.

### 2.7.1 System Design

The system is design by using the application of "WBL" which is the android users sends request to the server via the authentication process. To define the form of request the server should decode the message. Request forms may be collecting data or modifying data. Depend on the user permission the request will be executed and response will be delivered. A common user will first request the data of obtainable books in library. Furthermore, this application requires the location for the user by allowing the user to search the corresponding QR code. The program requires the user to select the path or route to the books position from the accessible books or the user will display the specific books.

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Next, after physically finding the book, the user may decide to register the book through an application. Lastly to find a book, the general method that are followed by through an application is allow the user to choose the book and obtain the user information after book location is identified. The figure of system design will be shown in figure below.

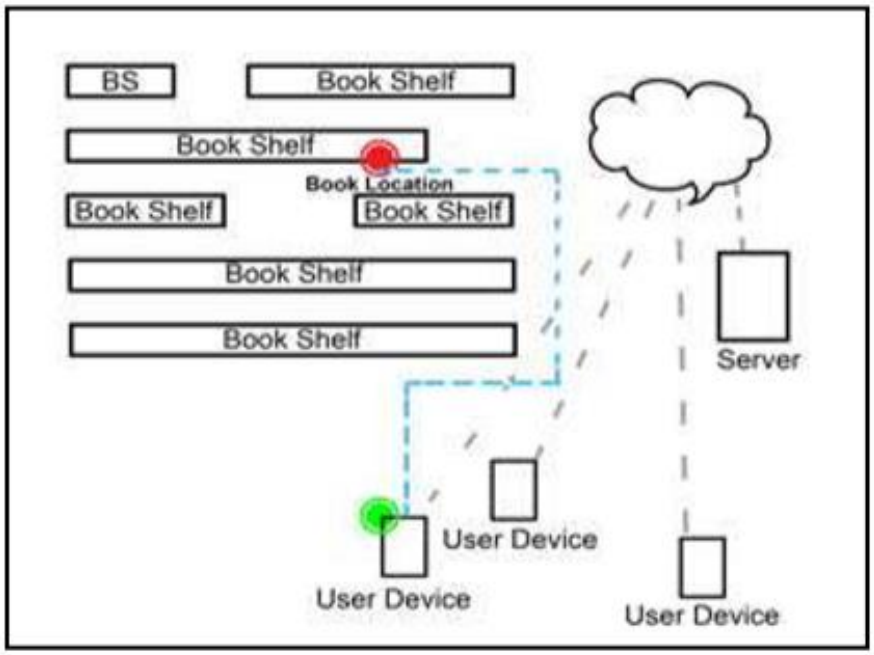


**Figure 2.8: System Design of this projects**

Figure 2.8 is about the system design of this projects is shown that can use for developed the projects of android application for WIFI based library book locator. In general, the need to map and locate the book has become important on a global basis. Using modern technology, this necessity can be solved and user-friendly. The android system makes the device simple and compact to use. It limits user and library staff efforts.

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## 2.8 Summary Table

The overall journal and articles that are study from multiple researchers will summarized and conducted in Table 2.0 below.

**Table 2.1: Table of Summary research for previous related work**

| No | Title of Project | Description | Method | Advantages | Disadvantages |
|---|---|---|---|---|---|
| 1. | Book Tracking Application in Android for library by using GPS system. (2013) | - User Interface (UI)<br>- Android application.<br>- Server<br>- GPS<br>- Camera | - Creative and accessible way by using GPS and mobile camera which enable engaging interaction between physical and virtual wok. | - Application is user friendly.<br>- It useful to all kind of users.<br>- Helpful to save time of not just the application user but also the librarian and staff member. | - GPS should be very high to find the exact location.<br>- Location of book is not change |
| 2. | Library access system smartphone application using android. (2015) | - SQLITE Database<br>- Eclipse.<br>- Android SDK Tools. | - Combination of the Eclipse and Android SDK tools are used in Integrated Development Environment (IDE) used for design and develop JAVA based application. | - Easily to access their library account to check availability of book in library.<br>- Allow the user and library administration to access system through android smartphone and computer. | - Library administration should manually update the details of book.<br>- Only Android User can use Library Access Application. |
| 3. | Library Management System. (2014) | - Windows 7.<br>- MYSQL.<br>- JAVA SCRIPT. | - Library Management System is a computerized system which helps user (librarian) to manage the library. | - Improvement in control and performance.<br>- Save cost and save time. | - Difficult to search record.<br>- Space consuming.<br>- Cost consuming. |

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| | | | | | |
|---|---|---|---|---|---|
| 4. | Library's Smart Bookshelf and Book Positioning System based on ultra-high frequency RFID Technology. (2017) | - Ultrahigh frequency RFID.<br>- C++ language.<br>- RFID module. | - Library and book positioning system based on the ultra-high frequency technology can complete the book inventory work, generate the list of exit books, and provide the data to the library automation. | - Faster reading speed.<br>- Farther read and write distance.<br>- Larger read and write amount.<br>- Lower tag cost | - Cannot accurately obtain true location of library collection. |
| 5. | Locating book in library using WI-FI. (2019) | - Android software development kit (sdk).<br>- Windows xp.<br>- Java development kit (jdk).<br>- Netbeans. | - The user search for a selected book in the library using WI-FI. Through android app and WI-FI it is connected to the server system. | - Individual will have the capacity to look as in which position of the book is available. | - Difficult to utilize, efficient and effective to discover a books in library. |
| 6. | Android application for WIFI based library book locator. (2019) | - Smartphones.<br>- WI-FI router<br>- QR codes.<br>- Server.<br>- Java.<br>- PHP.<br>- Android Studio.<br>- Eclipse. | - The application lets the user to choose from available books to get the direction or route to the books location or user can view the details of the book. | - Output of data is feasible for user task.<br>- Save the user efforts and time.<br>- Easily migrated and used for location and tracking. | - Only used for android applications.<br>- Required a WIFI. |

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## 2.9 Conclusion

Briefly, after comparing the literature review, the researcher had acquired additional knowledge and technical skills based on a reference from different educational journals consisting of past related research. All of the summary from the previous project based on the student research are be explained in this chapter. In this chapter, it very useful and important for the researcher to develop and do improvement about the previous projects that are related.

Furthermore, from the previous study, it also can help the students to get more knowledge about how to implement the projects. Finally, the researcher had performed an analysis of relevant field knowledge to implement and develop the project as mentioned above. So, the researcher can improve the problem statement and solve it through the further investigation and implementation of the project.

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# CHAPTER 3

# METHODOLOGY

## 3.0 Introduction

This chapter will explain and discuss about the methodology and approaches of this projects. In this chapter, the detail elaboration will be done about flow charts of this project, the software configuration that are used, how the process is work and lastly about how to develop and implement the applications of library book location tracking.

## 3.1 Software Development

In this project, it will use only software parts. The software parts are divided into two which is Xamarin Software and android Xamarin application. Furthermore, this software will help to develop the projects of library books location tracking system. All the explanation about the software development will be explain and discussed in this part.

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### 3.1.1 Xamarin Software

Xamarin is the software that use in mobile application development tool that utilizes a single shared. NET code base to enable designers and developers create native iOS, Android and Windows devices. An Advanced Programming Environment (IDE), Xamarin is used for Visual Design Software to create mobile applications from native sources. The framework offers a variety of functions including application writing, refactoring, monitoring, reviewing, and cloud publishing. The portal also offers links to on-demand material from the University curriculum of Xamarin. Furthermore, Xamarin Visual Studio Tools may be deployed to create

native applications on Windows or Mac computers and provides Xamarin SDKs, Xamarin. Forms and Mono open source tools through GitHub.

Next, Xamarin is exists in certain types of Xamarins. Forms to operate is a complete standardized programming interface for all frameworks. Lastly, Xamarin provides complete access to the iOS, watchOS, and tvOS SDKs for. NET apps. Build user interfaces with our built-in designer or use our application to add in your Xcode app. Leverage APIs such as Touch ID, ARKit, CoreML, and loads more from C++ language.

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**Figure 3.1: Xamarin Software**

### 3.1.2 Android Application

Android Software is the mechanism by which new applications for devices running and developed for android operating system. Furthermore, android applications can be developed by using Kotlin, Java and C++ languages that can utilizing by Android Software Development Kit (SDK). Therefore, it also can be possible to use for other language. Any non-JVM languages which is Go, JavaScript. C++ or assembly is required for aid of JVM language code

which may can be produced by software and possibly minimal support for APIs. Lastly, Google Play is the main software platform for end users of android devices. It also enables to controlled systematic launch of software as well as distribution to developers.


**Figure 3.2: Android Application**

## 3.2 Proposed System

The proposed system that are required to developed and implement of this project is using Xamarin Software and create a simulator for android applications in Microsoft Visual Studio (2019). Through this system, the user enables to access the details information about the library from one place. Furthermore, the users can find all the particular book that are list in library by searching the name of books through an application.

Next, this system will help to reduce time and energy that are required for the user to find the books in every shelf and every row inside the library through an android application by tracking the locations of books. To propose the system, it will create each of module that can be used in library by using the Xamarin Software and simulation of android application. There are 4 types of layout that are used for developed the application of library book location tracking system

### 3.2.1 Sign up Interface

Signup interface layout is used when the user is new for using the application of library book location tracking system. For the first time, users need to register the system. The purpose of this system is to store about the data and information about the user information when they use the system of library in application. The information that are required is very important to record when the users borrow the books in library.

The sign up information that are required for this application is for example username, user id, email and password. Once all of the required information is fill in this application, the user can access all the details about this application.

### 3.2.2 Login Interface

Login Interface is use when the user had already signed up the module. This interface is the main function and primarily include for an authentication function. If the users enter the incorrect password, the users are not be able to enter the applications and use this system. The information that are need to log in this interface is enter the "User ID" and "password" which is for the ID Number is about matrix number and for the password can be any kind of number. This application is suitable for the users that are used to determine the location of book in library.

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### 3.2.3 Books Module Interface

This module is use for the user to search any kind of the books they want. The purpose of this module will help the users to know about the books that are available in the library at bookshelf through this application. Furthermore, this interface is act as a "controller" for the user to determine the book they want by using this application. After the user "enter the title of the books" and click "OK", the application will track the position of the books at bookshelf area.

### 3.2.4 Bookshelf Interface

This Interface is used as the "output" for this system. Bookshelf Interface is the arrangement of books at bookshelf area that have in this application after the user searching the name of books. The function is when the user searching the name of the books they need and the message will display at the bottom and show the position of the books.

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## 3.3 Block Diagram of Projects

A block diagram is a diagram of a process in which blocks are connected and presented by the blocks that are connected with lines and show the relationship of blocks. This diagram usually presented about the process of hardware design, electronic design and software design. However, for this project is develop and implement by using Xamarin software only. In this project, there are includes 3 process which is input, controller, and output. All the process is presented about the module that are required to develop the projects of library book location tracking application. For the first part is about input process.

The input process that are using for this application are divided into 2 parts which is Sign Up Interference and Login Interference. These 2 parts are required to register before the system is enable to use applications. Next part is about the controller. The controller is using for the user to search name of books. Lastly is about output process. The output process is about bookshelf layout. The function of this layout is when the user searching the name of the books, the message will display and show the position of the book at bookshelf area.

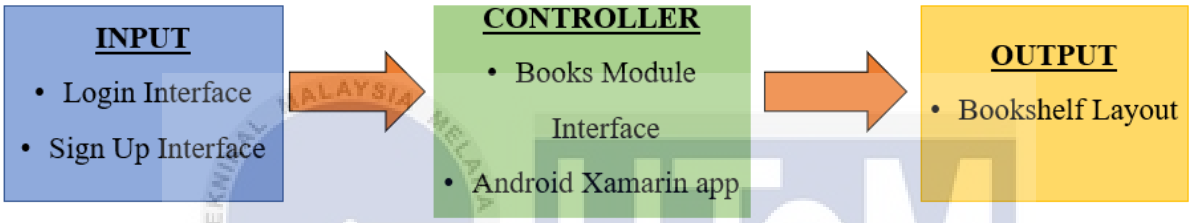


**Figure 3.3: Block Diagram of Library Book Location Tracking**

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## 3.4 Process Flow Chart

Flowchart is a type of diagram that can describe about the methods and explain about the process how the projects is function. A flowchart also can be characterized as a diagrammatic representation of an algorithm. In this part, it will show about the process how the projects are work and functions. The projects of library book location tracking system are developed by using android application in Microsoft Visual Studio 2019. The systems will be started by login and sign up for the applications. For the first time, users are required to register

the information for this application. Meanwhile for log in interface, the user needs to fill up the information for example user id and password before using the applications.

Next, after fill up all the information, the user can search the names of the books that are required in this application. If the user can find the names of books, the application will track the position of books at bookshelf area and give message about the position of books. The process of flow chart for "library book location tracking application" will show in figure below.

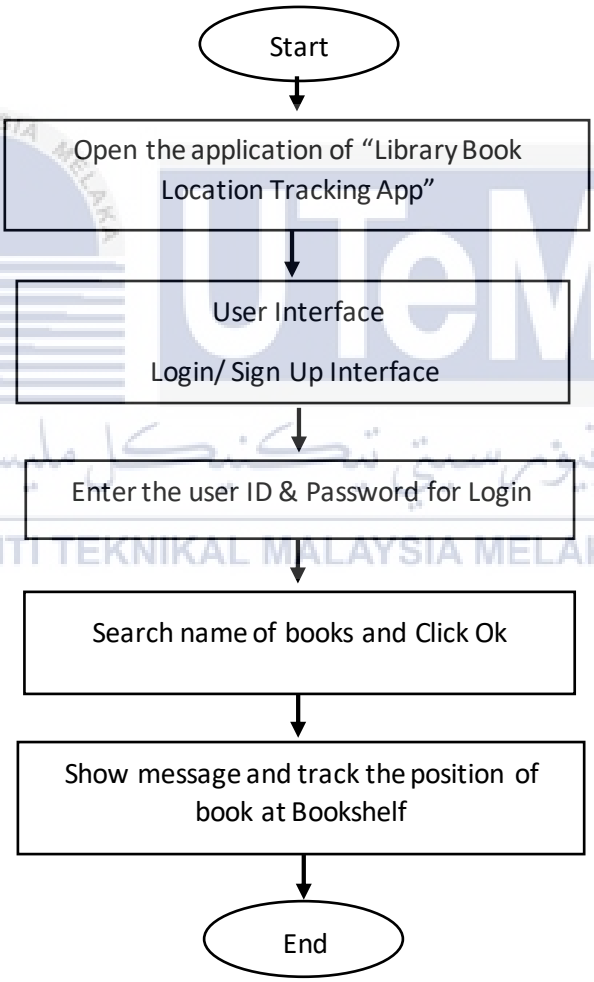


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**Figure 3.4: Flow Charts of the process of Library book location tracking system**

## 3.5 Project Work Plan

The possibility of implementing this project with the specified time period can be achieving by required operating capacity has been a right planning. The overall amount of time that are required to developing and implement this project will be 2 semesters which is about 30 weeks. Moreover, this aspect of the project is incredibly significant in terms of achieving a desired outcome for Project Sarjana Muda 1 and 2 with expected operating capability for avoid any possibilities error.

Because of that, it needs to create a Gantt chart that are used for planning about the times that are required for developing the projects. A Gantt chart is a type of chart that are used for summarized and update about all the progress of project activity during PSM 1 and PSM 2. The Gantt chart of this project will be presented and shown in table 3.1 and table 3.2 below.

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**Table 3.1 Gantt chart progress of project activity PSM 1**

| PROJECT ACTIVITY | Academic Week | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| PSM 1 Briefing and Meet Supervisor | | | | | | | | S | | | | | | | |
| Discuss about PSM project and Register Title Projects | | | | | | | | E | | | | | | | |
| PSM 1 Briefing (Literature Review) | | | | | | | | M | | | | | | | |
| PSM 1 Briefing (Abstract & Methodology) | | | | | | | | E | | | | | | | |
| Find articles that are related to PSM projects | | | | | | | | S | | | | | | | |
| Discuss planning of implementation project | | | | | | | | T | | | | | | | |
| Do the draft report for PSM 1 (chapter 1- 3) | | | | | | | | E | | | | | | | |
| Submit a draft report to supervisor for review | | | | | | | | R | | | | | | | |
| Do the research to implement the projects | | | | | | | | | | | | | | | |
| Learning Tutorial for Xamarin Software | | | | | | | | B | | | | | | | |
| Try the coding and Run the simulation | | | | | | | | R | | | | | | | |
| Submit a final draft report PSM 1 to supervisor | | | | | | | | E | | | | | | | |
| PSM 1 Final Report Submission to supervisor and Designated Panel and Video Slide Presentation | | | | | | | | A | | | | | | | |
| PSM 1 Presentation | | | | | | | | K | | | | | | | |

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**Table 3.2 Gantt chart progress of project activity PSM 2**

| PROJECT ACTIVITY | Academic Week | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| PSM 2 online briefing by JK PSM | | | | | | | | S | | | | | | | |
| PSM 2 online briefing (Result & Discussion) | | | | | | | | E | | | | | | | |
| PSM 2 online briefing (Conclusion & Future Recommendation) | | | | | | | | M | | | | | | | |
| Online Meeting Progress with Supervisor | | | | | | | | E | | | | | | | |
| Create User Interface for application | | | | | | | | S | | | | | | | |
| Create controller interfaces for the application | | | | | | | | T | | | | | | | |
| Create new relative layout for the output application | | | | | | | | E | | | | | | | |
| Try coding to combine the interfaces from application | | | | | | | | R | | | | | | | |
| Test and run the simulation for the application | | | | | | | | | | | | | | | |
| Try the coding and Run the simulation | | | | | | | | B | | | | | | | |
| Create Survey to make analysis for application | | | | | | | | R | | | | | | | |
| Submit a final draft report PSM 2 to supervisor | | | | | | | | E | | | | | | | |
| Submit a final report PSM 2 to panel | | | | | | | | A | | | | | | | |
| Video Demo Presentation & PSM 2 Slide Presentation | | | | | | | | K | | | | | | | |

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## 3.6 Summary

This part is explained more about the process and method that has been used for development of the projects Library Book Location Tracking systems. Besides that, the researcher also explained about the any kind of software that are used in this project to clearly present the vital information for the material part.

Furthermore, this chapter help the researcher to get more information about the software that are used of this project in a more efficient ways. Basically, the process on this system can be view in the flowchart of the projects where it will show about the details and the process about how the project is done. Next for the software part, the researcher had explained about the material that are used to give a better understanding and perform as a reference to develop this application

Lastly, the work process had been clearly stated so that the researcher had adequate guidelines for completing the project. If the process had been known, the researcher could effectively compete the project based on the information for this chapter.

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# CHAPTER 4

# RESULT AND DISCUSSIONS

## 4.1 Introduction

In this chapter, there is about explanation for the software configuration that are used to developed the applications of library book locations tracking and results that are obtained from the systems. The software that are used to develop the application is about Microsoft Visual Studio 2019. In Microsoft Visual Studio 2019 software, this application will create by using Android App (Xamarin). Android App (Xamarin) is the software that are develop the application by using mobile android only. This application is required internet connection before using this software.

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## 4.2 Software Configuration

This part is explained about the experiment results for the applications of library book location tracking that has been done to build the projects by using Xamarin software. This software is developed for the purpose that are used to tracking the locations of books inside the library area. Furthermore, this application was developed by using android Xamarin application.

### 4.2.1 Software Configuration using Xamarin

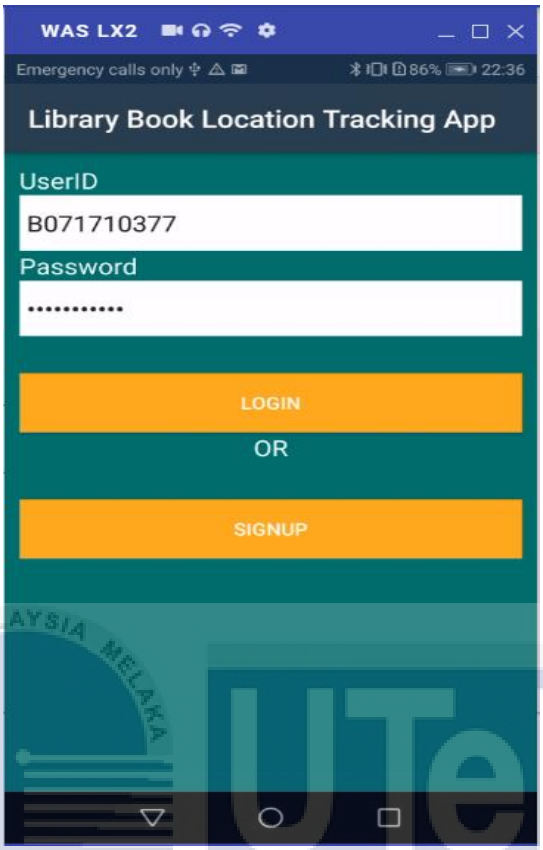


**Figure 4.1: Login Interface Layout**

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Figure 4.1 above shown about the Login Interface Layout parts that application has been developed and built by using Xamarin Software. The name project of this application is "Library Book Location Tracking App". The login layout is used as the "input" of this application. In this part, the user needs to key in the information for example ID Number and Password before using this application. The ID Number can be insert based on the student matrix number and the password can set any kind of characters and number. If the ID Number and password there are enter is correct, the user can login this system.

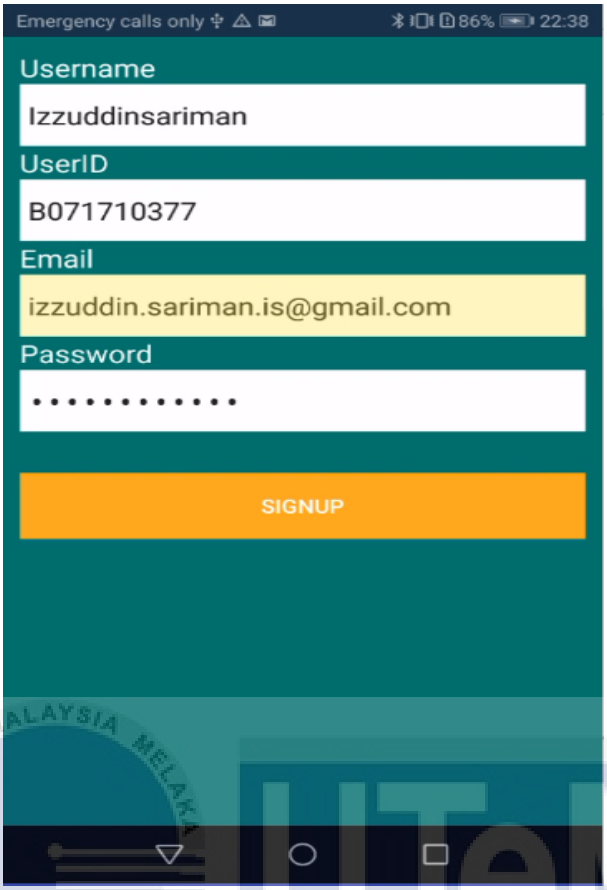


**Figure 4.2: Sign Up Interface layout**

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Next, in figure 4.2 is shown about the Sign up interface layout. The signup interface layout is created for the purpose where the users that are using the application for the first time. The Sign up interface layout is also used as the "input" for this application. This module is required for students to fill the information before using the applications. The information that are required to fill for example is about username, user id, password and email. The username is about the name of student and the user id is about the id number matrix for student. Meanwhile for the email, the user can use whether the student emails or any other emails.

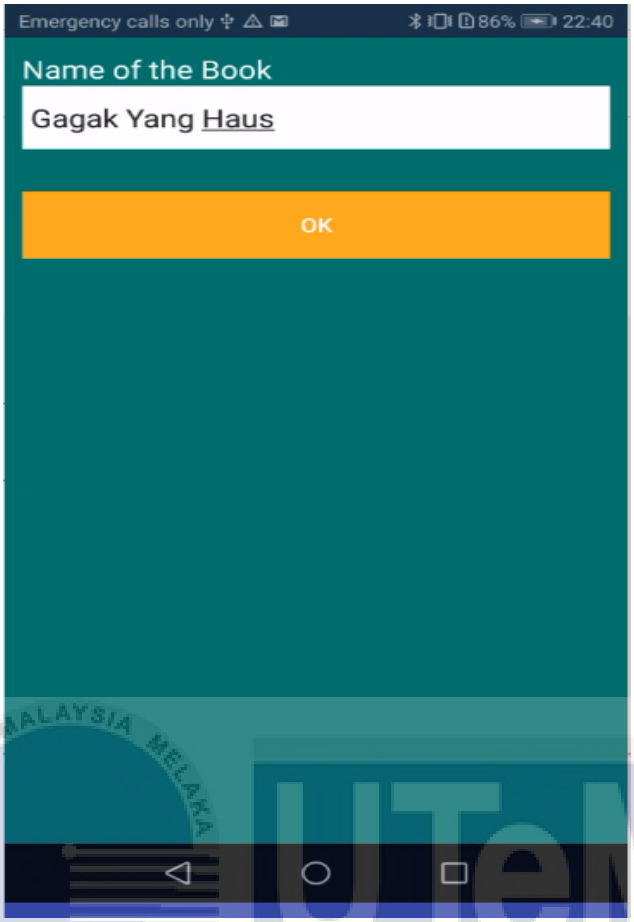


**Figure 4.3: Books Module Layout**

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Furthermore, in figure 4.3 is shown about the Book Module. This module is used as a "controller" where the user can search the all the names of the books there are required in this application. After the users is successful to login this system, the students can search the name of the books for this part. If the title of the book is in the application, the system will track the location of books inside the library and show the position of books in applications of mobile phones.

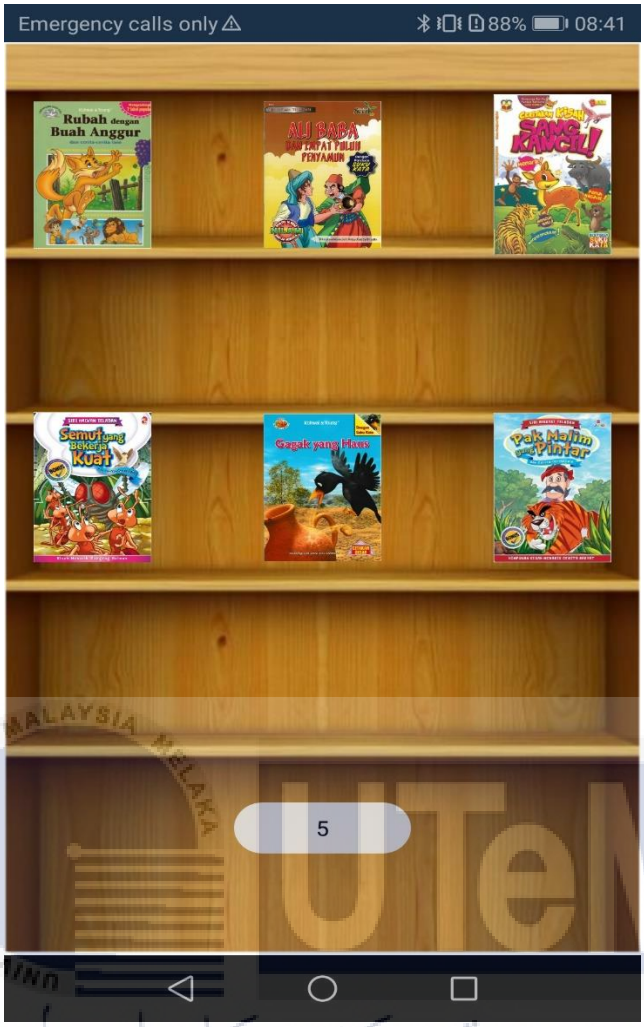


**Figure 4.4: Bookshelf Layout**

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Lastly, in figure 4.4 above show about the collections of books there have at bookshelf area inside this application. this module is used as a "output" for this application. The function of this part is when the users search the names of the books, the books can detect and give the message below to show about where the position of books at bookshelf area by using this application.

## 4.3 Analysis result for development application

This part will be explained about the analysis of the result based on the question from google survey form. The purpose of this survey is to ask about the opinions and give the positive response from the user about development of application "library book location tracking applications for the future and community services. This survey is containing 8 questions and get sample for 40 respondents about the project of the development "library book location tracking app".

### 4.3.1 Do you know about Xamarin software?

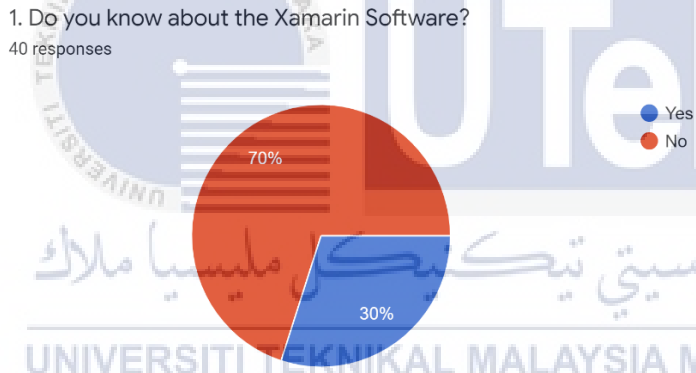


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**Figure 4.4.1: Pie chart responses about Xamarin Software**

Based on the Pie chart above, this analysis is about the common question about the Xamarin Software. Based on the pie chart, it can conclude that a total of 28 responses which is equal to 70% do not know about the Xamarin software. Meanwhile, 12 people respondent which is equal to 30% know about the Xamarin software.

### 4.3.2 Do you interesting to design the application using Xamarin software?

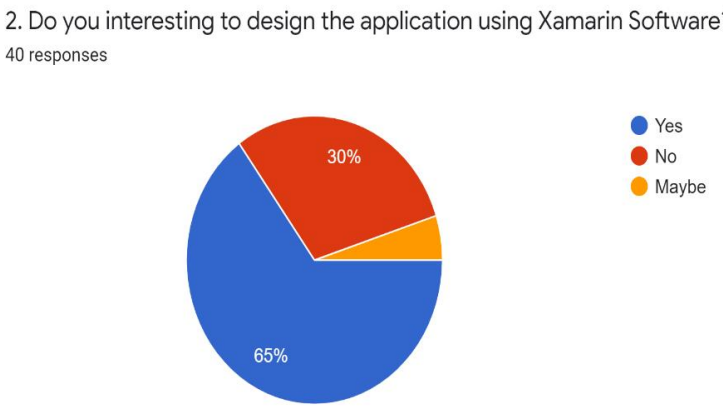


**Figure 4.4.2: Pie chart responses about interesting to design application using Xamarin Software**

Figure 4.4.2 above shown the total respondent about interesting to design application using Xamarin software. Based on the result for pie chart above, it can conclude 65% which is 26 respondents is interested to design application using Xamarin software. Meanwhile, some of the respondents which is 30% is equal to 12 respondents is not interesting to design application using Xamarin and 5% which is 2 respondents give maybe result to design application using Xamarin software.

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### 4.3.3 How do you get information about the Xamarin Software?

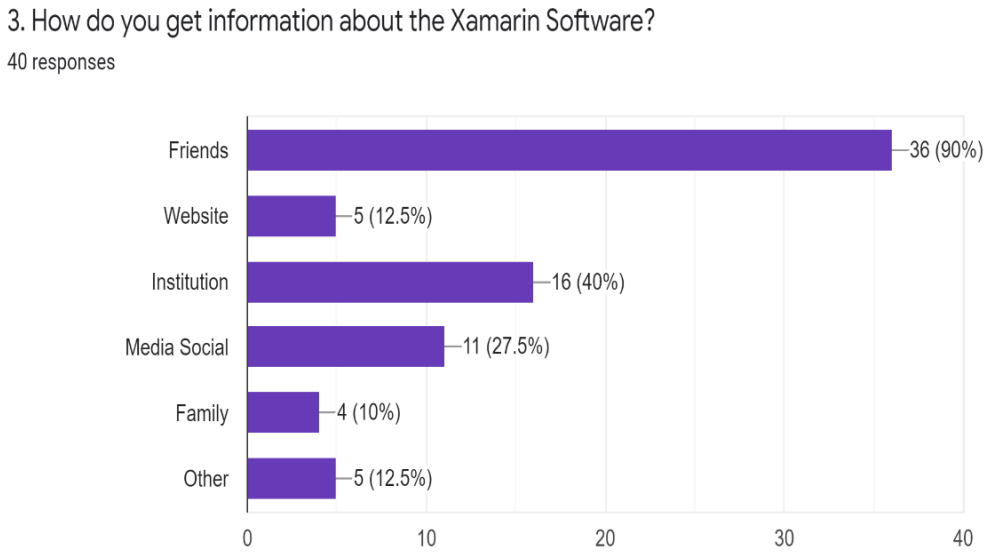


**Figure 4.4.3: Bar chart responses about how they get information about Xamarin Software**

Figure 4.4.3 above shown about Bar chart of total respondent about how they get information about Xamarin Software. Based on the analysis of this respondent, it can conclude that a total of 36 respondents which is 90% get information about the Xamarin software through friends. Furthermore, the total of 16 respondents which is 40% get information through institution. Next, the total of 11 respondents which is about 27.5% get information through media social. Lastly, the total of 5 respondents which is 12.5% get the information through other.

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### 4.3.4 Do you think this application can make some improvement for the future community?

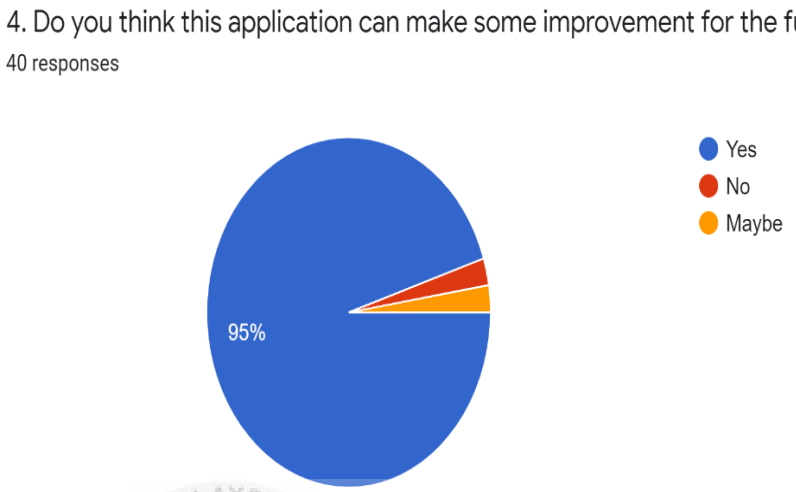


**Figure 4.4.4: Pie Chart responses about make improvement an application for future or community**

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Figure 4.4.4 above shown the total responses about make some improvement an application for the future or community services. Based on the analysis of pie chart above, it can conclude that the total of 38 respondents which is 95% is agreed this application made improvement for the community. Meanwhile, the total of 1 respondent is not agree to do improvement for the application and 1 respondent is give maybe respondent about improvement for application.

### 4.3.5 My application is developed only using android system, in your opinion should I upgrade this application to iOS system?

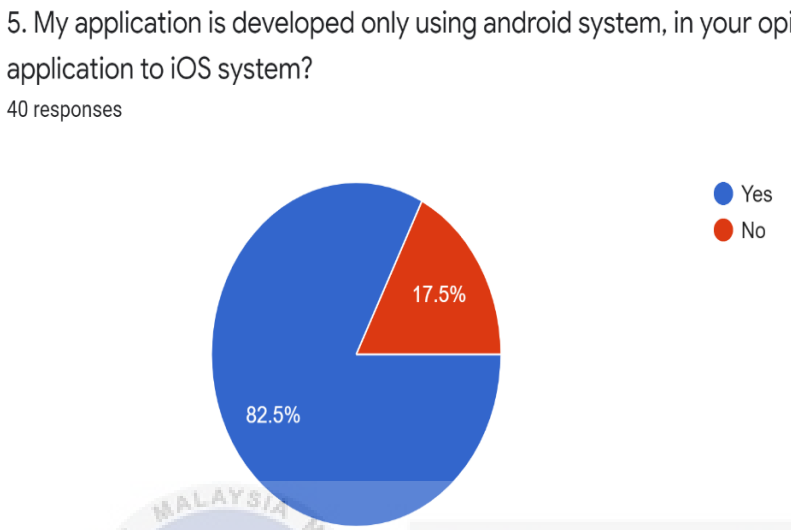


**Figure 4.4.5: Pie Chart responses about upgrade the application to iOS system**

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Figure 4.4.5 above shown the total responses about upgrade the application of Library Book Location Tracking application to iOS system. From the observation on the analysis of pie chart above, it can conclude the total of 33 respondents which is 82.5% is agree if this application is upgrade to iOS system. Meanwhile the other is about 7 respondents which is 17.5% is not agree if this application is upgrade to iOS system.

### 4.3.6 In your opinion, do you think this application is useful for any institution?

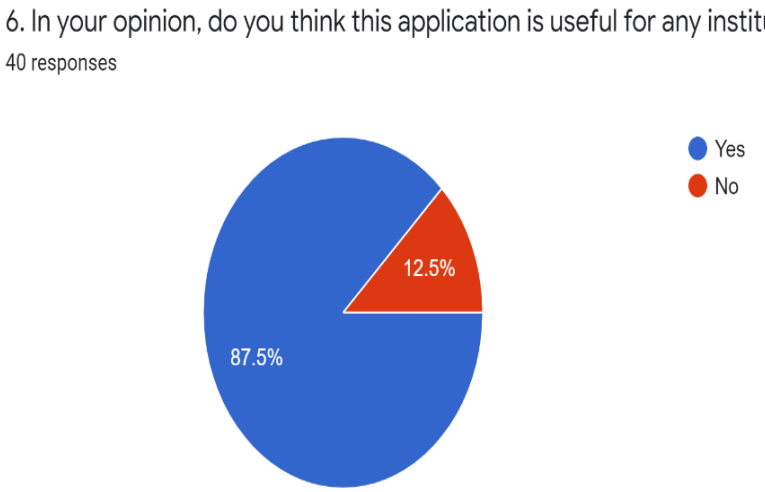


**Figure 4.4.6: Pie Chart responses about this application useful for any institution**

Figure 4.4.6 above shown the total responses about this application useful for any institution. Based on the observation from the pie chart result, it can conclude the total of 35 respondents which is 87.5% is agree if think this application is useful for any institution. Meanwhile the other is about 5 respondents which is 12.5% is not agree if this application is useful for any institution.

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### 4.3.7 If this application is success to develop, would you recommend to use this application for the future?

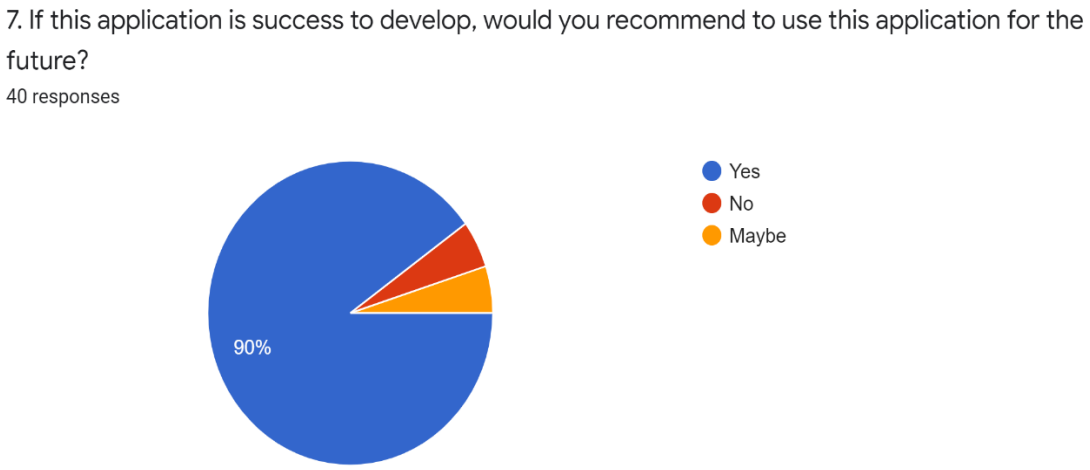


**Figure 4.4.7: Pie Chart responses recommend to use this application for the future**

Figure 4.4.7 above shown the total responses about the recommendation to use this application for the future if the application success to developed. Based on the observation from the pie chart result, it can conclude the total of 36 respondents which is 90 % is agree to recommend for using this application for the future. Meanwhile for the other is about 2 respondents which is 5% is not recommend to using this application for the future and 2 respondent which is 5% is maybe recommend to using this application for the future.

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### 4.3.8 Could you rate about the quality of this application

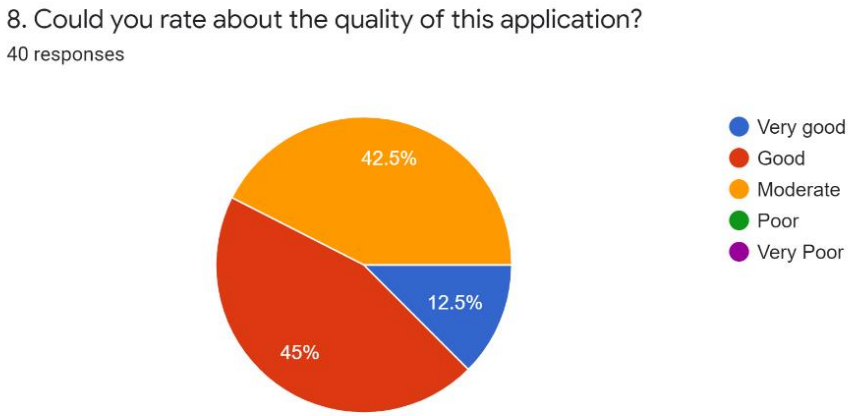


**Figure 4.4.8: Pie Chart responses about the rating quality of this application**

Figure 4.4.8 above shown the total responses about the rating quality of this application. Based on the observation from the pie chart result, it can conclude the total of 18 respondents which is 45 % is give a good rating about the application of library book location tracking using android application. Furthermore, other respondents about 17 respondents which is 42.5% is give moderate rating about the application. Lastly, some of respondents about 5 respondents which is 12.5% is give very good rating for this application.

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## 4.4 Summary

The summary of this chapter is explained about the result and discussion for the project of "Library Book Location Tracking Application using Xamarin Software". In this chapter, the researcher will explain about how the interfaces of application library book location tracking using android Xamarin app is work and function. This application was developed and implement by using Xamarin Software in mobile Xamarin app.

Furthermore, for the analysis result of this application, the researcher makes the survey by using google form. The purpose of this survey is to ask about the opinions that can make some improvement from the user about development of application "library book location tracking applications for the future and community services. Lastly, based on the survey analysis from the google form, many respondents give positive feedback about development of project library book location tracking using android application.

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# CHAPTER 5

# CONCLUSION & FUTURE WORK

## 5.1 Conclusion

The applications of "Library Book Location Tracking Apps" is a project that have been developed by using Microsoft Visual Studio 2019 for the android applications. There have the two main objectives which are wants to be achieve for this project which is to develop the application system for library book location tracking using android application. Besides that, to analyze about the development of this application in term of its functionality.

Nowadays, the user having some problem to find the specific books that are required because there have a lot and large of bookshelves in library. Because of that, it can make the students to spend a more time and efforts to find the books there are need. This project can help the users to find the location of books in library area by using the android application.

The function of this application is when the user searches the names of the books, this system can be able to tracking and detect the location of book in bookshelves at library area. Furthermore, this application can detect the position of books and give the message where the position of books at bookshelf area.

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## 5.2 Future Work

To make this project become much better, there are some future work and recommendation that can help to develop and implement about this system and application. This future work is required more research that can add more functionality to the applications of library book location tracking system.

Firstly, the recommendation for the future work about this application can be upgrade using the iOS system. iOS is a mobile operating system which is created and developed by Apple Inc. This operating system can use in mobile applications for example Iphone and IPad. By using IoS system, the Iphone users can easily to use this application to track the location of books inside library for the future works.

Next, this application can add more functionality and features, for example add the maps of library. By using this method or approach, that can help the user to find the location of books inside library and show the direction of books by using map. Lastly, this application can make improvement and develops by using Android Studio software, Kotlin software and MIT App Invertor as a future recommendation to do improvement.

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# REFERENCES


1. Chitra, N. T., Anusha, R., Roja, G., and Lakshmi, B. D., 2019. Locating Book In Library Using Wi-Fi (6), 114–117. Available from: http://www.openhandsetalliance.com/android_overview.html.
2. Choudari, A., Joshi, S., Bembalkar, A., Marathe, N., and Sankpal, L. J., 2013. Book Tracking Application in Android for Library Using GPS. *International Journal of Innovative Research in Computer and Communication Engineering* [online], 1 (1), 30–34. Available from: www.ijircce.com.
3. Dinesh, R., Arun Pravin, S. R., Aravindhan, M., Rajeswari, D., and Student, U., 2015. Library Access System Smartphone Application Using Android. *International Journal of Computer Science and Mobile Computing*, 43 (3), 142–149.
4. Gujja, A., Husain, I., Kulkarni, H., and Mahajan, P. M., 2019. Android Application for WIFI Based Library Book Locator, 2767–2769.
5. Singh, V. P., 2014. LIBRARY MANAGEMENT Submitted By : Division of Computer Science School of Engineering Cochin University of Science & Technology Done by. [online], (March), 1–88. Available from: http://dspace.cusat.ac.in/jspui/bitstream/123456789/8218/1/library management system.pdf.
6. Wang, X., Pan, H., and Ou, R., 2017. Library's Smart Bookshelf and Book Positioning System Based on ultra-high frequency RFID Technology, 123 (Msmee), 219–222.
7. Rafi, S. S., Mohan, A. G., Sankar, A., Reshmi, L., and Renjith, S. R., 2017. Android Based Advanced Book Locator and Library Manager. *International Journal of Advance Research in Science and Engineering*, 6 (04), 562–565.


UNIVERSITI TEKNIKAL MALAYSIA MELAKA

8. Surve, R. R., 2018. Book Locating Mobile App for Library, 7 (4), 258–263.
9. Uddin, M. P., Islam, M. Z., Nadim, M., and Afjal, M. I., 2013. GPS-based Location Tracking System via Android Device. *International Journal of Research in Computer Engineering & Electronics*, 5 (November), 1–7.
10. Vaidya, O., Kulthe, S., Khaire, A., and Kela, N., 2017. Design & Implementation of Rfid Based Book Tracking System in Library, 833–840.
11. Yenurkar, G. K., Nasare, R. K., and Chavhan, S. S., 2018. RFID based transaction and searching of library books. *IEEE International Conference on Power, Control, Signals and Instrumentation Engineering, ICPCSI 2017*, (February), 1870–1874.
12. Annaraman, D., Thamarai, P., and Kumar, D. T. V. U. K., 2015. Smart Library Management System Using RFID. *International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering* [online], 4 (4), 1916–1925. Available from: http://www.ijareeie.com/upload/2015/april/17A_087_Annaraman.pdf.
13. Begum, Sa., 2017. Library Management System Using RFID Technology. *Library Management System Using RFID Technology International Journal for Modern Trends in Science and Technology*, 03 (07), 187–190.
14. Geetha, B. T., Perumal, V., S.Hariharan, and T.Jayakumar, 2018. A Smart Book Accessing System Using RFID and IR in Library, 118 (24), 1–17.
15. Mohammed, M. N., Muhamad Alif Wan Radzuan, W., Al-Zubaidi, S., Ali, M. A. M., Ismael Al-Sanjary, O., and Raya, L., 2019. Study on RFID Based Book Tracking and Library Information System. *Proceedings - 2019 IEEE 15th International Colloquium on Signal Processing and its Applications, CSPA 2019*, (August), 235–238.

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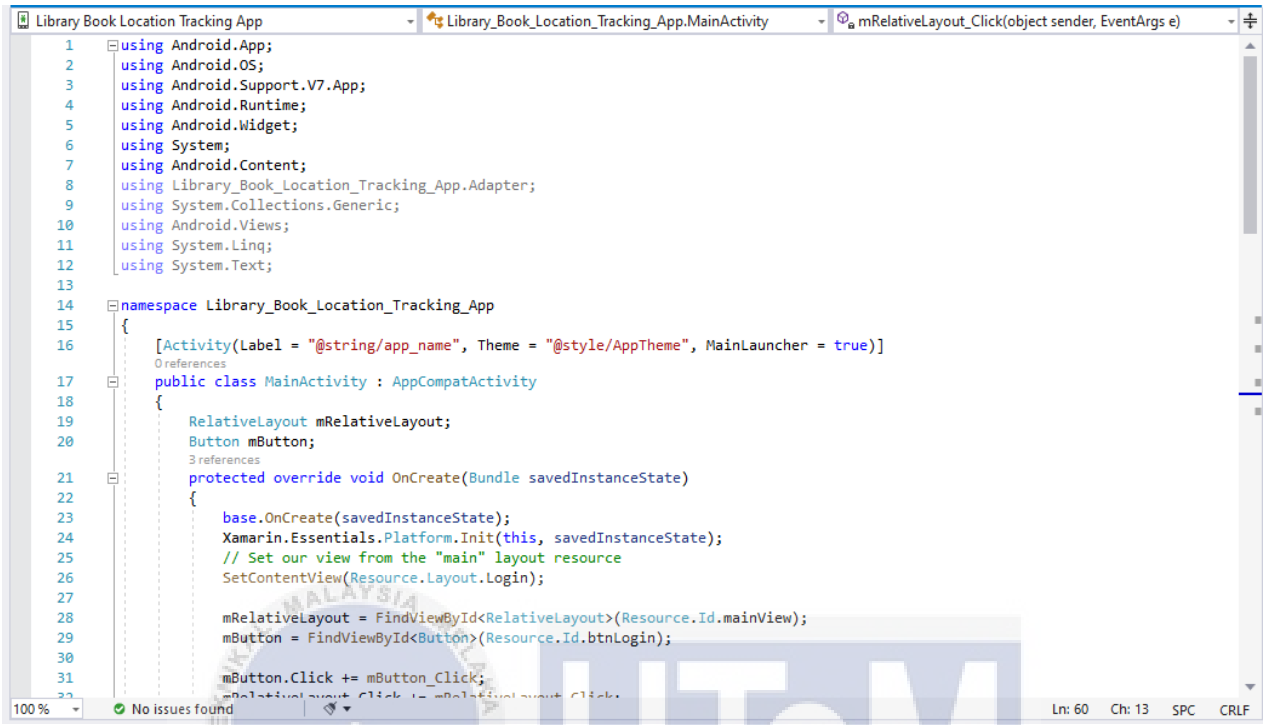
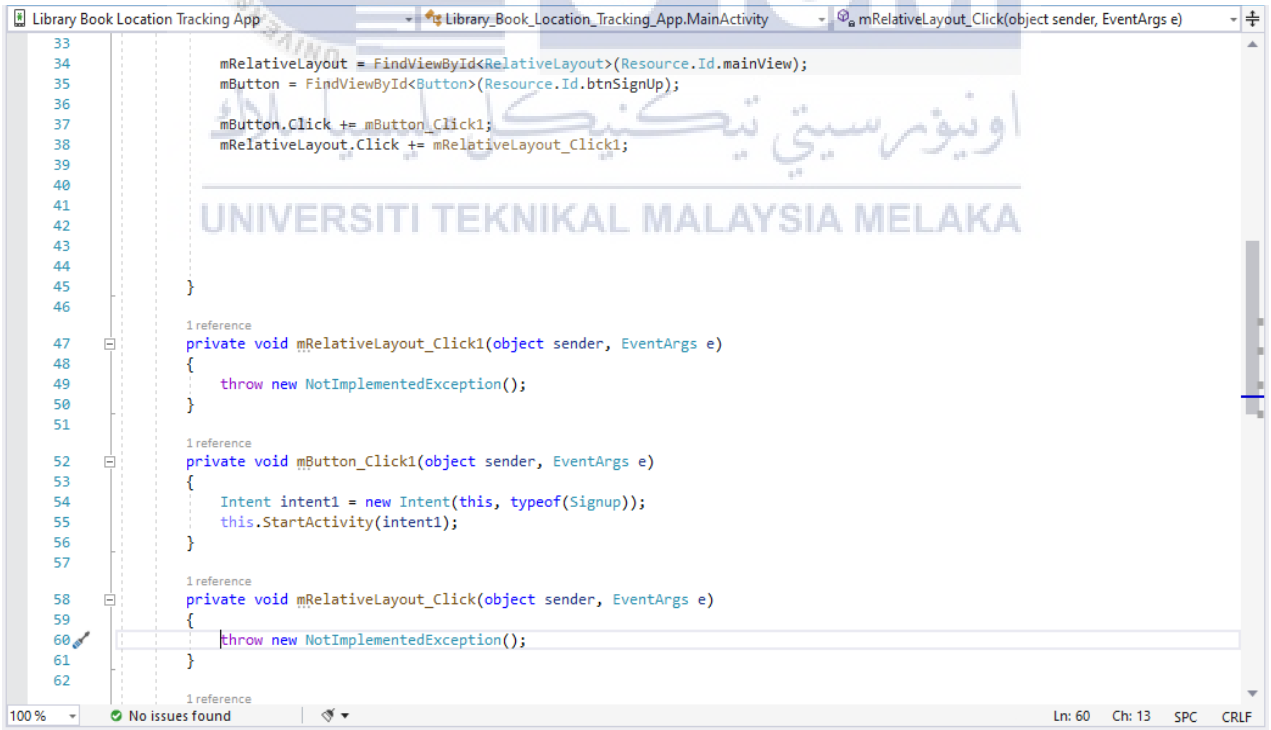
# APPENDIX



```
Library Book Location Tracking App | Library_Book_Location_Tracking_App.MainActivity | mRelativeLayout_Click(object sender, EventArgs e)

using Android.App;
using Android.OS;
using Android.Support.V7.App;
using Android.Runtime;
using Android.Widget;
using System;
using Android.Content;
using Library_Book_Location_Tracking_App.Adapter;
using System.Collections.Generic;
using Android.Views;
using System.Linq;
using System.Text;

namespace Library_Book_Location_Tracking_App
{
    [Activity(Label = "@string/app_name", Theme = "@style/AppTheme", MainLauncher = true)]
    0 references
    public class MainActivity : AppCompatActivity
    {
        RelativeLayout mRelativeLayout;
        Button mButton;
        3 references
        protected override void OnCreate(Bundle savedInstanceState)
        {
            base.OnCreate(savedInstanceState);
            Xamarin.Essentials.Platform.Init(this, savedInstanceState);
            // Set our view from the "main" layout resource
            SetContentView(Resource.Layout.Login);

            mRelativeLayout = FindViewById<RelativeLayout>(Resource.Id.mainView);
            mButton = FindViewById<Button>(Resource.Id.btnLogin);

            mButton.Click += mButton_Click;

100 %  No issues found                                                    Ln: 60  Ch: 13  SPC  CRLF
```



```
Library Book Location Tracking App | Library_Book_Location_Tracking_App.MainActivity | mRelativeLayout_Click(object sender, EventArgs e)

            mRelativeLayout = FindViewById<RelativeLayout>(Resource.Id.mainView);
            mButton = FindViewById<Button>(Resource.Id.btnSignUp);

            mButton.Click += mButton_Click1;
            mRelativeLayout.Click += mRelativeLayout_Click1;

        }

        1 reference
        private void mRelativeLayout_Click1(object sender, EventArgs e)
        {
            throw new NotImplementedException();
        }

        1 reference
        private void mButton_Click1(object sender, EventArgs e)
        {
            Intent intent1 = new Intent(this, typeof(Signup));
            this.StartActivity(intent1);
        }

        1 reference
        private void mRelativeLayout_Click(object sender, EventArgs e)
        {
            throw new NotImplementedException();
        }

        1 reference

100 %  No issues found                                                    Ln: 60  Ch: 13  SPC  CRLF
```

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```xml
<?xml version="1.0" encoding="utf-8" ?>
<RelativeLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:background="#ff00796b"
    android:layout_height="match_parent"
    android:id="@+id/mainView"
    android:clickable="true"
    >

    <LinearLayout
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:layout_centerHorizontal="true"
        android:layout_margin="10dp"
        android:orientation="vertical"
        >


    <TextView
            android:text="UserID"
            android:textAppearance="?android:attr/textAppearanceMedium"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:id="@+id/lblUserID"
            android:textColor="@android:color/background_light" />

        <EditText
            android:id="@+id/UserID"
            android:layout_width="fill_parent"
            android:layout_height="45dp"
            android:padding="5dp"
```

100 % No issues found Ln: 1 Ch: 1

```xml
    <TextView
            android:text="Password"
            android:textAppearance="?android:attr/textAppearanceMedium"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:id="@+id/lblPassword"
            android:textColor="@android:color/background_light" />

    <EditText
            android:id="@+id/txtPassword"
            android:layout_width="fill_parent"
            android:layout_height="45dp"
            android:padding="5dp"
            android:background="#ffff"
            android:inputType="textPassword"
            />

        <Button
            android:id="@+id/btnLogin"
            android:layout_width="fill_parent"
            android:layout_height="wrap_content"
            android:layout_below="@id/password"
            android:layout_marginTop="30dp"
            android:background="#ffffa726"
            android:text="Login"
            android:textColor="#ffff"
            android:autoLink="none"
        />

        <TextView
            android:text="OR"
            android:textAppearance="?android:attr/textAppearanceMedium"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
```

100 % No issues found Ln: 1 Ch: 1 MIXED CRLF

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