STUDENT ATTENDANCE SYSTEM BASED ON QR CODE WITH UNIQUE IDENTIFICATION CAPTURING

BY

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A REPORT

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FACULTY/INSTITUTE* OF INFORMATION TECHNOLOGY

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Lastly, many thanks to my parents and family that give me support, encouragement throughout this project.

ABSTRACT

This project presents as an QR code-based attendance system which will be using mobile devices to scan QR code in order to achieve the attendance in the class or any events. QR code system is a combination of android applications developed for taking and storing the attendance to the cloud storage. The reason why this advanced method has been chosen as the attendance tracking system instead of others advanced method such as biometric-based, RFID based attendance system is because of QR code-based attendance system does not required any high-cost implementation on hardware and maintenance fee for specific hardware. Mobile device is now popular and general to everyone that have it. Thus, there was not needed any hardware to be implement in the campus. Other than that, it will solve the issues that have been facing by those tradition attendances taking method such as calling out names and paper recording. These tradition attendance systems were highly use in manpower, resources and less effectiveness. Students will be easily cheated in having their attendance without attending the class. Therefore, QR code-based attendance tracking system will help in increasing the effectiveness and efficiency on taking students attendance. Lecturers will not be required to shout out students' name in the class and waste their time for the teaching lessons. This method will provide a more rapid and accurate attendance records of the class due to the highly convenience in the class and strict authentication while scanning the QR code. Students' attendance will not be recorded if any authentication does not fulfil the regulations such as, the location of the students scanning the QR code wasn't in UTAR campus or the unique ID of the student's devices does not match with the data from the database. Hence, the final objectives of this project are to have a more accurate and efficient in retrieving the student's attendance in the campus.

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LIST OF ABBREVIATIONS

RFID	Radio Frequency Identification
QR	Quick Response
1D	1 Dimensional
2D	2 Dimensional
Wi-Fi	Wireless Fidelity

Chapter 1: Introduction

1.1 Problem Statement

In this era of advanced digital technology, there were plenty of ways to record down a persons' attendance in an event or which the person has being attended in a place. Attendance is a very important element for defining whether a person had been attended on some occasion. In the traditional ways that usually used to record down attendance with calling out names in a small class which capacity 10 to 20 students or a small event. Usually in primary and secondary schools, every class consist of a class teacher with an appropriate number of students so that they could use the traditional way, calling names one by one that we familiar with, to monitor students' attendance in school. However, when the situation came to university or college, it might not be suitable for using traditional way to monitor students' attendance because capacity for a class in university or college will be large and hard to track down the attendance accurately. This will be a potential problem for this type of attendance taking method which is this type of method will be time consuming due to the teacher need to call out 10 to 30 students one by one when the class started, and this will be costing 5 to 10 minutes including making sure every student name had been call out without omission. Other than that, nowadays many universities and college are using signing signature on a piece of attendance paper as an evidence that a student had attended the class or practical lab. This will be wasting much more manpower and time consuming for a larger class with larger number of students and wasting much more resources on using paper for signing their signature. Besides that, students are much smarter and trickier, they could help their friends who absent to the class by imitate their signature. This will derivative a serious issue if the student who cheated on the attendance but unfortunately claims an accident outside of the campus. The lecturer who in-charge of the class will be taking full responsibility for this issue. Other than that, every lecturer will be handing more than one class for certain subjects and certain subjects will be having more than one class of students attending. If we assumed that every lecturer having three lecture class and one tutorial class per day, every class needed at least three papers for lecture class and one paper for tutorial class. There are countless of lecturers teaching countless of class per day. Thus, this will be a serious waste of paper, manpower, time consuming and incompatible with environmental awareness.

The motivation of this project is to create a student attendance system application based on QR code with unique identification capturing to solve the current issues that faced by tradition attendance tracking method. With using this system in campus, student will just need to download the application and scan the QR code that generated by the class lecturer during the class. With this technology, students will be hard to cheat on the attendance which this type of attendance system will be using unique identification capturing to make sure that there will be an accurate attendance that generated for lecturer.

1.2 Background and motivation

In the last several decades, along with the development of information technology, there were many great improvements in our environmental such as, Smart cities, Artificial Intelligence, Smart Autonomous Car etc. As everything being improved and enhanced, we should enhance in using a modern way attendance tracing system. In old days, primary and secondary school's teacher will be calling our names to record down our attendance in black and white for an evidence even until University and college lecturers using this type of traditional way for example, signing their signature on the attendance paper for their attendance. However, students are very smart and tricky, they could have several ways to sign their attendance even they are absent to lecture class and practical class. For some small amount of class such as practical lab class or tutorial class, lectures could take the students by traditional ways but if for a hundred students of lecturer class, it will be an activity that wasting time, manpower and resources. Now, in the era of Internet of things, there are much more devices could be using as a modern way of taking student attendance. The objective of taking students attendance was to make sure they could learn knowledge and experience from university and college but not spending money for vacations inside the university or college, which means that the data accuracy of student's attendance must be strict and accurate. In order to distinguish every student with their unique characteristic, there are much more methods such as QR code, fingerprint recognition, face recognition, Iris recognition, RFID system, and Barcode system. QR code system is a combination of two android applications developed for taking and storing the attendance. Biometric systems such as fingerprint, Iris recognition and face recognition is a type of system that capturing students' unique identification such as fingerprint, Iris and facial features for tracking down students' attendance. Other than that, RFID system is a shortening words of Radio Frequency Identification system. It is an ID framework that utilizing remote

correspondence that permit moving information between labels that are held by individuals or appended to objects. Standardized tag framework is an organization of equipment and programming, essentially by portable PCs, printers, handheld scanners, foundation, and supporting programming. Be that as it may, these two sorts of following innovation are unique. Standardized identifications are intended to be checked each in turn while numerous RFID labels can be filtered by numerous individuals without a moment's delay. Standardized identifications additionally necessitate that the scanner keep a view with each code which is very close in a distance, while RFID is a close to handle innovation, so the scanner will be just required in an inside range so the mark might be perused by it. In these modern attendance tracing systems having their own advantages and disadvantages in terms of visibility, ease of use, productivity, affordability and data accuracy. Considering the wide popularity of smartphones, we will be introducing the use of smartphone for the smart attendance taking. Smartphones had become a necessity for millions of people including students. Practically every student will be owning one or more smartphones. Students will be using their smartphones and installing an application for signing their attendance for class. This will be implemented in a web services and mobile application with a location based and unique identification tracking system. This attendance tracking system will be requiring internet connectivity such as Wi-Fi or 4G for connecting to database residing in the remote server. In our project does not required any kind of hardware device other than smartphone which this will highly reducing the implementation time, cost of placing extra devices, and also highly increasing in accuracy of tracking the attendance data, productivity and affordability of implementing this project to the entire University

In this project, it will be expecting a workable prototype application of attendance system which can be downloaded by android devices to be used in the lecture class. Android studio and Dart programming language is used to design the mobile application that allow users to generate QR code and scanning the QR code to obtain the certain information and store inside database as a record. In order to counter the issues of easily prone to manipulation by the students, in our proposed system having a unique identification tracking system that able to track the location of the student or track any unique identification from the devices that could be match from the database and if the student location or unique ID does not fulfil the campus location and data, it will not be counted as presence in the class. Besides that, in our system will be obtaining the unique ID from the users' phone, so that they can't cheat the attendance by logging out and sign-in to

other users' email. In this proposed system, we will be designing for two types of login method interfaces. One of the login method interfaces is for administrator to sign in with their UTAR email and password in web application. For administrator features in the web application will be enabling administrator to generate a certain event or subject class's QR code. Other than generating the QR code features, administrator could summarize and generating the attendance list of students that scan the QR code using the web application. For the convenience of administrator, administrator could generate the QR code earlier, save it and post it to WBLE for students to scan the QR code. For students' mobile application function, students will need to sign in with their UTAR email and register their name, student ID, phone number, Course and Faculty. Besides that, the features for students' mobile application are they could use this mobile application to scan the QR code that generated by the administrator for signing their attendance in the class or event. It will also be containing a feature that allow students to view on their subjects' attendance percentages and for administrator will be allowed to view the number of the students that attended their class or events. Therefore, in this proposed system, we will be using Dart programming language and Android Studio software to develop the mobile applications.

1.3 Project Objective

The main objective of this project will be to develop a student attendance system based on QR code with unique identification capturing.

1. To develop an application which can scan QR code on mobile devices.
2. To create an UI which can easily retrieve and tracking the accurate attendance record.

For this project, QR code-based attendance monitoring system is a modern technology way to track attendance with replacing the traditional attendance system. There are several objectives and goals of this project that we are going to achieve. The main goal that we wanted to achieve is to provide a fast and efficient attendance system instead of using traditional attendance system that time consuming and waste of manpower for a student to sign their attendance. This could explain by the process of a student signing their attendance using their mobile phone scanning the generated QR code will be much faster and more effective than signing their attendance on a piece of attendance sheets or lecturer calling names one by one. In addition, this system could work in any place or classroom and applied to all the students, lecturers and administrator in University Tunku Abdul Rahman. Other than that, we planned to provide a system that requires minimum

hardware and could be maintained at minimum cost. This could be meant by using QR code-based attendance system, the hardware that requires is mobile devices. In the age of advanced technology, every University or college students will at least own a mobile device, and this will the essential to meet the requirement that uses minimum cost. It won't be unlike others modern attendance system such as biometric based attendance system that require much more hardware to obtain the students attendance. Besides that, uses this proposed system could help lecturers' that teaching class or administrator of an event to reduce the error in the attendance such as over signed or counterfeit on friends' signature to give a hand to their friends who absent.

1.4 Proposed approach/study

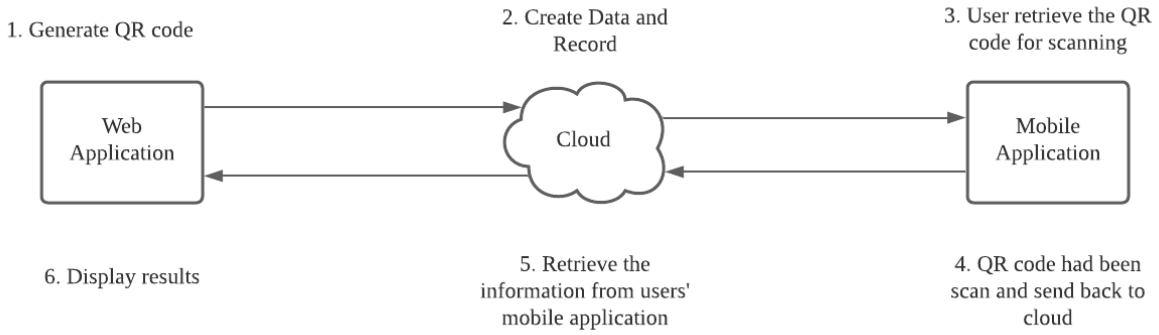


Figure 1.4.1 General work

In this part will show the general work of the project. In this general work of the attendance system will be differentiate as 3 part which is web application, cloud and mobile devices. For web application will be allowing admin to login to the web to generate QR code and save to cloud as a record and create data of the attendance for the specific day or class. Mobile application could scan the QR code that generated by administrator and the cloud will retrieve the information from the user as an evidence of attended to the class or specific event. At last, administrator could retrieve records of the attendance from the cloud and display the results in the web application.

1.5 Highlight of what has been achieved

In this project, the highlight that has been achieved were created a localhost web server that allow user to proceed with several features such as sign in, sign up, captured attendance data from database directly and able to make changes for example like update and delete on the records of

attendance. Other than that, in this project consist of using RESTful API which allows other user to request data or post data into the database.

Besides that, a mobile application had been developed by using Flutter and android studio. This mobile application consist of features of scanning QR code, sign in, sign up method and unique identity tracking system which is getting the users' mobile device unique information such as android ID and etc.

1.6 Report of organization

This document consists of 6 chapters. The first chapter will be including the problem statement, background, and motivation that related to this project topic, scope, objective and proposed approach/study. Next, chapter 2 will be defining and explaining the literature review of existing work that related to the topic and the critical remarks of previous work that has been researched. Other than that, Chapter 3 will be describing the overall system design and module design by using flowchart. Moreover, Chapter 4 explain the methodology and tools which consists of general methodologies and tools to use. The upcoming Chapter 5 will be including the implementation and testing. Lastly, Chapter 6 will be leading to the conclusion and the future work that can be done or implement in this project.

Chapter 2: Literature Review

A literature review is a comprehensive summary of existing research paper on particular topic. It should enumerate, describe, summarize, objectively evaluate and clarify on existing research. It is also presenting the current knowledge such as substantive finding as well as theoretical and methodological contributions to a particular topic. In this section, we will be going to discuss about the current existing system, types of solution that able to counter the issues of traditional attendance system with using the current existing system and the modern systems' strength and weakness.

2.1 Biometric-based Attendance Management System

2.1.1 Fingerprint-Based Attendance Management System

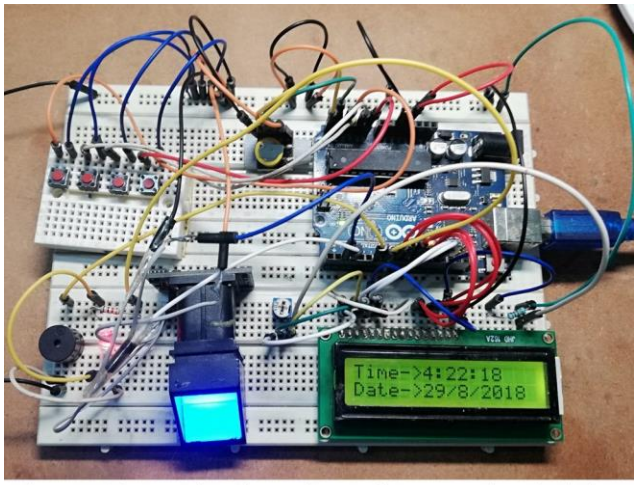


Figure: Fingerprint Attendance System using Arduino

Figure 2.1.1 Fingerprint Attendance Tracking System

Fingerprint that anyone will be having on their finger is just one of the most mature and famous technologies that used for individual identification. Biometric technologies verify identity and characteristics in the following methods for example like fingerprints, faces, Irises, etc. The motivation behind why is that finger impression confirmation is mainstream is on the grounds that fingerprints are special as an individual ID, it was significantly steadier, enduring and effectively taking. Unique finger impression Based participation the board framework adjusts finger impression verification into interaction of participation the executives for understudies. It is made up by two techniques which is enrolment and approval. Enrolment is to acknowledge a user using their ID and capturing their biometrics fingerprint of the user and stored into the database after the feature extraction. In feature extraction, it will be called the minutiae point of the fingerprint. It can filter out the attributes in the print, such as orientation, changes in the direction of ridges, arches, circles, and threads. These capacities structure a format that is utilized to decide the character of the client and plan the confirmation cycle. During authentication, the user's biometrics will be captured again, and the extracted features will be compared with the existing biometric data recorded in the database to determine matches. Once the matched is successful, attendance will be recorded against the users' id used in matching templates. This work uses a fingerprint reader as input to obtain characteristics and develops a program with a fingerprint recognition and identification system including a database that stores user information. The database will include the user's fingerprint template and other biometric data as well as the user's attendance record.

2.1.2 Iris recognition-based attendance system

Figure 2.1.2 Iris recognition-based Attendance System

Iris acknowledgment or iris examining is the way toward utilizing noticeable and close infrared light to take a high-contrast photo of a human's iris. It was a kind of biometric innovation which having similar attributes, for example, face acknowledgment, and fingerprinting. It generally gauges the remarkable examples in irises, the shaded circles in an individual's eyes. The scanner typically works by illuminate the iris to get the special sample that are not noticeable to the unaided eye. It will be prohibiting and identifying all that commonly block separated of the iris. Iris acknowledgment has been applied for getting to some high-security offices or accomplishing on explicit information in a portion of the data set. Be that as it may, this innovation is presently being broad in created on data frameworks for instance like organization, internet business, and retail applications. In these innovations, iris acknowledgment is the one that comprise of develop biometric innovation that utilized in programmed individual recognizable proof. Iris acknowledgment for individual distinguishing proof was proposed in 1936 by ophthalmologist Candid Burch. This kind of innovation was showed up in James Bond film in 1980s', yet it actually remained sci-fi and guess. In 1987, this thought was protected by two ophthalmologist that are Aran Safir and Leonard Flom. This innovation is being utilized in a few different applications for instance like getting to control for high security establishments, Visa utilization check, or worker recognizable proof. Iris acknowledgment is mainstream on account of its uniqueness for recognizable proof, soundness, permanency and effectively taking.

2.1.3 Face recognition-based attendance system

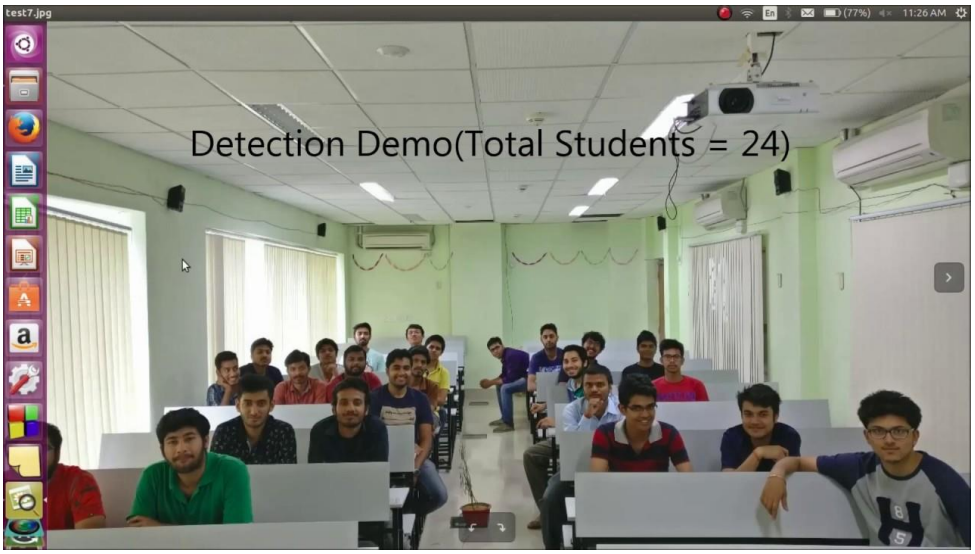


Figure 2.1.3 Face recognition-based Attendance System

The programmed participation framework utilizing face acknowledgment proposes that the framework depends on face discovery and acknowledgment calculations for participation which having a gadget that examining students' face while they enter the class, and the framework will record the participation by identifying students' face. It was one of the develop and famous innovation in Biometric-based participation framework. Computerized Attendance framework is a methodology that consequently decide if the presence or the shortfall of the understudy in the instructional exercise class or speaker class. This framework can likewise recognize where the understudy is available or missing during the talk class and it additionally can be applying to test meetings to guarantee the presence of the understudy. The participation of understudy will be controlled by catching their appearances. There are two basic Human Face Recognition strategies are highlight based methodology and brilliance-based methodology. For the element-based methodology otherwise called nearby face acknowledgment framework. The way to include based methodology is that utilized in face like eyes, ears, nose, mouth, edges, and so forth, while the brilliance-based methodology likewise named as the worldwide face acknowledgment framework, utilized in perceiving every one of the pieces of the picture

Advantage:

There is significantly more benefit for utilizing Biometric-Based participation observing framework. Above all else, it is security-wise, and it is a gigantic enhancement for secret key and

furthermore ID cards. Fingerprints are a lot harder to fake or cosy, it additionally endures long and will not be change incredibly over a long period, so the information stays current in the data set will be keep going long than photographs and passwords. Second, is usability. For client, this framework is straightforward and simple to use for client. Client will not require attempting to recollect their identity card or being hindered out because of ID card left at home. Other than that, fingerprints are not transferrable or fakeable, precluding the sharing of passwords or 'checking in' for the benefit of another associate. This takes into consideration more exact following and observing understudies' participation. Other than that, biometric will verification client have been available when a circumstance or episode has happened is difficult to invalidate and can be utilized as proof whenever required. To wrap things up, from a specialized administration perspective, unique mark acknowledgment is presently a financially savvy security arrangement. The little handheld scanner is not difficult to introduce and has high precision.

Disadvantage:

Disadvantages in using this system that may be occurs is system failures. Those scanners are dependent upon similar specialized issues and constraints as any remaining electronic ID frameworks, for example, blackouts, mistakes and factors that causes by ecological. Other than that, is the expense for executing. The unique finger impression acknowledgment framework is more practical yet for more modest associations or College and school, the expense of execution and upkeep can in any case be the boundary to execution. In any cases, this drawback is diminishing as gadgets become more financially savvy and moderate. Last but not least, aversions are one of the bothers also. While the biometric sign excess parts respectably stable over a person's lifetime there are spaces of the general population that will denied from using the structure or people who have persevered through the insufficiency of fingers or hands would be dismissed.

2.2 Bar Code Scanner Based Student Attendance System

Figure 2.2 Barcode based Student Attendance System

Barcode recognition is one of the mature technologies and widely used in globally. There are two types of barcodes that were 1-dimensional and 2-dimensional. 1D barcodes are usually used to store text information while 2D are more complex and consist of more information such as text, price, quantity and image. Barcode can be usually seen in market store, convenience store, supermarket and hypermarket. There will be a square or rectangular image consisting of a series of black striped lines and blank areas with different width on the product. These images could be read by scanner, and it was applied to products for a quick identification by just scanning through it. They are widely used as a part of purchase process in retail, to track inventory in warehouse, and assisting in accounting on invoices. Mostly for education such as primary, secondary and University had applied this kind of technology to their library system and attendance system for events. Every student from the new intake will be required to take a photo in the campus to conduct an enrolment process for their student identification card. On the student identification card will contains of their student identification number, photo and an image of barcode. This barcode that consists on the student identification card will allow student to borrow books from the library or attend certain event for scanning through the barcode reader for their attendance. In this system, it could provide a more visibility of attendance for administrator and lecturer of their students' attendance instead of using traditional attendance system.

Advantage:

The advantage of this system is it could provide a quicker and more accurate attendance records. It will also reduce the hectic of lecturer and administrator for recording and tracking down the students' attendance. This system will also help in going paperless because there will not be needed to use paper for students to sign on the paper for their attendance. Barcodes eliminate the

possibility of human error because it was simple and easy to use. This could mean that lecturers or administrator just need to take only a few minutes to master the hand-held scanner for reading barcodes.

Disadvantage:

The disadvantage of this system is that high cost for requiring hardware in each class in the campus for taking students' attendance which means that every class required a barcode reader. It could not be done within a barcode scanner and a computer for scanning and retrieving information from the embedded barcode. Every scanner can only scan once barcode per time. Thus, it could not be effective for minimizing the time consumption for taking students' attendance. However, with the comparison with our proposed system, we could be more saving time in taking attendance by just scanning the QR code that prepared earlier by the administrator or lecturer.

2.3 RFID based attendance system

Figure 2.3 RFID based Attendance Tracking System

RFID is an acronym for Radio Frequency Identification. It uses radio waves to send data from the tag that were mentioned as RFID tags or label. It is a mature and stable technology that were widely used in certain sector such as retail, healthcare and institution. From this system, we could know that the requirement for this system is that a computer device with a connected RFID-reader that able to achieve student RFID-cards and, every student need to have a student RFID-cards that

assigned by the campus staff. Once the student enters the class, the RFID reader will read their RFID-cards and transmit the data to the server for comparison. The information that the RFID reader reads will be transmit to the server and the system will compare the information with the existing information that stored in the database. Once the transmitted data matched with the existing data that store in database, the attendance will be given and recorded in the database for report and statistic purpose. In this system, RFID reader is to read the RFID cards that obtain by the student, and the RFID server is to receive, manage and compare the data that transmitted from the RFID reader.

Advantage:

The advantage of this system is that this system able to provides more accurate identification than traditional attendance system. It was quick and rapid in identifies candidates. Thus, this will be more effective and avoid time consuming for students to take attendance while the lecturers having class.

Disadvantage:

The disadvantage of this system is the system is expensive in implementing because it requires a lot of technologies goes into making it and it could be a massive cost for purchasing tags for every student in the campus. Besides that, maintenance fees for the systems would be a massive cost too due to replace microchip, radio transceiver, antenna and battery in the system. Other than that, this system is not as secure as others modern attendance system such as fingerprint-based attendance system or QR code-based attendance system because this system could be easily prone to manipulation for example, a student holding more than one RFID cards that belongs to their friends to scan for their attendance.

2.4 Critical Remarks of previous work

Systems	Biometric-based Attendance Management System	RFID based Attendance System	Barcode based Student Attendance System
Advantages	• High security-wise	• Quick and rapid in identification • More effective and efficient	• Easy to use • Easy to learn
Disadvantages	• High uncertainties • High cost for implementation	• High cost in implementation • Massive cost for maintenance • Less secure and accurate	• High cost for requiring hardware • Not efficient
Comments	This proposed system having an advantage in a high security wise because biometrics are unique and it can't be counterfeit such as fingerprints, IRIS and face recognition. However, it consists of high uncertainties due to technical issues and limitations. This system is also including high cost of implementation for hardware devices.	This proposed system having an advantage in quick, efficient, and effective on identification, but it was less secure and accurate than others modern attendance system such as Biometric and bar code scan.	This proposed system having an advantage in easy to learn and easy to use on this system, but it was not efficient due to it could only scan one by one individually and also required high cost in implementing hardware.

Table 2.4 Critical Remark of previous work

Chapter 3: System Design

Figure 3.2.1 Login module of Web application

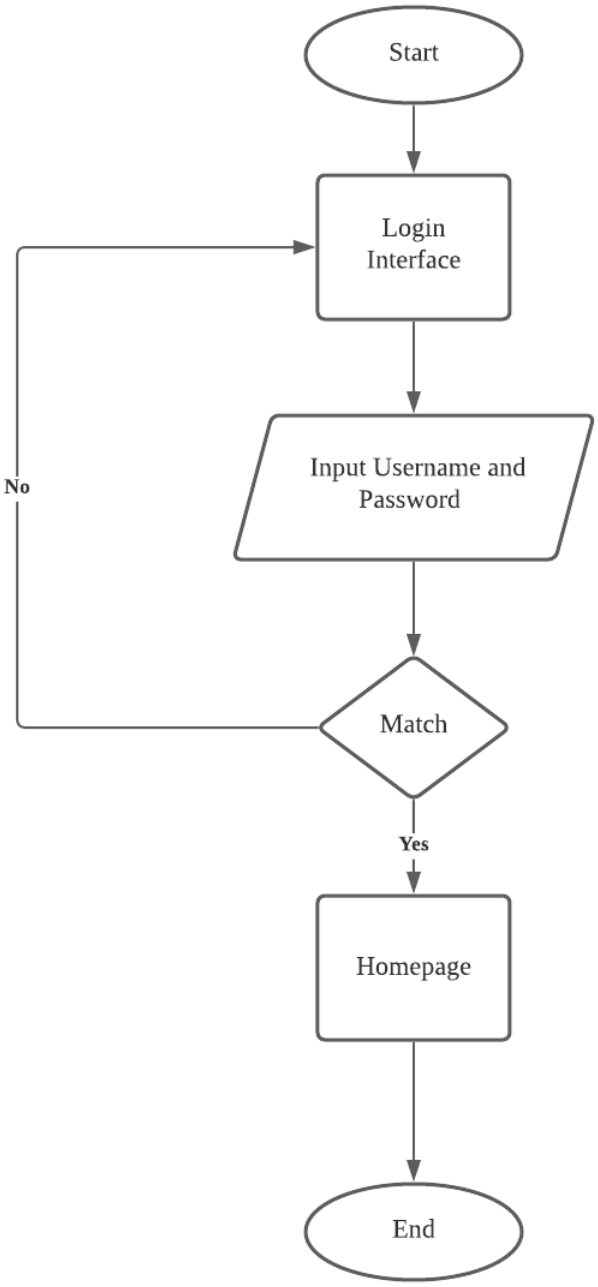


Figure 3.2.2 Register module of Web application

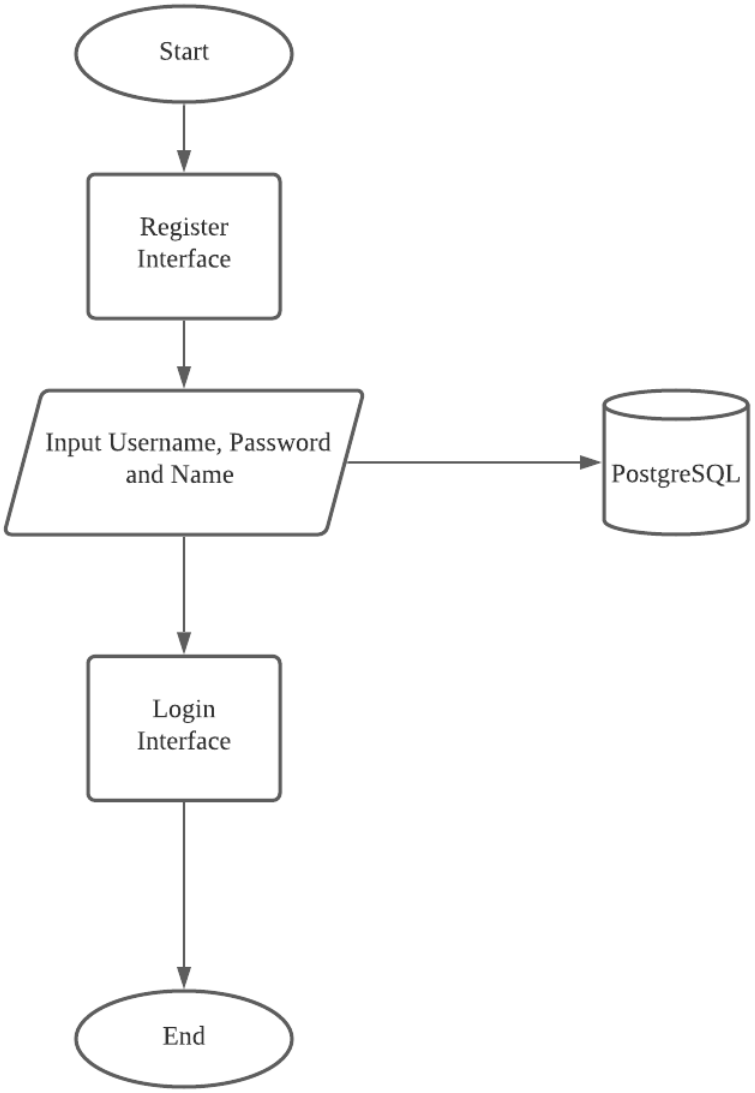


Figure 3.2.1 Main module of Web Application Flow diagram

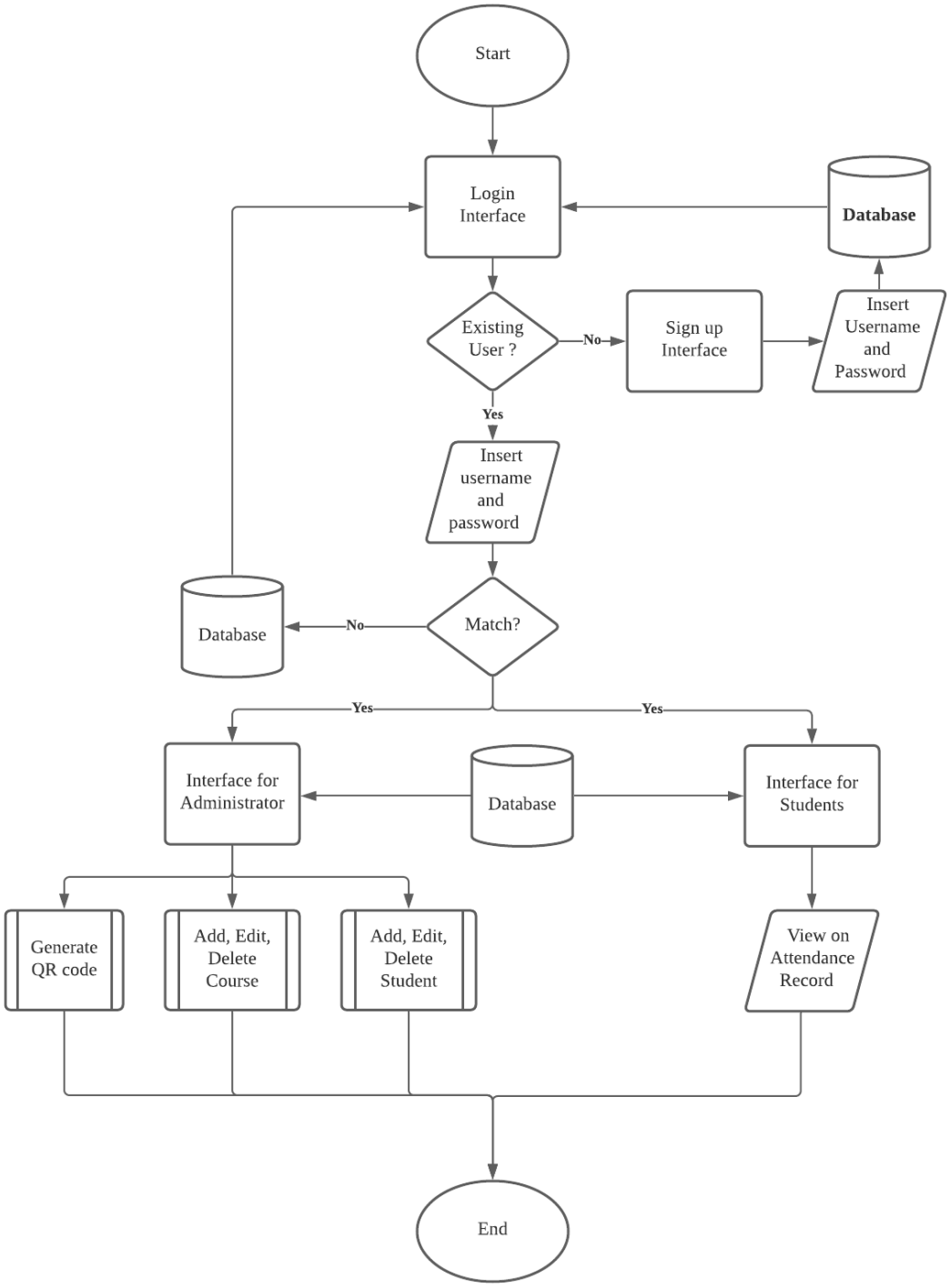


Figure 3.2.1 Main module of Web Application Flow diagram

In Figure 3.2.1 is the flow diagram of the web application that will be done in upcoming semester. At the first, start browsing into this web server will be the login interface which it allows lecturers, administrator and student to sign into their own respectively account at the login interface. This will be requesting users to have an account to login to the specific interface. If the user requires an account, it will proceed to insert the username email and password that requires to login to the interface. If the user does not require an account, user could select on register button and proceed to sign up interface to register an email and key in password to create an account. The email and password that used to create account will be store in Firebase database for authentication using. So, when the user logins with their own email and password, if the system founds that the email or password does not match with the database, it will show up Invalid email or invalid password and returns to sign in interface for users to sign in again with correct email and password. After authentication with the email, password and personal information of the user, the system will proceed to the specific interface which is interface for administrator or interface for students depends on the role that the user registered. In the interface for lecturers will be including the section for lecturers to generate QR code for their class, add, edit and delete course which they are teaching in current semester and add, edit and delete students that in their course. However, students' interface will be only consisting of attendance record which allowing them to have a view on their attendance record on each course.

3.2.2 Flow diagram of Mobile Application

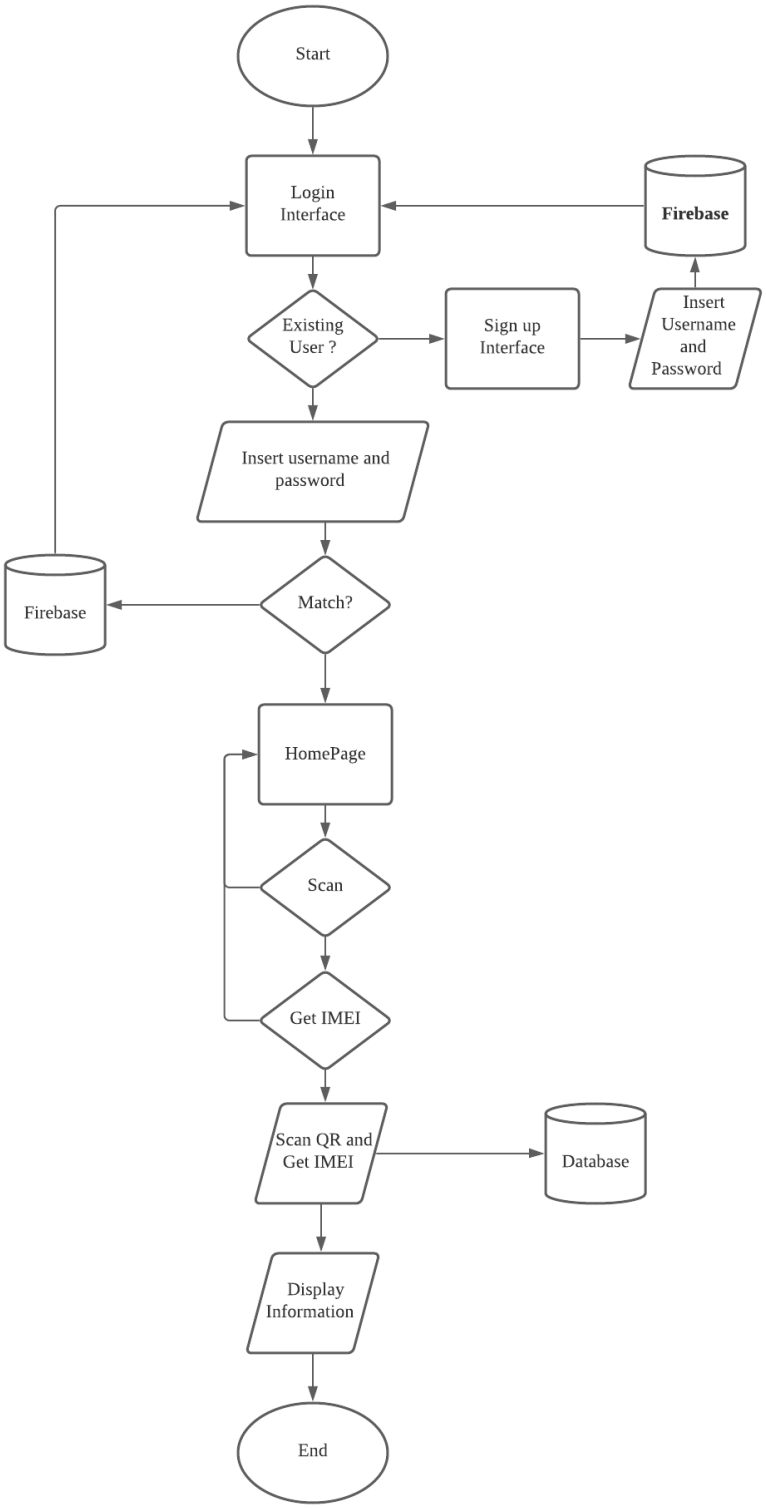


Figure 3.2.2 Flow Diagram of Mobile Application

In the figure 3.2.2 will be the flow diagram of the mobile application that had be done in this project. For the first starting the application, it will have a flash screen which contains of UTAR logo. Next will be the sign in interface which allow user to sign in or sign up. It could be toggle in the same interface which is sign in and sign up. If the user consists of an account to login, the system will proceed with authentication with the firebase that authenticate whether the email and password validate with the database. Otherwise, user could register their email and password in the sign-up interface which the interface will save the user email and password to the database for authentication use. After logging in, the upcoming interface will be the homepage of the application. When the students want to scan the QR code that generated by lecturer to gain their attendance, the system will automatically start the camera for scanning and the application will be automatically capturing the unique IMEI number of the mobile devices as an evidence for the attendance records. These IMEI number and information will be send to database save as a record.

3.2 Functional Requirements

In this section, this project will be describing the overall functional requirement of local web server attendance platform and mobile application for QR code scanning.

- This project will be able to sign in and register for Student and Admin on the attendance platform.
- This project will be able to view attendance data record from PostgreSQL database.
- This project will be able to create data record for the attendance data and user data.
- This project will be able to update data record for the attendance data and user data.
- This project will be able to delete data record for the attendance data and user data.
- This project will be able to Post and Get data from API.
- This project should be able to generate QR code.
- This project will be able to edit and delete record of the attendance.
- This project should be able to scan QR code for mobile application
- This project should be able to generate unique information from mobile device.

Non-Functional Requirement

- This project should be able to post information from mobile application to database by using API.

Chapter 4: Methodology and tools

4.1 Methodology

Methodology in this section will be mentioning that some SDLC models that relevant to the development of the project. Each type of SDLC models will be having the most suitable software development lifecycle for this project will be chosen.

4.1.1 Iterative Model

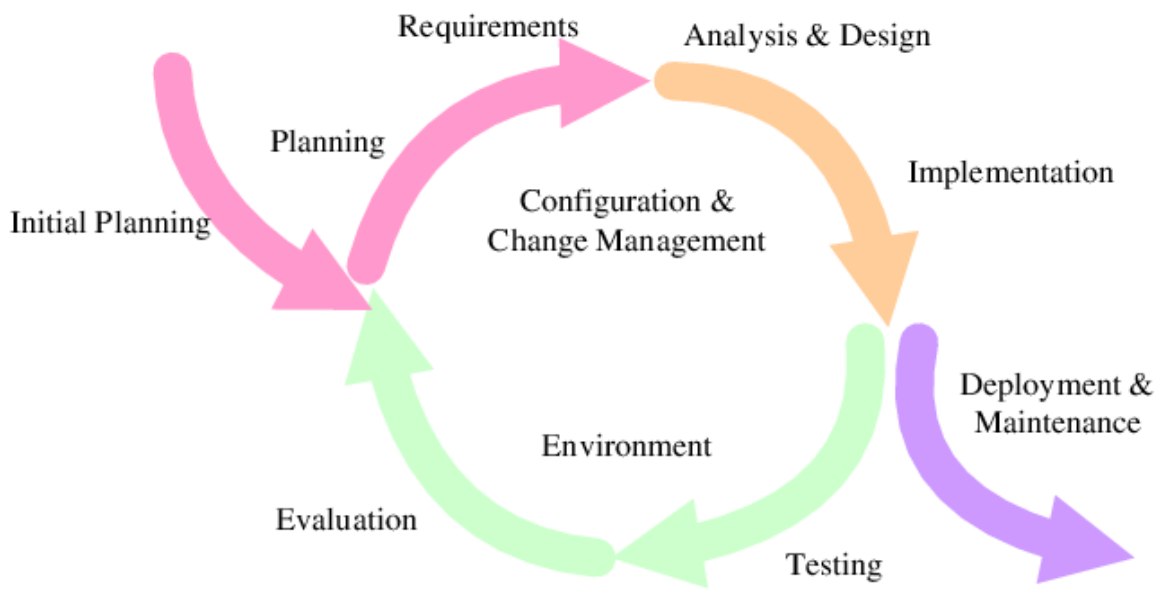


Figure 4.1.1 Iterative Model

The first SDLC model is the iterative model. In this SDLC approach, it is well known as the incremental developments that can develop the project quickly more compare than traditional SDLC approach. It usually breaks a big application to a smaller part and iteratively enhance their module to a useful application for developing the project. In this process, it will keep repeat and keep enhancing with a better version of the application at the end of each iteration, this could be explained that it could be review, implement and testing back to the previous iteration of the project and enhance to a more advance and complex program.

Iterative model having the advantage which it could be more efficient and faster in some of the module in the early stages. This SDLC model will be saving more time and resources early in development stage. The upcoming advantage will be supporting changing requirements. When some of the functional requirement does not meet the expected results, it could be change or modify earlier to avoid some system failure in future development.

Other than that, the disadvantage of this SDLC approach will be requiring more resources in development team. Although it saves resources in developing modules in early stage, but it requires more resources for manpower to track on the process.

4.1.2 Agile Model

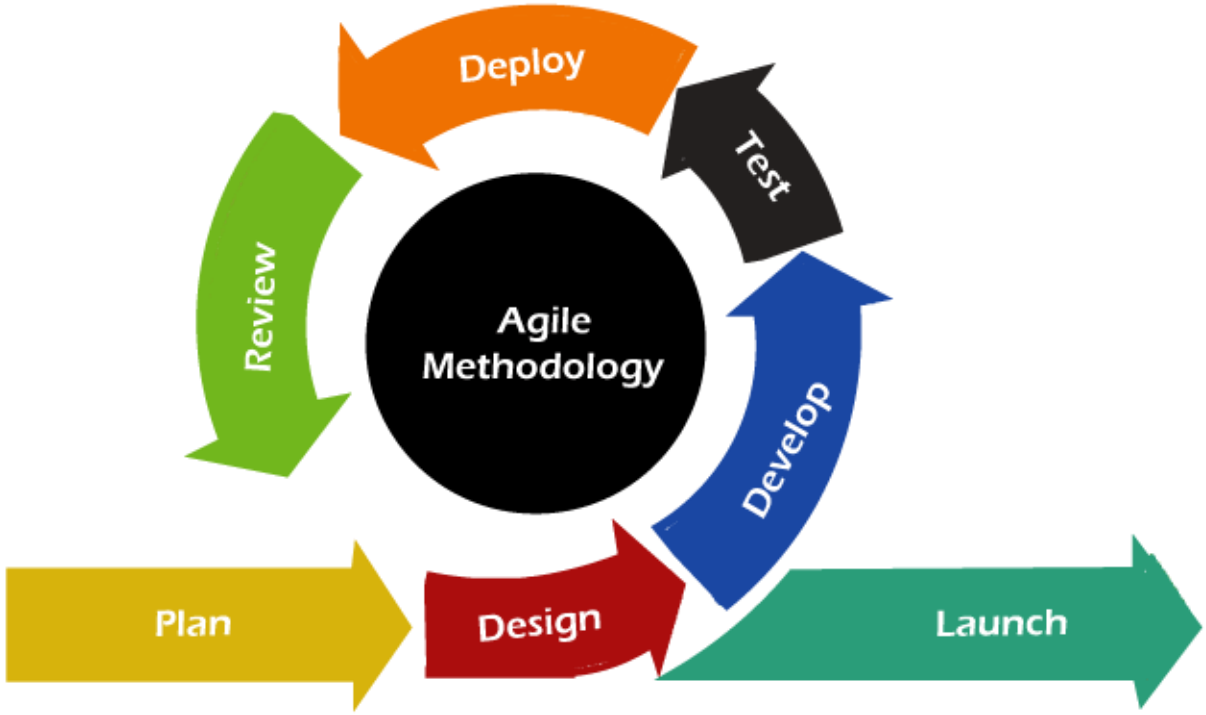


Figure 4.1.2 Agile Model

The next SDLC model is agile model. It was as same as the first SDLC model iterative model which it is an incremental development in SDLC approach. It will be more concentrate on the process and client feedback in developing a project rapidly. It could be mentioned as limiting planning will be enough for people to start the project due to the project requirement can be change frequently followed by client feedbacks.

Advantage of agile model is the frequent delivery and reduces total development time. The developer can develop the project rapidly and receive feedback from client for applying decision in selecting changes is needed for the project or not. Other than that, the procedure of this SDLC approach will required lesser document that need to plan and analysis (GeeksforGeeks, 2018). This could be meaning that it could save a lot of development time for developer to deliver the prototype toward their client.

Disadvantage of agile mode will be lacking documentation. This will lead to confusion for different development team to understand the requirement of the project due to shortage of formal documentation (tryqa.com, n.d.). It has a difficulty to trace back the project requirement when it comes to maintenance part.

4.1.3 Waterfall model

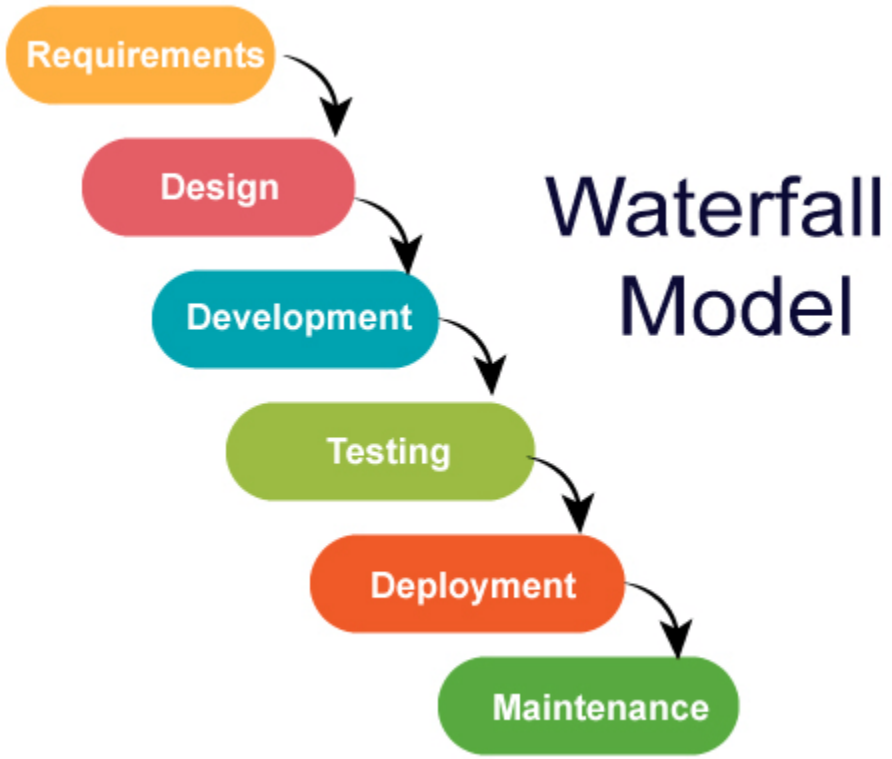


Figure 4.1.3 Waterfall Model

The last but not least SDLC model is the waterfall model. It is the traditional SDLC model that mostly used for software development. Many software projects were still using this SDLC

approach in development process. This SDLC model is easy to understand and use for any software development team. In this SDLC model, the phases that consist in the model has to be complete at a time and follow up with the new phases. This could be mean that every phase must be done in step by step. Moreover, the process and documentation in this approach will be well arranged and it will be able to trace back the documentation easily in the previous phases.

Advantage of this waterfall model is that it was a well-arranged documentation for each phase, process and results. This could be explained that this SDLC approach will have record well in every phase which it will be convenient in tracing back when it reaches maintenance phase. Other than that, the advantage for this waterfall model is the ease of task arrangement during development phases (Existek.com, 2017). Every development phase will be going through in a strict order which will be clearly defined for people during development team are working their tasks.

The disadvantage for this model is difficult in changing the project requirements. It will be wasting much more resources and manpower if they might want to change the requirements once the development team and client had decided the requirements

4.1.4 Selected Model

Throughout the research of SDLC, the most suitable SDLC model for this project will be Iterative model. The reason for choosing Iterative model is it could be developed application rapidly at the earlier stages. Other than that, for this project to use this model for involving iterative process to seek enhancement for the project and it could be modify earlier to avoid system failure. The disadvantage of this model which it was required much more resources such as time and manpower, but advantage will be much far greater than disadvantage which in improve the overall performance for the project. Hence, this SDLC will be the first choice to be applied in this project.

4.2 Tool to use

The tools that were used in this project will be mainly on software. The main software tools that were used in this project will be android studio with Flutter plugins and Dart programming language plugins. Android Studio is a type of Android app development tool that it is a replacement for Eclipse Android Development Tools. It is the official IDE for Google's Android operating system, and it is specially designed for Android development. Flutter is free and open source which

created by Google and released in May 2017, and it could be used by everyone. It is a cross-platform User Interface toolkit which is designed to allow code reuse across operating system such as Android and IOS. However, the programming language that were used in this project will be Dart programming language. It is programming language that developed by Google that it was used to build mobile, desktop, server and web application.

4.2.1 Android Studio

Figure 4.2.1 Android Studio

Android studio is the chosen platform for this project to be work for the mobile application is because it was free and open source which it can support application development within the Android operating system. It is containing an instant push function to push codes and resources changes to a running application. This can be mean by the android emulator will show immediately the results whenever you make changes on the code in Android studio.

4.2.2 Dart Language

4.2.2 Dart Programming Language

Dart is a programming language designed for client development such as for the web and mobile apps. It was developed by Google. Dart is a client-optimized language for developing fast application on any platform such as Android studio. Dart language is designed for a technical envelope that is particularly suited to client development. In this project, dart language is the main programming language that used to develop the mobile application on android studio platform.

4.2.3 Firebase

Figure 4.2.3 Firebase

Google Firebase is a Google-backend application development software that mainly for creating mobile and web application. Firebase will be the using in the mobile application sign in, sign up and authentication, it also including saving the email and password in firebase. It supports authentication using password, phone numbers, Google, Facebook and more.

4.2.4 WildFly

Figure 4.2.4 WildFly

WildFly usually well- known as JavaBeans Open-Source Software Application Server It was an application server that implements Java platform which is a powerful, modular and lightweight application server in building application. The configuration in WildFly is simple and user focused. In this project will be using WildFly for the standalone localhost server for the web application.

4.2.5 PostgreSQL

Figure 4.2.5 PostgresSQL

PostgreSQL is a powerful, open-source object-relational database system which uses and extend the SQL language combined with many features that safely store and scale the most complicated data workloads. Other than that, PostgreSQL has earned a strong reputation for its proven architecture, reliability, data integrity, robust feature set extensibility, and the dedication of the open-source community behind the software to consistently deliver performant and innovation

solutions. In this project will be using PostgreSQL as the database for storing the attendance data, admin data and student data.

4.2.6 Ecplise

Figure 4.2.6 Ecplise

Eclipse is an IDE which is using for developing applications with any programming language such as Java programming language, C/C++ programming language. Other than that, eclipse platform provides foundation and plug-ins that could be used in developing application. In this project, eclipse will be playing the role to link WildFly and PostgreSQL database for developing the web project.

4.2.6 HTML

Figure 4.2.6 HyperText Markup Language

HyperText Markup language is the set of markup symbols or codes inserted into file intended for display on the internet. HTML 5 is a standard markup language that going to use for website design. It will be used to structure the content on the website. HTML 5 was easy to understand and learn

for developing website design. Besides that, it was important due to present the design of a base structure to the client.

4.2.7 CSS

Figure 4.2.7 CSS

CSS is a style sheet language which describes the content that could work in HTML language. It usually used to design different style of fonts, images, layouts, colors and more in order to enhance the website design to be more interactive. CSS could be saved into a single file named ".css" and able to share the style sheet together with a same design by specifying the relevant CSS file. In this project, CSS will be used to make the design and web page looks more user friendly and interactive.

4.2.8 Java Programming Language

Figure 4.2.8 Java Programming Language

Java is a programming language which is designed for implementing lesser dependencies. Java programming language will be easy to understand and implementing for any functions and features in the web project. In this project, java programming language will be using to generate the RESTful API, functions, and features for the web server.

4.4 Timeline

In this section will be showing the timeline that been planned for the project in FYP1 and FYP2

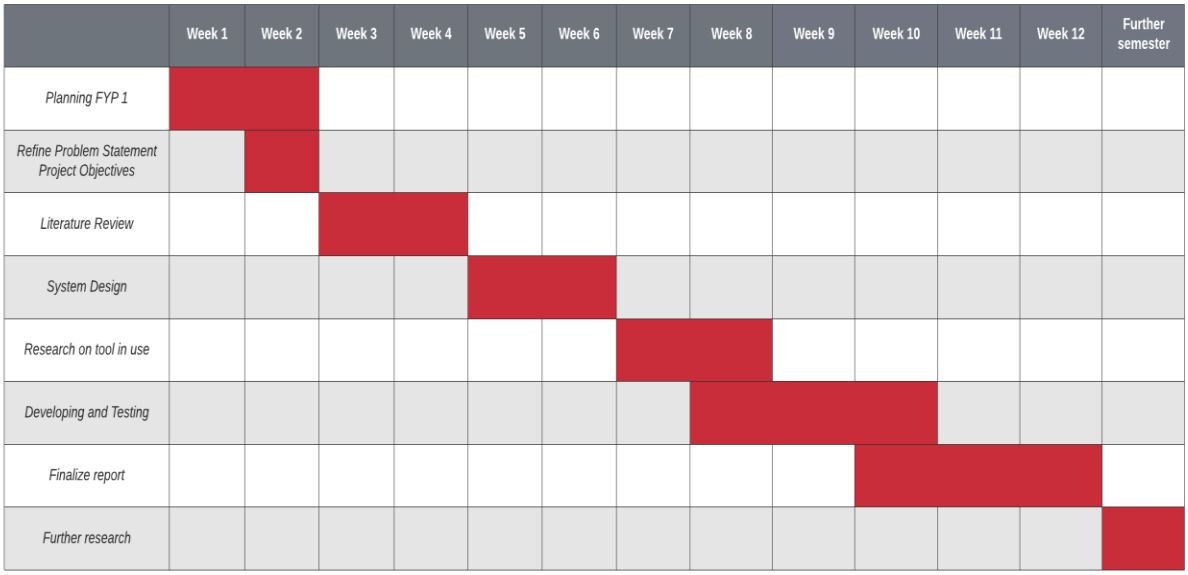


Figure 4.4.1 Timeline of FYP 1

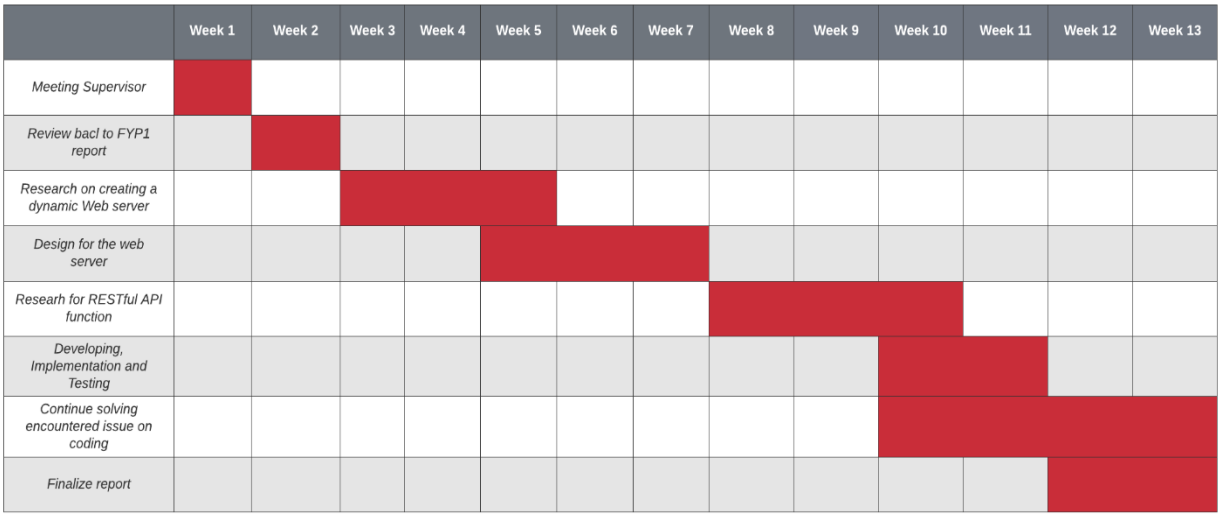


Figure 4.4.2 Timeline of FYP 2

Chapter 5: Implementation and Testing

5.1 Software Setup

5.1.1 PostgreSQL setup

This section will be showing the software setup that will be used in this project. The first software will be setting up is the PostgreSQL database. PostgreSQL database plays the important role in this project which it stores the data and information in the database.

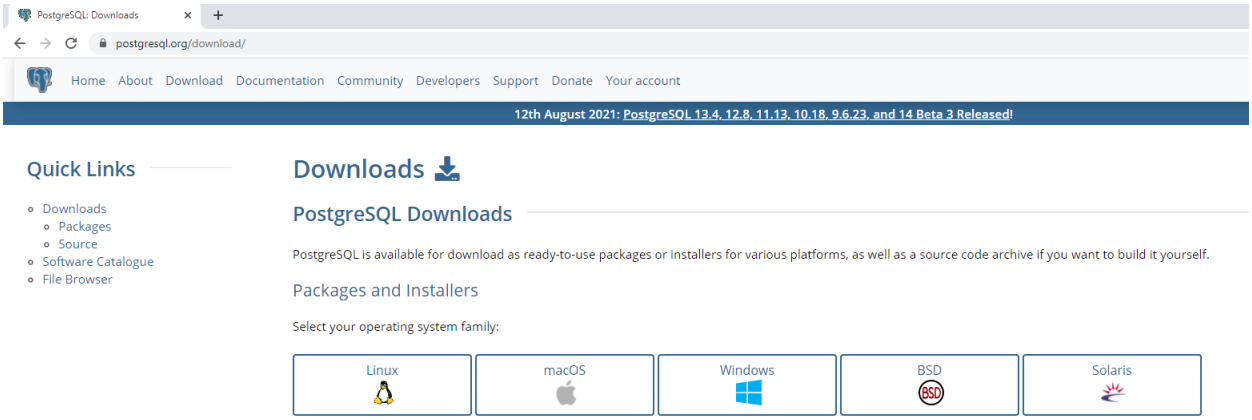


Figure 5.1.1.1 Official Website of PostgreSQL

In the figure above shows that the official website for PostgreSQL. It was an open-source software which anyone could download it through their official website by choosing their own operating system.

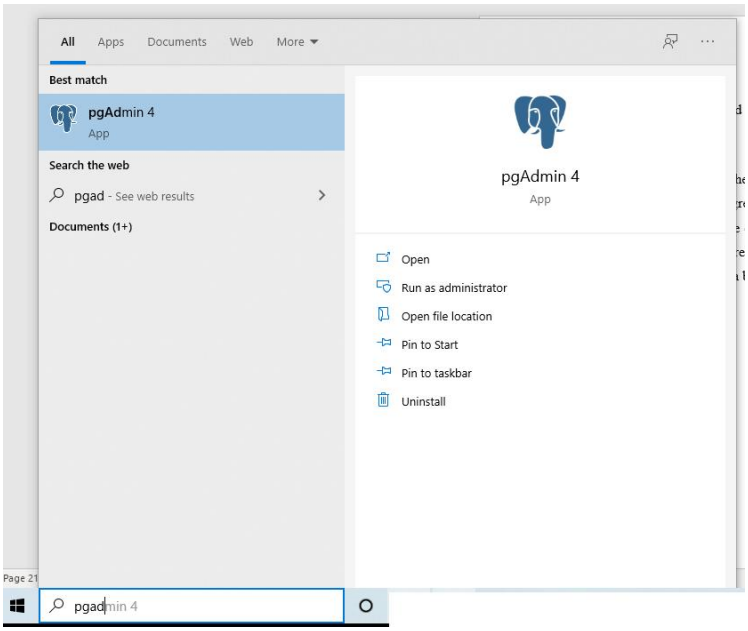


Figure 5.1.1.2 Setting up PostgreSQL

After finishing installation, we will need to start the PostgreSQL by searching pgAdmin 4 in search tab of the window and run it.

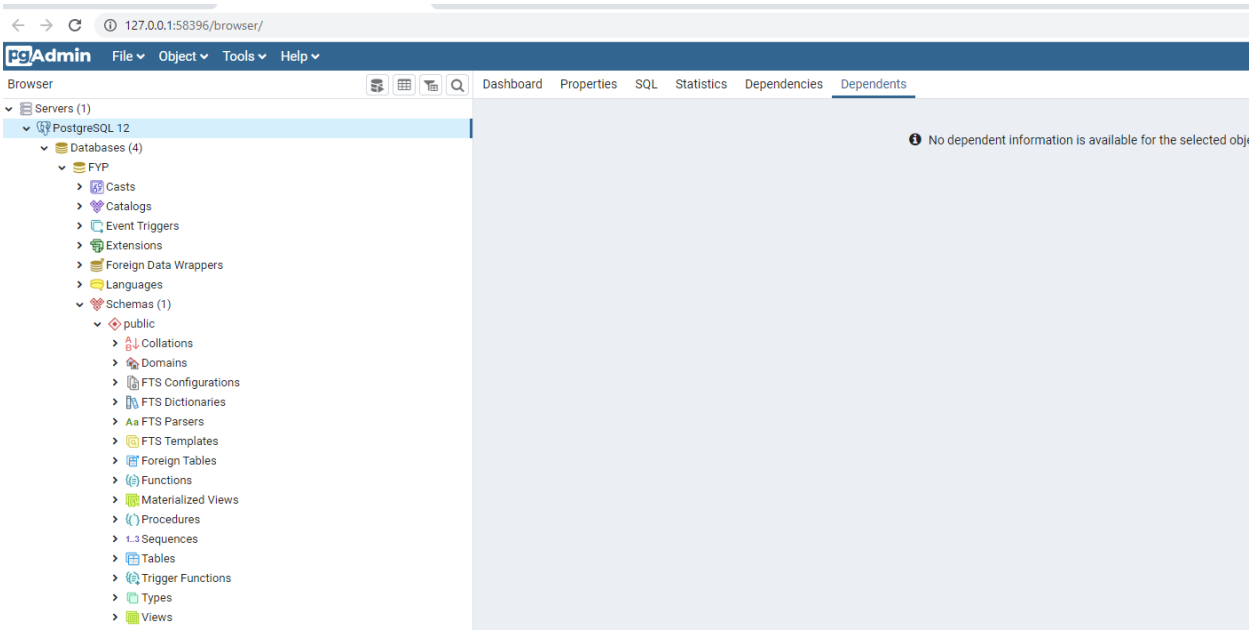


Figure 5.1.1.3 Page of PostgreSQL

In the figure above shows that the output of the PostgreSQL starting in a browser, and it will be able for user to create new database, tables and inserting data accordingly.

5.1.2 Eclipse and WildFly setup

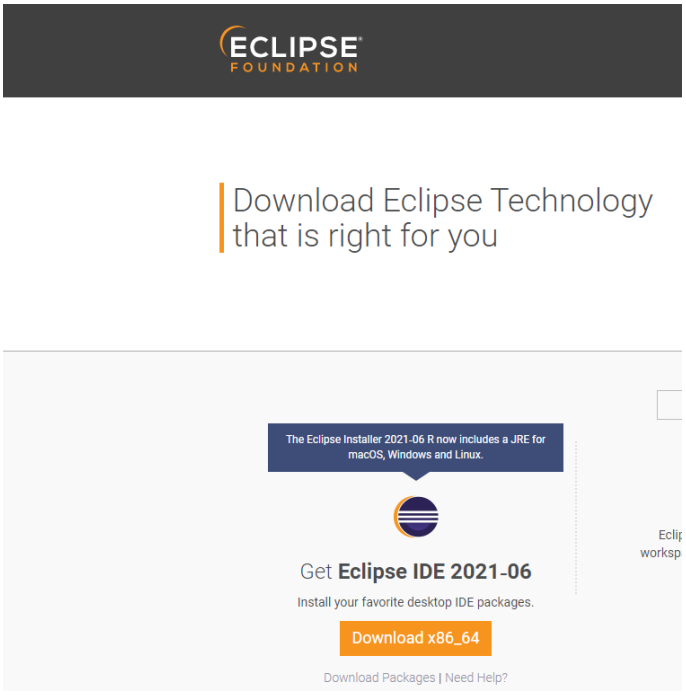


Figure 5.1.2.1 Official website of Eclipse

Next will be download and install eclipse IDE for developing a dynamic web project which can be run on localhost. In the figure above shows that the official website of eclipse which it was an open-source software that allows everyone to download it by selecting the suitable operating system.

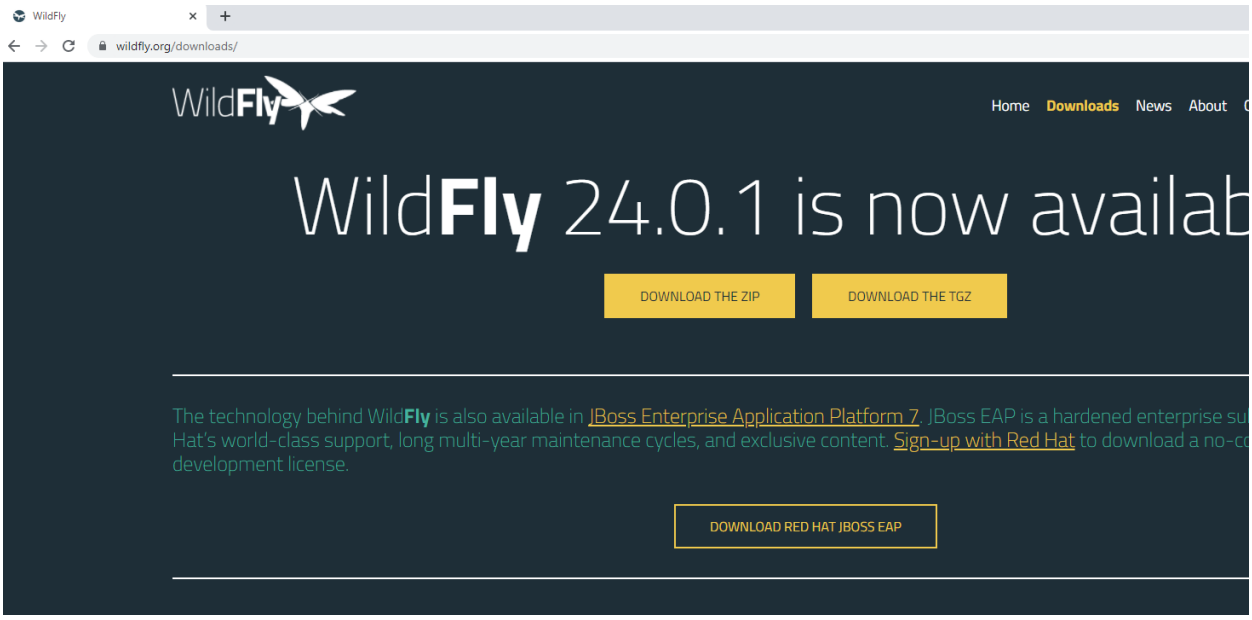


Figure 5.1.2.2 Official Website of Wildfly

WildFly is the important role for this project which it provides the standalone server for the dynamic web server. Download the WildFly zip file from the official website of Wildfly. It was an open-source software which allow everyone to download the zip file. After finish downloading the zip file, extract the zip file.

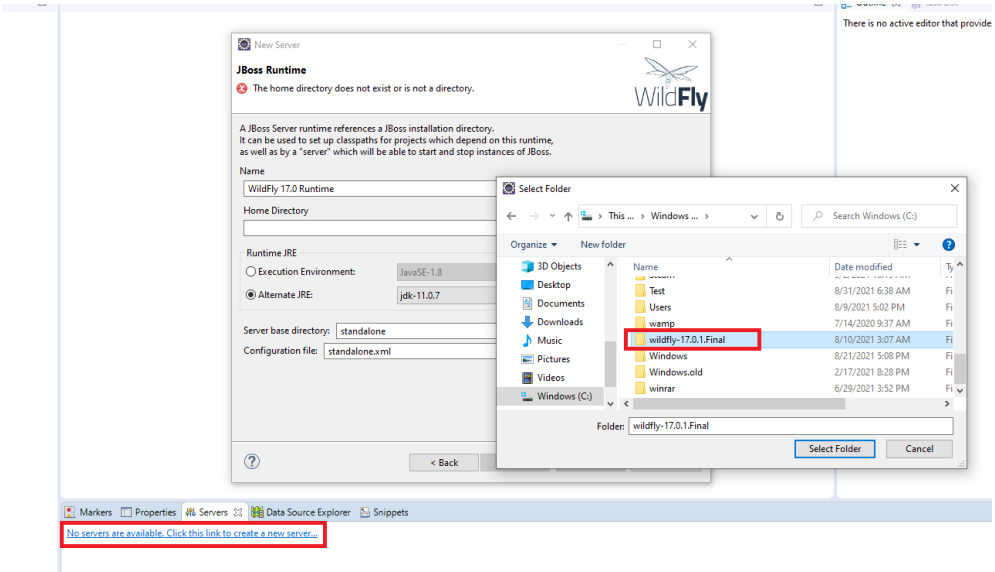


Figure 5.1.2.3 Implementing and Setting up Wildfly into Eclipse

After finish extracting the Wildfly file and installation of eclipse, run eclipse and select the folder path for the WildFly file that just done extracting. After done selecting the folder path, create a dynamic web project by selecting File > New > Dynamic Web project to start designing the web server.

5.1.3 Android Studio Setup

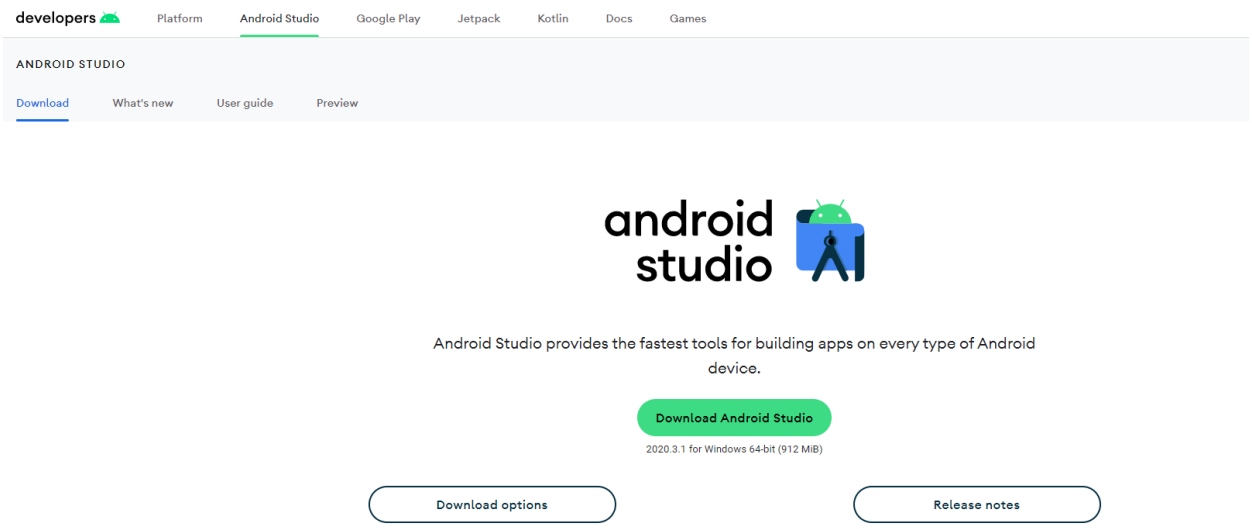


Figure 5.1.3.1 Official website of Android Studio

Android studio is an open-source software which it was everyone will be able to download it from its official website. In this project, we will be downloading android Studio from the android studio official website and install it.

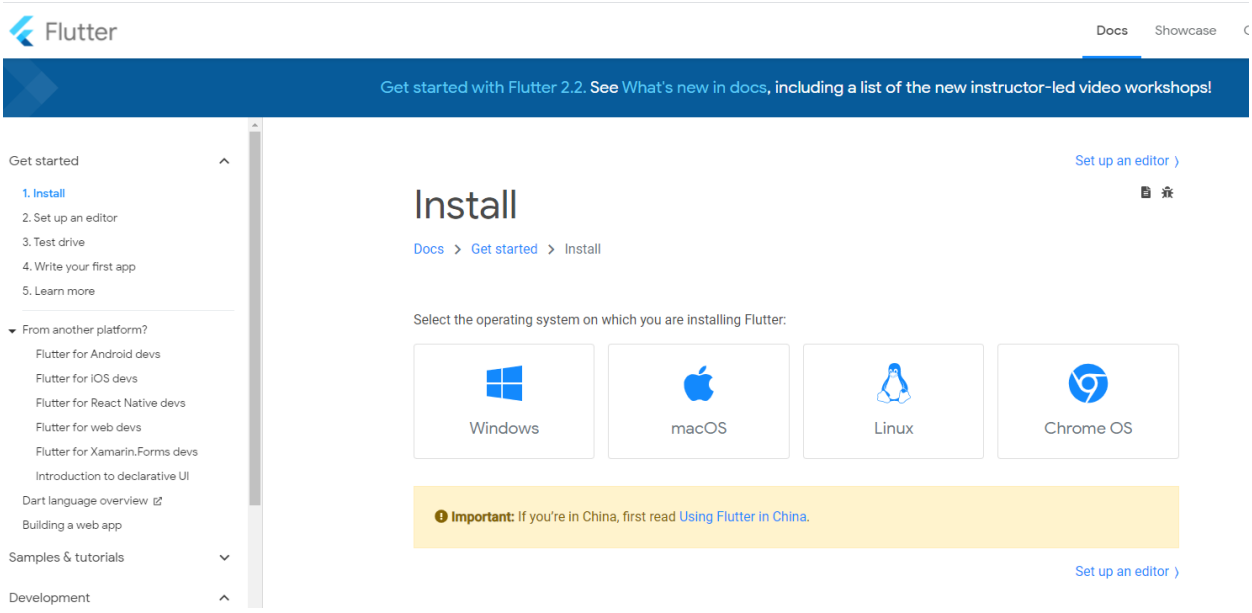


Figure 5.1.3.2 Official website of Flutter

Other than that, download the flutter plugin from its official website. It was free and open source which everyone could download it from its official website.

5.2 System Operation & Testing

Index.html

index.html

```
<!DOCTYPE html>
<html>
<head>
<meta charset="ISO-8859-1">
<title>UTAR SCAN</title>
<link href="index.css" rel="stylesheet">


</head>
<body>


<div class = "container">
<img src="utarlogo.jpg"  class="center">
<br>
<br>
<button class='one'><a href="login.jsp">  Get Started <br> with <b><br> Admin</b></a></button>
<button class='one'><a href="Stulogin.jsp">  Get Started <br> with <b><br> Student</b></a></button>
</div>



</body>

```

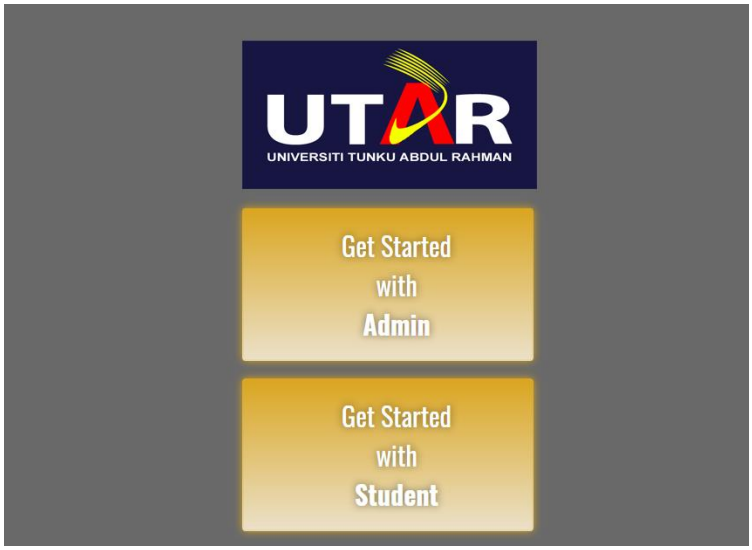


Figure 5.2.1 Codes for index interface of web server

In the figure 5.2.1 above shows that the coding for the index.html which will show the first interface for student or admin to choose their interface to sign in and sign up. There will be two buttons on the website which will be allowing clicking on it. From the code above, the two buttons will be linking to a java server page file which is login.jsp and Stulogin.jsp.

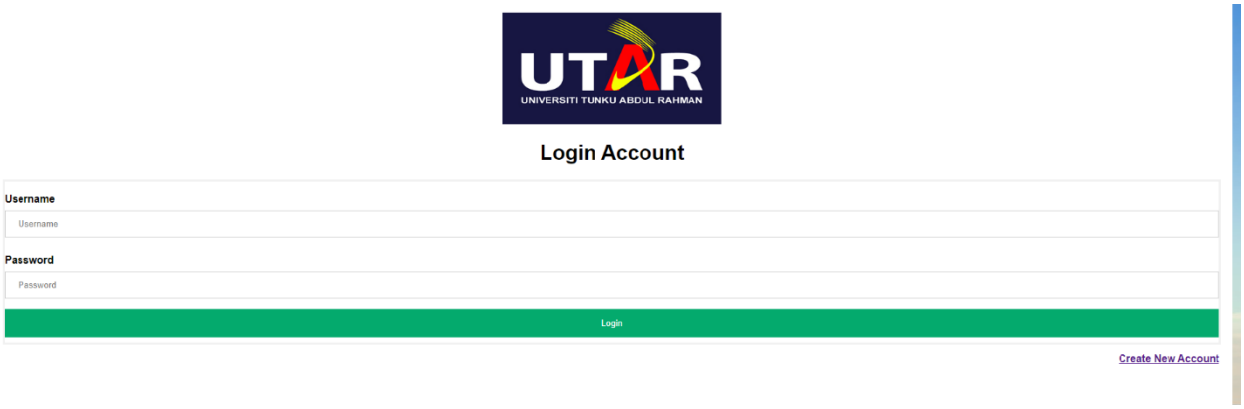
Login.jsp

login.jsp

```
1  <%@page contentType="text/html" pageEncoding="UTF-8"%>
2  <!DOCTYPE html>
3  <html>
4  <head>
5  <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
6  <title>Login</title>
7  <link href="css/login.css" rel="stylesheet" type="text/css" />
8  </head>
9  <body>
10     <div class="container">
11         <div class="box">
12             <img class="avatar" src="avatar.png">
13             <h1>Login Account</h1>
14             <form action="LoginServlet" method="post">
15                 <p>Username</p>
16                 <input type="text" placeholder="Username" name="email" required>
17                 <p>Password</p>
18                 <input type="password" placeholder="Password" name="password"
19                     required> <input type="submit" value="Login"> <a
20                     href="#">Forget Password?</a><br> <a href="registration.jsp">Create
21                     New Account</a>
22             </form>
23         </div>
24     </div>
25 </body>
26 </html>
```

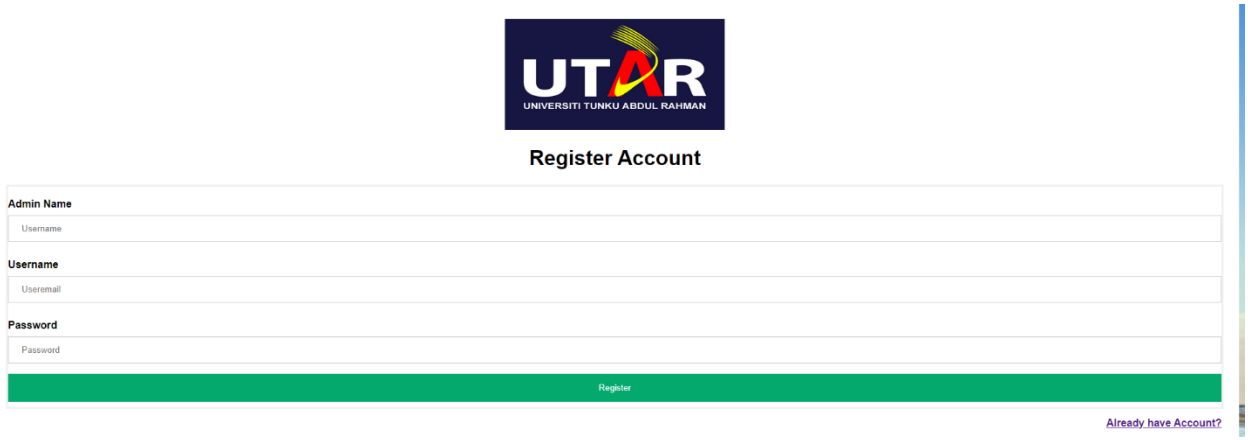
5.2.2 Codes for Sign In Interface

In the coding will be having two form which is email and password for user or admin to key in their email and password in order to sign into the webpage. If the user or admin does not have a account registered, they could click on registration and register their email, name and password into the database. After registration, they could use the email and password that registered to sign in.



5.2.3 Admin Sign in Interface

From the figure 5.2.3 above shows that the admin's sign in interface of the web page. It allows admin to key in their username and password in order to achieve the homepage of admin.



5.2.4 Admin Sign Up Interface

In the figure 5.2.4 above shows that the interface for admin to register their account for sign in. It requires the admin's name, username and password for registering admin's account.

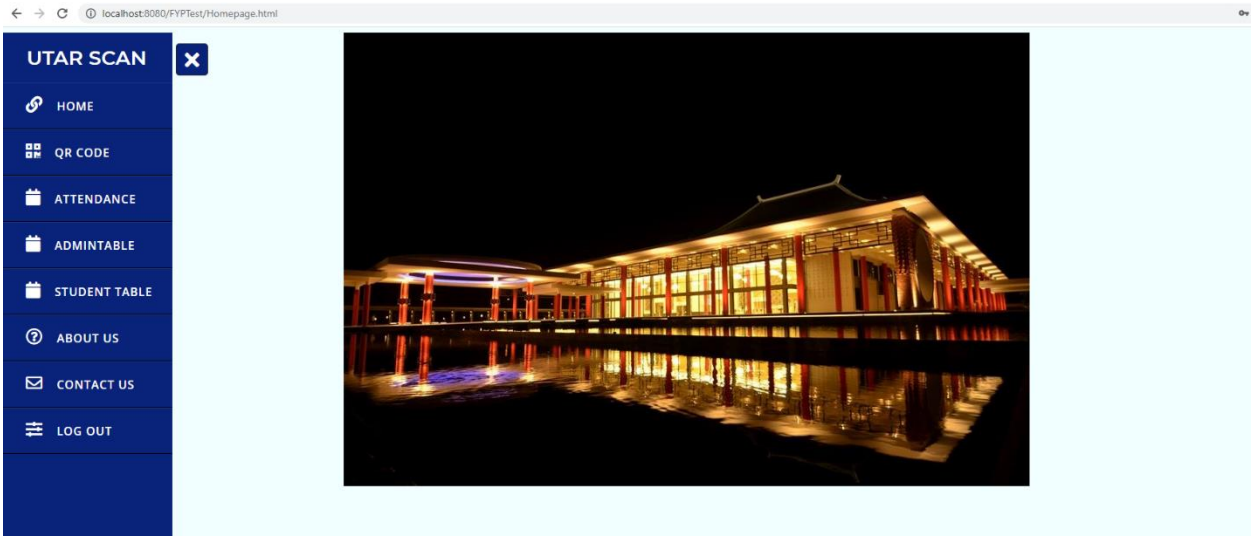


Figure 5.2.5 Admin Homepage Interface

After signing in, admin will be leading to the admin homepage interface which having several features for admin to select. There will be a homepage button, QR code generator, Attendance table, About Us webpage, contact us webpage and a sign out feature. For the homepage button will be leading user back to the very first page which is the homepage as shown as the figure above.

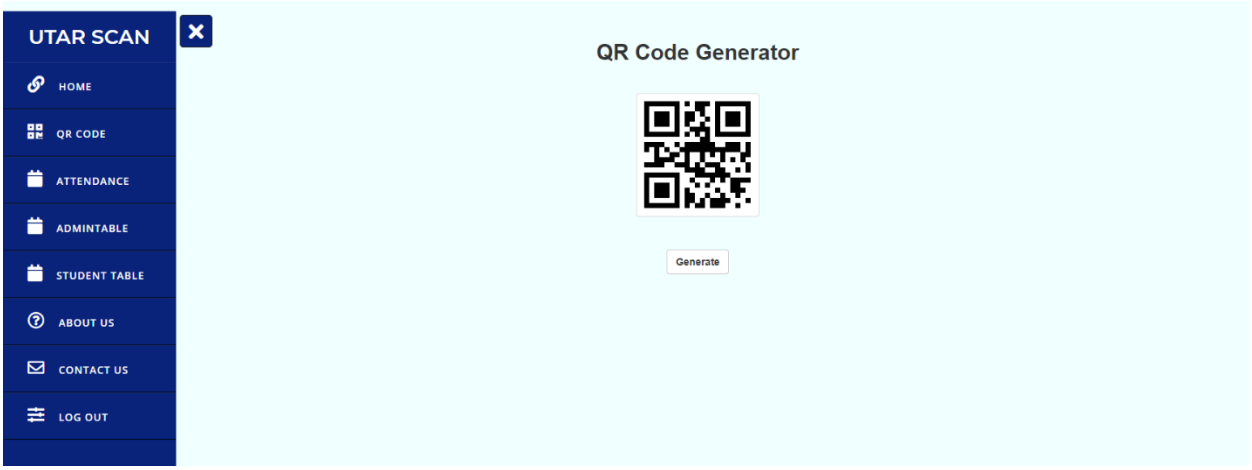


Figure 5.2.6 QR code generator interface

From the figure above shows that the QR code generator interface which can generate the URL API to a QR code image by clicking on the generate button. It will auto generate the QR code image once the generate button was clicked. API URL will be using for posting or requesting the information from the PostgreSQL database.

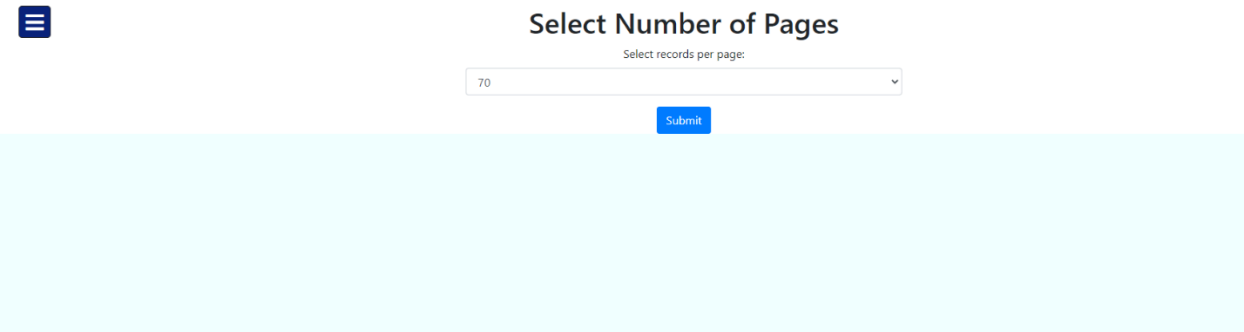


Figure 5.2.7 Attendance Table Interface

The next features will be the attendance table. Once admin click on the attendance, it will lead admin to the interface page as shown as the figure above. In this page, admin could choose the numbers of row for displaying the attendance information. It will allow user to update and delete straight from the table and it will directly make changes in the database.

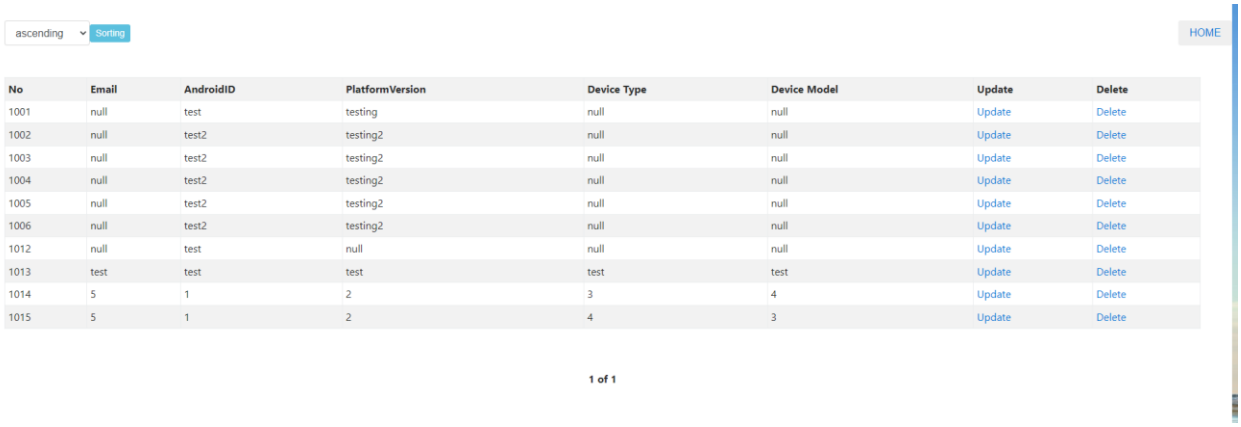


Figure 5.2.8 Attendance Data Records Interface

Once admin selected the number of rows and clicked on the submit buttons, it will redirect to the table of attendance that capture from PostgreSQL database. It will allow user to update and delete straight from the table and it will directly make changes in the database. In this attendance table will be having pagination which will be useful when it comes to a large lecture class that contains of 100 to 200 students sign into attendance. Admin will be able to update or delete the attendance record.

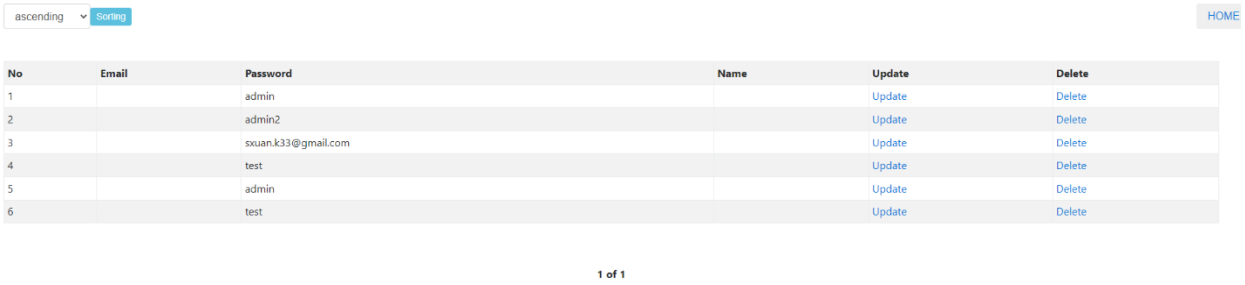
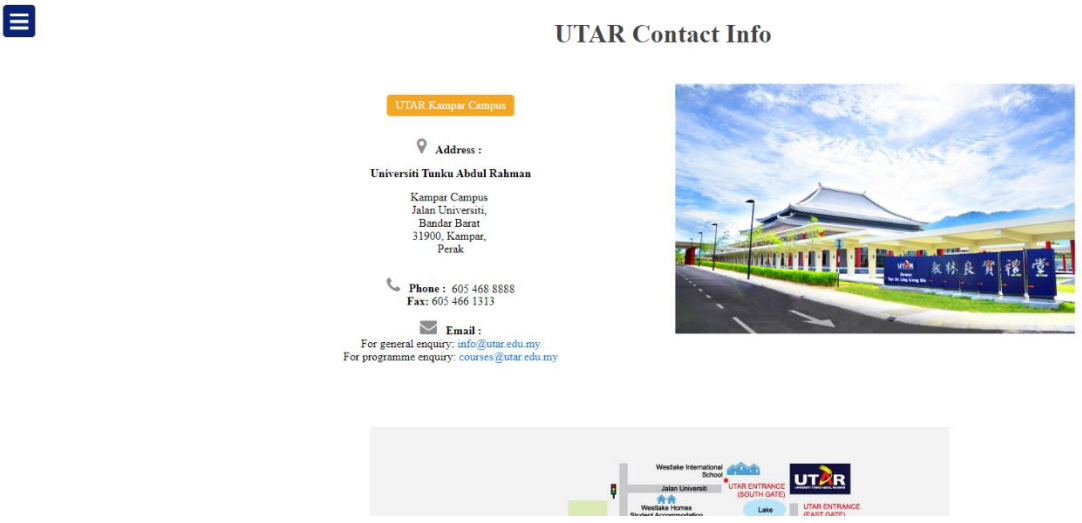


Figure 5.2.9 Student Data Tables

The next upcoming features will be the student tables which it contains the information that student register and use to sign into the web server. Admin could update and delete the user password or username for the records. Once the data has been deleted, the table will immediately show the results directly captured from the database which means that the user could not sign in with the username and password.



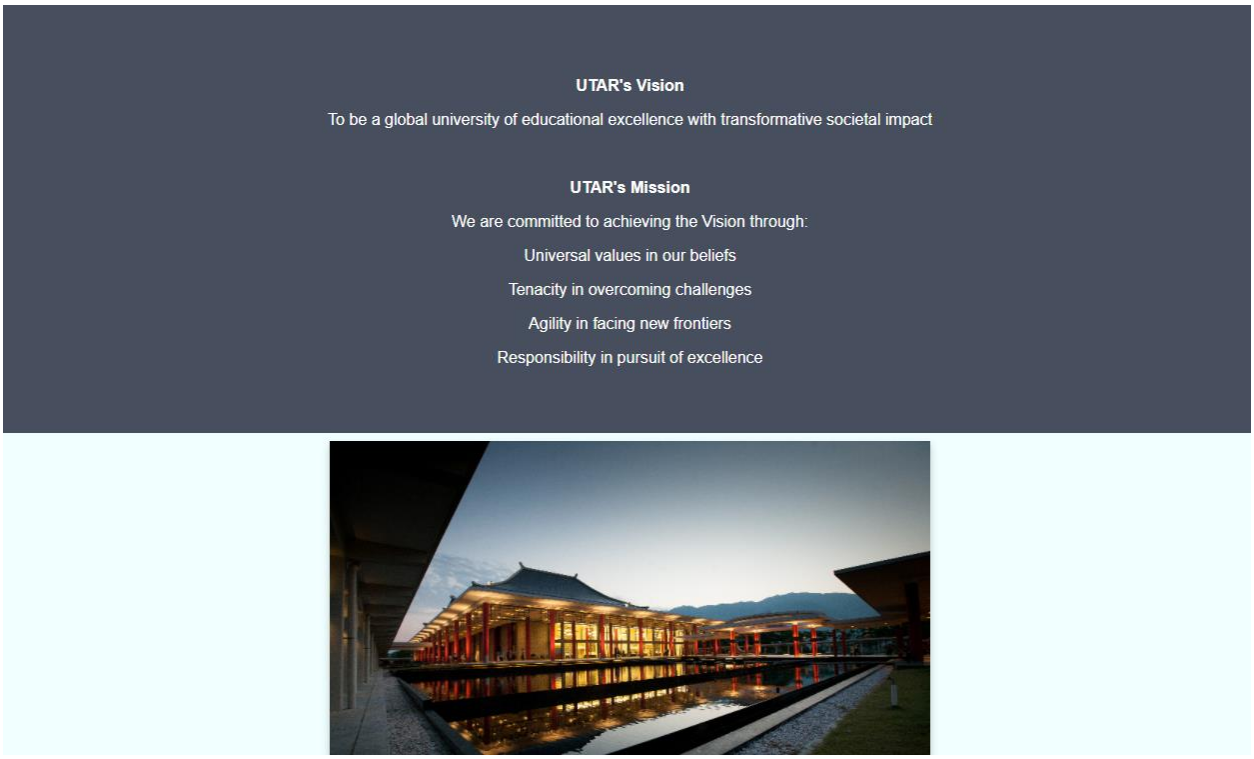


Figure 5.3 Interface of About Us and Contact Us

In the figure 5.3 above, about us features shows and contains about University Tunku Abdul Rahman's mission and vision. This section is aimed to increase the exposure of our University campus in order to allow student to know better about UTAR. Other than that, there was another section which contains about University Tunku Abdul Rahman's contact list, address, phone numbers for UTAR Kampar campus and UTAR Sungai Long campus.

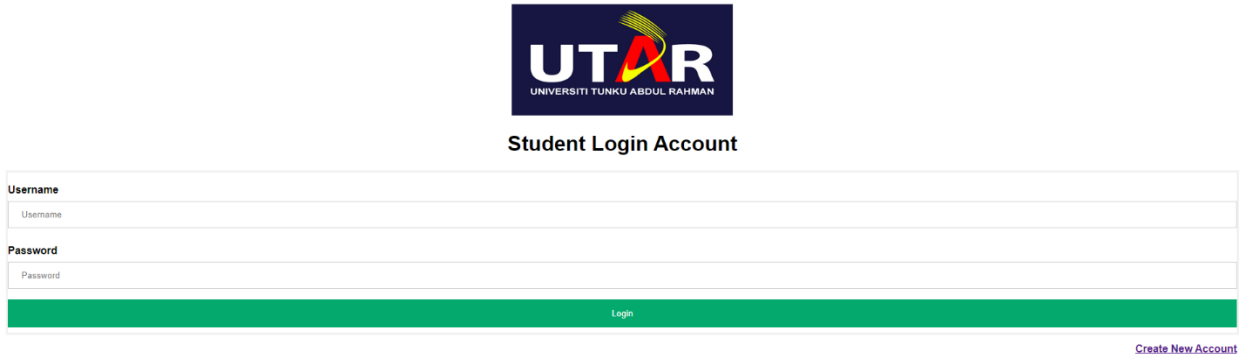


Figure 5.3.1 User Sign In Interface

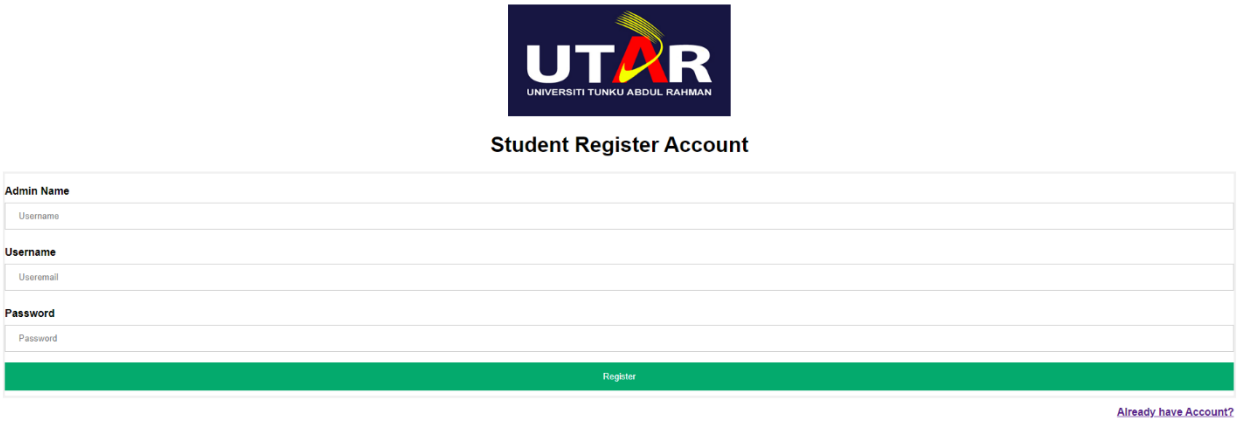


Figure 5.3.2 User Sign up Interface

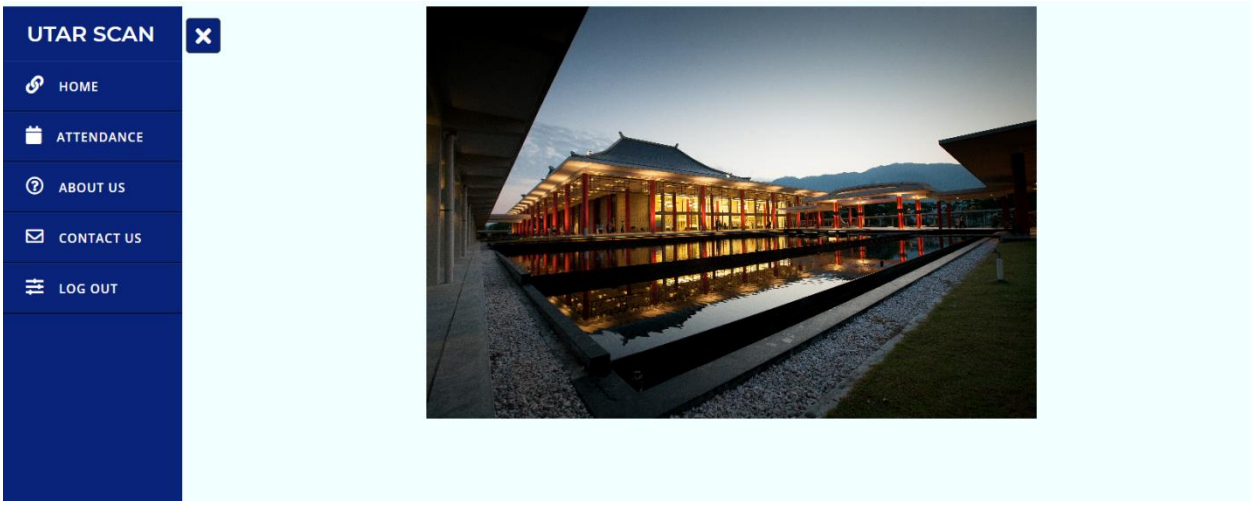
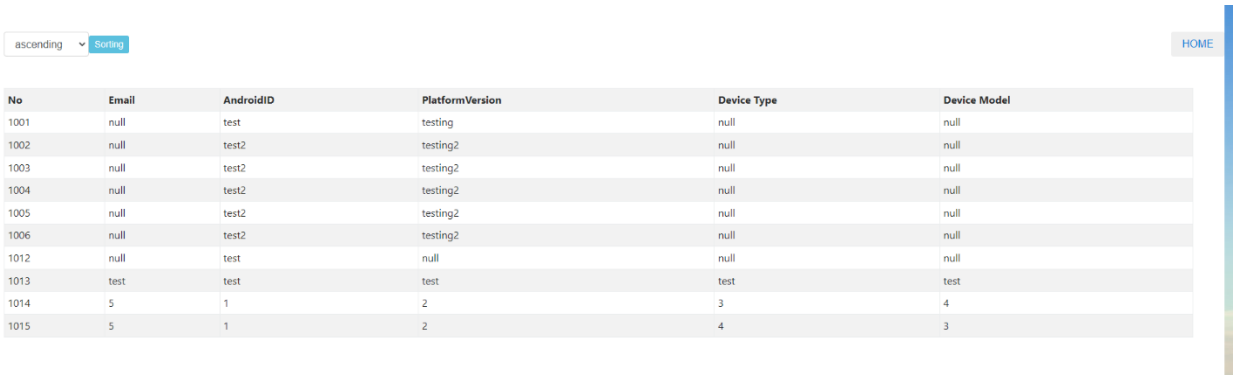


Figure 5.3.3 User Homepage Interface

Other than admin sign in interface, there was an interface for student or user to sign in which it will leads users to a homepage interface which it was totally not similar with admin homepage interface. In this user homepage interface, users are only allowed to view the attendance table and information of University Tunku Abdul Rahman.



No	Email	AndroidID	PlatformVersion	Device Type	Device Model
1001	null	test	testing	null	null
1002	null	test2	testing2	null	null
1003	null	test2	testing2	null	null
1004	null	test2	testing2	null	null
1005	null	test2	testing2	null	null
1006	null	test2	testing2	null	null
1012	null	test	null	null	null
1013	test	test	test	test	test
1014	5	1	2	3	4
1015	5	1	2	4	3

Figure 5.3.4 Attendance Table on User Interface

Besides that, users are only allow to view the records of the attendance but they can't make any other moves such as update and delete records unlikely admin's features.

```
content2 ='http://localhost:8080/FYPTest/rest/info/addinfo';
function htmlEncode(value) {
return $('<div/>').text(value)
    .html();
}

$(function () {

// Specify an onclick function
// for the generate button
$('#generate').click(function () {

    // Generate the link that would be
    // used to generate the QR Code
    // with the given data
    let finalURL =
'https://chart.googleapis.com/chart?cht=qr&chl=' +
     content2 +
    '&chs=160x160&chld=L|0'

    // Replace the src of the image with
    // the QR code image
    $('.qr-code').attr('src', finalURL);
});
```

From the figure above shows that the codes for the function generating the QR code. There will be an URL http://localhost:8080/FYPTest/rest/info/addinfo in the string content2. When the user clicks on the generate button, it will generate the QR code by using the function and content2 to generate the QR code. After generating, it will replace the default image of QR code to the new generated QR code image.

```java
@Path("info")
@RequestScoped
public class infoService {

    @Inject
    private infoRepository infobean;


    @GET
    @Path("getInfo")
    @Produces(MediaType.APPLICATION_JSON)
    public Response getAttendanceList()
    {
        return Response.ok(infobean.getAttendanceList()).build();
    }

    @POST
    @Path("addinfo")
    @Produces(MediaType.APPLICATION_JSON)
    public Response addinfo(infoWrapper info)
    {

        String[] a = {"1",info.getAndroidId(),info.getPlatformVersion().toString(),info.getModel().toString(),info.getType().toString(),info.getEmail().toString()};

        infobean.addinfo(info);

        List<Attendance> list = infobean.getAttendanceList();
        if(list != null) {
            return Response.ok(list.get(0)).build();

        }else {
            return Response.status(Response.Status.OK).entity("Info record not added").type(MediaType.TEXT_PLAIN).build();
        }
```

```xml
    <servlet>
        <servlet-name>javax.ws.rs.core.Application</servlet-name>
        <load-on-startup>1</load-on-startup>
    </servlet>
    <servlet-mapping>
        <servlet-name>javax.ws.rs.core.Application</servlet-name>
        <url-pattern>/rest/*</url-pattern>
    </servlet-mapping>
</web-app>
```

In this project will be including REST API function which will be able to get and post data through the URL. A RESTful API is an application programming interface that conforms to the constraints of REST architectural style and allows for interaction with RESTful web services. It was a set of definitions and protocols for building and integrating application software. From the figure above shows that the codes for creating the API function. In the code above there were mentioned the url-pattern which will be /rest and the path will be /info. For get method will be /getInfo and for post method will be /addinfo.

To allow mobile application can be install in the mobile device, there are few steps that were required to be done before you may install the application. First, you may need to confirm that the programming coding does not contains of any errors. Next, select on Build on the toolbox interface, select flutter, and lastly click on Build APK. After building the APK, you may find the APK will be built in C:\Users\<Username>\Desktop\utarscan_app\build\app\outputs\flutter-apk. Copy the APK and share to your mobile device to install it.

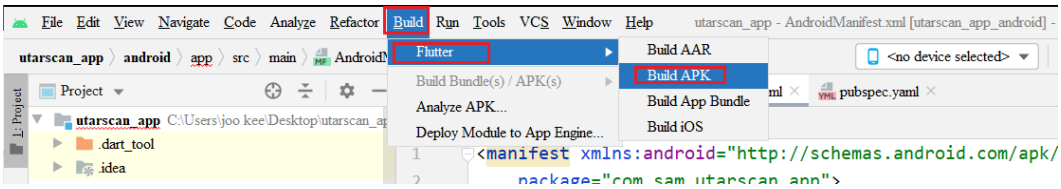


Figure 5.4 Ways to build up the APK.

To allow mobile application can be install in the mobile device, there are few steps that were required to be done before you may install the application. First, you may need to confirm that the programming coding does not contains of any errors. Next, select on Build on the toolbox interface, select flutter, and lastly click on Build APK. After building the APK, you may find the APK will be built in C:\Users\<Username>\Desktop\utarscan_app\build\app\outputs\flutter-apk. Copy the APK and share to your mobile device to install it.

```
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.sam.utarscan_app">
    <application
        android:label="UTAR SCAN"
        android:icon="@mipmap/utarlogo1">
        <activity
```

Figure 5.4.1 Code that change Name and Icon on mobile device

After installing the APK in your mobile devices, you may find an application that name UTAR SCAN with a UTAR icon. This application name and icon might be change in the androidmanifest.xml in android studio with changing on the android label and android icon as shown in the figure 4.1.2 below.

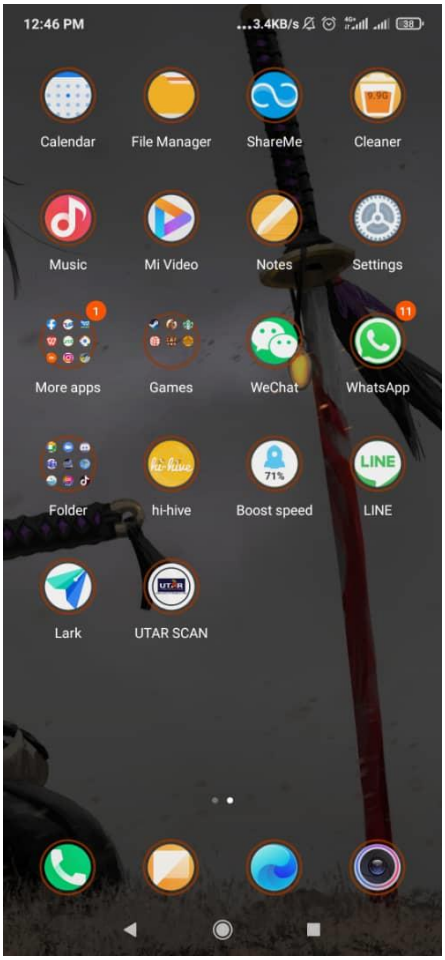


Figure 5.4.2 UTAR SCAN application installation complete

Once the installation is completed, the application will be appearing in the interface of your mobile device, and it is ready for user to be use.

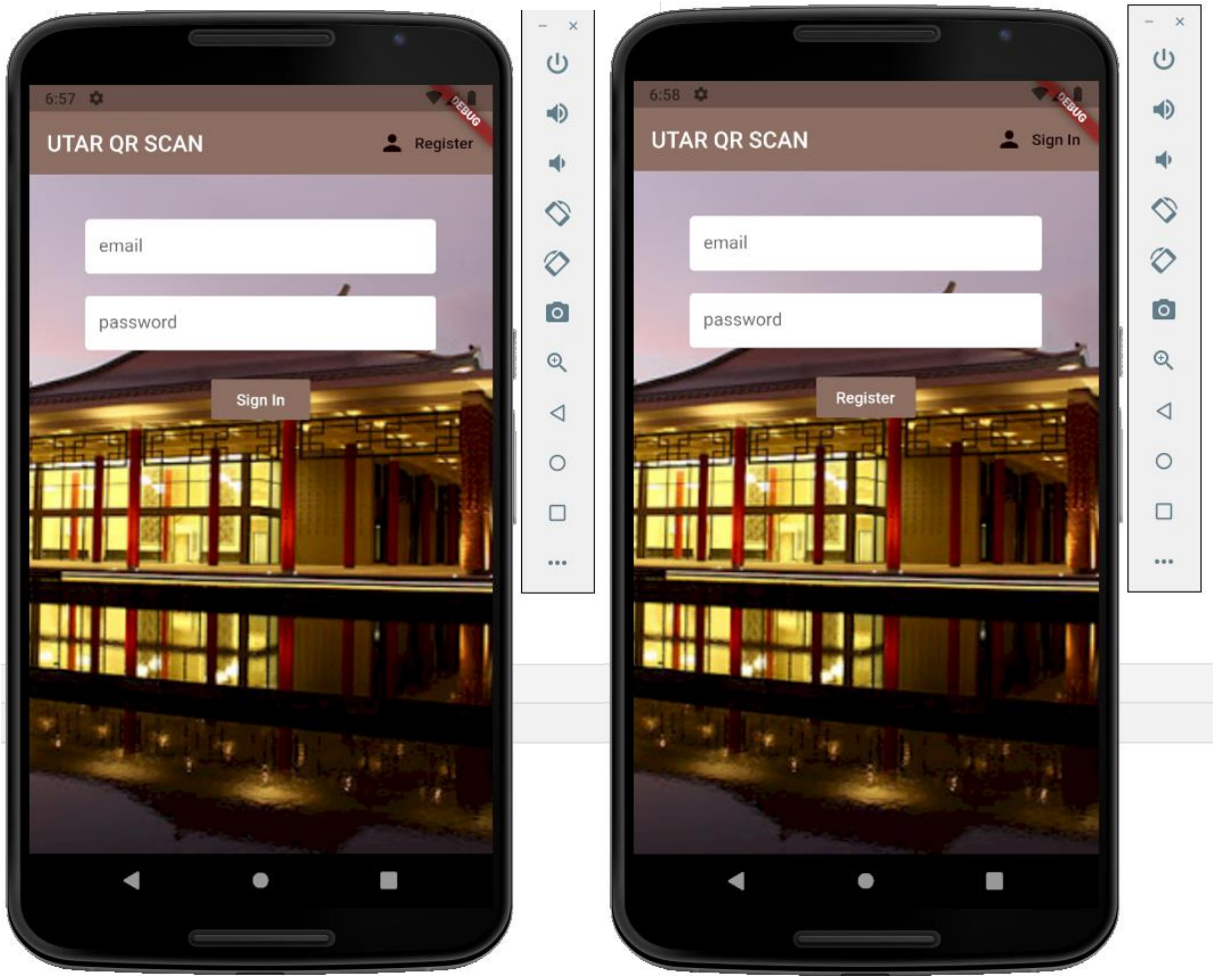


Figure 5.4.3 Sign in and Sign-Up Interface

In the figure 4.1 shows that the sign in and sign-up interface. These two interfaces were in a same interface which it can be toggle on the top right which having a button register and sign in. By pressing the button, it will switch into the two interfaces intermediately.

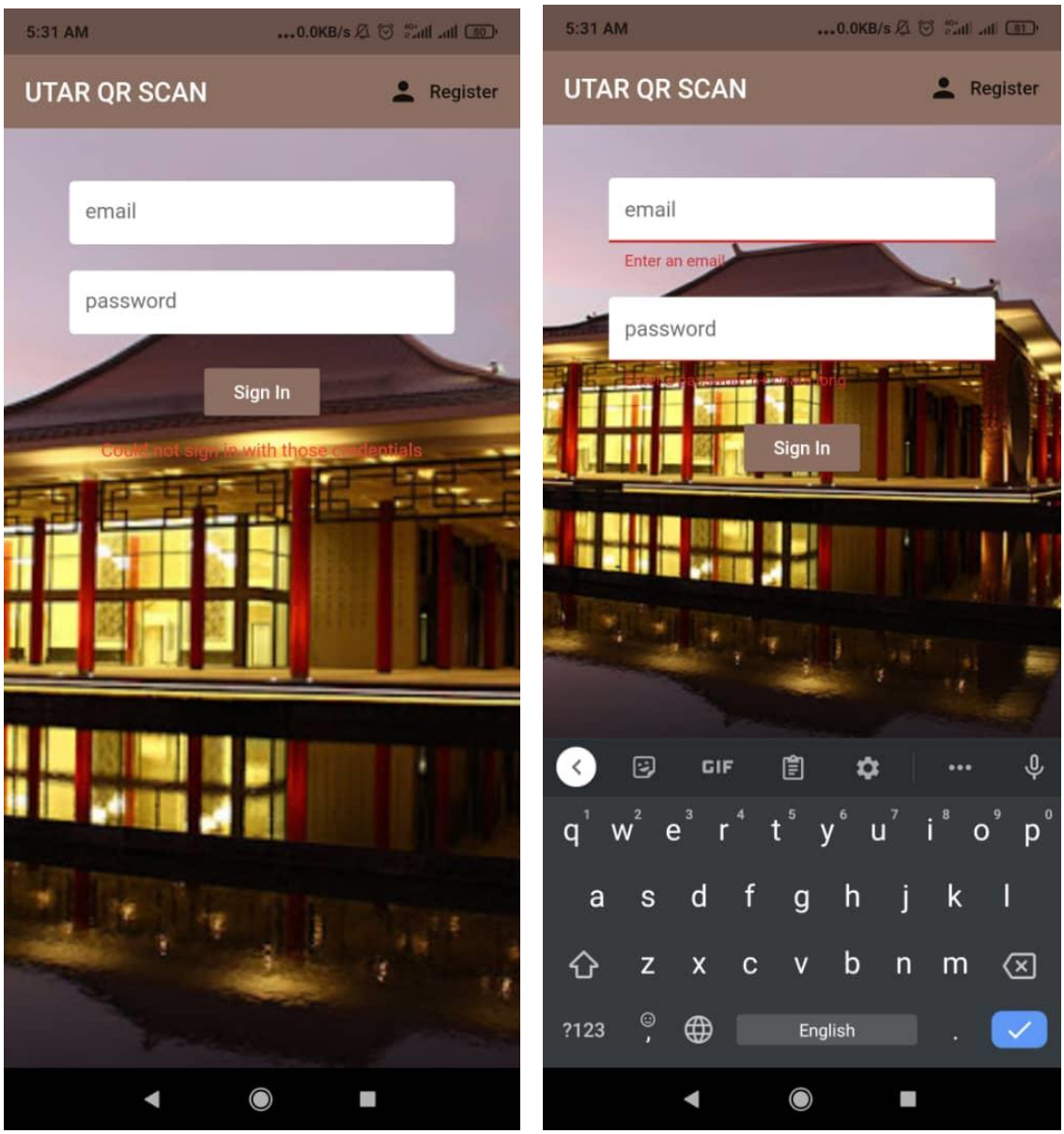


Figure 5.4.4 Invalid credentials and errors Interface

In figure 4.3, when the user inserts the wrong email or password for signing in, the system will show invalid credentials and does not allow the user to login to the application. However, for the registering part, the system will be required user to insert a valid email and a valid password that more than 6 character for registering the account for signing into the application.

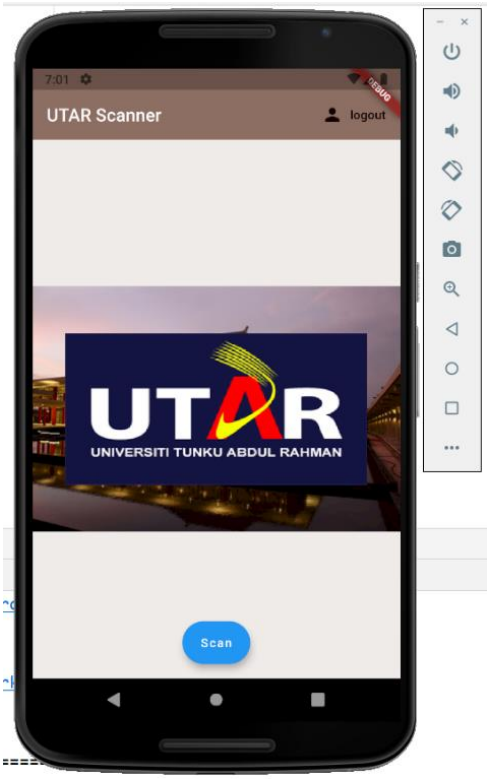


Figure 5.4.5 Homepage Interface

In figure 4.3 the homepage interface, there will be a function button which is scan will be proceed to a new interface that contains of the function scanner. On the top right corner will be having a flat button which having a function for user to logout from this current account.

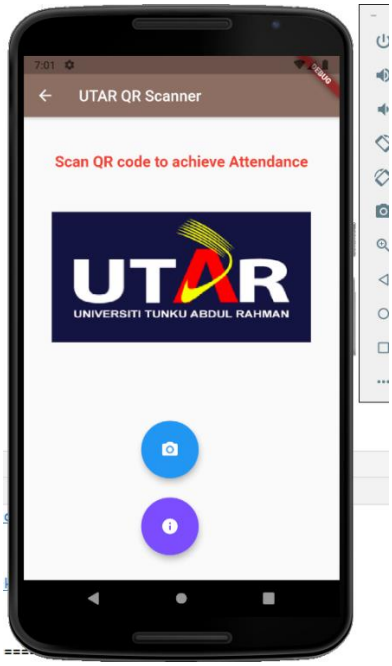


Figure 5.4.6 Scanner Function Interface

In the scanner function interface above will be containing two features which is the blue button camera icon and purple button information icon. There will be two difference function when clicking on the button. There will be a notice to remind user to scan QR code to achieve attendance which is the feature for blue camera button. For the second icon will be leading user to the device information interface.

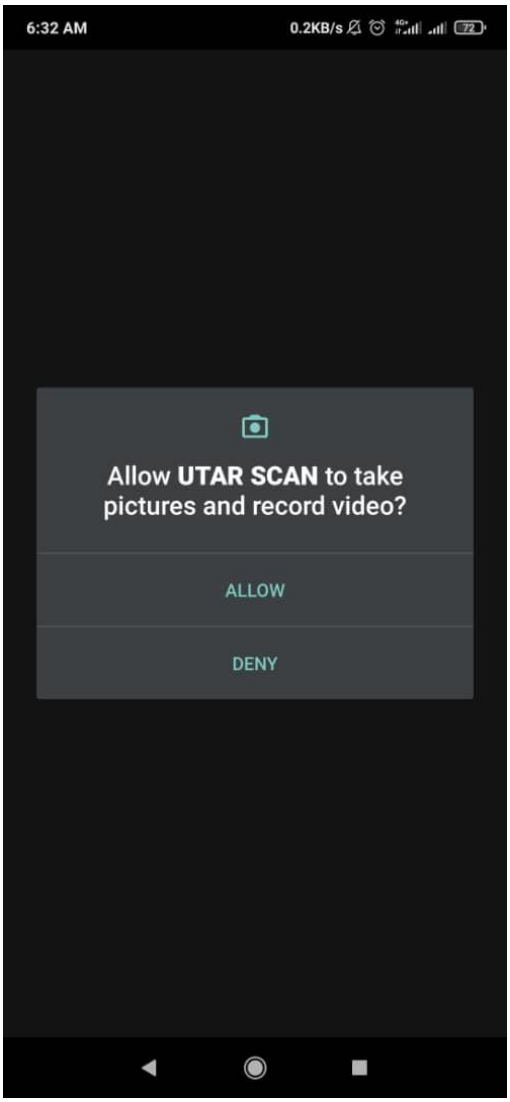


Figure 5.4.7 Requesting permission for activating camera

From the figure above shows that the alert dialog which every mobile device will be asking permission for using certain function of the devices. After clicking the scan button, if you are the first-time approach to this application, the system will ask permission for allowing this application to use the camera.

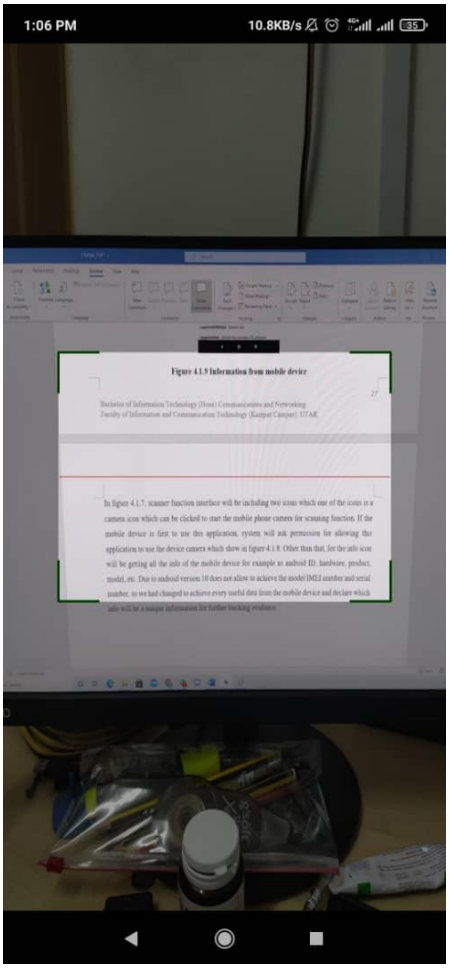


Figure 5.4.8 Scanning function

In the figure above shows that the scanning function in the mobile application app. With this scanning QR code function, we will be scanning the QR code that generated from the web server and after scanning, the program will be running a POST method to post data and information using the url result that scanned by QR code.

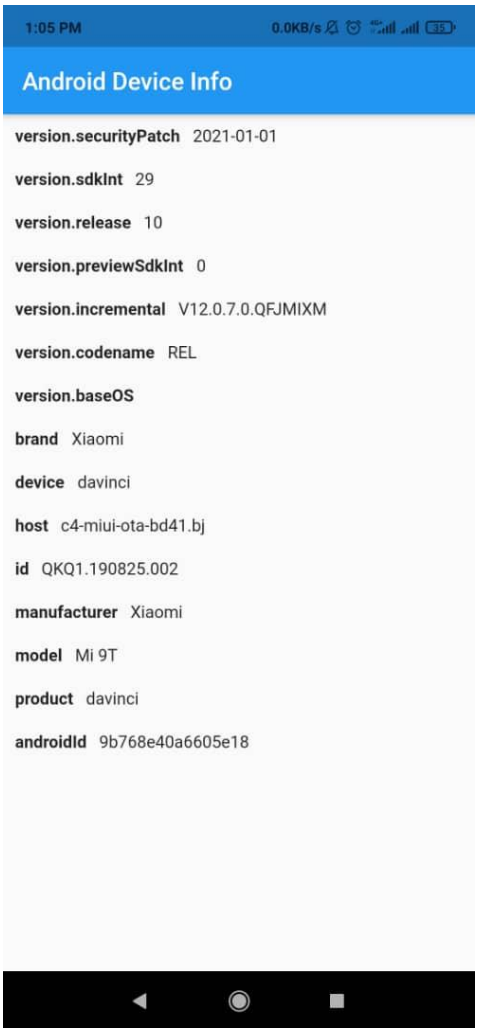


Figure 5.4.9 Device Information Interface

In figure 4.1.7, scanner function interface will be including two icons which one of the icons is a camera icon which can be clicked to start the mobile phone camera for scanning function as shown as in figure 4.1.9. If the mobile device is first to use this application, system will ask permission for allowing this application to use the device camera which show in figure 4.1.8. Other than that, for the info icon will be getting all the info of the mobile device for example as android ID, hardware, product, model, etc. Due to android version 10 does not allow to achieve the model IMEI number and serial number, so we had changed to achieve every useful data from the mobile device and declare which info will be a unique information for further tracking evidence.

Chapter 6: Conclusion and Future Work

6.1 Project Review, Discussion and Conclusion

In conclusion, traditional attendance taking system such as calling out names, paper recording or signing on an attendance sheet will need to be replace with a more technological methods in attendance taking, for example like biometric, RFID, face recognition and QR code attendance system. Due to the issue of students always cheats in their attendance records which they were absent from the class, but the attendance was attended in the class. This is a very critical behaviour for lecturers and students because if the student ends up occurring in an accident or any critical incident out from the campus, lecturers will be question that why the student's attendance were recorded present in class. Other than that, these traditional attendance taking systems having a few critical issues which is time consuming, waste of manpower and waste of resources.

For this project, one of our project objectives is to solve the issue of current tradition method of attendance tracking system facing. In developing this project is to avoid students cheating in the attendance when they presented in the class or an event that organized by the university. They could not cheat in the attendance because the QR code that generated by lecturers will only be show by the lecturer during the class. However, students might get the QR code from their friends that attended the class or having their friends helping in scanning the QR code for their friends, but in this system will be having unique identification tracking system to track down the students whether did they cheated on the attendance.

At last, this project will be benefiting to UTAR campus because it does not need any hardware or devices that need to be implement in the campus which is high cost on implementing hardware such as biometric attendance system, IRIS attendance system and RFID attendance system. Besides that, this will be easy to understand and easy to use without any guidance since everyone had experienced that scanning QR code on MySejahtera while covid-19 pandemic.

Throughout this project, the major problems encountered was the lack of knowledge about dart programming language and flutter. In this project there were some errors which is the code could not work in the most important feature which is posting data to the API after scanning the QR code. Other than dart programming language and flutter mobile application encountered issues, for the web server part will be most likely better. Student and Admins sign in and sign-up interfaces,

calling out data from database to show in pagination, able to update and delete record for the data in the database, return results immediately and REST API method with using Eclipse, WildFly and PostgreSQL database.

6.2 Future Work

Throughout this project, there were plenty enhancement and improvement could be made or achieved for future work. Continuously learning and research about flutter, dart programming language and POST method with using flutter mobile application. The malfunction function for posting data to the API will be solve. Other than that, face recognition, fingerprint recognition could be added for extra authentication since nowadays were popular with two factors authentication. Therefore, bio-metric attendance tracker will be the best choice to implement into this project to increase the uniqueness of the identity significantly. This concept will be improving the security which it is way more difficult to cheat on taking their attendance.

Besides that, real cloud-based storage will be another recommend enhancement or improvement to be done rather than use local server to achieve the concept of cloud technology. This will be improving in the result representing will be more realistic and accurate which the data store into cloud storage and web hosting by using cloud server. Other than that, adding in more features in mobile application such as achieve attendance table by using get method through API for user to view their attendance table on mobile application and not only having scanning function on mobile application.

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APPENDIX – BIWEEKLY REPORT

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: 2, 3	**Study week no.: 2**
Student Name & ID: Ng Sam Kee 17ACB04344	
Supervisor: Dr. Robithoh Annur	
Project Title: **Student Attendance System based on QR code with unique identification capturing**	

1. WORK DONE

- Going through FYP II guideline
- Identify what task should be done in FYP II
- Identify on what should be discussed from chapter 1 to 5
- Plan a schedule for Project II

2. WORK TO BE DONE

- Review back previous report that wrote in FYP I

3. PROBLEMS ENCOUNTERED

- N/A

4. SELF EVALUATION OF THE PROGRESS

- Make sure everything is on track in planning stage

Samkee

Robithoh

_____ _____

Supervisor's signature Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: 2, 3	**Study week no.: 4**
Student Name & ID: Ng Sam Kee 17ACB04344	
Supervisor: Dr. Robithoh Annur	
Project Title: **Student Attendance System based on QR code with unique identification capturing**	

1. WORK DONE

- Review back to FYP I report

2. WORK TO BE DONE

- Sketch out the design of the prototype
- Define modules needed in this project

3. PROBLEMS ENCOUNTERED

- Confuse about modules that needed in this project
- Facing issues in designing the prototype

4. SELF EVALUATION OF THE PROGRESS

- Need to learn and think more about the modules and designing of the prototypes

Samkee

Robithoh

_____ _____

Supervisor's signature Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: 2, 3	**Study week no.: 6**
Student Name & ID: Ng Sam Kee 17ACB04344	
Supervisor: Dr. Robithoh Annur	
Project Title: **Student Attendance System based on QR code with unique identification capturing**	

1. WORK DONE

- Identify the system design
- Identify the modules that needed in the project

2. WORK TO BE DONE

- Research and study more on Dart Programming language
- Research and study more on Flutter
- Research and study about RESTful API
- Research and study more on JSP, Eclipse and PostgreSQL

3. PROBLEMS ENCOUNTERED

- It's hard when facing a totally new programming language and new things.

4. SELF EVALUATION OF THE PROGRESS

- Need more research and study about the new tools in use

Samkee

Robithoh

_____ _____

Supervisor's signature Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: 2, 3	**Study week no.: 8**
Student Name & ID: Ng Sam Kee 17ACB04344	
Supervisor: Dr. Robithoh Annur	
Project Title: **Student Attendance System based on QR code with unique identification capturing**	

1. WORK DONE

- Research and study about Dart programming language
- Research and study about Flutter
- Research and study about RESTful API

2. WORK TO BE DONE

- Start to develop and testing the project prototypes
- Keep on enhancing project prototypes

3. PROBLEMS ENCOUNTERED

- Confuse on the class and function that used in coding

4. SELF EVALUATION OF THE PROGRESS

- Need more research and study about the new tools in use so that can be more understanding while using it.

Samkee

Robithoh

_____ _____

Supervisor's signature Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: 2, 3	**Study week no.: 10**
Student Name & ID: Ng Sam Kee 17ACB04344	
Supervisor: Dr. Robithoh Annur	
Project Title: **Student Attendance System based on QR code with unique identification capturing**	

1. WORK DONE

- Develop and testing in project prototype

2. WORK TO BE DONE

- Finalize report
- Design poster of the project
- Check whether which part or chapter is missing.

3. PROBLEMS ENCOUNTERED

- Too many bugs encountered while in the phase of developing and testing in project prototypes

4. SELF EVALUATION OF THE PROGRESS

- Need to figure out more ways and try to solve the issues encountered
- Try to make more progress on attendance platform

Samkee

Robithoh

_____ _____

Supervisor's signature Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: 2, 3	**Study week no.: 12**
Student Name & ID: Ng Sam Kee 17ACB04344	
Supervisor: Dr. Robithoh Annur	
Project Title: **Student Attendance System based on QR code with unique identification capturing**	

1. WORK DONE

- Finalize the report of Project II
- Check on each chapter and make sure everything required from the guideline is consist in the report.
- Design poster

2. WORK TO BE DONE

- Solve issues and bug that encountered in the prototypes
- Double check on the report Project II.

3. PROBLEMS ENCOUNTERED

- RESTful API
- Prototypes facing bugs and issues.

4. SELF EVALUATION OF THE PROGRESS

- Fix the issues and bugs that faced in the prototypes

Samkee

Robithoh

_____ _____

Supervisor's signature Student's signature

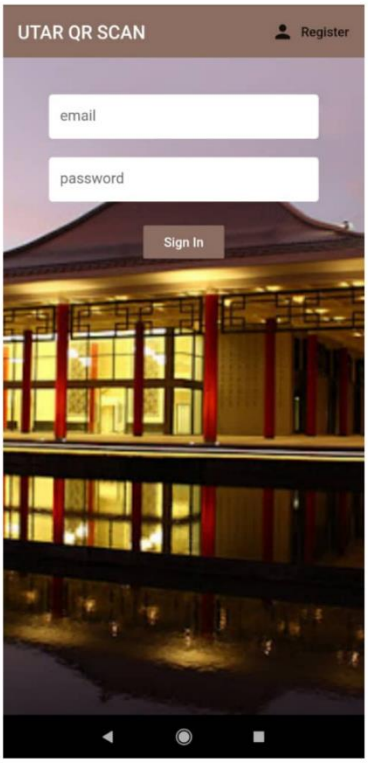
Poster

UNIVERSITY TUNKU ABDUL RAHMAN

STUDENT ATTENDANCE SYSTEM BASED ON QR CODE WITH UNIQUE IDENTIFICATION CAPTURING

INTRODUCTION

- **To develop an application which can scan QR code on mobile devices.**



DISCUSSION

This project is using Dart programming language, Flutter based software development kit in Android Studio to develop a mobile application which allows to scan and retrieve information from the devices.

CONCLUSION

At the end of this project will bring benefits to the campus with providing a lower cost in implementation and high accuracy in retrieving students' attendance.

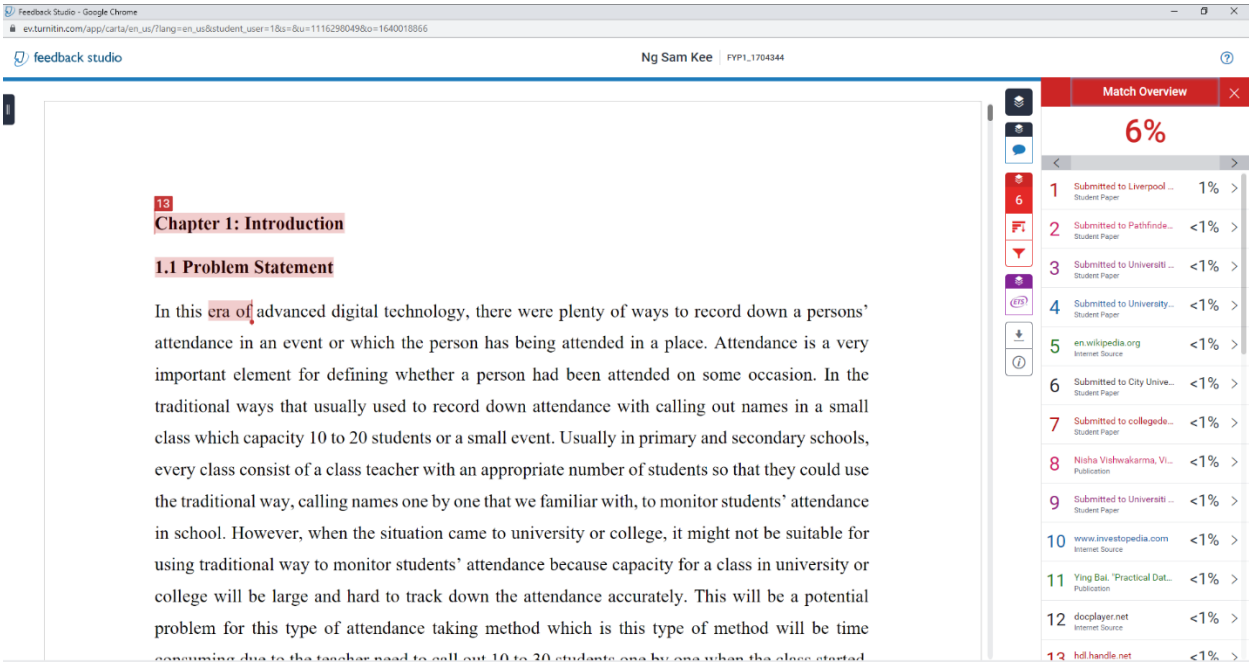
SUPERVISOR :

DR. ROBITHOH ANNUR

STUDENT :

NG SAM KEE

Plagiarism Check Summary



Form iad-FM-IAD-005

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY

Full Name(s) of Candidate(s)	NG SAM KEE
ID Number(s)	17ACB04344
Programme / Course	FICT/CN
Title of Final Year Project	**STUDENT ATTENDANCE SYSTEM BASED ON QR CODE WITH UNIQUE IDENTIFICATION CAPTURING**

Similarity	**Supervisor's Comments** **(Compulsory if parameters of originality exceeds the limits approved by UTAR)**
Overall similarity index: 6 % **Similarity by source** Internet Sources: 2% Publications: 1 % Student Papers: 5 %	
Number of individual sources listed of more than 3% similarity: 0	
Parameters of originality required and limits approved by UTAR are as Follows: **(i) Overall similarity index is 20% and below, and** **(ii) Matching of individual sources listed must be less than 3% each, and** **(iii) Matching texts in continuous block must not exceed 8 words**	

Note Supervisor/Candidate(s) is/are required to provide softcopy of full set of the originality report to Faculty/Institute

Based on the above results, I hereby declare that I am satisfied with the originality of the Final Year Project Report submitted by my student(s) as named above.

Robithoh

Signature of Supervisor

Name: DR. ROBITHOH ANNUR

Date: 3rd September 2021

Signature of Co-Supervisor

Name: _____

Date: _____

FYP 2 Checklist

UNIVERSITI TUNKU ABDUL RAHMAN

FACULTY OF INFORMATION & COMMUNICATION TECHNOLOGY (KAMPAR CAMPUS)

CHECKLIST FOR FYP2 THESIS SUBMISSION

Student Id	17ACB04344
Student Name	NG SAM KEE
Supervisor Name	DR. ROBITHOH ANNUR

TICK (√)	DOCUMENT ITEMS Your report must include all the items below. Put a tick on the left column after you have checked your report with respect to the corresponding item.
√	Front Plastic Cover (for hardcopy)
√	Title Page
√	Signed Report Status Declaration Form
√	Signed FYP Thesis Submission Form
√	Signed form of the Declaration of Originality
√	Acknowledgement
√	Abstract
√	Table of Contents
√	List of Figures (if applicable)
√	List of Tables (if applicable)
√	List of Symbols (if applicable)
√	List of Abbreviations (if applicable)
√	Chapters / Content
√	Bibliography (or References)
√	All references in bibliography are cited in the thesis, especially in the chapter of literature review
√	Appendices (if applicable)
√	Weekly Log
√	Poster
√	Signed Turnitin Report (Plagiarism Check Result - Form Number: FM-IAD-005)

*Include this form (checklist) in the thesis (Bind together as the last page)

I, the author, have checked and confirmed all the items listed in the table are included in my report. Samkee _____ (Signature of Student) Date:3rd September 2021	Supervisor verification. Report with incorrect format can get 5 mark (1 grade) reduction. _____Robithoh _____ (Signature of Supervisor) Date:3rd September 2021