



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

Development of Hostel Management System based on Android Application

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

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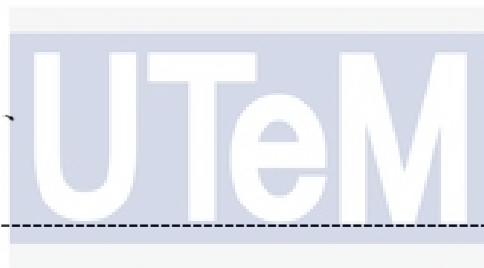
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I declare that this project report entitled Development Of Hostel Management System based on Android Application is the result of my own research except as cited in the references. The project report has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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APPROVAL

I hereby declare that I have checked this project report and, in my opinion, this project report is adequate in terms of scope and quality for the award of the degree of Bachelor of Computer Engineering Technology in Computer System (BEEC).



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DEDICATION

To my beloved mother and father

and

To myself



Abstract

Hostel management system is a project that produced a management system for a variety of activities that occur in every student's hostel, including registration, reporting broken items, and technical failure in the hostel room. Nowadays, there are many educational institutions have established and take many students to enter their institution every year. So, for a student to be accepted into this dormitory, there is a lot of work to be done, and in most cases, no applications or software are produced. This project was created in response to obstacles faced by hostel managers, and it avoids many of the problems caused by human mistake, such as incorrect data entry, inconsistent data administration, and human error in data handling. A hostel administration system, which is automated and digitalized, can be designed that is both pleasant and compatible with the present system, as well as more user friendly. This system uses Flutter framework as user interface and Firebase as backend to store the data and handle the data. While the system is generating, the proposed offers several benefits, including high security, avoiding data redundancy, data consistency, easy handling, saved records, data updating, less hard work, and less human errors. Furthermore, this system will be managed registration hostel's room for students, provide useful and important data to students, and manage data collected to make the data reachable for students and easy to manage by hostel administrator.

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Abstrak

Sistem pengurusan asrama merupakan projek yang menghasilkan sistem pengurusan untuk pelbagai aktiviti yang berlaku di setiap asrama pelajar, antaranya pendaftaran asrama, laporan kerosakan barang, dan kegagalan teknikal di bilik asrama. Pada masa ini, terdapat banyak institusi pendidikan yang telah ditubuhkan dan mengambil ramai pelajar untuk memasuki institusi mereka setiap tahun. Jadi, untuk seorang pelajar diterima masuk ke asrama ini, terdapat banyak kerja yang perlu dilakukan, dan dalam kebanyakan kes, tiada aplikasi atau perisian bangunan. Projek ini dihasilkan sebagai penyelesaian kepada masalah yang dihadapi oleh pengurus asrama, dan dapat mengelakkan banyak masalah yang disebabkan oleh kesilapan manusia, seperti kemasukan data yang salah, pentadbiran data yang tidak konsisten dan kesilapan manusia dalam pengendalian data. Sistem pengurusan asrama yang mempunyai ciri-ciri automatik dan dalam bentuk digital, dibangunkan bagi menyesuaikan dengan system terkini dan lebih mesra pengguna. Sistem ini menggunakan rangka kerja Flutter sebagai pengantara muka pengguna dan Firebase sebagai operasi di bahagian belakang untuk menyimpan data dan mengendalikan data. Semasa sistem dijalankan, ianya menawarkan beberapa faedah, termasuk keselamatan yang terjamin, mengelakkan pengulangan data, data yang konsisten, pengendalian sistem yang mudah, rekod disimpan dengan selamat, pengemaskinian data, mengurangkan tenaga kerja manusia dan kurang ralat ketika mengendalikan sistem. Tambahan pula, sistem ini akan menguruskan pendaftaran bilik asrama, menyediakan data yang penting kepada pelajar, dan mengurus data yang dikumpul untuk menjadikan data itu mudah dicapai oleh pelajar dan mudah diurus oleh penyelia asrama.

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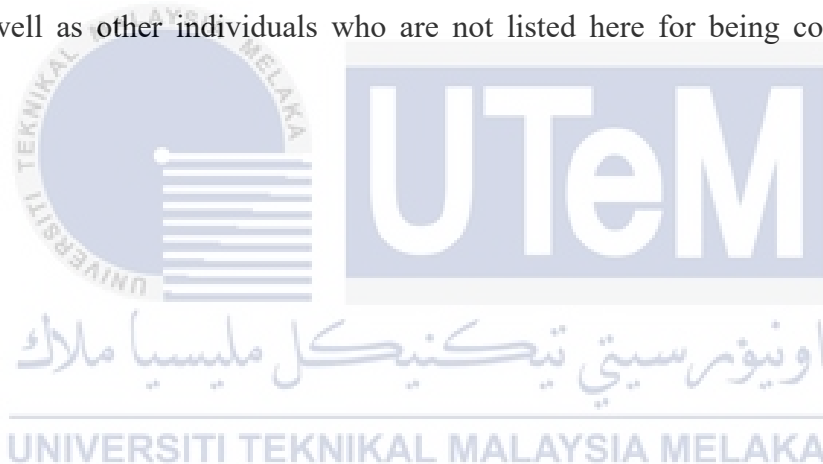


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CHAPTER 1

INTRODUCTION

This chapter will discuss about the background of the project, problem statement, objectives, scope of the project and summary.

1.1 Project background

Many information systems are rapidly evolving nowadays. Those information systems were created with the goal of overcoming the challenges that manual methods posed, as well as making it easier for users to complete their daily tasks. The development of computer-based systems and Android mobile applications provides more advantages and effects that can shape and establish a more systematic work culture, as well as change an organization's administrative structure more rapidly and effectively. In today's age of information technology, using an Android mobile application is nothing new.

This hostel management system app is a system that is being developed to replace the manual system utilised in Higher Education Institutes' hostel offices (IPT). It is applicable to students who have been in a hostel. The user will be able to capture all information about the student, room, and complaint details that the student has entered in the form through the app using this method. They can also register their electrical appliances in their hostel using this method.

Every piece of information can be searched, added to, updated, and deleted. Students could only file complaints, change them if necessary, and check the status of their complaints using their matrix number. They can also register their electrical equipment and add to or change their existing registration. Staff can read the complaint report and change the status of the complaint. They can also search for complaints by date and amend the complaint from there, as well as view the complaint report. The system also allows staff to view and approve registrations. Furthermore, the Hostel Management System App is simpler to use. The staff does not need to manually save all of the registration and complaint information. The system

also can save a lot of information and it will be easy to search the information. The system may also store a large amount of data and make it simple to search it.

1.2 Problem Statement

Many hostels still use an outdated administration system. We need to get to the hostel early in the morning to get a better option of rooms while renting a room at the hostel. When the procedure begins, each floor is assigned to a minimum of 2-3 hostel authorities, who will then assign a token number to each student. This process takes a minimum of 2-3 hours to complete for all students. And a day is set aside for first-year students, followed by their seniors, for a total of 4 to 5 days.

Some of the problems required student to solve it by manually. To begin, students who file a complaint through the manual system must write it in a manual book, which the staff may overlook or overlook. Furthermore, students frequently lack the time to travel to the office to file a complaint or complete some of the necessary registration paperwork for their electrical equipment. This is because students normally end their classes at 5.00 pm, and offices close at 5.00 pm as well, making it easier for students to register and file complaints online. Finally, adopting the manual technique for hostel management necessitates greater concentration and attention to detail throughout the operation of the hostel. This is due to the fact that the staff will be dealing with hundreds of students for registration and complaints. As a result, managing the hostel must be exhausting and will lead to human error. Also, because the students must put the complaint and registration details on the paper, more paper must be maintained by the staff if it is done manually.

1.3 Objective

To complete this project, there are several objectives that needed to be achieved to determine the success of the project. The main objective of this project is to develop a hostel management system for student. The objectives are as stated below:

- a) To develop of hostel management system that manage the registration room for students, complaining report system and news update about the hostel event based on android application.
- b) To develop a complaint report status system to notify current status of the report to student.
- c) To analyse the performance of the system to make sure the data is reachable and easy to manage.

1.4 Project Scope

This project focuses on new approach to manage hostel instead of manually manage. This project is to develop a hostel management system app that will work efficiently and fast. In addition, this project focuses on how efficient the system by looking how the data will be managed during registration and complaint system work. Therefore, this project follows the scope of the study below:

- i. To develop hostel management system app that manage data from registration room details, complaint system and news of hostel.
- ii. To develop an important and useful feature to display information for student
- iii. To provide a complaint status system for student.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

In this chapter, for a better understanding of the research, the project's background will be briefly presented. A review of earlier related work will be discussed to get some useful information by synthesizing their work.

2.2 Hostel Management System

A hostel is a place where a certain group of people, such as students, employees, or visitors, may get cheap meals and housing. Especially, it provides student a convenient room for them to study, sleep and focus on their goals in study. This system use a mobile application to manage hostel-related activities. This application gives many optional management systems such as registration hostel, complaint system platform and registration for electronic item. There is other option to make hostel management which is the conventional method.

2.2.1 Conventional Method

Traditionally, universities usually used the conventional method by make the registration for student's hostel by using registration sheet form and manually record the details on it. This method has proven to be very tiring and inefficient especially for large number of students and can be led to the human error while record the data manually. This non-effective system can cause false information and lead to the problems in the system. Besides that, the form sheet can be easily lost due to large number of students make the registration, and the staff needs to identify and recheck which students have lost their information. Therefore, modern methods have proposed as a solution to the many problems from the conventional methods.

2.3 Development Tools

The scope of this section is the discussion on the technologies and software that are being used. To develop and enhance hostel management system project, fundamental programming and development software should be utilized. Some framework and software tools had been chosen to make the development process easy to build.

2.3.1 Programming language for application development

2.3.1.1 Dart

Dart is a client-side programming language that may be used to create web and mobile apps. Google created it, and it can be used to create both server and desktop apps. It's a garbage-collected, object-oriented, class-based language with C-style syntax. Dart programming is used to construct frontend user interfaces, particularly for mobile applications. It's in active development and has been compiled to native machine code for use in mobile app development. It also supports most common programming concepts like classes, interfaces, functions, and object-oriented programming (OOP). [9]

2.3.1.2 Java

High-level, class-based, object-oriented Java is created to have as few implementation dependencies as possible. Because Java is a general-purpose programming language, compiled Java code can run on any platforms that accept Java without the need to recompile. This is known as writing once, running anywhere (WORA). Regardless of the underlying computer architecture, Java applications are often compiled to bytecode that can run on any Java virtual machine (JVM). Although Java has fewer low-level features than either C or C++, it has syntax that is like each of them. Unlike most traditional compiled languages, the Java runtime has dynamic capabilities (such reflection and runtime code change). According to GitHub, with 9 million developers as of 2019, Java was one of the most widely used programming languages, especially for client-server web applications.

2.3.1.3 Kotlin

The general-purpose, statically typed programming language Kotlin is cross-platform and has type inference. The JVM version of Kotlin's standard library relies on the Java Class Library and is meant to work seamlessly with Java, while type inference enables more concise syntax. Kotlin primarily targets the JVM, although it may also be compiled to JavaScript or native code using LLVM (for example, for front-end web applications using React) (e.g., for native iOS apps sharing business logic with Android apps). JetBrains is responsible for language development costs, and the Kotlin Foundation is in charge of trademark protection.

2.3.2 Framework for application development

2.3.2.1 Flutter

Google developed Flutter, an open-source user interface software development kit. It's used to create cross-platform apps for Android, iOS, Linux, Mac OS X, and Windows. Flutter can be used to develop applications quickly and easily especially in cross-platform development. Flutter avoids using a bridge to communicate with the native layer such as android and iOS. This thing will minimize the boots app startup time and performance issues. Flutter having its own programming language that developed by Google which Dart. Dart is quite similar with Java, .Net, Swift, JavaScript and Kotlin. It basically easy to learn since the code is quite similar with some popular programming language. Setting up environment for Flutter development is easier than another cross-platform framework such as React Native. Flutter's hot reload functionality ensures that the output is displayed in real time on both the emulator and the real device. It also does not need to restart if we want to build UIs, adding features and bug fixing. [8]

2.3.2.2 React Native

React Native is a popular JavaScript-based mobile app framework that allows you to build native-looking Android and iOS apps. You can use the same codebase to construct an application for several platforms using this framework. Facebook first released React Native as an open-source project in 2015. In just a few years, it became one of the most popular mobile development options. React Native is used in the construction of some of the world's most popular mobile apps, including Instagram, Facebook, and Skype. However, this framework has a steep learning curve because many developers find it difficult to become familiar with the environment if they have never worked with React before. React Native uses bridge as their mediator from JavaScript Thread and Native Threads. [10]



Figure 2. 1 Bridge React Native

2.3.4 Backend and database tools for application development

2.3.4.1 Firebase

Google's Firebase technology allows developers to create mobile and online applications. It provides several tools and services to help developers create high-quality apps, grow their user base, and profit. It is built on Google's platform. Firebase is also classified as a NoSQL database application, as it saves data in JSON format. It also includes tools for analyzing data, reporting, and repairing app crashes, as well as marketing and product testing. Because Firebase is hosted in the cloud, Google is responsible for all backend maintenance and operations.

It is not necessary to set up any middleware between our app and the service because Firebase provides client SDKs that allow us to interface directly with these backed services. This differs from traditional app development, in which both frontend and backend software must be written. The frontend code simply calls API endpoints that the backend can access, leaving the hard lifting to the backend code. With Firebase products, the traditional backend is bypassed, putting the job on the client. Each of these products has administrative access through the Firebase console.[6]

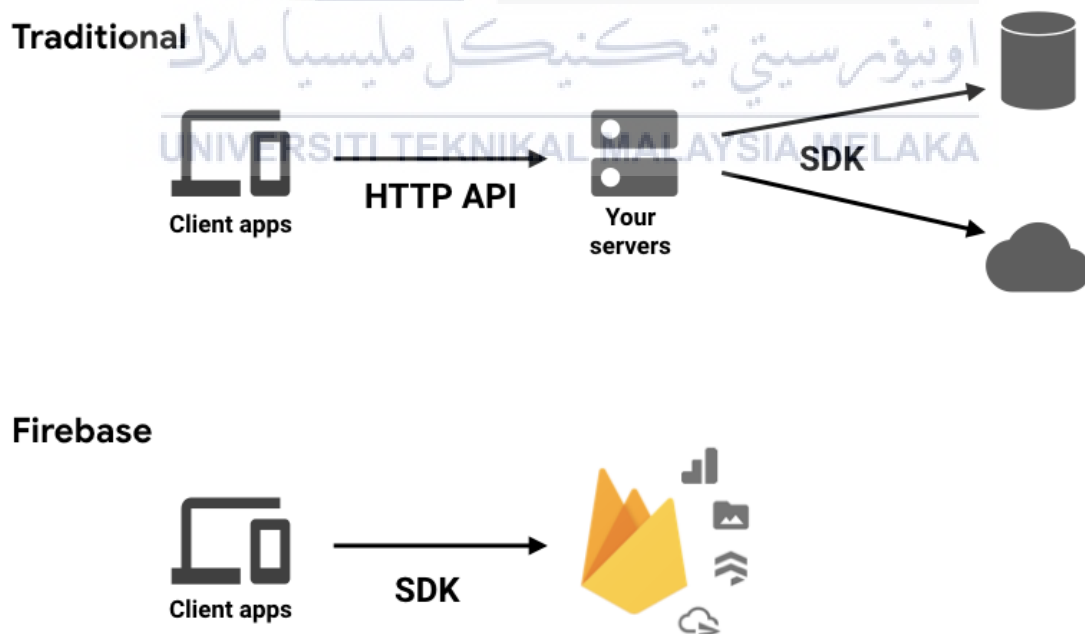


Figure 2. 2 Firebase Diagram

2.3.4.2 MongoDB

Document-oriented database program MongoDB is cross-platform and open source. MongoDB, a NoSQL database application, employs documents that resemble JSON and may or may not include schemas. The Server-Side Public License (SSPL), which is used to distribute MongoDB and is developed by MongoDB Inc., is viewed as non-free by some distributions.

2.3.4.3 Django

Django is a model-template-views (MTV)-based web framework that is free and open-source that uses Python. The Django Software Foundation (DSF), a non-profit organisation, looks after it. Django's main objective is to make it simpler to create intricate, database-driven websites. The framework places a strong emphasis on the principles of don't repeat yourself, low coupling, less code, and component reusability and "pluggability." Everywhere, even in settings, files, and data models, Python is employed. Additionally, Django offers a customizable administrative creation, read, update, and delete interface that is dynamically built by introspection.

2.3.4.4 SQL

Structured Query Language (SQL), a programming language used for managing data stored in a relational database management system (RDBMS) or for stream processing in a relational data stream management system, is a domain-specific language (RDSMS). It is especially helpful when managing structured data, or data that includes relationships between entities and variables. Compared to more traditional read-write APIs like ISAM or VSAM, SQL has two key advantages. The idea of accessing numerous records with a single command was first proposed. The requirement to define how to access a record, such as with or without an index, is also removed.

2.3.5 Integrated Development Tools(IDE) for application development

2.3.5.1 Android Studio

Android Studio is Google's official integrated development environment, based on JetBrains' IntelliJ IDEA software and intended exclusively for Android programming. More capabilities are available in Android Studio to help us be more productive while developing Android apps. On the 16th of May 2013, at the Google I/O conference, Google launched Android Studio as an official IDE for Android app development. It started with version 0.1 in May 2013 as an early access preview. Starting with version 1.0 in December 2014, the first stable built version was released. Since May 7, 2019, Kotlin has been Google's preferred language for building Android apps. Apart from that, Android Studio is compatible with a wide range of programming languages. Android Studio provides several capabilities, including a powerful Gradle-based build system, a quick and feature-rich emulator for app testing, and the ability to make changes to the resources code of a running app without having to restart it. The languages that can might be consider learning for Android Development is as follows: [7]

- i. Java – Java is still one of the two official alternatives, which means it has a lot of Google backing.
- ii. Kotlin – Kotlin is a cross-platform programming language that may be used to create Android apps instead of Java. When compared to Java, Kotlin is considerably easier and more beginner-friendly for those who wish to start developing Android apps.
- iii. C/C++ - Android Studio supports C++ with the Java NDK. All of your project's native source files, headers, build scripts for CMake or ndk-build, and prebuilt libraries are stored in C++.

2.3.6 Framework for Web development

2.3.6.1 Vue.js

Vue.js is a progressive framework for designing web interfaces and one-page apps in JavaScript. The Electron framework uses Vue.js not only for online interfaces, but also for desktop and mobile app development. Because of its HTML extension and JS base, Vue soon became a popular front-end tool, as seen by its adoption by Adobe, Behance, Alibaba, Gitlab, and Xiaomi. The view is an IO of an application/website in this framework's typical Model-View-Controller (MVC) design, and the main library of Vue.js defaults to focusing the view layer. In comparison to other frameworks like React.js, Vue.js has a much smoother learning curve. It is suitable for those who are new to the JavaScript-based web development framework. [4]

2.3.6.2 React

React is a front-end JavaScript toolkit for creating user interfaces based on UI components that is free and open-source. It is kept up-to-date by Meta and a group of independent programmers and businesses. With frameworks like Next.js, React can be the foundation for single-page, mobile, or server-rendered applications. Making React apps typically necessitates the use of extra libraries for routing and specific client-side functionality because React is only concerned with state management

2.3.6.3 Flutter Web

The finest framework for creating cross-platform mobile apps is Flutter, which is growing in popularity. Over 100,000 apps have been released since the framework was initially used, according to Google research. But Flutter isn't only limited to making mobile apps; it can also be used to make cutting-edge, feature-rich desktop and online programmes. With Flutter, you can easily develop sophisticated and beautiful user interfaces without affecting the efficiency of the Flutter web application. Furthermore, web apps created with Flutter run significantly quicker and deliver superior results. Hot reloading is another feature of Flutter that makes development easier by immediately updating UI elements as the code is changed. [11]

2.4 Existing System in Hostel Management System

2.4.1 Research and Design of Hotel Management System Model by Jingda Yang Jilin Business and Technology College

According to (Jingda Yang, 2013) this system makes hotel management become more systematic, standardize and automatic. The overall goal of this article is to design a hotel management system that allow office staff to accomplish hotel guest room management tasks quickly and easily. From the standpoint of actual application to the system, depict the basic situation; then introduce system analysis and modelling, focusing on the functional requirements of the hotel management system, at the same time on the system design goal, the system use case diagram, and so on several aspects, the hotel management system is primarily introduced the three layers of frame structure, and the database design, etc. This technology can be used to improve processing time and modernize hotel room management in a variety of ways. [3]

The middle tier of business rules, data access, and the check of legitimacy are the three levels of system design used by hotel management information systems. The most common system users are system administrators, foreman users, and waiters. During initialization, the system's default "Admin" system administrator user is added to the database. The admin user oversees all functions, including adding, deleting, and editing users' information. Foreman users can manage the server user, which allows them to create, update, and delete user information, among other things. He is unable to manage other foreman users, though. Foreman users get access to statistics for all the other functions. He just has access to user information and has very limited user permissions. Ordinary users can only access the receptionists and front desk cashier function of two modules, as show in Figure 2.3.