



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DEVELOPMENT OF TRANSPORT INFORMATION SYSTEM USING PUSH NOTIFICATION

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

by

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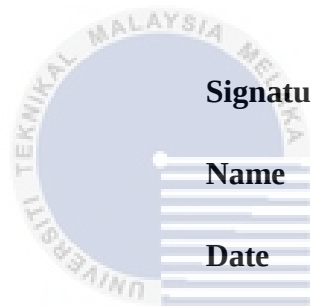
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DECLARATION

I hereby, declared this report entitled “Development of Transport Information System Using Push Notification” is the results of my own research except as cited in references.

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APPROVAL

This report is submitted to the Faculty of Engineering Technology of UTeM as a partial fulfillment of the requirements for the degree Bachelor of Computer Engineering Technology (Computer Systems) with Honours. The member of the supervisory is as follow:



ABSTRACT

Mobile application is the latest and rapid growing technology available for all user or customer in today market. An enormous increase in the end user acceptance has been experienced in the past few years. This project will be developed to provide transport information system using push notification. This push notification uses the Google Cloud Messaging (GCM) as platform that enables developers to send messages to the smartphone user. This project also proposes an mobile phone application gives information and integrate map interface in the application. Mobile application requires an open source development which is probably the most feasible and present user friendly approach. This project deals with location based services. Which are used to track current location of the bus as well as give an estimate remaining time for tracked bus to reach its destination using the client server technology. Also, it displays the required maps with the help of Google map. The purpose of the project provides the bus information about buses, bus numbers as well as bus router. Other than that, using database SQLite to displays the schedule of the bus. Lastly, gets information using push notification between servers to the mobile phone.

ABSTRAK

Aplikasi mudah alih adalah teknologi terkini dan pesat berkembang disediakan untuk semua pengguna atau pelanggan di pasaran hari ini. Peningkatan yang besar dalam penerimaan pengguna akhir yang telah dialami pada tahun-tahun kebelakangan ini. Projek ini akan dibangunkan untuk menyediakan pengangkutan sistem maklumat menggunakan “Push Notification Service”. pemberitahuan push ini menggunakan Google Cloud Message (GCM) sebagai platform yang membolehkan pemaju untuk menamatkan mesej kepada pengguna telefon pintar. Projek ini juga mencadangkan aplikasi Telefon mudah alih memberikan maklumat dan mengintegrasikan peta muka dalam permohonan itu. Aplikasi mudah alih memerlukan pembangunan sumber terbuka yang mungkin pendekatan mesra pengguna yang paling layak dan masa kini. Projek ini berkaitan dengan perkhidmatan berasaskan lokasi. Yang digunakan untuk mengesan lokasi semasa bas serta memberi baki masa anggaran bas dikesan untuk sampai ke destinasi dengan menggunakan teknologi pelayan pelanggan. Juga, ia memaparkan peta yang diperlukan dengan bantuan peta Google. Tujuan projek ini menyediakan maklumat bas mengenai bas, nombor bas serta router bas. Selain itu, dengan menggunakan SQLite pangkalan data untuk memaparkan jadual bas. Akhir sekali, mendapat maklumat menggunakan pemberitahuan menolak antara pelayan untuk telefon mudah alih.

DEDICATIONS

Alhamdulillah, praise to the Almighty Allah S.W.T

This project is dedicated to:

My parents,

My beloved family,

My Supervisor,

My lecturers,

And all my friends

Thanks for their encouragement and never end support.



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I would like to express my gratitude towards the following groups of people which not only given me continuous support and guidance throughout the entire course of this project. First and foremost, I would like to thank Allah SWT for the great health and ability in completing this paper. I would extent my deepest appreciation to my beloved parents who have never fail to support me from the beginning. To Mr Mohd Saad Bin Hamid, my supervisor who not only guided me but also provided me the knowledge about coding, teach me how to use each of software and experience that help in this research project. To my supporters which include friends, classmate and housemate who assisted me with care plus giving me a link to refer with to insert in database project. Last but not least, thank you to everyone that directly and indirectly involved in helping me finishing this Finale Year Project report. Thank you.

اونیورسیتی تکنیکل ملیسیا ملاک

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LIST OF ABBREVIATIONS, SYMBOLS AND NOMENCLATURE

B4A	-	Basic 4 Android
DBMS	-	Database management system
IDE	-	Integrated Development Environment
IP	-	Internet Protocol
JVM	-	Java Virtual Machine
OS	-	Operating system
PC	-	Personal Computer
POIINav	-	Points of Interactive Interest Navigator
SDLC	-	System Development Life Cycle
SQL	-	Standard Query Language
WYSIWYG	-	What You See Is What You Get
VM	-	Virtual Machine

CHAPTER 1

INTRODUCTION

1.0 Introduction

This chapter introduce brief the idea of the project and focus to problem statement, objective and followed by the scope and limitation of the project.

1.2 Background

Mobile application is the latest and rapid growing technology. A mobile application is a software app developed specifically for use in, small wireless computing devices such as smartphone, tablets or laptop. The mobile application is design to take into account the demands and constraints of the device and also take advantage of any special ability that they have. Although know mobile application used for device application. When selected open application, the operating system (OS), it running until system close. Any mobile application can be accessed and hold of any mobile device such as a phone, music player or tablet.

The popular mobile devices these days are mobile phone, tablets and personal computer, through many mobile devices have been introduced in the market today. The main features of this mobile device are that it can be enabled to use a variety of communication technologies such as Wi-Fi, Bluetooth, RFID and third generation. This growth in technology makes digital lifestyle. From people live in these statistics, the result show the user with more than one mobile phone has increased in Malaysia. The difference between users has a mobile phone in 20014 and 2010

decreased by 15.6%. Meanwhile, for users also increased 3.4%. Figure 1.1 shows the percentage of users with a variety of mobile phone in Malaysia.

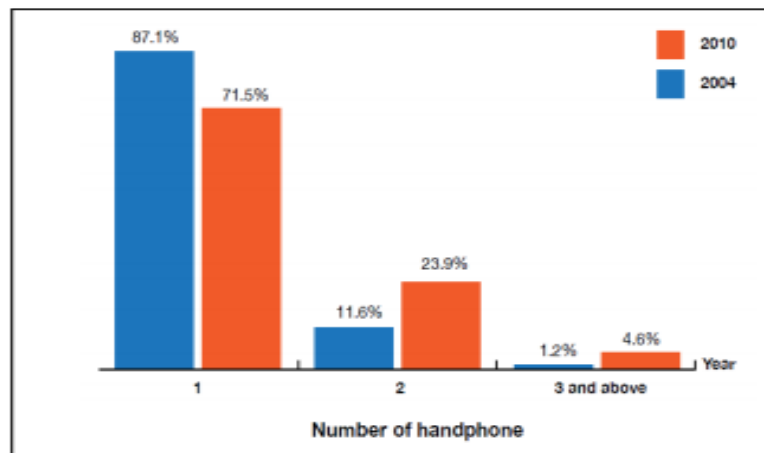


Figure 1.1: Percentage of User with Multiple Hand Phone (MCMC, Cyberjaya 2011)

1.3 Problem Statement

Generally, everyone is in a hurry to reach their destination. In this case to waiting for the bus cannot be trusted. People who are really in the public their main concern is to find real time location of buses in which they were waiting and time required to get the bus stop. This information helps people in making better travelling decisions. This information gives a great challenge in the public transport system and discuss various approaches to manage it wisely. The current location of the bus is obtained by integrating the GPS device on the bus and coordinate buses sent by either the GPRS service provided by the mobile application. GPS enable device on the tracking and the information sent to the central control unit or directly at bus stops using RF receiver. The information also can used Bluetooth to detect bus coming when bus connect into the range. The system is integrated with an average speed of any segment of history. This is done to improve the accuracy by including factors such as traffic, track in each segment, the day and time of day. The public can track information using Android software. GPS coordinate are sent to the bus when the centralized servers where algorithms are used for various estimated arrival time using its speed.

The problem regarding in the transport information system are to track the system anytime a system that can connect the information about the bus timing and schedule. The main problem that must be solved is how make the system able to send the data only when the owner wants to track the bus.

1.4 Project Objective

The objective of this project is:

- To study on vehicle arrival time estimation method
- To provide real time bus location information on the mobile application
- To integrate Map interface in the mobile application

1.5 Workscope

The work scope of the project is to study the bus tracking system using the Bluetooth reader that can give the current position of the bus. The range of Bluetooth system is about 10 meter. The Bluetooth reader also sends the data into database to collect the data of the bus such as bus stop and time arrival.

This project also has mobile application to developed using Android and IOS Apple platform. Other than that, the project has push notification that allows sending data from the server to user Android mobile devices using Google cloud message.

The Figure 1.2 and Figure 1.3 shows the block diagram of the whole system and Bluetooth reader system to development of transport information system using push notification. In this case, the system has following features:

1. Information exchange on transport system through mobile push notification
2. To estimate of transport using Google Maps
3. The schedule of the bus

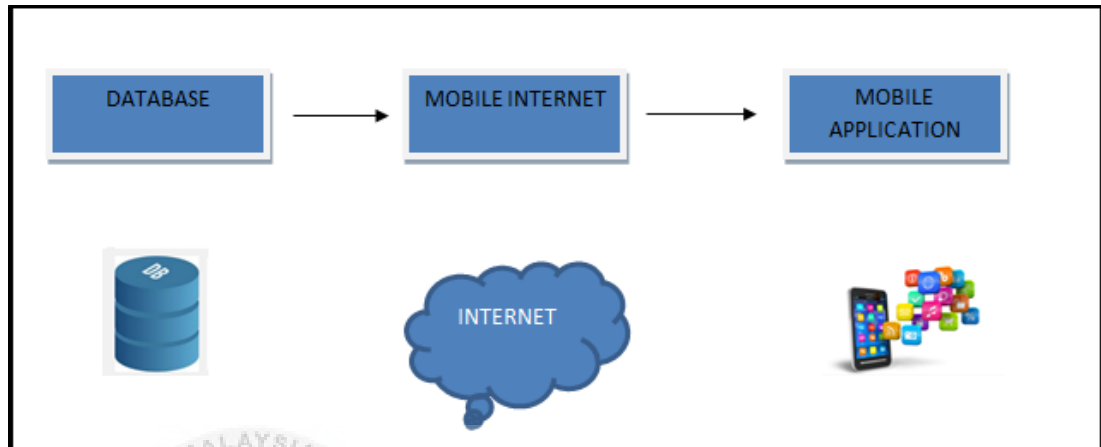


Figure 1.2: Block Diagram with Proposed System



Figure 1.3: Bluetooth Shield, Bluetooth Reader, Database and Mobile Application of Transport Information System

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

In this chapter will be discussed on the background of relevant research in the project. In this chapter the information was collected from many sources such as book, journals and internet. Information as a guide to make sure this project is done in time given.

2.1 Transport Information System

Tracking of organization buses while moving on highway is a crucial task. A person patiently waiting for the bus may want to enquire about the position of current location of the bus. Phone discussion is not always possible due to traffic disturbances. Further it involves variant costs due to the calls and message service over phone and the person in the bus may get annoyed if he gets multiple calls from people boarding that bus. Mobile based Bus Tracking System provides a solution to this problem which helps anyone to retrieve the location of the bus without calling or disturbing the person travelling in the bus. The people boarding the bus and the coordinators of the bus should own an android driven mobile phone with internet connectivity.

The Global Positioning System (GPS) supports in area following with backing of Global Standard for Mobile (GSM) in cellular telephone to report transport area information again to the servers. Continuously, this shows where transports are on a guide and evaluation the entry time and separation with reference to holding up stop

by utilizing propelled gimmicks of Internet. The function of proposed system is to provide an economical, flexible and reliable system for bus tracking.

Chew et al. in 2006, proposed A Hybrid Mobile-based Patient Location Tracking System for Personal Healthcare Applications. They proposed a crossbreed portable based area system using the worldwide situating framework (GPS) and cell convenient framework establishment is used to give the range after fitness using modem. Lenain et al., in 2006 proposed Mobile robot control in vicinity of sliding which is an Application to agrarian vehicle way tracking.

Varandas et al., in 2010 proposed an tracker which is a Mobile Tracking Application for Pervasive Environment created for cellular telephones. Through the known geographic position, this requisition empowers the client to track a cell phone and send cautions on the off chance that it is out of the span around an investment point, long ago characterized by the provision chairman. Donko et al., in 2012 proposed Implementation of tracking mobile application and analysis of spatial data. This model presents utilization of existing aspects of global navigation and global position system (GPS), and visualization of Earth using satellite images, in order to gather and store particular data.

2.1.1 Bus Module

This module is installed inside the bus. In a user interface it consists of the driver, location, control unit and GSM module. User interface have push button which is used to give the information or logic high signal to the control unit. The driver also required to use this simple switching like a push button an arrival at each bus station. Inside the bus also has indicator LEDs which are used to show status module. Next, for the emergency case it has reset button to reset or starting the whole module.

Saujatha (2014), the control unit consist of Atmega8 microcontroller circuit to find the current position, bus number and has also has unique word for which is to be send to the coming bus stop. GSM module transmit the serially control and has connection between bus and bus station. It also sends the control work by the control unit as text. Figure 2.1 show the block diagram of the bus module.

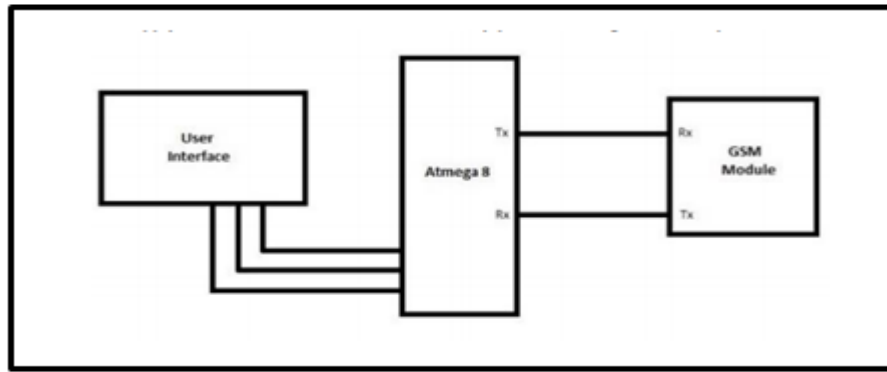


Figure 2.1: The Block Diagram of The Bus Module (Saujatha,2014)

2.1.2 Station Module

This module is installed inside bus station and consists of a GSM module, control unit and LCD display. The GSM receives the control unique send by bus module and also send by signals the control unit. Atmega8 microcontroller is used to control unit. After that, GSM module sends command throw the message which store in the SIM card present in the GSM module. The LCD will be displayed based on the control unit that show the bus number and the its position.

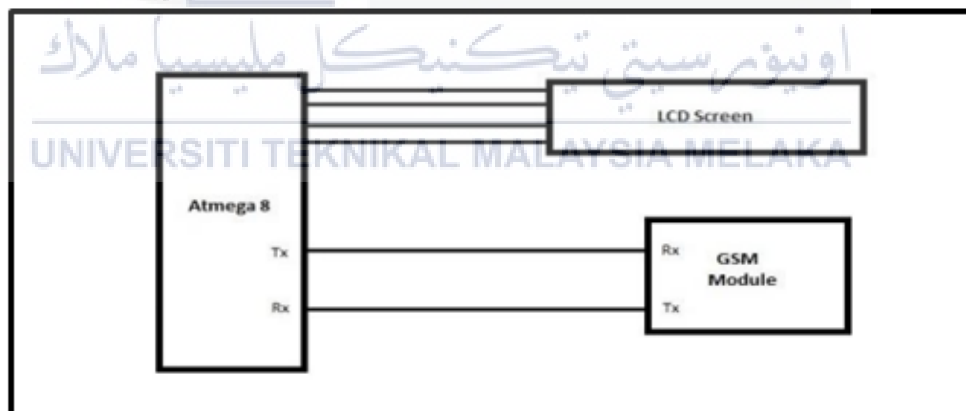


Figure 2.2: The Block Diagram of The Station Module (Saujatha, 2014)

Therefore, when bus moved in the certain route the transmitter module detected in it. The transmitter module send the data of the location bus and the expected time that will bus arrive. Transmitter and receiver have their own unique number that used in GSM module. Figure 2.3 show the example of the bus route of Coimborate City. The route display map of the four points bus stop such as bus stop

A,B,C and D. Point A is the starting point of bus, the bus driver used push button to provide in the transmitter module inside the bus and continues of other point bus. For the particular location it will increment a variable. This variable is now sent as a text message bus stops B, C and D. When the bus reaches point B, the bus driver again push button and this will increment the variable correspond to point B. The information of the bus will display in the LCDs when the bus has now reached. This increment will continue until the bus reaches the point D. The figure 2.4 show the estimate time that bus reached.



Figure 2.3: Bus Route of Coimbatore City (Yasha, 2014)



Figure 2.4: LCD Display Show The Estimate Time of Bus (Yasha, 2014)

2.2 Geolocation Data Transmission

Stated simply, geolocation is a technology that uses data acquired from an individual's computer or mobile device (any type of radio or network-connection-enabled device) to identify or describe the actual physical location. It is one of the most popular manifestations of the current development of information technologies and is recently experiencing a significant rise in popularity.

Geolocation software services are used to support the business objectives of private and public enterprises. Geolocation data generally are used for three purposes:

1. Geo-referencing or positioning - Ascertaining the physical location of an object or person relative to a coordinate system (map) to access specific information later.
2. Geo-coding - Searching for information regarding objects or services on a map.
3. Geo-tagging - Adding geographic information to an object, such as a photograph, by incorporating the geolocation data in the photograph's metadata.

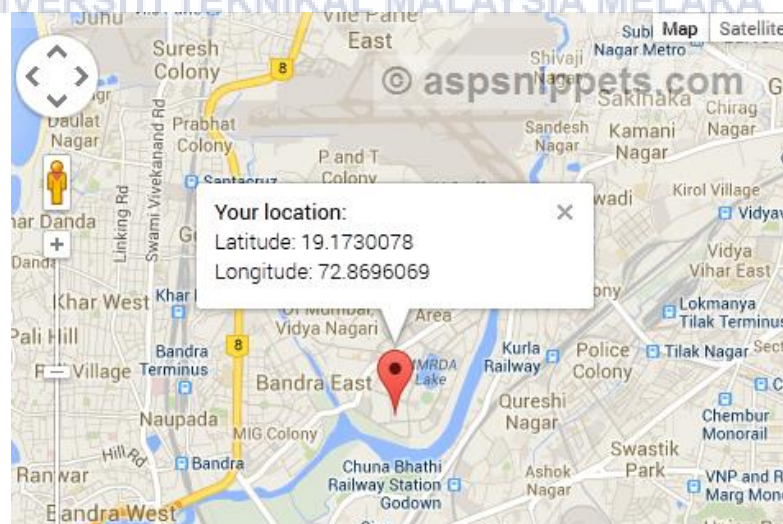


Figure 2.5: Geolocation (A. V. Prabu, 2015).

2.3 Location-Based Application

A Hybrid Mobile-based Patient Location Tracking System for Personal Healthcare Applications was proposed by Chew et al. They proposed a crossbreed portable based area system using the worldwide situating framework (GPS) and cell convenient framework establishment is used to give the range after fitness using modem. Lenain et al., in 2006 proposed Mobile robot control in vicinity of sliding which is an Application to agrarian vehicle way tracking.

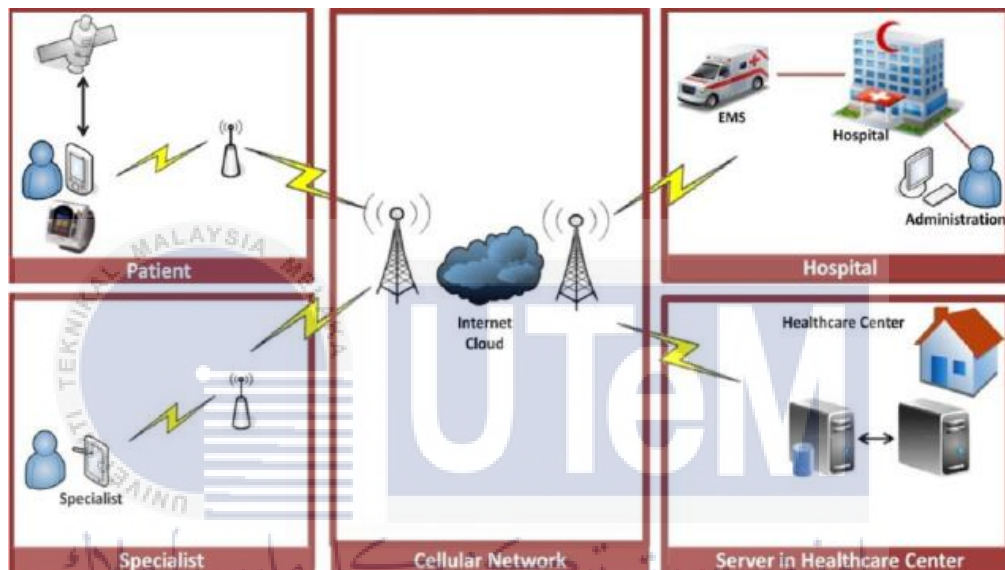


Figure 2.6: A Hybrid Mobile-Based Patient Location Tracking System (Chew, 2006).

Varandas et al., in 2010 proposed an mtracker which is a Mobile Tracking Application for Pervasive Environment created for cellular telephones. Through the known geographic position, this requisition empowers the client to track a cell phone and send cautions on the off chance that it is out of the span around an investment point, long ago characterized by the provision chairman. Donko et al., in 2012 proposed Implementation of tracking mobile application and analysis of spatial data. This model presents utilization of existing aspects of global navigation and global position system (GPS), and visualization of Earth using satellite images, in order to gather and store particular data.

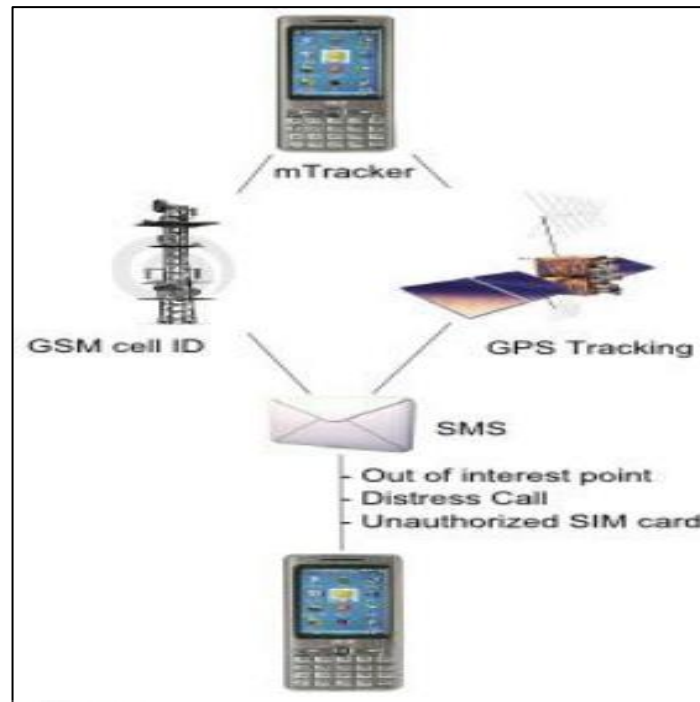


Figure 2.7: Mobile Tracking Application for Pervasive Environment (Varandas, 2010).

2.4 Wi-Fi Network

WI-FI accuracy is about up to 5 m. The advantage of this system is the use of existing IEEE 802.11 infrastructure that results in a reduced cost of use. However, in multi-story floor and compact indoor environments makes the performance of the system decreased because the signal reflections and dynamic network conditions may affect the signal readings. If the technique used Finger Print, analysis and calibration of the site is required. However, minor changes may require recalibration of the whole location system.

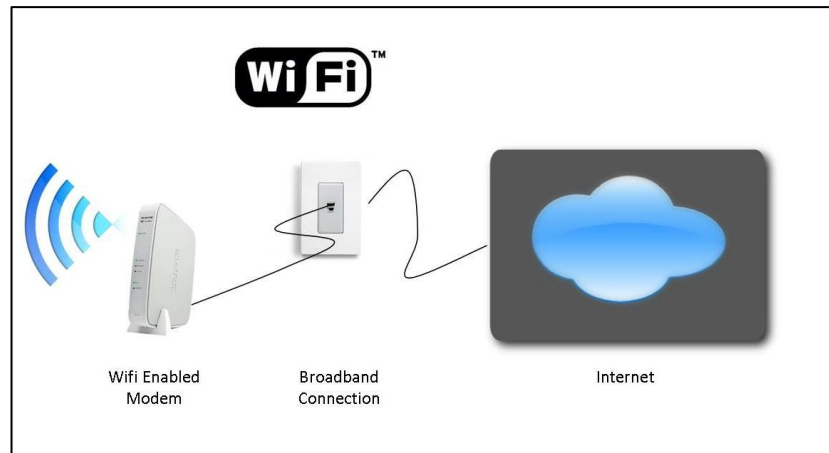


Figure 2.8: Wireless Wi- Fi Network (google.com).

Wi-Fi based RFID is a big business and expected to grow all percent annually. From the primary usage, the increased Wi-Fi adoption has led to RFID over Wi-Fi and brought location and asset tracking to additional areas. RFID can be used to trace and manage inventory, assets, people, vehicle, computer materials, smart phones, airport baggage and even pets. The RFID market grew by 115% from 2013 to 2014 with a net worth of \$8.89 billion and expected to rise to \$27.31 billion by 2024 (Kathy Vogler, 2016).

2.5 Database Management System (DBMS)

A database management system (DBMS) is a software package with computer programs that control the creation, maintenance and use of a database. It allows organization to conventionally develop database for various application by database administrators (DBAs) and other specialists. A database is an integrated collection of data records, files and other objects. A DBMS allow different user application programs to concurrently access the same database. DBMS may use a variety of database models, such as the relational model or object model suitably describe and support applications. In general, it is capable to accept query language which in high-level programming language. Moreover, it offer of managing concurrency control, enforcing data integrity, controlling data access and recovering database after failure and restoring it backup files as well as maintain database

security. DBMS define of software that consent users define, create, maintain and control access to the database. For application programs, a computer that interact with the database by issuing an appropriate request (typically an SQL statement) to the DBMS (Connolly and Begg, 2010).

Database of all access is through the DBMS that provides a Data Definition Language (DDL), which allows user to define the database while Data Manipulation Language (DML), allows user to insert, update, delete and retrieve data from the database. Generally, there have different types of database management system listed Hierarchical DBMS, Network DBMS, Relational DBMS, Flat file DBMS and Object Oriented DBMS. Database in Android system use to store valuable data that need to be adhere even user close it down (Connolly and Begg, 2010).

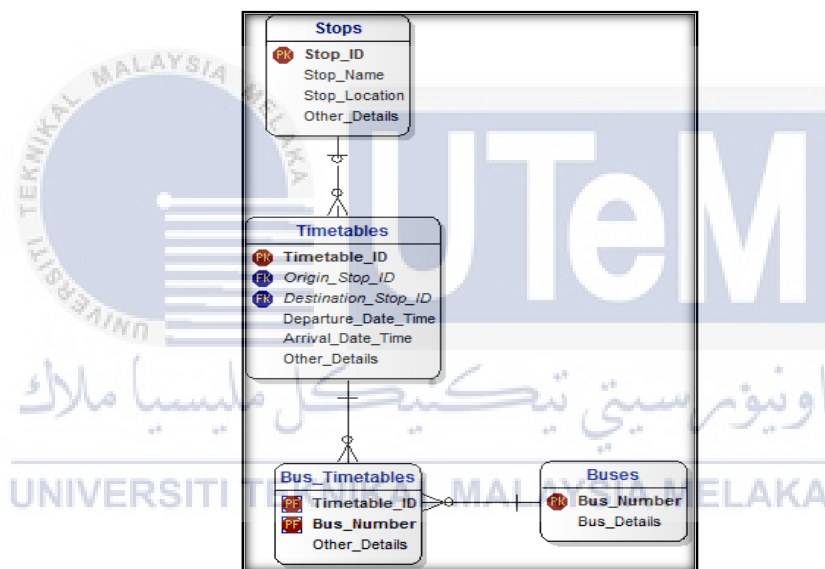


Figure 2.9: Database Management System of Tracking Bus(www.databaseanswers.org/data_models/bus_tracking/index.htm)

2.5.1 SQLite

SQLite is open source database and uses dynamic typing and also process in library that implement a self-contained, server less, zero-configure, transactional SQL database. This means there is absolutely no configuration for the database developers. This makes it relatively easy to use, does not have a SQLite database

server and no process running. It is basically a set of libraries that provide the functionality of the database.

Furthermore, it is a single file database that can be straight forward or safety boils with file system security. Android aside special, sandbox for each application is open source. Android framework is some way to use SQLite with ease. Although SQLite using SQL, Android provide a library with a higher level interface that is easier to integrate to the applications..(Sqlite.org, 2015).

Sqlite.org (2015), SQLite support into Android, it not only option when it comes to data persistence for app. For another example database is MySQL it also relevant, but must have bundle to required libraries with app. SQLite is not an alternative to a full SQL server; instead, it is an alternative to using a local file with an arbitrary format.

There are many advantages to using SQLite as an application file format, including of a better performance in the application that load needs data only so then it become faster than reading individual files from disk. It is reliability where the content can be updated continuously and atomically so that little or no work is lost in a power failure or crash. Then, database content can be viewed using a wide variety third-party tools. Content stored in an SQLite database is more likely to be recoverable decades in the future, long after all traces of the original application have been lost.

There are many advantages to using SQLite as an application file format. SQLite is a better performance in the application that load needs data only so then become faster than reading individual file from disk. Other than that, SQLite packages is higher performance alternative where source is not an issue. SQLite database is more popular to be recoverable decades in the future, long after all traces of the original application have been lost. Figure 2.10 show the example for the database browser for SQLite in transport information system.

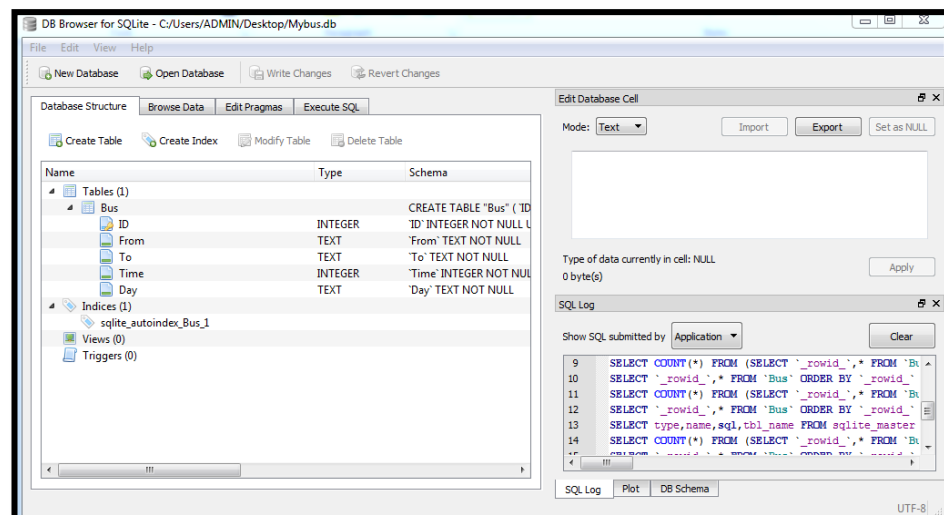


Figure 2.10: DB Browser for SQLite

2.5.2 MySQL

It is an open sources database management system and is used is some of commonly can find online counting Twitter, Facebook, Flickr, Nokia.com, Youtube and Google. It world's most famous open source database of course have its own features. That listed as high performance for storage-engine architecture allows database professionals to configure the MySQL database server specifically for particular applications with the high-speed load utilities, distinctive memory caches, full text indexes, and other performance-enhancing mechanisms.

Furthermore, it is strong in data protection which MySQL offers exceptional security features that ensure absolute data protection. In terms of database authentication, MySQL provides powerful mechanisms for ensuring only authorized users have entry to the database server, with the ability to block users down to the client machine level being possible. It also is a comprehensive application development that support for every application development need. Within the database, support can be found for stored procedures, triggers, functions, views, cursors and more. Moreover it eases in management where it has exceptional quick-start capability with the average time from software download to installation completion being less than fifteen minutes. Once installed, self-management features

like automatic space expansion, auto-restart, and dynamic configuration changes take much of the burden off already overworked database administrators. Many third party software vendor tools are also available for MySQL that handle tasks ranging from data design, to complete database administration, job management, and performance monitoring. (Mysql.com, 2015).

2.6 Software Development Tools

Software development tools is the process minds behind computer program and part of operating system (OS). Mobile operating system such as smartphone , tablet and order digital device is a set of data or program that manages all hardware and optimizes the efficiency of the application software in the device. Mobile operating system can be seen in smart phone by Android, IOS, window mobile and many more.

Karch, (2015) Android is the world operating system for the touch screen smartphone. Android is an open source Linux-based mobile OS developed by Google. The software of choice because it is low-cost, customizable, light weight OS for high technology devices without developing one from scratch.

According to Jia YU and Min Liu, (2010) Android platform has some others important functional characteristics as follows. For example, platform for Dalvik Virtual Machine (VM) is build VM designed especially for Android and for modified Java Virtual Machine by Google with a number of immediately available libraries and application software such as SQLite.

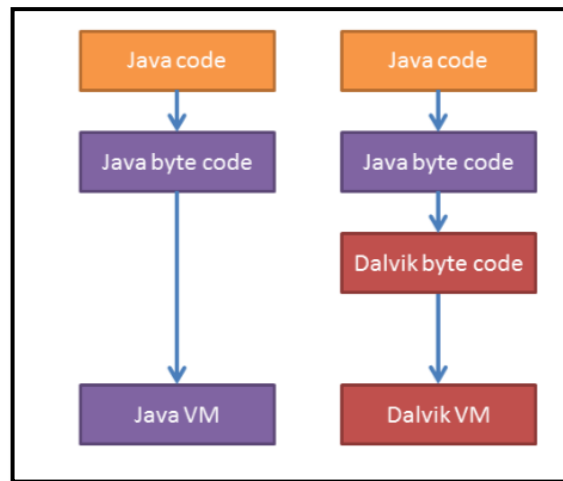


Figure 2.11: Java vs Dalvik (Gargenta, 2011)

In Java it easy to write and compile the Java source code using the Java compiler. Next, this code runs on Java Virtual Machine. Figure 2.11 is comparison between standard Java and Dalvik. By write the Java source file and compile for the both is same using Java compiler but at the point, it recompiled once again using Dalvik compiler to Dalvik byte code.

2.6.1 Eclipse

The mobile application was developed using Eclipse Android Development Tool (ADT). Basically, there were three parts of the development tools such as XML for interfaces, Java for main functions and Android Manifest for screen connections. To make the application function well as planned, the Java coding of the mobile application will be needed. The basic function of the buttons, screen as well as activities has been set and linked with the XML interfaces. Besides that, the connection of the screens was done in Android Manifest.xml (Wan Fatimah, et al., 2014).

Based on Yan et al., 2012 states when Eclipse was first being developed by IBM, it was treated to replace the business software Visual Age for Java as the next generation of IDE development environment, and now it is ran by nonprofit alliances with software suppliers, Eclipse Foundation. As a open source software development

project, Eclipse focus on providing a full functional platform for the integrated tool development. As a result of the merger, Eclipse SDK is a luxuriant development environment which allows developers to construct the tools in the platform effectively.

2.6.2 Android Studio

Android Studio Overview, (2015) state information about Android Studio. It is the official IDE for Android application development, based on IntelliJ IDEA. On top of the capabilities you expect from IntelliJ, Android Studio offers gradle-based build support, Android-specific refactoring and quick fixes, lint tools to catch performance, usability, version compatibility and other problems. It also has proGuard and app-signing capabilities, template-based wizards to create common Android designs and components. Android Studio has rich layout editor that allows to drag-and-drop UI components, preview layouts on multiple screen configurations, and much more. In addition, it built-in support for Google Cloud Platform that making it easy to integrate Google Cloud Messaging and App Engine as server-side components. This IDE has understanding context in which are working of (because it built over IDEA). The purpose of its build is to improvise from Eclipse.

However, Android Studio stills not that firm. From one conversation about Android Studio located in stackoverflow forum, Kaliakos, T., 2014 tells Android Studio actually means that in certain cases the only thing can do is to build from command line and edit the gradle script. For the reason that is something relative new, many libraries are not supporting it out of the box, whereas in Eclipse, since it has been around for so long, everything is more or less trivial. From the time when Android Studio it is quite new, may not find answers online for the problems.

2.6.3 Basic 4 Android

Basic for Android (B4A) is one of the easiest ways to build up Android application. Such as other IDE, B4A have option to develop with using Android emulator or use real device to connect in USB debugging mode. The Android emulator takes off the hardware and software element of usual mobile device which offer navigation and control keys using any equipment to produce function of the application. Good thing it have a screen use to display application. However, when running out through emulator not straightforwardly to hardware does have limitations on communication. In order to correspond with emulated device might block from firewall program running on device. More to the point, it could block by any physical firewall/router to the device is attached. By using USB debugging for device that support ADB debugging, can retrieves more data from the device, making it possible to recover deleted files that were saved on the device. The down side is that it takes more time, and that file system reconstruction is not supported for all devices (B4x.com, 2015).

In addition, B4A also can mark with B4A-Bridge and B4A Designer to facilitate user to design Android apps. When smartphone get those applications, it can show up design layout through mobile device. It functions with B4A software that install in personal computer and by connecting using Bluetooth or local network. This tool created to improvise method of ADB debugging and android emulator (B4x.com, 2015).

B4A-Bridge is made of two elements. It runs on the device and allows which is part of the IDE to connect and correspond with the device either using Bluetooth or wireless. By Bluetooth can simply connect when the device (mobile phone) listening for connection on Personal Computer (PC) or laptop. For wireless, it allows the listening process whenever device and PC use same router of internet connection. Or else, it will not cooperate because B4A need Internet Protocol (IP) to hook. This is done through a network connection (B4A-Bridge cannot work if there is no network available). Once connected, B4A-Bridge supports all IDE features that include application to install, view visual designer. Android does not allow apps to

secretly install other applications that use B4A-Bridge, developers will be able to see a dialog that asks for approval. B4A is productive tool and IDE tools.(B4x.com, 2015).

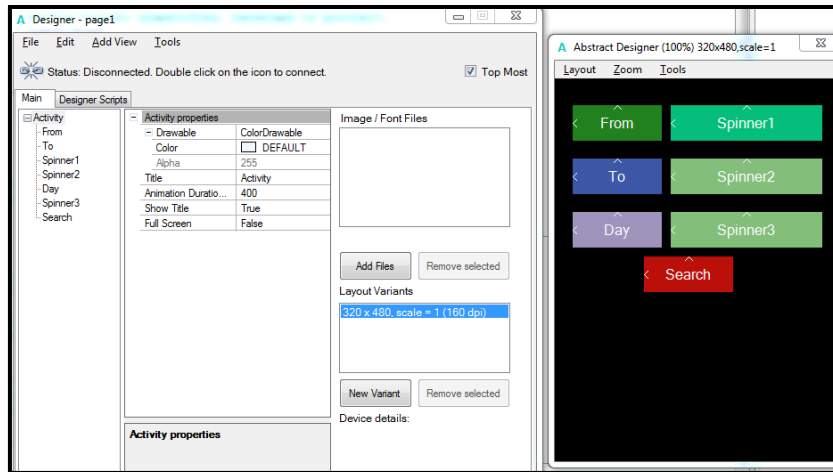


Figure 2.12: Interface of Basic 4 Android

B4A show the features that develop any type of Android application. From B4x.com, 2015 contain the features of this IDE. It is already states its object oriented programming high level language or machine language no need for XML programming, highly extensible with support for custom Java libraries. Moreover, it is the only true What You See Is What You Get (WYSIWYG) visual editor for Android that built in code obfuscation. Visual editor supports multiple screens and resolutions. B4A also for support all Android phones and tablets from Android 1.6 and above for Android 5.x. Furthermore, it is one of the modern IDE with auto complete, built-in documentation, internal index and have advanced features with large set of documentation with a custom online search engine and offline search engine tools (B4x.com, 2015).

2.7 GUI Design Guideline

Before starting to build user interface for the product, it has some qualities and characteristics for make a good user interface such as clarity, concision, familiarity, responsiveness and consistency.

For clarity, the interface to avoid confusion by making everything clear through language, flow, hierarchy and metaphor for visual elements. Clear interface does not need a manual. It also ensures that users make less mistakes while using it.

Next concision it's easy to make the interface more clear by explaining and label everything, but this leads to facial bloat, where there are too many items on the screen at the same time. If too many things on the screen, find what you are looking for is difficult, and so the interface becomes tedious to use. The real challenge to creating a great interface is to make it simple and clear at the same time.

Familiarity, something familiar when you remember that a previous encounter with what is there. Even if a person using the interface for the first time, certain elements can still be used. It can use real-life metaphors to communicate meaning. For example, folder style and are often use for navigation on the website and within the application. People recognize them as items folder navigation metaphor because it is familiar to them.

Other than that, Responsiveness, that means a couple of thing. A good user interface should not feel sluggish and interface should provide good feedback to the user for being successfully processed.

Lastly, consistency to keep interface consistency across to application is important because it allow users to recognize usage patterns.

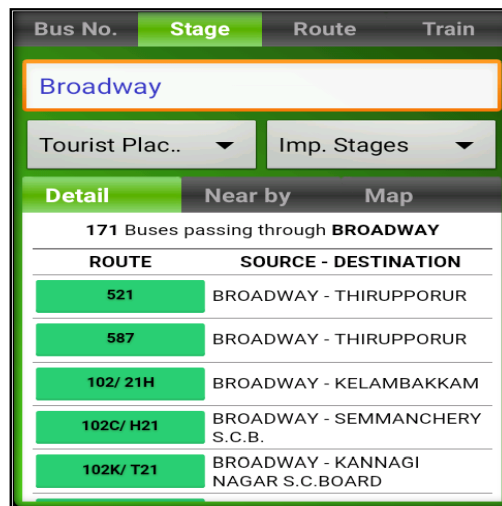


Figure 2.13: Example Interface for The Tracking Bus System (Google.com)

2.7.1 Layout and Position

Layout provides structure to all features or elements of the visual interface. It also defines the relationship between each of the elements closer together. For example, the position of the label in the form of a text field, rather than to the left, which allows us to move our eyes down them easily, and not have to continue to look to the left to check the label to apply to the field.

2.7.2 Shape and Size

The shape and size used for different elements. For example by changing the icon it makes them easier and quicker to recognize. Size can be used to show the importance, elements of larger, more noticeable. Size also can make clickable controls easier to use. The larger the clickable area is the faster they can move the mouse cursor over it. Making the most frequently used controls larger will make it easier for users to click on them, thereby increasing the efficiency of the interface

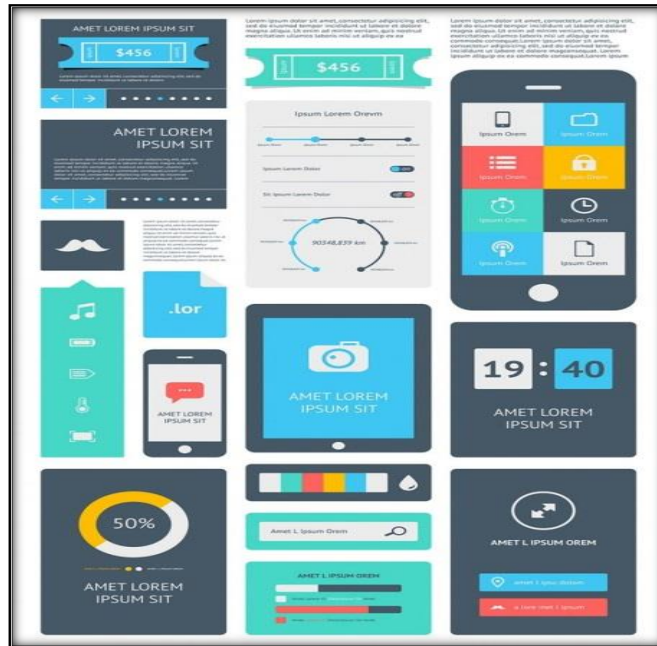


Figure 2.14: Example for size and shape for interface (Google.com)

2.7.3 Color interface

Color can attract enough attention that provides a contrast with the background. For example, the bright color of the light in the background. Colors can express meaning. For example, red usually stop or danger symbol and also reserved for the error message. Green generally means success or a successful process. Color cans as well as the relationship of color coding things like buttons and toolbars to help users.

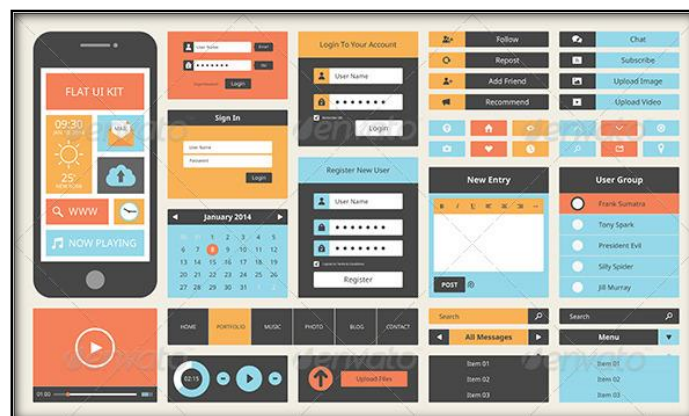


Figure 2.15: Example for Color Interface (Google.com)

2.8 Push Notification

Zhaotai (2015), Push notification is the smart push that is an important approach for distributing interesting information to users beginning with the fast development of mobile application and mobile device. Push notification is very popular.

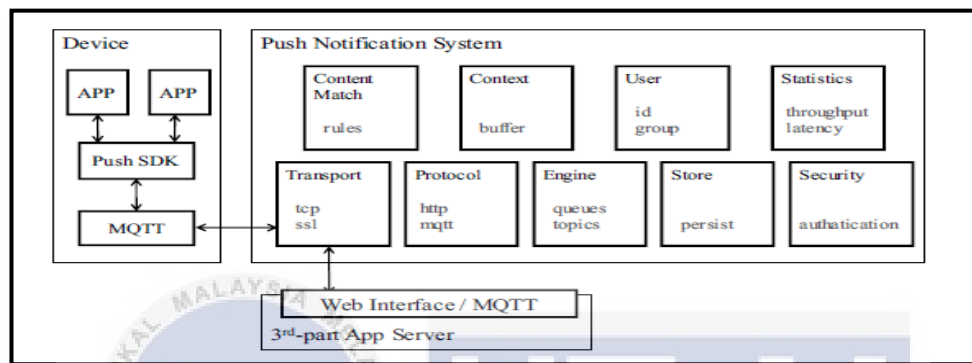


Figure 2.16: System Framework (Zhaotai ,2015)

The system of framework consists a higher performance message engine as a fundamental platform, as well as modules of content match, context management, statistics and user management for efficient push notification. The engine consists of a message transport module, protocol, saving and safety. Transport module is responsible for the connection between client and server. HTTP and MQTT are supported for communication interface is simple and low cost. The Engine module manages topics and queues messages and route messages to the line by publishing topics. For continuous high speed message module is responsible for the store. The security module checks the authentications and ensures that unauthorized users cannot access these services. Software and hardware technology is optimized by the engine message it can support a large number of concurrent connections and achieving high processing power.

2.8.1 Google Cloud Messaging for Android

Google cloud messaging for Android is a push notification service that allows sending data from GCM server to user in Android mobile application. Push messaging prepare an important aspect of server to device communication. This service repair a simple mechanism that server can use to information mobile applications to contact the server directly, to fetch updated application or user data. This Google cloud handles all aspects of queuing of messages and delivery to the target application device. The application on an Android device will wake up as long as the application is set up with the proper broadcast receiver and permission, do not need to be running to receive messages. The application might post a notification display in the custom user interface or silently sync data. The devices running Android 2.2 or higher and uses an existing connection for Google service. This requires users to set up the Google account on their mobile devices. The message size for each notification is limited to 1024 byte and Google limits the number messages a sender sends in aggregate and the number of message send to the specific device. Thus in the future Android mobile application will be in the hands of people in companies such as schools, collages, hospital, banks and shops. Thus using this application, message and all information from the superior, if posted to the cloud will be sent as push message to the registered person.

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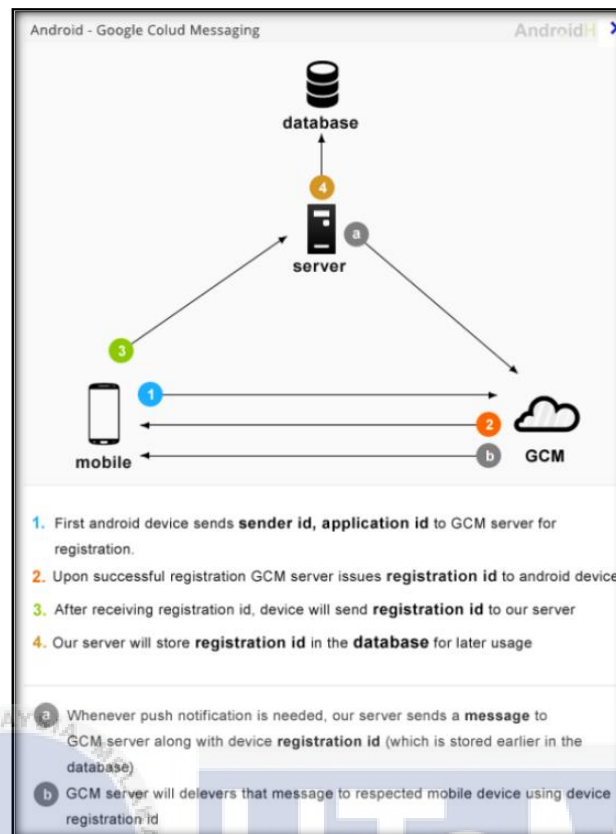


Figure 2.17: Push Notification Work (Tamada, 2012)

2.8.2 Apple Push Notification

Apple push notification service (APNs) is the centerpiece of the remote notification features. The apple push notification is the higher efficient service for propagating information to iOS watchOS, tvOS and OSX devices. For each device create and accredited and encrypted IP connection with APNS and receives notifications over persistent connection. When the notification for the app arrives that app is still not running, the device alerts the user that app has in data waiting.

Jack, (2016) iOS is to imagine users of their awesome app using the app all day. Unfortunately, the cold hard truth is that users will sometimes have to close the app and perform other activities. Apple push notification become more powerful since were first introduced in iOS 9. Apple push notification can makes the user Display a short text message play a notification sound, set a badge number on the

app icon, provide action the user can take without opening the app and lastly, be silent allowing the app to wake up in the background and perform a task.

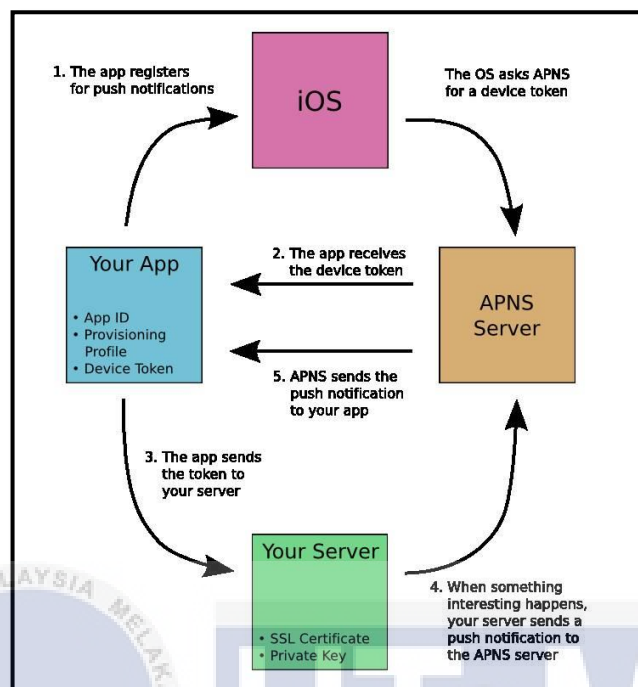


Figure 2.18: Apple Push Notification (Jack, 2016)

2.9 Google Maps

Google Maps My Maps is an online application that offers the creation of personalized maps. Its most popular tool is the placemack feature, utilized by millions of people to create maps with lines, and shapes, as well as text, photos, and videos. In many ways it is similar to some of the map making features that Google Earth offers, however it is more conveniently accessible because it doesn't require a software download. Google Maps does however require free registration.

Google maps is an Google service that offer powerful, user friendly mapping and local business information include business location, contact of all information, direction of place and driving direction.



Figure 2.19: Example of Google Map (Google.com)

2.10 Estimated Method

Statistical estimation theory is empirically measured data. Budget deals with the values of the parameters that describe the atmosphere of physical backup in any way with their values influence the distribution of measured data.

Hong S. Bae (2011) there is two methods to get around the road using the Global Positioning System (GPS) in land vehicles. There are two methods to estimate the time of arrival. The first method is the two antennas are used to directly measure the vehicle attitude in the field plan. Next, in the second method uses a single antenna to a ratio of the horizontal speed of vehicles on the road grade. Both of these methods are carried out experiments and their relative susceptibility to corruption by a golf cart and motion characteristics rebounds. Size grades are then used together with information to produce the essence rolling, mass and aerodynamic balance of power tool drag longitude. The resulting mass is estimated to be consistently focused within $\pm 2\%$ of the mass of the actual vehicle. Google Translate for Business: Translator Toolkit Website Translator Global Market Finder

Yanakiev (1996) longitudinal control systems such as adaptive cruise control or the control room on the highway automatically require an exact model of vehicle dynamics longitudinal to achieve the desired level of security and closed-loop performance. The base model sound and longitudinal accurate model parameter easily and end up with the overall performance. This is important for automated highway where some vehicles may platoon and uncertainties disturbance can propagate down a platoon.

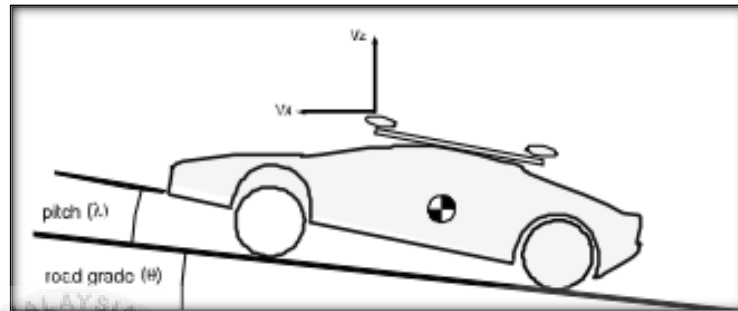


Figure 2.20: Two antenna setup on car to measure vehicle pitch angle

Figure 2.20 shows two GPS antennas mounted on the roof longitudinal passenger cars with a fixed base of the antenna. The FLE baseline compared with horizontal measurable. When the antenna on the car roof can it measure the grade of the road number (angle θ) and car pitch (angle λ) is changed in response to acceleration, decelerations and diversion of high-frequency road.

CHAPTER 3

METHODOLOGY

3.0 Introduction

This chapter explains about the theory of the research and explains the starting point of the project, the direction of the project and the possible implication when the project is done.

3.1 Project Overview

This project used four major steps to implement. The steps follow by planning, analysis, design and testing.

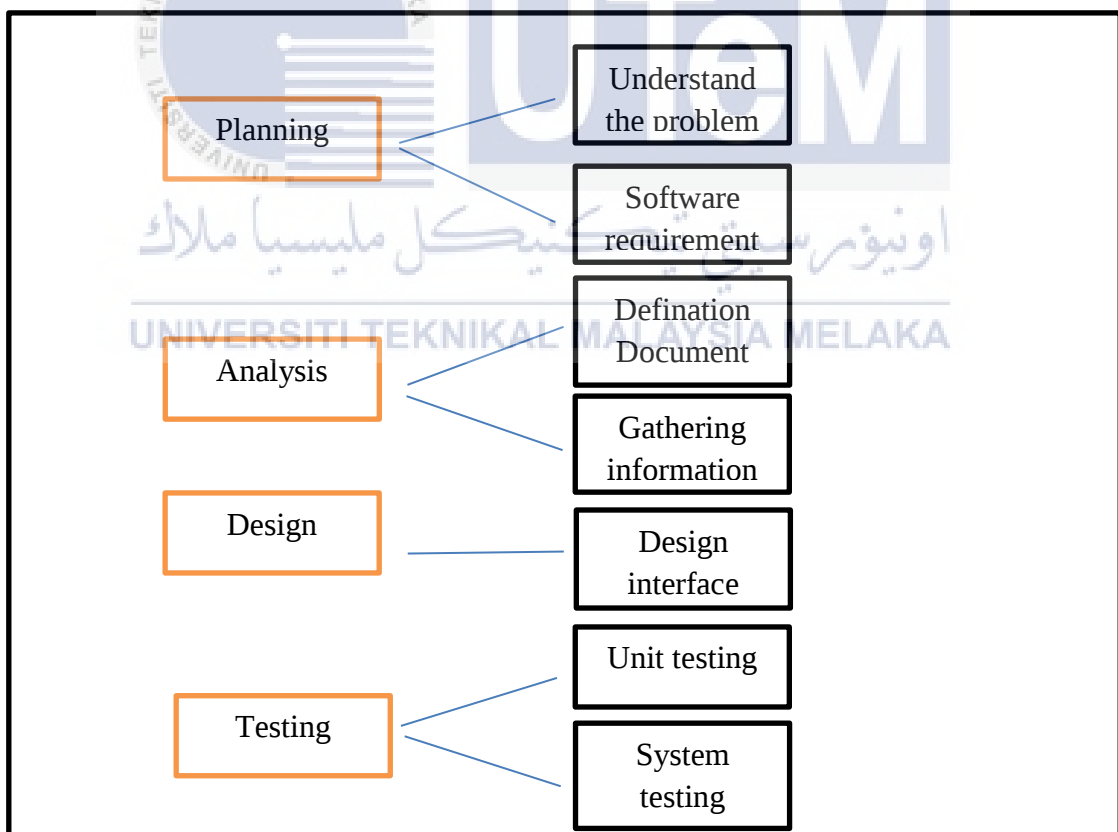


Figure 3.1: System Development of Project

Table 3.1: Description Phase Base on Figure 3.1

Phase	Description Phase
Planning	Product need have to identify by understanding the problem and purpose to build application for transport information system using mobile push notification.
Analysis	Study and understand the functional requirement of the proposed mobile application project that related to the objective.
Design	Study about the design specification for user of mobile application. Used the suitable design for user to understand.
Testing	The mobile application must testing first to know the error of the application.

3.1.0 Project Requirement

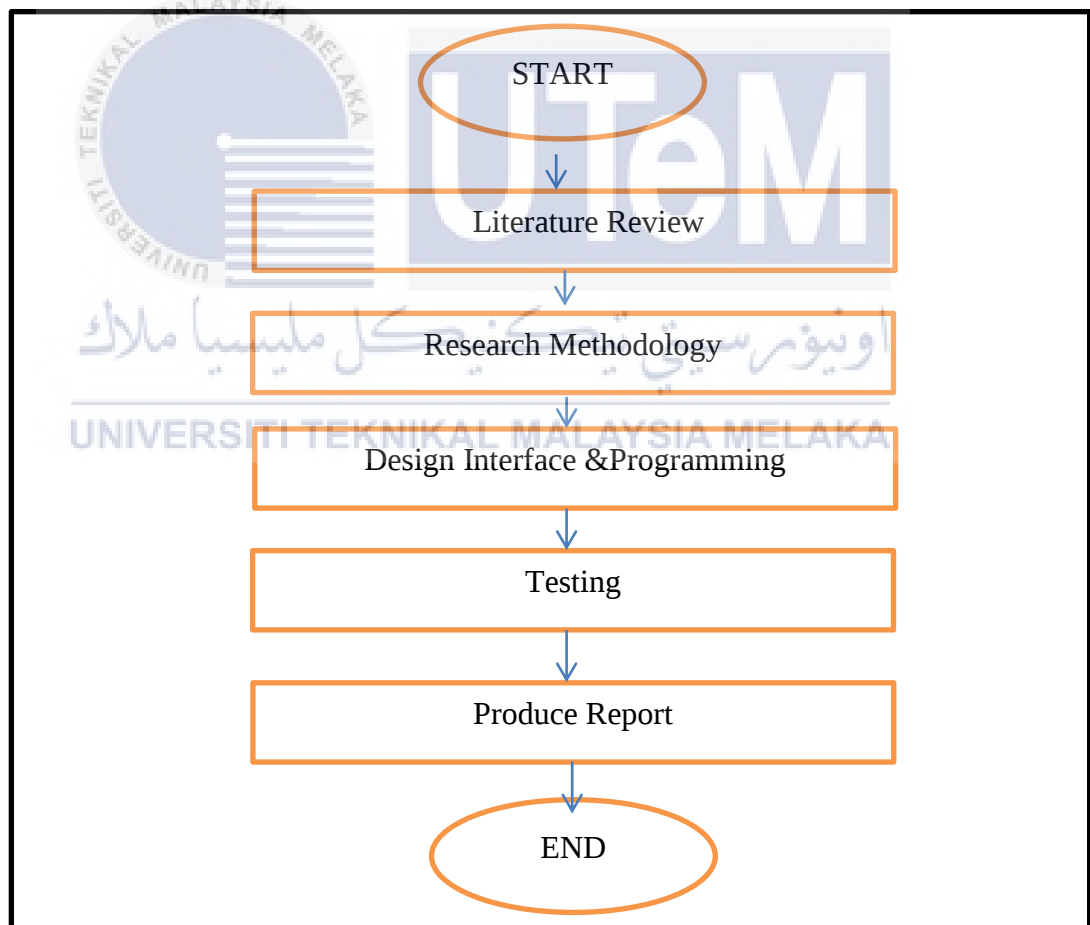


Figure 3.2: System Development Life Cycle

From the flowchart (Figure 3.2), it is steps developing project for tracking bus using android application. (Table 3.2) show the description steps of project.

Table 3.2: Description Steps of Project

Step	Description Step
Literature Review	Analysis made with transport information system using mobile application push notification. Besides that, study about android that use as main tools to create the application.
Research Methodology	Chosen methods of designing interface and programming used to start develop the programming used to start develop the application. B4A will use as start of program the apps. Besides that, use Location Based services to track the current location of the bus and also displays the required maps with the Global Positioning System(GPS) information.
Designing interface and programming (B4A)	Designing interface part should apply with a good picture and interactive button which will make the apps user friendly and attractive to play with. Design interface also have to insert picture, text and make out useful button that can be use by user to find out the apps function. Next, To use B4A IDE, installation required in Personal Computer (PC) to use display main program. Then B4A Bridge and B4A Designer install in real devices. B4A will allow designing on real devices by using B4A Designer after connecting PC and device either using Bluetooth or wireless.
Testing	This application needs to be tested the either meet the requirement of the objective and the output should be satisfied and acceptance by users.
Produce Report	To complete this project, report must be made as finishing project that consists of report structure.

3.2 Flowchart

This flowchart consist the flow of software implement for development of transport information system using mobile push notification.

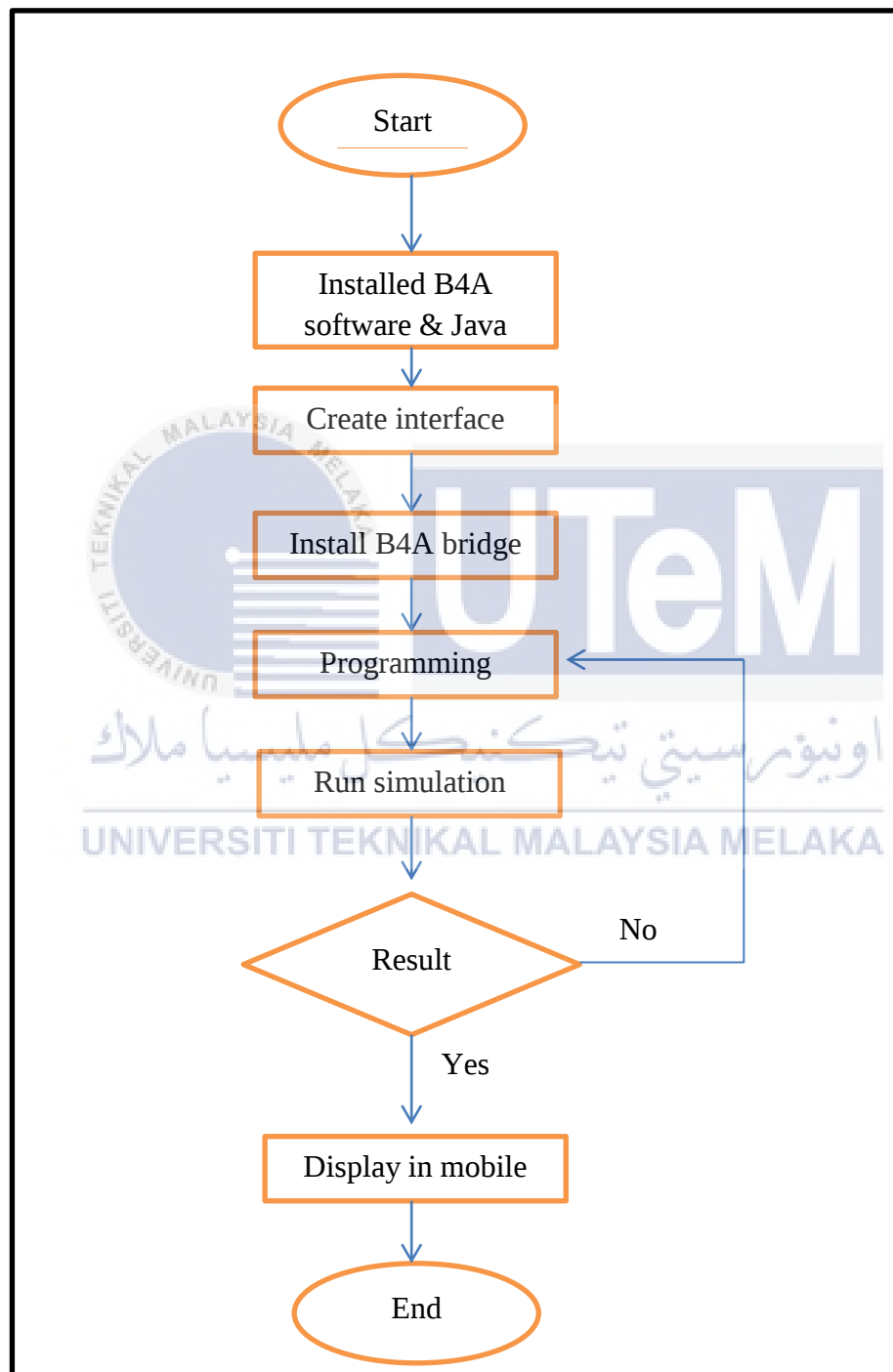


Figure 3.3: Flowchart of Software Implement

3.2.1 Application Process

This Flowchart shows the process of the application in tracking bus.

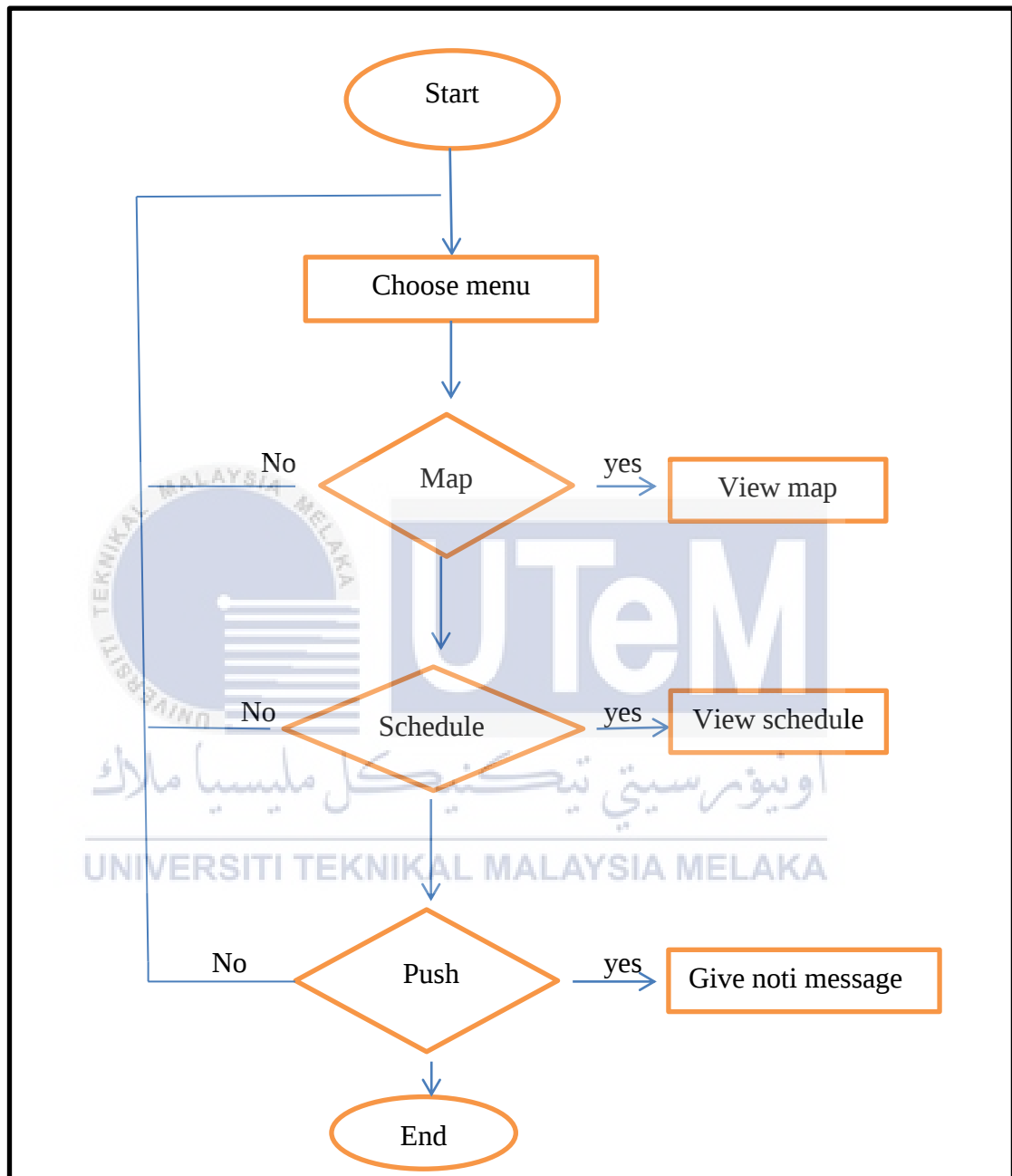


Figure 3.4: Flowchart The Application Process

Figure 3.4 show the flow chart of the project. This project has three partitions which is Map, schedule and push. The maps show the position marker of such as marker in Kampus teknologi, Kampus Bandar and kampus induk. Next, schedule is show the information of bus when the user insert into from, to, and day. Lastly push is can send the data from server to user mobile application.

3.3 Software Development

Software development is explained about a component that used to develop Tracking bus system using push notification. For this project is using android, SQLite and push notification. Android using is B4A and adding SQL library because it will allow and application to access with database.

SQLite database browser was insert information about tracking bus contains bus information such as from, to, time and day. The entire database was identified using similar code in B4A. Following code is code used to find tracking bus system from "test.sql" SQLite file.

```

'''sqlite
If FirstTime Then
    Dim dpath As String

    If File.ExternalWritable Then
        dpath = File.DirDefaultExternal
    Else
        dpath = File.DirInternal
    End If

    If File.Exists(dpath,"test.db")=False Then
        File.Copy(File.DirAssets,"test.db",dpath,"test.db")
    End If

    SQL1.Initialize(dpath, "test.db", True)

End If

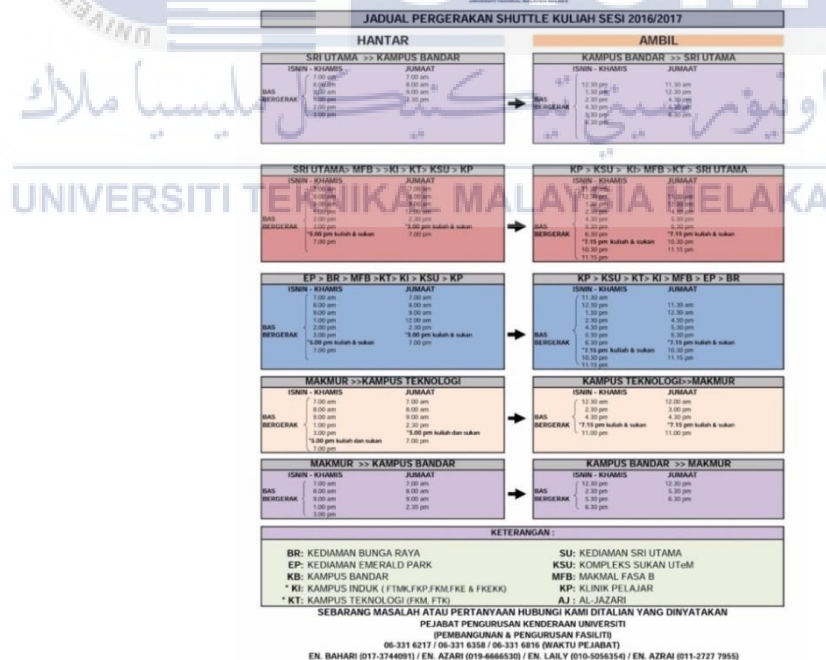
```

Table 3.3: Database Browser SQLite

ID	FromLoc	ToLoc	Time	Day
1	SU	KB	7.00am	IK
2	SU	KT	9.00am	IK
3	EP	KT	7.00am	J
4	EP	KI	9.00am	J
5	SU	KI	10.00am	IK

Table 3.3 show the Database browser SQLite for the bus travel from the user. This database was inserted as information used for tracking bus system. The table contains data about ID, FromLoc, ToLoc, Time and Day. For example the user goes from where to where. User can select the current location from Kolej Kediaman Seri Utama “SU” and went go Kampus Bandar “KB”. Time show 7.00am and Day Isnin-khamis “IK”.

The SQLite database browser allow user to find out the information about bus. The information of bus contained in the schedule that make easier for user to find information such as where the bus started until the bus stop. Furthermore, there is time and day in the schedule and indirectly allows user anticipate the bus on time and on the day. Figure 3.4 bus schedule in UTeM.



JADUAL PERGERAKAN SHUTTLE KULIAH SESI 2016/2017

HANTAR

AMBIL

KETERANGAN:

BR: KEDAMAIAN BUNGA RAYA
EP: KEDAMAIAN EMERALD PARK
KB: KAMPUS BANDAR
KI: KAMPUS INDIK (FTIK, FK, FM, FKE & FKEKK)
KT: KAMPUS TEKNOLOGI (JEM, FTK)

SU: KEDAMAIAN SRI UTAMA
KSU: KOMPLEKS SUKSES UTAM
MFB: MAKMAL FASA B
KP: KLINIK PELAJAR
AJ: AL-JAZARI

SEBARANG MASALAH ATAU PERTANYAAN HUBUNGI KAMI DITALIAN YANG DINYATAKAN
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Figure 3.5: Schedule Buses in UTeM

3.3.1 Database Design

A database system management is a software package with computer program that control the creation, maintenance and used of database. Database is an integrated collection of data records, files and other object. Database allows users to program different application to simultaneously access the same database. It can use various database models such as a model describing the appropriate relationship and application support.

For data that needs a server, web view was created and implemented using PHP, MySQL and graphic framework to deliver the proposed system. The system runs on XAMPP which combine MySQL and PHP. The front end graphical user interface is implemented using PHP development language and connection to MySQL via localhost of personal computer. Data store in database and retrieve according to what client insert.

For an interface user, in development web view used to create the interface using Dreamweaver by referring some template from w3school website and from there editing had been done to make compatible with tracking bus web view. For all user interface for this application done to be saved in XAMPP htdoc document. So then application that already installed to smartphone can be linked to web view which save in personal computer of developer as a server. In order to make it work, XAMPP was used and start button for Apache and MySQL.

Overall, the form is based on PHP language. Basically, it needs html form and html display form while all database that we insert in html form store at MySQL. Html form that already created cannot work directly to MySQL and become a reason why PHP comes in. PHP is server-side scripting language that considered for web development but also used as a general-purpose programming language. As shown in Figure 4.3 PHP works to interact with html and MySQL. On the other words, the data is processed by PHP to post the data from html form to MySQL and also to retrieve data back from MySQL to html display form

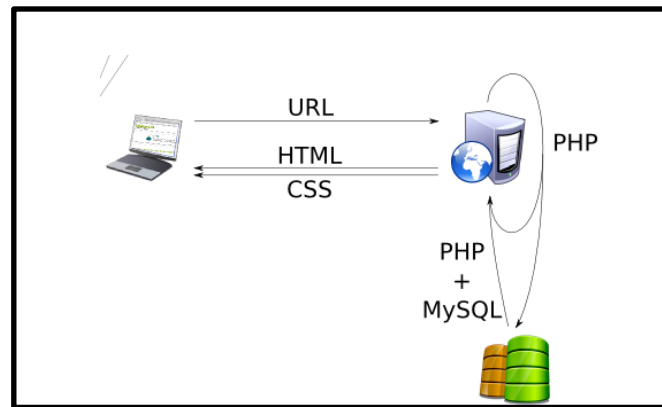


Figure 3.6 : How PHP works with html and MySQL (www.science4all.org, 2015)

3.4 Installing Android SDK

Before using the android application, it must be installed first on the laptop.

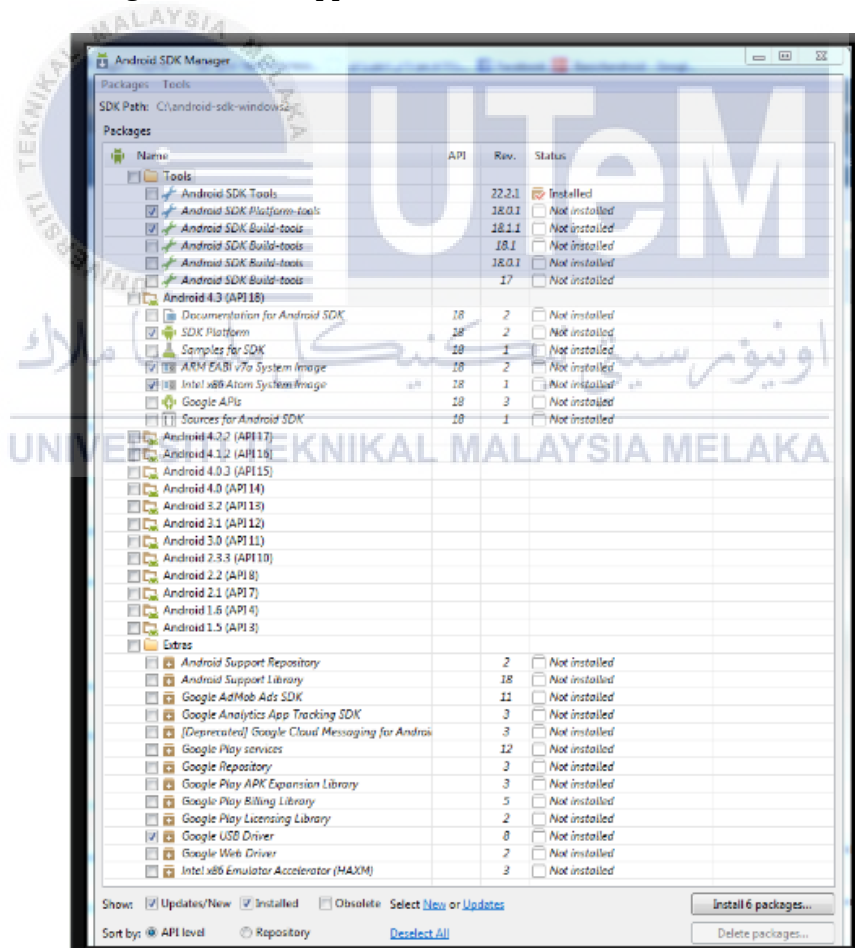


Figure 3.7: Installing the Android SDK

3.4.1 Installing the Basic 4 Android

B4A includes all the features need to quickly develop any type of Android app.

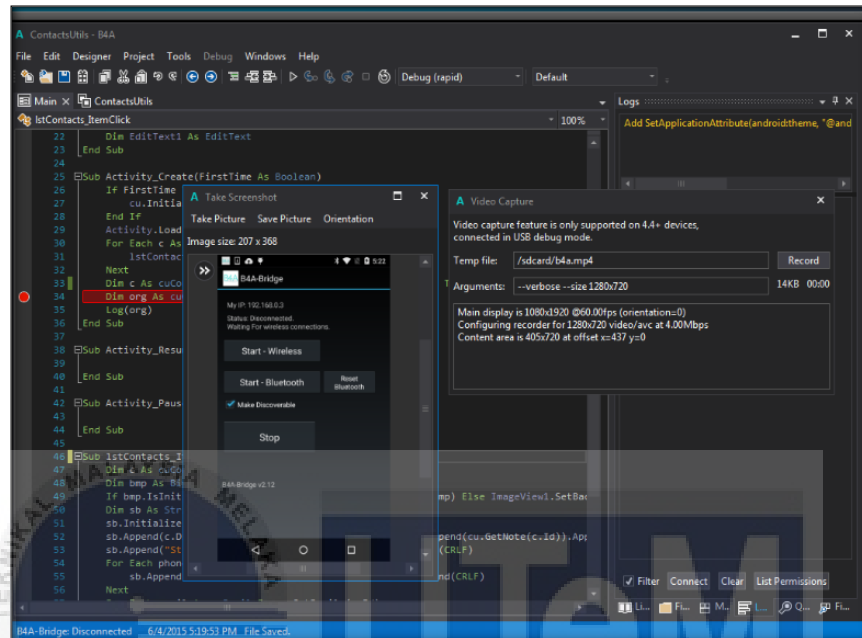


Figure 3.8 : Installing the B4A

3.4.2 Create Interface

The interface between the application must be done in order to control the system by using B4A. After interface the coding can be verified and upload the board.

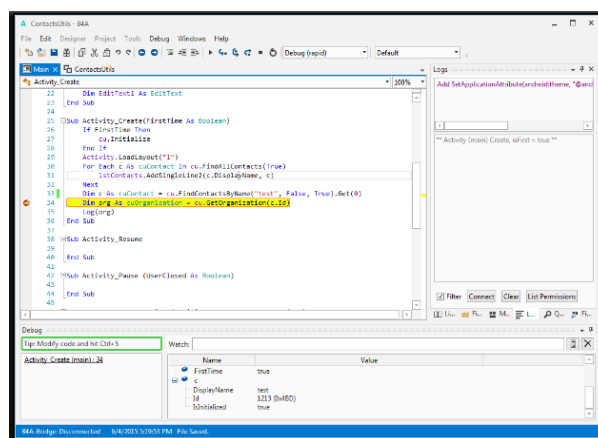


Figure 3.9 : Example of Verifying the Coding

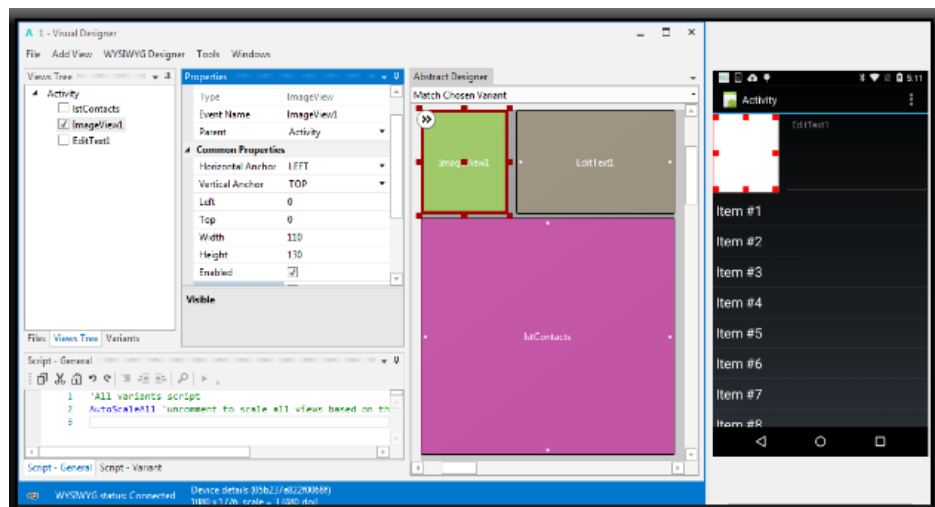


Figure 3.10 : Example of Interface

3.4.3 Draw The Interface Using B4A Design

For drawing the interface using B4A design. Each design has their own function and attributes. for example, create sub module for button1_click into interface.

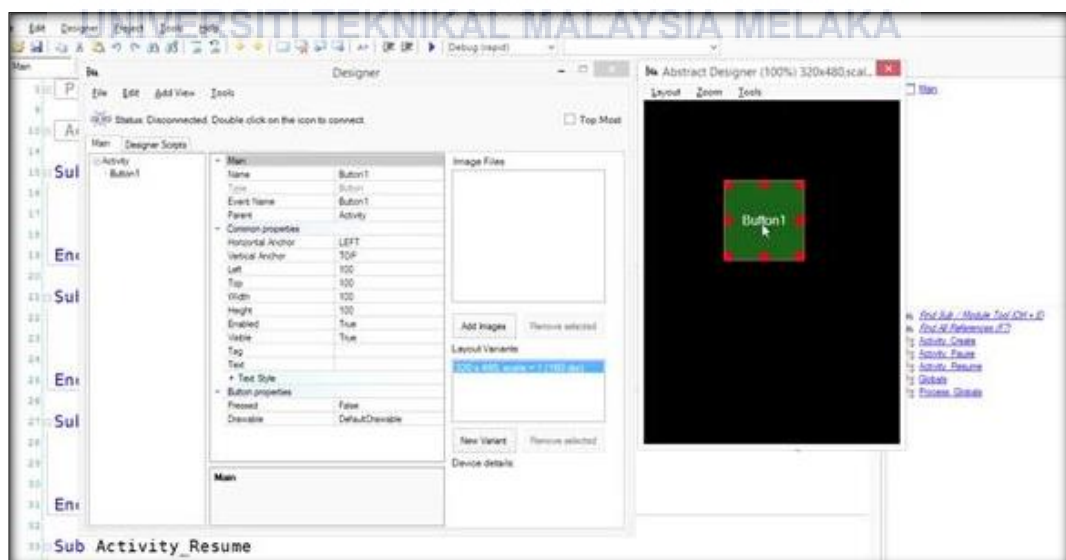


Figure 3.11 : Draw Interface Using B4A Design

3.4.4 Coding

Example coding for hello world.

```
96  
97 Sub Button1_Click  
98     MsgBox("helloo world")  
99 End Sub
```

Figure 3.12: Coding for Message “helloo world”

3.5 The Library

Basic 4 Android have many library such as GPS, HTTP, google map and etc.

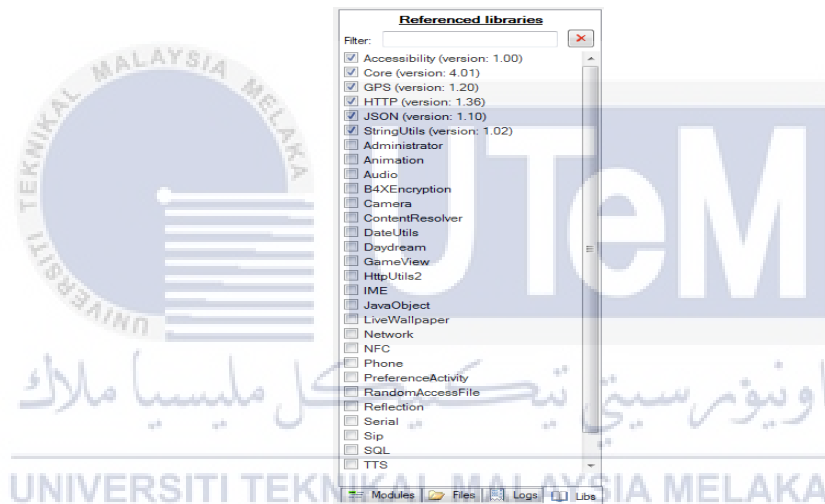


Figure 3.13: Library in Basic 4 Android

CHAPTER 4

RESULT AND DISCUSSION

4.0 Introduction

This chapter will discuss about the project operation, the relationship between user and interface and lighting diagram or tables other software to help describe the project flow and also describes the function in the application to allow a user to use it. The system consists of interface using B4A, database from SQLite, Google maps and push notification server.

4.1 Design User Interface Using B4A.

This application created using IDE which is an alternative to programming with Java and the Android SDK. To create the layout in B4A, click on Designer on the top toolbar. Then when the screen layout designers appear, such a view can add select and start designing the layout on visual designers with a click and drag. In this project using Map Fragment to show the current position in the Google Maps. TabHost used for need a partition for example has Map, Schedule and Push. Spinner help to list out the place Kediaman Bunga Raya, Kampus Teknologi, Kampus Bandar and other. Other view used this project are Label, EditText, WebView and Button.

The first interface of this application shows the Google Maps using Map Fragment. Map Fragment used to view the position. As Example, the marker show of

the places. In the current location user know the estimate time and distance where user wants to go (Figure 4.1). Figure 4.2 show the marker for the certain places.

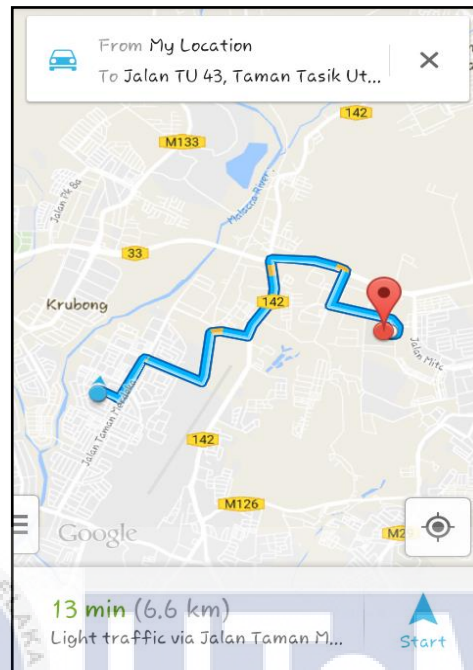


Figure 4.1: Show The Time and Distance

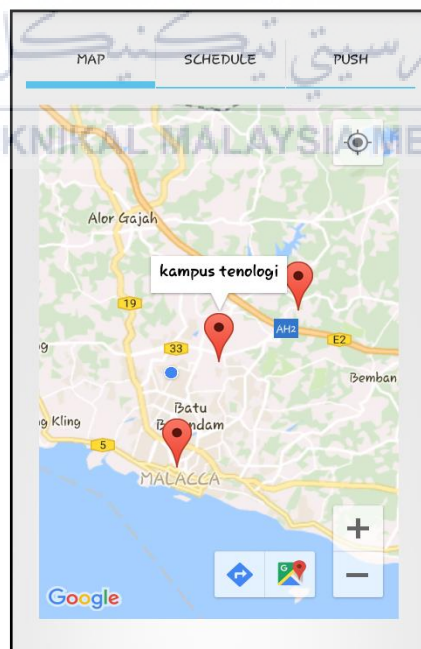


Figure 4.2: The Marker Places

After that for the second partition is a Schedule. This interface when the user must know the bus schedule. Basically all the data information come out to screen needs a database which is insert in SQLite. In Figure 4.3 user must choose the location From, To and Day. Next has button Search it is a button to link the database SQLite file as a web view in android phone. The web view show the schedule that user insert. Figure 4.4 show the interface when Search button clicked and information the bus.



Figure 4.3: Interface for Schedule Tab

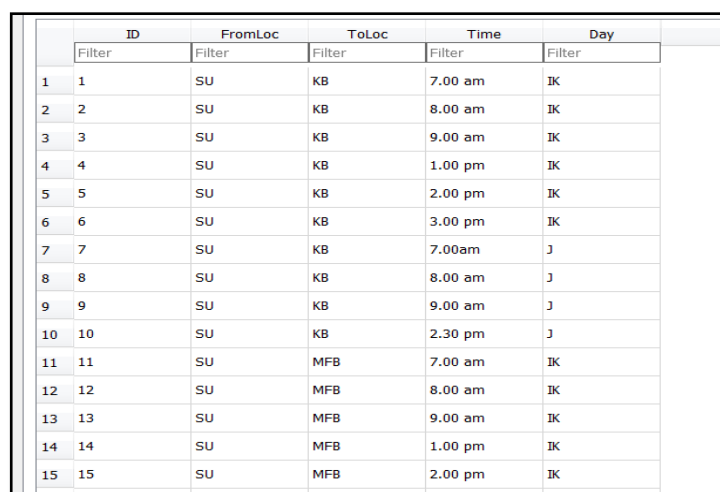


ID	FromLoc	ToLoc	Time	Day
67	EP	MFB	2.00 pm	IK
68	EP	MFB	3.00 pm	IK
69	EP	MFB	7.00 pm	IK
70	EP	MFB	7.00 am	J
71	EP	MFB	8.00 am	J
72	EP	MFB	9.00 am	J
73	EP	MFB	12.00 am	J
74	EP	MFB	2.30 pm	J
75	EP	MFB	7.00 pm	J
76	EP	KT	7.00 am	IK
77	EP	KT	8.00 am	IK
78	EP	KT	9.00 am	IK
79	EP	KT	1.00 pm	IK
80	EP	KT	2.00 pm	IK
81	EP	KT	3.00 pm	IK
82	EP	KT	7.00 pm	IK
83	EP	KT	7.00 am	J
84	EP	KT	8.00 am	J
85	EP	KT	9.00 am	J
86	EP	KT	12.00 am	J

Figure 4.4: Information Bus

For the database SQLite data are insert in Excel the data import form the Excel to the smartphone interface. Figure 4.5 show the import file between Excel in Databse. All the data was inserted using Excel.

select * From Example where FromLoc= "SU"



	ID	FromLoc	ToLoc	Time	Day
	Filter	Filter	Filter	Filter	Filter
1	1	SU	KB	7.00 am	IK
2	2	SU	KB	8.00 am	IK
3	3	SU	KB	9.00 am	IK
4	4	SU	KB	1.00 pm	IK
5	5	SU	KB	2.00 pm	IK
6	6	SU	KB	3.00 pm	IK
7	7	SU	KB	7.00am	J
8	8	SU	KB	8.00 am	J
9	9	SU	KB	9.00 am	J
10	10	SU	KB	2.30 pm	J
11	11	SU	MFB	7.00 am	IK
12	12	SU	MFB	8.00 am	IK
13	13	SU	MFB	9.00 am	IK
14	14	SU	MFB	1.00 pm	IK
15	15	SU	MFB	2.00 pm	IK

Figure 4.5: Database SQLite Tabel Import from Excel

Tables (1)		
Example		CREATE TABLE 'Example' ('ID' INTEGER NOT NULL UNIQUE, 'FromLoc' TEXT NOT NULL, 'ToLoc' TEXT NOT NULL, 'Time' INTEGER NOT NULL, 'Day' TEXT NOT NULL)
ID	INTEGER	'ID' INTEGER NOT NULL UNIQUE
FromLoc	TEXT	'FromLoc' TEXT NOT NULL
ToLoc	TEXT	'ToLoc' TEXT NOT NULL
Time	INTEGER	'Time' INTEGER NOT NULL
Day	TEXT	'Day' TEXT NOT NULL

Figure 4.6: Database Declaration Table

When user send clicked the search button, it display on the information bus. The user know to the location, time and day of the bus. It only based on the user insert through database as in 4.5 and figure 4.6.

Next, for the push partition it need a server and implement using PHP. The system run on XAMPP which combine PHP. GCM push notification service that allow sending data from server to user. First user send sender id and application id to GCM. Then when the register succesful, GCM send the registration id to the user. After that, The registration id or user send into the server. Server will store in the database for later usage. Whenever push notification need sever message to GCM and the message will delevers that message to the user. Figure 4.7 the interface for push.

MAP SCHEDULE **PUSH**

123

Register Unregister

Web:123 GCM Registration successful
Web:MAA 123 GCM Removal successful

APA91bHGxNgU6uw5jHGxx1rNSVwm
Br0LO37wjn-
zkjl1E8TLKm7JGg5UYTGWULBF1jk

Figure 4.7 Interface for Push Notification

Table	Action	Rows	Type	Collation	Size	Overhead
c2dm	Browse Structure Search Insert Empty Drop	0	InnoDB	latin1_swedish_ci	16 KiB	-
gcm_users	Browse Structure Search Insert Empty Drop	0	InnoDB	latin1_swedish_ci	16 KiB	-
2 tables	Sum	0	InnoDB	utf8_general_ci	32 KiB	0 B

Figure 4.8: Databae of Push Notification

4.2 Create Interface in B4A

The interface for mobile application design requirements that are different from desktop computer. The screen size and touchscreen controls that are smaller making special consideration in the design that makes ensure usability, readability and consistency. The user should be able to understand the meaning either through text readable or understand graphic representation. Figure 4.9 show the design interface using B4A.

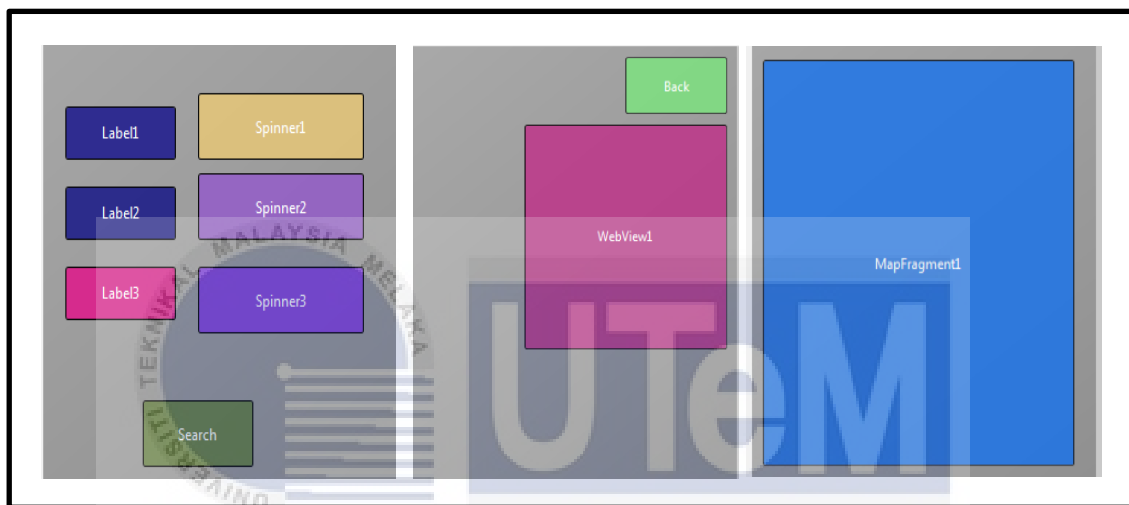


Figure 4.9: Design Interface

Layout information of design or instructions within the application to echo them in the operating system deployment, composition and color. Although the application may deviate to a certain level in style, consistent and allow user learn how to use the interface. Design Interface must be flexible that means when user touches a certain button or label it makes the user suitable to interact with the app, features, content and function.

4.3 Library for B4A

In the software B4A has many libraries such as GPS, HTTP, Google Maps and others. B4A interacts with the API through the Java library. The library has two files such as Java file and XML file that is produced by a tool to provide with B4A.

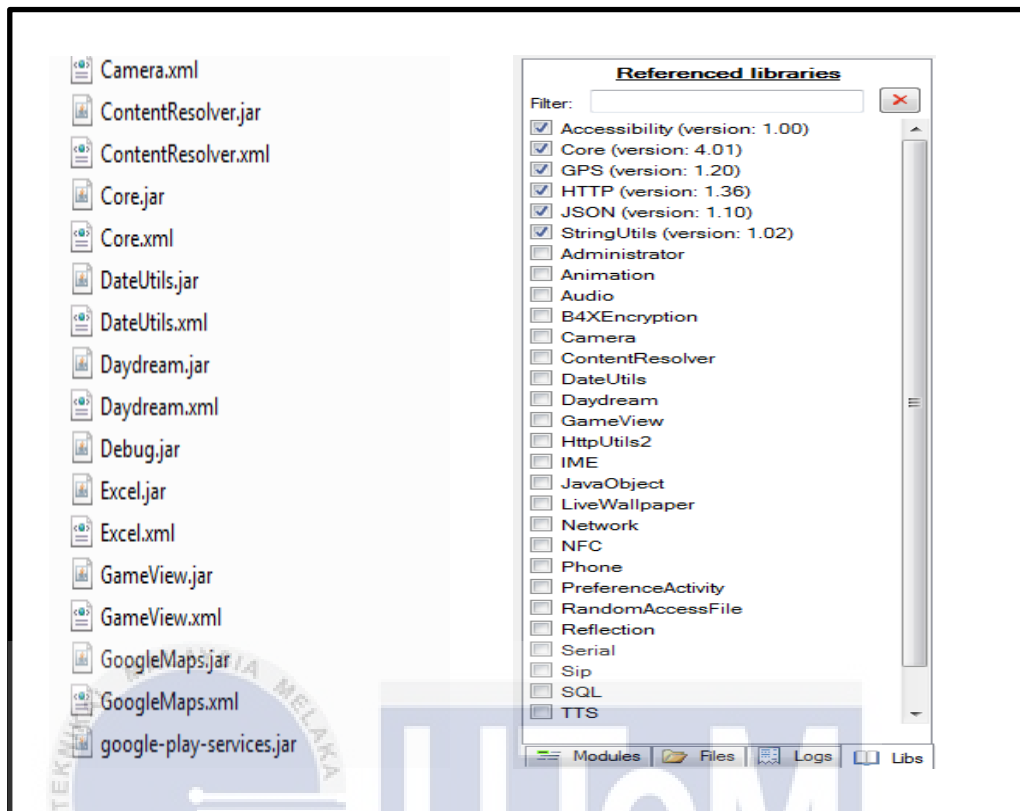


Figure 4.10: Library in B4A

4.4 Coding In B4A

In B4A is the simple code. The code more accessible for the beginner and there are a lot of near features to make the process simpler. The Project code has SQLite code for import the table, Google map, push notification and etc. Figure 4.11 show the simple code for using in this project. After write the code, then compile and see the code has error or not it will be displayed. Figure 4.12 show the error in the after compile.

```

94 If MapFragment1.IsGooglePlayServicesAvailable = False Then
95     ToastMessageShow("Please install google servicess", True)
96 End If
97
98
99 'sqlite -----
100
101
102 If FirstTime Then
103     Dim dpath As String
104
105     If File.ExternalWritable Then
106         dpath = File.DirDefaultExternal
107     Else
108         dpath = File.DirInternal
109     End If
110
111     If File.Exists(dpath,"test.db")=False Then
112         File.Copy(File.DirAssets,"test.db",dpath,"test.db")
113     End If
114
115     SQL1.Initialize(dpath, "test.db", True)
116     'SQL1.
117 End If
118
119 End Sub
120
121 Sub MapFragment1_Ready
122     gmap = MapFragment1.GetMap
123     Dim m1 As Marker = gmap.AddMarker(2.2782, 102.2745, "kampus teknologi")
124     Dim m2 As Marker = gmap.AddMarker(2.314736, 102.32731, " kampus induk")
125     Dim m3 As Marker = gmap.AddMarker(2.201978, 102.246532, "kampus bandar")

```

Figure 4.11: The Coding of B4A

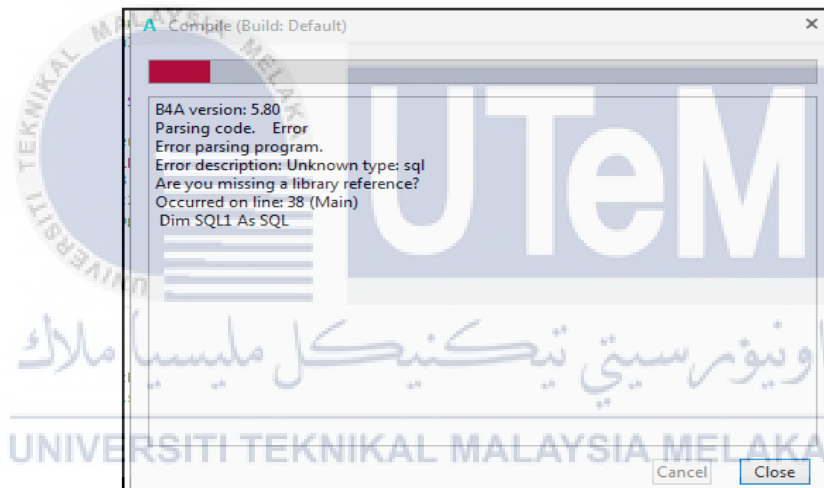


Figure 4.12: The Error in Code

Figure 4.12 show the error are missing a library. For example the library must tick when the variable used. B4A interacts with the native API through Java libraries. B4A libraries consist of two files: the Java jar file and a XML file that is produced by a tool provided with B4A.

CHAPTER 5

CONCLUSION

5.0 Introduction

This chapter will explain the overall project and followed by some recommendation on how to improve the performance of the system on desired results.

5.1 Conclusion

As the conclusion a mobile application is the latest and rapid growing technology. This project is development of transport information system using mobile push notification. Push notification is used for Google Cloud Messaging that allows sending data from server to the android. Push is very important of server to device for communication. This services provides a simple mechanism that server can use to tell mobile application to contact server directly. Other than that, the mobile application gives the information about the transport such as location, real time and the day. Next, have the Google maps for show the location for the destination. All the information in this project can be used for the future research and hopefully this can be inspire for young generation to grow up the application that meet the market needs of an expanding market.

5.2 Recommendation

This project still has much improvement that should be done to improve its accuracy and reliability. There are some suggestion for the future research and development.

- a) In the future, this project can be applied to all people do not even focus on the student but also can be used to lecturers, staff and etc.
- b) Add more features in mobile application for being attractive and like to see it.
- c) The design for interface more interesting to make the user satisfied.
- d) Add text box message to chat or communicate with other user.



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APPENDICES

```
#Region Project Attributes
    #ApplicationLabel: Project1
    #VersionCode: 1
    #VersionName:
    'SupportedOrientations possible values: unspecified, landscape or portrait.
    #SupportedOrientations: unspecified
    #CanInstallToExternalStorage: False
    '#AdditionalRes: C:\android\android-sdk\extras\google\google-play-
services\libproject\google-play-services_lib\res, com.google.android.gms

#End Region

#Region Activity Attributes
    #FullScreen: True
    #IncludeTitle: False
    '#AdditionalRes: C:\android\android-sdk\extras\google\google-play-
services\libproject\google-play-services_lib\res, com.google.android.gms
    #AdditionalRes: C:\Program Files (x86)\Android\android-
sdk\extras\google\google-play-services\libproject\google-play-services_lib\res,
com.google.android.gms
    '#AdditionalRes:
C:\Android\sdk\extras\google\google_play_services\libproject\google-play-
services_lib\res, com.google.android.gms

    #ExcludeClasses: .games, .drive, .fitness, .wearable, .measurement, .cast,
.auth, .nearby
    #ExcludeClasses: .tagmanager, .analytics, .wallet, .plus, .vision, .gcm
    'remove the following line if you use AdMob

#End Region

Sub Process_Globals
    'These global variables will be declared once when the application starts.
    'These variables can be accessed from all modules.

    'push notification
    Public DeviceBoardPassword, BoardUrl, DeskUrl, SenderId,
DeviceName, Registration_Id As String
    DeviceBoardPassword = "34f34fkj02d3"
```

```

'BoardUrl = "http://aiuri.site88.net/gcm_server_php/c2dm_board.php"
DeskUrl = "http://aiuri.site88.net/gcm_server_php/register.php"

""192.168.3aiuri.site88.net/gcm_server_php/register.php"
""http://b4aserver.basic4ppc.com/c2dm_board.php"
,

'Set this field to match the project ID in Google Console.
SenderId = "227683920400"

'sqlite
Dim SQL1 As SQL

Dim gpsClient As GPS
Dim userLocation As Location
End Sub

Sub Globals
'These global variables will be redeclared each time the activity is created.
'These variables can only be accessed from this module.

"""""" Map
Private MapFragment1 As MapFragment
Private gmap As GoogleMap
'Dim userlocation As Button
'Private cmg As CameraPosition

""schedule
Private Back As Button
Private Search As Button
Private Spinner1 As Spinner
Private Spinner2 As Spinner
Private Spinner3 As Spinner
Private Label3 As Label
Private Label2 As Label
Private Label1 As Label
Private FromStr As String
Private ToStr As String
Private DayStr As String

Dim HtmlCSS As String
HtmlCSS = "$"
    table {width: 100%;border: 1px solid #cef;text-align: left; }
    th { font-weight: bold;        background-color: #acf;        border-
bottom: 1px solid #cef; }
    td,th { padding: 4px 5px; }
    .odd {background-color: #def; }
    .odd td {border-bottom: 1px solid #cef; }
    a { text-decoration:none; color: #000;}"$

```

```

'main layout
Private TabHost1 As TabHost
Private ListView1 As ListView
Private WebView1 As WebView

'push notification
Dim btnRegister As Button
Dim txtName As EditText
Dim txtRegId As EditText
Private btnUnregister As Button
Private txtMessage As EditText

End Sub

Sub Activity_Create(FirstTime As Boolean)
'Do not forget to load the layout file created with the visual designer. For
example:

loadfirstpage

If MapFragment1.IsGooglePlayServicesAvailable = False Then
ToastMessageShow("Please install google servicess", True)
End If

'sqlite
If FirstTime Then
Dim dpath As String
Dim dbName As String
dbName = "new1.db"
If File.ExternalWritable Then
dpath = File.DirDefaultExternal
Else
dpath = File.DirInternal
End If

If File.Exists(dpath,dbName)=False Then
File.Copy(File.DirAssets,dbName,dpath,dbName)
End If

SQL1.Initialize(dpath,dbName, True)
ToastMessageShow(dpath&dbName,True)
End If

If FirstTime Then

```

```

        gpsClient.Initialize("gpsClient")
        userLocation.Initialize
    End If

End Sub

Sub gpsClient_LocationChanged (gpsLocation As Location)
    ProgressDialogHide
    userLocation=gpsLocation
    gpsClient.Stop
    StartActivity("actDisplayMap")
End Sub

Sub MapFragment1_Ready

    gmap = MapFragment1.GetMap
    Dim m1 As Marker = gmap.AddMarker(2.2782, 102.2745, "kampus teknologi")
    Dim m2 As Marker = gmap.AddMarker(2.314736, 102.32731, " kampus induk")
    Dim m3 As Marker = gmap.AddMarker(2.201978,102.246532,"kampus bandar")
    Dim m4 As Marker = gmap.AddMarker(2.246049,102.277193,"kolej kediaman
bunga raya")
    Dim m5 As Marker = gmap.AddMarker(2.269477,102.277813,"kolej kediaman
seri utama")
    Dim m6 As Marker=gmap.AddMarker(2.227073,102.259552,"kolej kediaman
makmur")
    Dim m7 As Marker=gmap.AddMarker(2.24950,102.274772,"kolej kediaman
emerald park")
    Dim m8 As Marker=gmap.AddMarker(2.274232,102.281226,"makmal fasa b")

End Sub

Sub loadfirstpage
    'Activity.LoadLayout("1")
    'map-----
    Activity.LoadLayout("TabLayout")
    TabHost1.AddTab("Map","2")
    TabHost1.AddTab("Schedule","main")
    TabHost1.AddTab("Push","3")

    'schedule -----
    Spinner1.AddAll(Array As String("-","Kediaman Bunga Raya", "Kediaman Seri
Utama", "Kediaman Emerald Park", "Kampus Teknologi", "Kampus
Induk", "Kampus Bandar", "Makmal Fasa B", "Makmur"))
    Spinner2.AddAll(Array As String("-","Kediaman Bunga Raya", "Kediaman Seri
Utama", "Kediaman Emerald Park", "Kampus Teknologi", "Kampus
Induk", "Kampus Bandar", "Makmal Fasa B", "Makmur"))
    Spinner3.AddAll(Array As String("-
","Monday", "Tuesday", "Wednesday", "Thursday", " Friday"))

```

End Sub

Sub Activity_Resume

End Sub

Sub Activity_Pause (UserClosed As Boolean)

End Sub

Sub Search_Click

```
RemoveViews
Activity.LoadLayout("1")
ListDataBusSchedule
```

End Sub

Sub RemoveViews

Dim i As Int

For i=Activity.NumberOfViews-1 To 0 Step -1

Activity.RemoveViewAt(i)

Next

End Sub

Sub Back_Click

```
RemoveViews
loadfirstpage
```

End Sub

Sub ListDataBusSchedule

Dim SqlQuery As StringBuilder

SqlQuery.Initialize

SqlQuery.Append("SELECT * From bus").Append(" where

FromLoc=").Append(FromStr).Append(" AND

ToLoc=").Append(ToStr).Append(" AND Day=").Append(DayStr).Append(")")

Log(SqlQuery)

SqlQuery.Append(GetFrom(Spinner1.SelectedItem))

ToastMessageShow(SqlQuery, False)

If Spinner1.SelectedItem <> "-" And Spinner2.SelectedItem <> "-" And

Spinner1.SelectedItem <> "-" Then

Spinner1.s

End If

```

WebView1.LoadHtml(ExecuteHtml(SQL1,SqlQuery,Null,0,False))

'    Dim Cursor1 As Cursor
'    Cursor1 = SQL1.ExecQuery("SELECT * FROM Bus_Schedule")
'    For i = 0 To Cursor1.RowCount - 1
'        Cursor1.Position = i
'    Next

ListView1.AddSingleLine2(Cursor1.GetInt("Day"),Cursor1.GetInt("Time"))
'    Next
'    ToastMessageShow("Found:"&Cursor1.RowCount&" rows",False)
'
'    Cursor1.Close
End Sub

'Copied from DBUtils example B4x.com
Sub ExecuteHtml(SQL As SQL, Query As String, StringArgs() As String, Limit
As Int, Clickable As Boolean) As String
    Dim cur As Cursor
    If StringArgs <> Null Then
        cur = SQL.ExecQuery2(Query, StringArgs)
    Else
        cur = SQL.ExecQuery(Query)
    End If
    Log("ExecuteHtml: " & Query)
    If Limit > 0 Then Limit = Min(Limit, cur.RowCount) Else Limit =
cur.RowCount
    Dim sb As StringBuilder
    sb.Initialize
    sb.Append("<html><body>").Append(CRLF)
    sb.Append("<style
type='text/css'>").Append(HtmlCSS).Append("</style>").Append(CRLF)
    sb.Append("<table><tr>").Append(CRLF)
    For i = 0 To cur.ColumnCount - 1

        sb.Append("<th>").Append(cur.GetColumnName(i)).Append("</th>")
    Next

    sb.Append("</tr>").Append(CRLF)
    For row = 0 To Limit - 1
        cur.Position = row
        If row Mod 2 = 0 Then
            sb.Append("<tr>")
        Else
            sb.Append("<tr class='odd'>")
        End If
        For i = 0 To cur.ColumnCount - 1
            sb.Append("<td>")

```

```

        If Clickable Then
            sb.Append("<a href='http://'").Append(i).Append(".")
            sb.Append(row)

sb.Append(".com'>").Append(cur.GetString2(i)).Append("</a>")
        Else
            sb.Append(cur.GetString2(i))
        End If
        sb.Append("</td>")
    Next
    sb.Append("</tr>").Append(CRLF)
Next
cur.Close
sb.Append("</table></body></html>")
Return sb.ToString
End Sub

Sub btnRegister_Click
    If Regex.IsMatch("[\d\w]+", txtName.Text) = False Then
        ToastMessageShow("Name not valid", True)
        Return
    End If
    Register(txtName.Text)
End Sub

Sub Register(Name As String)
    DeviceName = Name
    CallSubDelayed2(PushService, "RegisterDevice", False)
End Sub

Sub Unregister(Name As String) ignore
    DeviceName = Name
    CallSubDelayed2(PushService, "RegisterDevice", True)
End Sub

Sub btnUnregister_Click
    If txtName.Text <> "" Then
        Unregister(txtName.Text)
        txtName.Text=""
    End If
End Sub

Sub UpdateMessage
    txtMessage.Text = PushService.PNMsg & CRLF & txtMessage.Text
    Dim n As Notification
    n.Initialize
    n.Icon = "icon"
    n.SetInfo("This is the title", "and this is the body.", Me)
    n.Light = True
    'Change Main (above) to "" if this code is in the main module.

```

```

n.Notify(1)
End Sub

Sub UpdateGCMId(id As String)
    txtRegId.Text = id
    Registration_Id = id
    If id="" Then
        btnRegister.Enabled=True
        btnUnregister.Enabled = False
        txtMessage.Text=""
    Else
        btnRegister.Enabled=False
        btnUnregister.Enabled =True
    End If

End Sub

Sub GetShortForm(Position As Int) As String

    Dim SF As String
    SF = "-"
    If Position=1 Then
        SF = "BR"
    Else If Position = 2 Then
        SF = "SU"
    Else If Position = 3 Then
        SF = "EP"
    Else If Position = 4 Then
        SF = "KT"
    Else If Position = 5 Then
        SF = "KI"
    Else If Position = 6 Then
        SF = "KB"
    Else If Position = 7 Then
        SF = "MFB"
    Else If Position = 8 Then
        SF = "MM"
    End If

    Return SF
End Sub

Sub Spinner1_ItemClick (Position As Int, Value As Object)
    'ToastMessageShow(Position&" "&Value,False)
    FromStr = GetShortForm(Position)
End Sub

```

```
Sub Spinner2_ItemClick (Position As Int, Value As Object)
    ToStr = GetShortForm(Position)
End Sub

Sub Spinner3_ItemClick (Position As Int, Value As Object)
    If Position=0 Then
        DayStr = "-"
    Else If Position=5 Then
        DayStr = "J"
    Else
        DayStr = "IK"
    End If
End Sub
```

