UTeM VEHICLE INFORMATION SYSTEM USING QR CODE WITH ALERT MESSAGE

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This report is submitted in partial fulfilment of the requirements for the Bachelor of Computer Science (Networking) with Honors

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
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2016

DECLARATION

I hereby declare that this project report entitled

UTeM VEHICLE INFORMATION SYSTEM USING QR CODE WITH ALERT MESSAGE

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

STUDENT : _____ Date: 26 AUGUST 2016
(NORHAMIERA BINTI NORDIN)

I hereby declare that I have read this project report and found this project report is sufficient in term of the scope and quality for the award of Bachelor of Computer Science (Computer Networking) With Honors.

SUPERVISOR : _____ Date: 26 AUGUST 2016
(PN. MARLIZA BINTI RAMLY)

DEDICATION

Specially dedicated to my beloved mother, Hamidah Binti Hasan, my family that always be by my side and for their guidance that they showed to me, the comments and suggestions over the past few years. I hope this achievement will make them happy. For my lecturer and supervisor, Madam Marliza Binti Ramly in Universiti Teknikal Malaysia Melaka (UTeM). Last but not least to all my dear friends who have encouraged, guided and inspired me throughout my journey of education.

In memory of

My beloved late father, Nordin Bin Abu Samah.

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Last but not least, I would like to express my sincere gratitude to my family and friends for the support and willingness to spend their precious time to help me complete this project.

ABSTRACT

The main focus of this paper is to develop a web-based system of UTeM vehicle information. Besides that, it is to create vehicle smart sticker with the implementation of QR code that store vehicle's details. Moreover, one of the objectives is to give an alert message to the owner of the vehicle who do not follow the rules and regulations that has been made. The web-based system is developed in order to have a systematic system and replaced the current system which is organized manually. The QR code contains all details of the vehicle and the owner that will avoid from manually data record. Besides, the methodology used in this project is based on Rapid Application Development (RAD) model. There are four stages in this model that are, analysis, design, implementation and testing. In the end of this project, a web-based tracing vehicle information system and vehicle smart sticker with the implementation of QR code will be developed and will be tested by sending alert message to the user.

ABSTRAK

Fokus utama kajian ini adalah untuk membangunkan sistem maklumat kenderaan di UTeM yang berasaskan *Web*. Selain itu, kajian ini bertujuan untuk mencipta pelekat kenderaan pintar dengan pelaksanaan *QR code* yang menyimpan segala maklumat tentang kenderaan. Selain itu, salah satu objektif projek ini adalah menghantar pesanan ringkas sebagai amaran kepada pemilik kenderaan yang tidak mematuhi arahan dan peraturan yang telah ditetapkan. Sistem yang berasaskan *Web* ini dibangunkan untuk memiliki sebuah sistem yang lebih sistematik dan menggantikan sistem yang sedia ada dimana diuruskan secara manual. *QR code* menyimpan semua maklumat tentang kenderaan dan juga pemiliknya yang membolehkan masalah merekod data kenderaan secara manual dapat dielakkan. Seterusnya, kaedah yang digunakan dalam projek ini adalah berdasarkan model *Rapid Application Develop (RAD)*. Terdapat empat peringkat dalam model ini iaitu analisis, reka bentuk, pelaksanaan dan ujian. Di akhir projek ini, sistem mengesan maklumat kenderaan beasakankan Web dan pelekat kenderaan pintar dengan pelaksanaan QR code akan dibangunkan dan akan diuji dengan menghantar pesanan ringkas sebagai amaran kepada pengguna.

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INTRODUCTION

1.1 Introduction

UTeM Vehicle Information System via QR Code for every vehicle in Universiti Teknikal Malaysia Melaka (UTeM) is proposed as a topic for this final year project, with the intention of upgrading the current manual system to a web-based system. With this idea, this system is capable to help smooth and enhance the vehicle information management in UTeM. This system is not similar with current system.

Previously, the current vehicle information has been manage manually. The authority in charge need to record manually the vehicle information to give them warning letter because the owner does not follow the rules. By develop vehicle information system and vehicle smart sticker with the implementation of QR Code, the authority officer just have to scan the QR Code to get all the details about the owner of the vehicle. The information and all data are stored in a proper way. QR Code will be implement on the sticker. When the authority officer scan the code, all the details of the owner will be display. The data of the owner of each vehicle will be stored in database once they

register for the sticker. If the student did not follow the rules and regulation, they can give them an immediate alert message through mobile phone.

In recent years, many students tend to choose their residences inside the campus. As a result of this change, the number of private cars owned by the students is increasing rapidly. In addition, the communication between university and students has become much closer than before. This scenario leads to a shortage of residence parking capacity especially in Kolej Kediaman Lestari (UTeM). The residence inflow and outflow of vehicles, the location and use of parking lots as well as the drivers' parking behaviour are surveyed and analyzed. So, by developed UTeM Vehicle Information System and vehicle smart sticker with the implementation of QR Code, came along with alert message, for every vehicle in Universiti Teknikal Malaysia Melaka (UTeM), it is to upgrading the current manual system to a web-based system.

As the number of students increased the usage of private cars owned by the students got increased too. In order to solve this problem, a smart system need to be implement to help smooth and enhance vehicle management in UTeM. Here we are going to see the solution on how to reduce the parking problem and how to manage vehicles data systematically by using Vehicle Information system with vehicle smart sticker implemented with QR Code technology with the help of wireless technology.

This project will embark on developing a web-based system where user can search related information of the vehicle, create vehicle smart sticker with implementation of QR Code that contain details of the vehicle and find solution for manually data record. The expected output of this project is to provide a smart information system that can tracing any information of a vehicle without delay any minute. Other than that, this project will also proposed a system that apply the new technology that are computerized information and systematic data handling.

1.2 Problem Statements (PS)

UTeM Vehicle Information System by giving alert message, is a system that is capable to help to smooth and enhance the vehicle management in UTeM. The current system is not systematic and very manually. Prior to that, this project will focus on provide a smart system that can tracing any information of a vehicle. The project problems are:

Table 1.1: Summary of Problem Statements

PS	Project Problems
PS1	Difficulties to find out information about the owner of the vehicle.
PS2	Information of registered vehicle stored and organized manually.
PS3	Students do not obey the parking rules that have been made.

1.3 Project Questions (PQ)

Once the architecture is understood, then how this system can make the scenario of manually vehicle information recorded can be solved? The project questions are:

Table 1.2: Summary of Project Questions

PQ	Project Questions
PQ1	What type of a system will be developed?
PQ2	What technique implemented in order to create smart vehicle sticker?
PQ3	How to give notification to the owner of the vehicle?

1.4 Project Objectives (PO)

Based on the research questions, this project will carry three main objectives. To ensure the project will carry on smoothly. The web-based system will be developed to have a systematic system. After that, vehicle smart sticker with the implementation of QR code that stored all the details of owner of the vehicle will be create. The project objectives are:

Table 1.3: Summary of Project Objectives

PS	PQ	PO	Project Objectives
PS1	PQ1	PO1	To develop a web-based system where user can organize vehicle information systematically.
PS2	PQ2	PO2	To create and generate QR code that contain owner of vehicle details.
PS3	PQ3	PO2	To test the system by sending alert message.

PO 1: To develop a web-based system where user can search vehicle information.

With web-based system, this project can replace the current system which are not systematic and very manually.

PO 2: To create smart sticker with implementation of QR code that contain vehicle's details.

QR code will stored all the data, details, and information about the vehicle and the owner once they registered their vehicle.

PO 3: To test the system by sending alert message.

Each of vehicle inside the campus will be notified by receiving an alert message if they did not follow the rules that have been made.

1.5 Project Scope

Scope of the project will be handled as follow:

i. Developing web-based vehicle information system.
ii. Focusing implementing QR Code on vehicle sticker that stores vehicle information.
iii. Focusing on students who registered their vehicle.
iv. Testing this project by sending alert message to user.
v. Programming platform used in this project is Hypertext Preprocessor (PHP). PHP is the productive language to understand.
vi. The database software use is MySQL database to store the data once the owner of vehicle registered.

1.6 Project Contribution (PC)

Table 1.4: Summary of Project Contribution

PS	PQ	PO	PC	Project Contribution
PS1	PQ1	PO1	PC1	Proposed to develop a web-based system where user can organize vehicle information smoothly.
PS2	PQ2	PO2	PC2	Proposed to create and generate QR code that contain owner of vehicle details.
PS3	PQ3	PO2	PC3	Proposed to give an alert message to the owner of the vehicle who do not follow the rules.

1.7 Report Organization

Chapter 1: Introduction

This chapter will focus on introduction, problem statements, project questions, project objectives, project scope, project contribution, report organization and conclusion.

Chapter 2: Literature review

This chapter will thrive more on the related work or previous work about this project, critical review of current problem and justification and proposed solution. Explanation and details of this project, supported with reading materials and conference paper.

Chapter 3: Project Methodology

This chapter will explain the method that will be used in this project and project milestones.

Chapter 4: Analysis and Design

In this chapter, will discuss about problem analysis, requirement analysis, high-level design, database design and detailed design of this project.

Chapter 5: Implementation

This chapter discuss about software development environment setup, software configuration management and implementation status.

Chapter 6: Testing

In this chapter will discuss about the method that are used to developed vehicle information system. Besides that, the QR code generated stores the owners of vehicle

data and alert message send to user who do not follow the rules. If there are any problem occurs, this project will refer to RAD methodology to fix it.

Chapter 7: Project Conclusion

This chapter discuss about project summarization, project contribution, project limitation and future work.

1.8 Conclusion

As for conclusion, at the end of this project, a web-based tracing vehicle information system and vehicle smart sticker with implemented QR code will be developed and will be tested by sending alert message to user. The next chapter will be focusing on literature review.

CHAPTER II

LITERATURE REVIEW

2.1 Introduction

This chapter will discuss about the source that are related with vehicle information system using QR Code with alert message. All of the resources are obtained from the journal, articles, books, internet and webpage that are related with the project title. A literature review can be just a simple summary of the sources, but it usually has an organizational pattern and combines both summary and synthesis. A summary is a recap of the important information of the source, but a synthesis is a re-organization or a reshuffling of the information. It might give a new interpretation of old material or combine new with old interpretations. It is also might trace the intellectual progression of the field, including major debates. Depending on the situation, literature review may evaluate the sources and advise the reader on the relevant idea. Literature review is the research of the previous project and it can give a better understand about the method that was proposed.

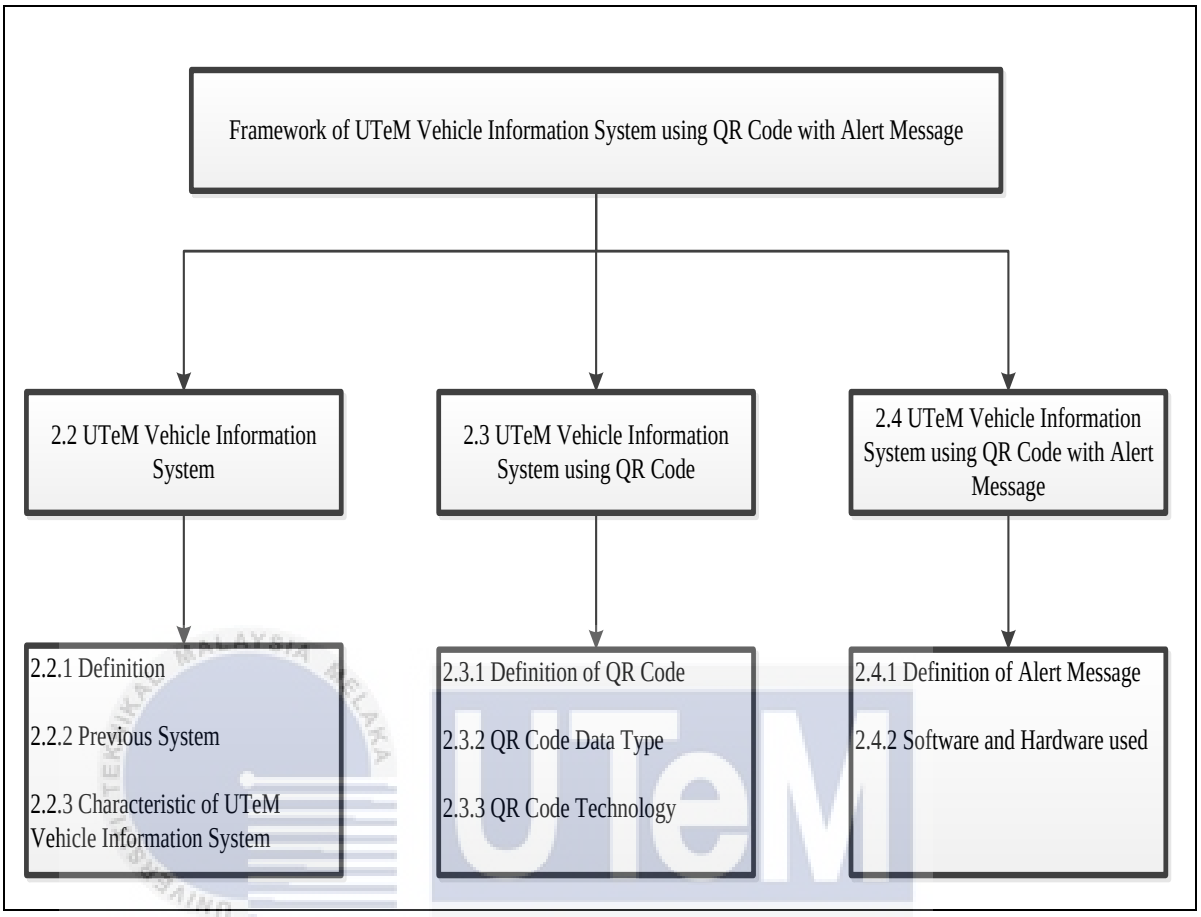


Figure 2.1: Framework of UTeM Vehicle Information System using QR Code with Alert Message

2.2 UTeM Vehicle Information System

2.2.1 Definition

Information systems have become the backbone of most organizations and it plays an important role. Every day work, communication, information gathering, and decision making all rely on information technology (IT). Most companies and institutions rely heavily on their information systems. Organizations such as banks, online travel agencies, tax authorities, and electronic bookshops can be seen as IT companies given the central role of their information systems.

In most organizations, huge volumes of data accumulate: data of products, data of customers, data of employees, data of the delivery of products, and data of other sources. These data therefore play an important role in contemporary organizations and must be stored, managed, and processed, which is where information systems come into play.

According to Aalst and Hee (2004) a Workflow Management System (WfMS) is an information system that defines, manages and executes workflows. The workflow logic specifies the order of the activities. The execution order of the workflow's activities is driven by a computer representation of the workflow logic. The ultimate goal of workflow management is to make sure that the proper activities are executed by the right people at the right time. As refer to Olive (2007) it is ambitious to classify the many types of information systems that have emerged in practice. Many classifications for information systems exist in the literature.

2.2.2 Previous System

In this part, it is really important which it presents identify the domain that related to the project, explain the issues that related to the domain problem in terms of platform, architecture and algorithm, provide any evidence or statistic to verify the domain problem and explain several terms that being used in this project.

In Kentucky, United States there is current system that has been used to store vehicle information which is call as Online Vehicle Information System (OVIS). This system provides access to all the Kentucky vehicle (including cars, trucks, motorcycle and RVs) title, registration and privilege information. Only authorized users can use this system but before that, they need to pay an annual subscription fee for each record accessed. In order to use this service, user must be registered at Kentucky.gov first before user get to access all the information. OVIS will allow authorized users to search with VIN or title number to see information about a vehicle registered in Kentucky returning the vehicle registration, current title, and dealer assignment category and privilege information.

Sample Record

Vehicle Information	
VIN	STICE18G46U681900
Vehicle Model year	2004
Vehicle Type	PASSANGER CAR
Vehicle Make	TOYT
Vehicle Model	SOLARA
Cylinders	04
Odometer Brand	
Title Brand	
Taxes are Owed?	NO
Taxable Value	15345.00

Registration Information	
Plate Number	EYR451
Registration Type	NATURE RENEWAL
Registration Status	ACTIVE
Registration Date	03/22/2007
Expiration Date	03/23/2007
Plate Series Year	04

Printed Title Information	
Owner 1	SMITH, TOME
Owner 2	
Title Number	151094560071
Title Type	ORIGINAL
Title Status	ACTIVE
Odometer	0056345

Figure 2.2: Sample record from Online Vehicle Information System (OVIS)

2.2.3 Characteristic of UTeM Vehicle Information System

Tracing UTeM Vehicle Information via QR Code with Alert Message is proposed as a solution for helping to smooth and enhance the vehicle management in UTeM. This system is obviously not similar with current system that been used in any company or system. As been told previously, the current vehicle management has been manage manually. The person authority person in charge need to record manually the vehicle information to give them warning letter because of the owner does not follow the rules.

By develop vehicle information system sticker with implementation of QR Code, the authority just have to scan the QR Code to get all the details about the owner of the vehicle. The information and all data are stored using in proper way. QR Code will be implement on the sticker. When the authority person scan the code, all the details of the owner will be display. The data of the owner of each vehicle will be stored in database when the first time they register for the sticker. If the student did not follow the rules regulation, they can give them an immediate alert message through their mobile phone.

2.3 UTeM Vehicle Information System using QR Code

2.3.1 Definition of QR Code

A QR Code is a matrix code that been developed in Japan in 1994 by Toyota subsidiary. Danso Wave and this code acts to help track the automobile parts throughout production (Lyne, 2009). Denso has chosen not to exercise its pattern rights, so QR Code is open to public. This means that, developers are free to generate new varieties of QR Code and develop applications to interpret as well as the process of code (Narayanan, 2012). QR Code has become widely popular because of superior functionality characteristics, reading, speed and accuracy (Lyne, 2009).

Figure 2.3: A sample of QR Code

2.3.2 QR Code Data Type

There are varieties of data type that can be stored in QR code. Different reader applications are developed able to act and read data in this code. There are some possibilities of using QR code as alternative ways to get data such as contact info, calendar event, URL, Wi-Fi network and geo location (Matt, 2011).

a. Contact information. QR Code can save contact information in its code. So, the receivers only need to scan the code to view the contact information and save into their smartphones. The data can be stored in QR Code including of name, phone number, address, website and other else.

b. Calendar event. A QR Code can be created to promote an event. This code containing info for the event title, data and time, location and description of the event.

c. URL. The possibilities to encode an URL link into a QR Code are endless. QR Code is used to link someone to a website suggested by user. QR Code also used to tell someone about the location of user by encodes the check-in link into QR Code.

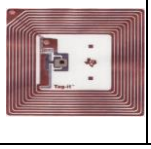
d. Wi-Fi network. A long WEP password can be encoded into a QR Code. A person only needs to scan the code to get the password of Wi-Fi network.

e. Geo location. A QR Code can link someone to a Google Maps location. The person can get the direction automatically after scan the code.

2.3.3 QR Code Technology

Quick Response Codes or QR Codes are two-dimensional barcodes that can be scanned by mobile phone with embedded camera. In the automatic identification fields QR Code has been widely. These codes can be used to provide fast access to URL, an SMS message, a phone number or any text and QR Codes can hold much more information than a regular barcode. The information encoded in a QR Code images.

Table 2.1: Comparison between QR Code and other automatic identification technologies

Information media	**Magnetic card**	**OCR identification**	**Biological identification**	**RFID**	**QR Code**
Identification speed	0.3 – 2s	4 – 8s	1 – 5s	0.3 – 0.5s	0.3 – 1s
Bit error rate	Up to life of magnetic media	1/1,000	1/300	Up to noise and angle	1/1,000,000
Technical advantage	Portable and data rewritable	Quick in image and symbol operation	Non-counterfeitable	Quick and batch processing	Quick and accurate
Print cost	Intermediate	Low	High	Very high	Very low (only in cost)
Sample					

Those are QR Code features:

a. High capacity encoding of data
b. Small print out size
c. Dirt and damage resistant
d. Readable from any direction in 360^0

2.4 UTeM Vehicle Information System using QR Code with Alert Message

2.4.1 Definition of Alert Message

What specifically is a safety alert message? Alert is defined as a warning message in owner's manuals that typically consists of a signal word, safety alert symbol and text. Safety warning messages in manuals act as reasonable attempts to provide risk information and an opportunity to avoid personal harm.

2.4.2 Software and Hardware used

In this project, the software that will be use is Macromedia Dreamweaver 8. The programming language that is use is PHP. PHP is the most productive language to understand. Person who can used this system are authority officer and students but they have to register first. Next, programming platform used in this project is PHP. The database software use is MySQL to store data of registered vehicle. Hardware that will be use in this project are laptop and smartphone.

2.5 Conclusion

As for conclusion, at the end of this project, a web-based tracing vehicle information system by implementing QR code will be developed and will be tested by sending alert message. The next chapter will be focusing on methodology used for this project.

CHAPTER III

PROJECT METHODOLOGY

3.1 Introduction

This chapter will be discuss about the project methodology and project milestones. In project methodology, the technique used in this project will be explain and project milestones was created to follow the deadline of the project so that the project will be complete. A project methodology should be chosen earlier during the project planning. The approach depends on the formalized requirements and on both the general project plan. Actually, the approach will certainly affect all of the planning therefore its pay a huge part in development of this system as a foundation of the system.

The project process model is an abstract representation of a project process. Each process model represents a process from a particular perspective and thus, provides only partial information about the process. Table below shows the comparison between the process models.

3.2 Methodology

The methodology used in this project is based on Rapid Application Development (RAD) model. There are four stages involves in this model. They are analysis, design, implementation and testing phase. Each stages have different activities and will be explain below.

Figure 3.1 Rapid Application Development (RAD) methodology

3.2.1 Analysis

In the analysis phase, will be discuss about current problem that usually happen inside the campus. All the problem need to be analyse to get the summary and find the solution for the problem. A system needs to be developed for fulfilling the requirements that have to finalize what method that need to use in this project. The method that implement is QR code technology in order to store information. Besides that, this project needs to find past paper or previous research to make it as a references for more understanding about this project. This phase needs to collect and find more information that related to this project. Then, after got all the information, they need to be rearrange to make it simple, understandable and systematic.

3.2.2 Project Design

For this phase, the basic design of interface is begin as this project involve with system interface. In order to develop a system, it must have interface to begin with. The interface must contain the vehicle information platform. This project will use Macromedia Dreamweaver software to design the interface. This phase will transform detailed requirements into complete vehicle information system.

3.2.3 Implementation

The most critical phase is implementation phase. In this phase, the vehicle information system must be able to generate user registered QR code. Once the user registered their vehicle, QR code that contain and store their information will be generated to be implement on the vehicle sticker. This system will be develop using Macromedia Dreamweaver, PHP and MySQL as database.

3.2.4 Testing

In this phase, the system will be tested to ensure the data stored in database can be process to generate QR code for each registered user. It is also to make sure that the system will be able send alert message to those who do not follow the rules. Testing phase is the most important part because it is to make sure that the output of the system will work as expected and achieved the objectives. The expected result are, tracing UTeM vehicle information system that can generate QR code is developed, and success to send alert message to user.

3.3 Project Milestones

Project milestone is a time frame that describe actions plan prior to the end of the project and also describe stage by stage of activities.

Table 3.1 Project Milestone

Week	Date	Activities
1	22 – 26 February	- Proposal submission, presentation and correction
2	29 – 4 March	- Chapter 1 - Identify environment setup
3	7 – 11 March	- Submission Chapter 1 report - Chapter 2
4	14 – 18 March	- Correction of Chapter 2
5	21 – 25 March	- Chapter 3 - Methodology
6	28 – 1 April	- Chapter 3 - Progress report
7	4 – 8 April	- Implementation of vehicle information system - Chapter 3
MID – SEM BREAK		
9	18 – 22 April	- Implementation of vehicle information system - Chapter 3 - Installation of Dreamweaver and MySQL
10	25 – 29 April	- Implementation of vehicle information system - Correction of chapter 3 - Progress report
11	2 – 6 May	- Analysis
12	9 – 13 May	- Analyse the vehicle information system web – based - Chapter 4

13	16 – 20 May	- Chapter 4 - Progress report
14	23 – 31 May	- Presentation of PSM 1 - Submission PSM 1 report

3.4 Conclusion

In conclusion, this project refer to RAD model for project methodology. This model has four phases which are analysis, design, implementation and testing phase. The milestone was created to make sure this project can be done in a given time. The next chapter will discuss about analysis and design that include problem analysis, requirement analysis, high-level design, database design and detailed design of this project.

CHAPTER 1V

ANALYSIS AND DESIGN

4.1 Introduction

This chapter will explain about the analysis and design of the system. Analysis is a detailed examination of the elements or structure of something, typically as a basis for discussion or interpretation. Analysis phase defines the requirements of the system, independent of how these requirement will be accomplished. It defines problem that trying to be solve from current system to to – be system. While go through this chapter, it explains more detail on problems of current system and requirements that need to be included in the new system.

Design phase defines the results of the analysis of the preliminary design and detailed design. The design phase is when build the plan for how the project will take through the rest of the Rapid Application Model (RAD) which is start from analysis phase, design phase, implementation phase and testing phase. During the design phase it is best practices to follow this phase by way of functional and design specifications. Through this chapter, it will explain and illustrate the design of the system in detail.

4.2 Problem Analysis

After going through analysis process, there are few problems has been identified by using current system in Universiti Teknikal Malaysia Melaka (UTeM). The current system has been manage manually. As been listed, according to the campus rules, each students that own a vehicle, need to register their vehicle in order to get the sticker. Two types of vehicle that has been allowed for students are car and motorcycle. So, student has to fill in the form which they need to go to *Pejabat Keselamatan* to get the form. The use of vehicle sticker is to differentiate whether the student stay in residential area inside the campus or outside the campus.

Student who stays in the residential area inside the campus will be given red colour of sticker meanwhile for student who stays outside will get green colour of sticker. That is how they differentiate. This is because, some of the students that stay outside from campus love to park their vehicle at the parking space that has been assigned just for student that stay in residential area. The next problem arise when once student disobey the rules, the authority officer has to record the data of the vehicle manually thus, produce a warning letter. Other example is when someone put their car in double Park, it is really hard to find the owner of the vehicle asking to move their vehicle because they do not left contact number to be inform. So, from problem analysis process, it shows that vehicle information has been managed unsystematically. Here where the system need to be improved in order to have a better vehicle information system.

According to Coulson et al (2011) dealing with campus transportation system has become a challenge and sometimes a nightmare for many universities. The growing problems of traffic congestion, inadequate public transportation, parking shortages and pedestrian safety are some of the long list challenges facing university today.

Kaplan & Clapper (2007) describe that as universities grew in numbers (students and staff) and diversified in their activities, coupled with increases in vehicle ownership and usage, their current campuses were not able to cope with these emerging problems. Most urban university campuses are facing problems of traffic congestion and parking shortages. University campuses have unique congestion

characteristics. Traffic patterns are influenced by various movements from faculty and staff, students and visitors to the different campus activities. These movement patterns differ in time and space. Most congestion problems in university campuses occur around campus gates or near parking facilities. University campuses experience different travel peak hours related to their physical layouts, university operations and class scheduling.

As been state earlier, QR code will be use in this project in order to store data of registered vehicles which replace the current manual system. A QR code is a matrix code that been developed in Japan in 1994 by Toyota subsidiary, Danso Wave and this code acts to help track the automobile parts throughout production (Lyne, 2009). Denso has chosen not to exercise its pattern rights, so QR code is open to public. This means that, developers are free to generate new varieties of QR code and develop applications to interpret as well as the process code (Narayanan, 2012). QR code has become widely popular because of superior functionality characteristics, reading, speed and accuracy (Lyne, 2009).

4.3 Requirement Analysis

4.3.1 Data Requirement

The input of this system is the data from user when they registered their own vehicle to get the sticker. The data from user will be stored in database and will be process to be generate into QR code form. The output of the process is to produce vehicle smart sticker that has QR code on it which all the information of vehicles owner is store in it.

4.3.2 Functional Requirement

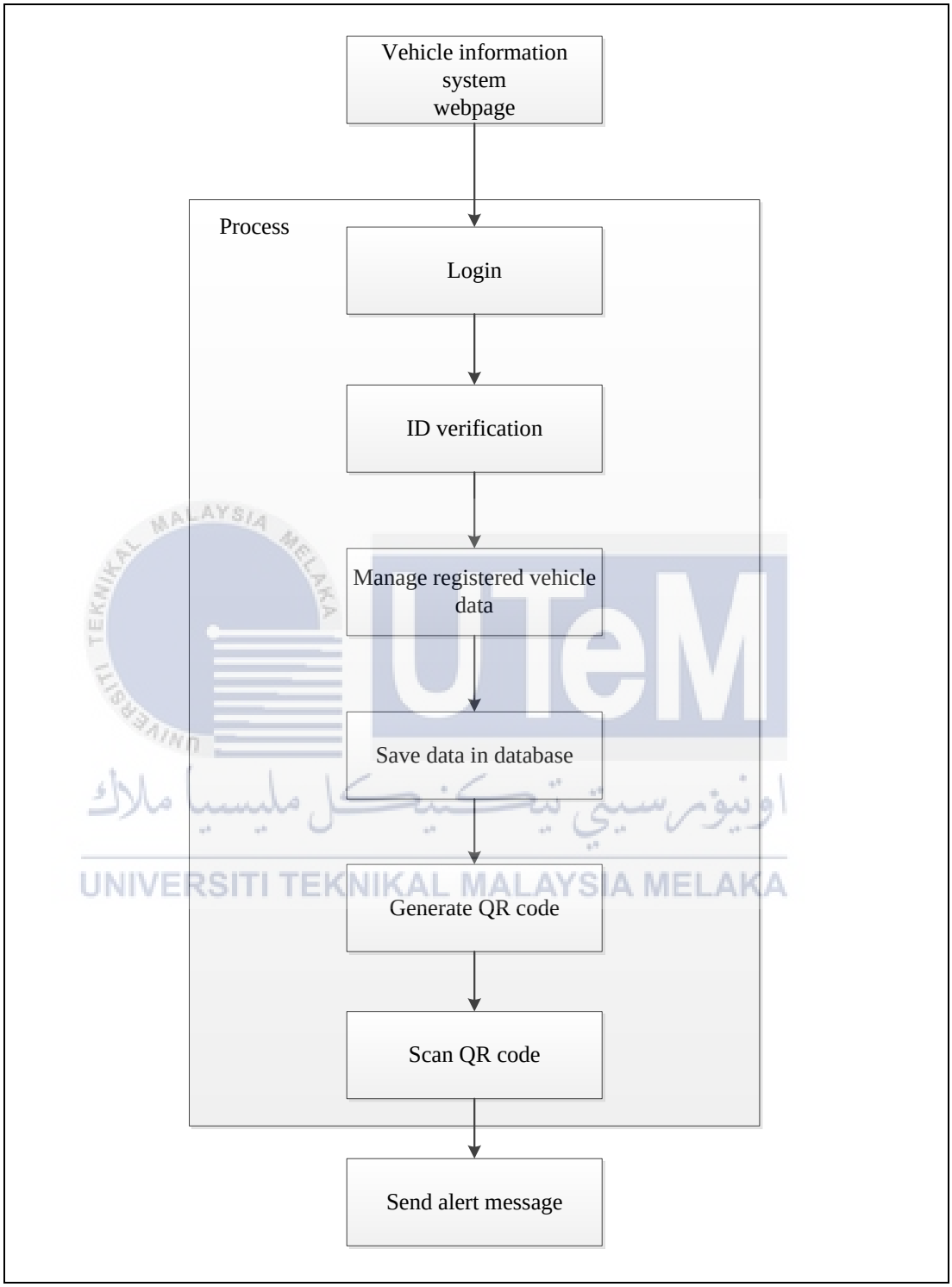


Figure 4.1: Process of functional requirement.

For functional requirement in this system, there are seven functions which are login, id verification, manage registered vehicle data, save data, generate QR code, scan QR code and send alert message.

Table 4.1: Description of Functional Requirement

Requirement	Description
Login	The system shall enable authority officer to login to the system.
ID verification	This function will only allow registered user to login. User need to sign up to pass the verification.
Manage registered vehicle data	Enable authority officer to register the vehicle by fill in the form provided.
Save in database	All the data will be save in database which replace the manual system where the data is manage in a proper way.
Generate QR code	After the vehicle is done registered, QR code is generate based on the data stored in database.
Scan QR code	The scan function will be able to display registered vehicle data once the QR code is scan.
Alert message	Alert message will be send to the person where the data is get from the QR code.

4.3.3 Software Requirements

Software that been use to develop this system are:

a. **Operating system** – Windows 10 Education, 64-bit operating system. This is the main software required in order to start develop the system.

b. **Programming language** – PHP
This software is required to generate QR code.

c. **Database** – MySQL
This software is required to store data to be use in the system as a record and generated into QR code. MySQL is coded from the start to be multi-threaded.

d. Macromedia Dreamweaver
This software is required to create web pages and sites. It allows user to preview websites in many browsers that are installed on their computer. It also has some site management tools, such as the ability to find and replace lines of code or text by whatever parameter specified across the entire site. The behaviours panel also enables use of basic JavaScript without any coding knowledge.

4.3.4 Hardware Requirement

Hardware that been use to develop this system are:

a. Laptop

This hardware is the most required in order to run all the software needed to develop the system.

b. Smartphone

This hardware is required when to test and scan the QR code and to see if the recipient received the alert message.

4.4 High – Level Design

4.4.1 System Architecture

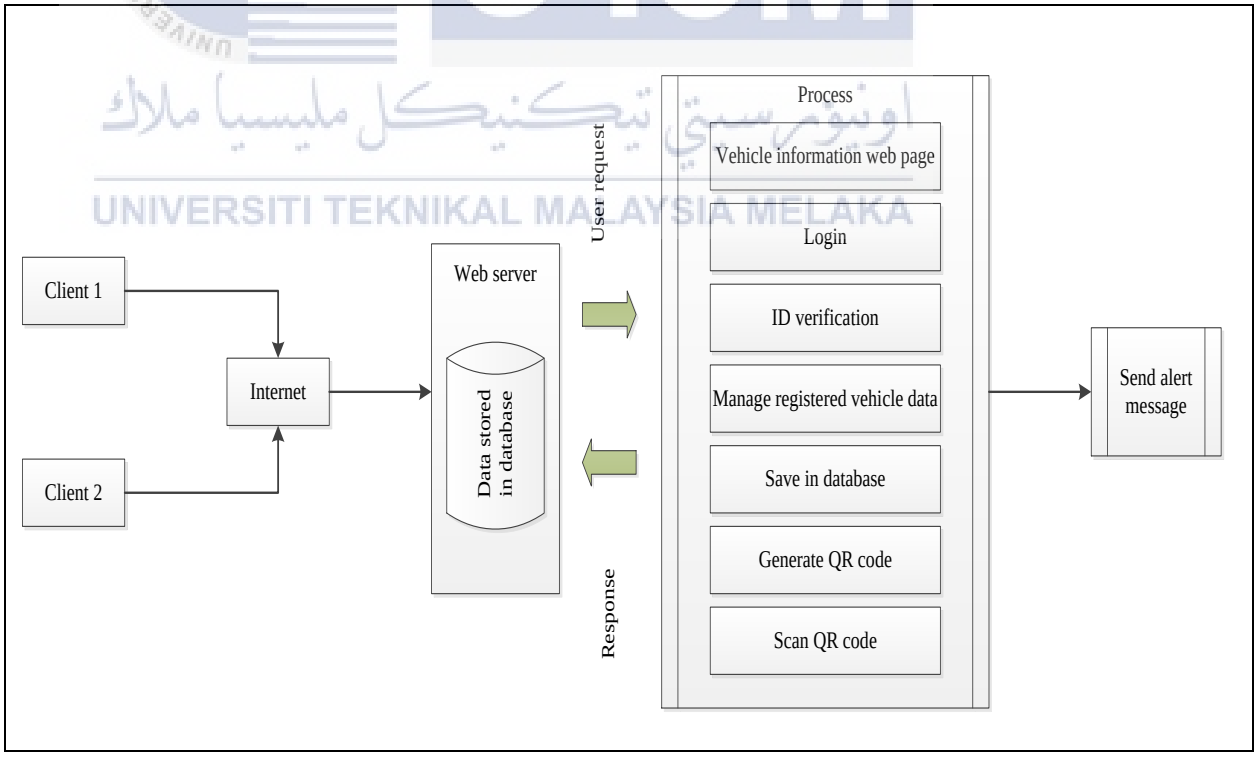


Figure 4.2: System architecture design of vehicle information system

System architecture in Figure 4.2 describe about the process of vehicle information system work flow. The client will surf into internet which is send request to the web server to login or sign up. The process include id verification, manage registered vehicle data, save in database, generate QR code and scan the QR code. The QR code will be generate when the owner of vehicle is registered and the data save in database is gathered and convert into QR code form. Once the QR code is scan, user will be able to send alert message to the recipient from vehicle information system.

4.4.2 User Interface Design

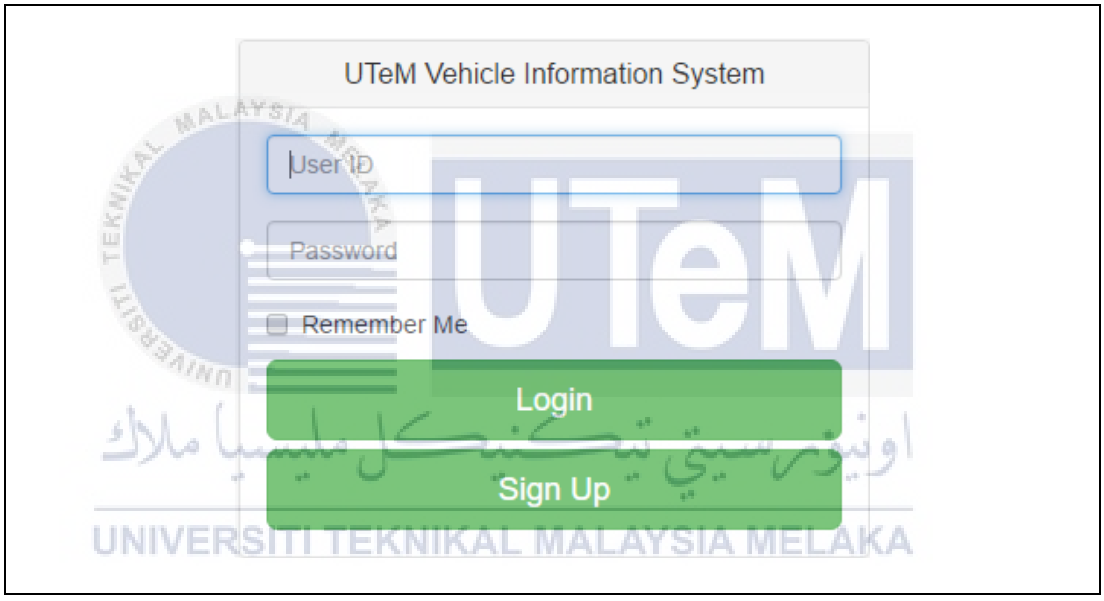


Figure 4.3: Interface design for Login

Based on figure 4.3 user has to enter their username and password before can use the system. This is to make sure only authorized user can login the system. So, it will be easier to maintain the system because any harm that can crash the system will be prevented.

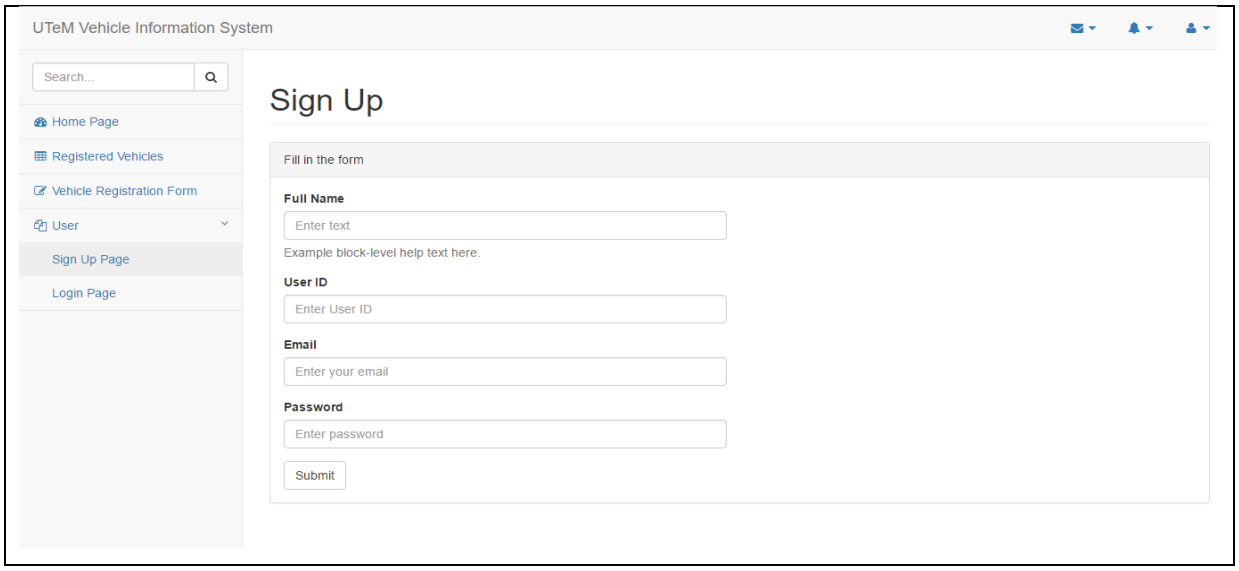


Figure 4.4: Interface design for Sign Up

As refer to figure 4.4 above, once the system detect there is a user that do not register, they will not be able to enter the system. So, user need to sign up by fill in the form and after that go to login page to enter the system. Data will be save in database after user click submit button.

Figure 4.5: Interface design for homepage

Figure 4.5 shows the homepage of vehicle information system. Here is where all announcement or any information will be update. In this page also provided the link to go to vehicle registration form page and the list of registered vehicle.

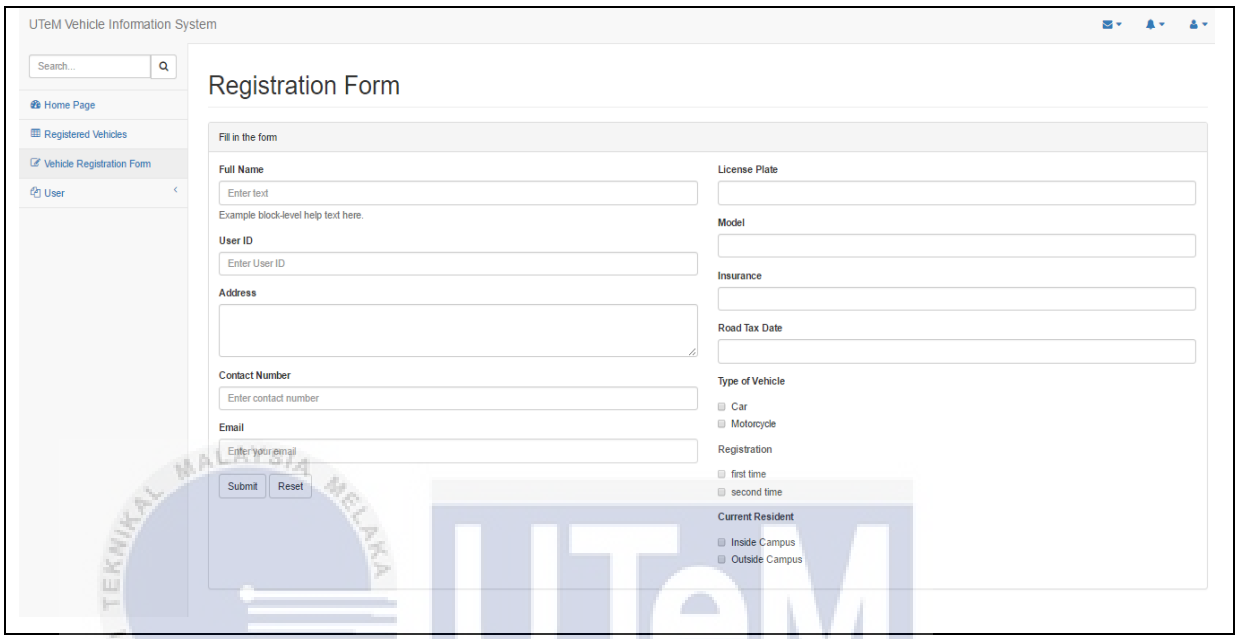


Figure 4.6: Interface design for vehicle registration form

Based on figure 4.6, this registration form is replaced the current system that been used by Universiti Teknikal Malaysia Melaka (UTeM) which student has to fill in the form in a paper. Here all the data is keep save in database when user click submit button and this system will be manage systematically.

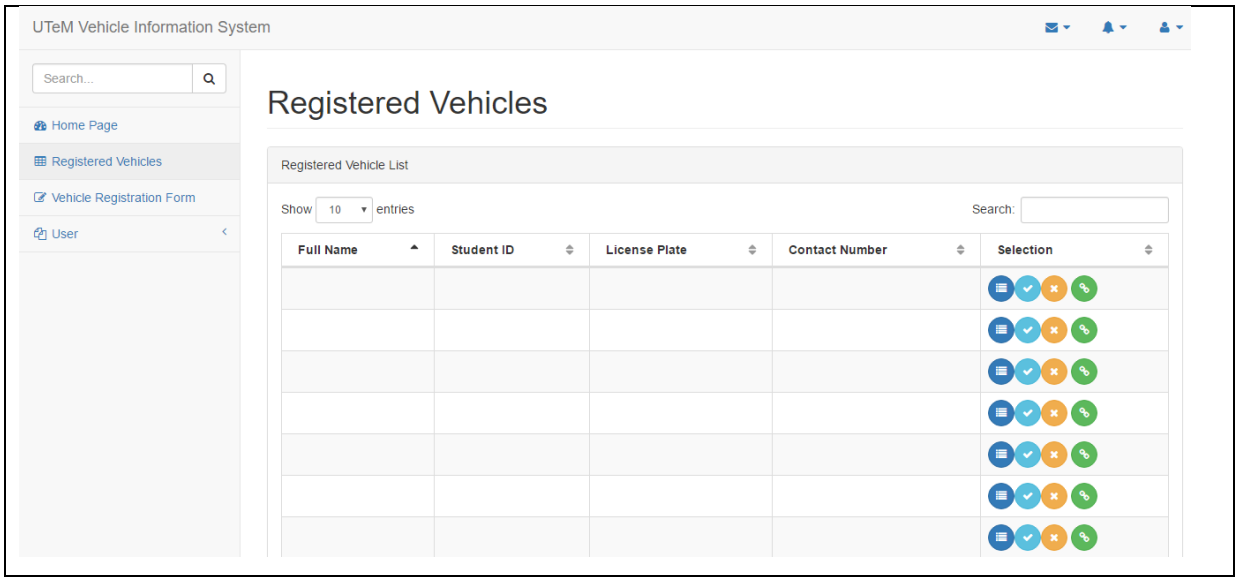


Figure 4.7: Interface design for list of registered vehicle

Figure 4.7 shows the interface design for list of vehicle that already registered. In this page, authorized user can view the list of vehicle that has been registered. Search bar is provided to make it easier to search by entering the owner of vehicle user id. In the selection column, there are four buttons provided. The dark blue button will give the function of updating information. The light blue button will be able to add data and the orange button is to delete data. For green button, once user click on it, a new web page will appear where it will show the QR code that has been generated for the registered vehicle.

4.4.3 Database Design

4.4.3.1 Entity Relationship Diagram

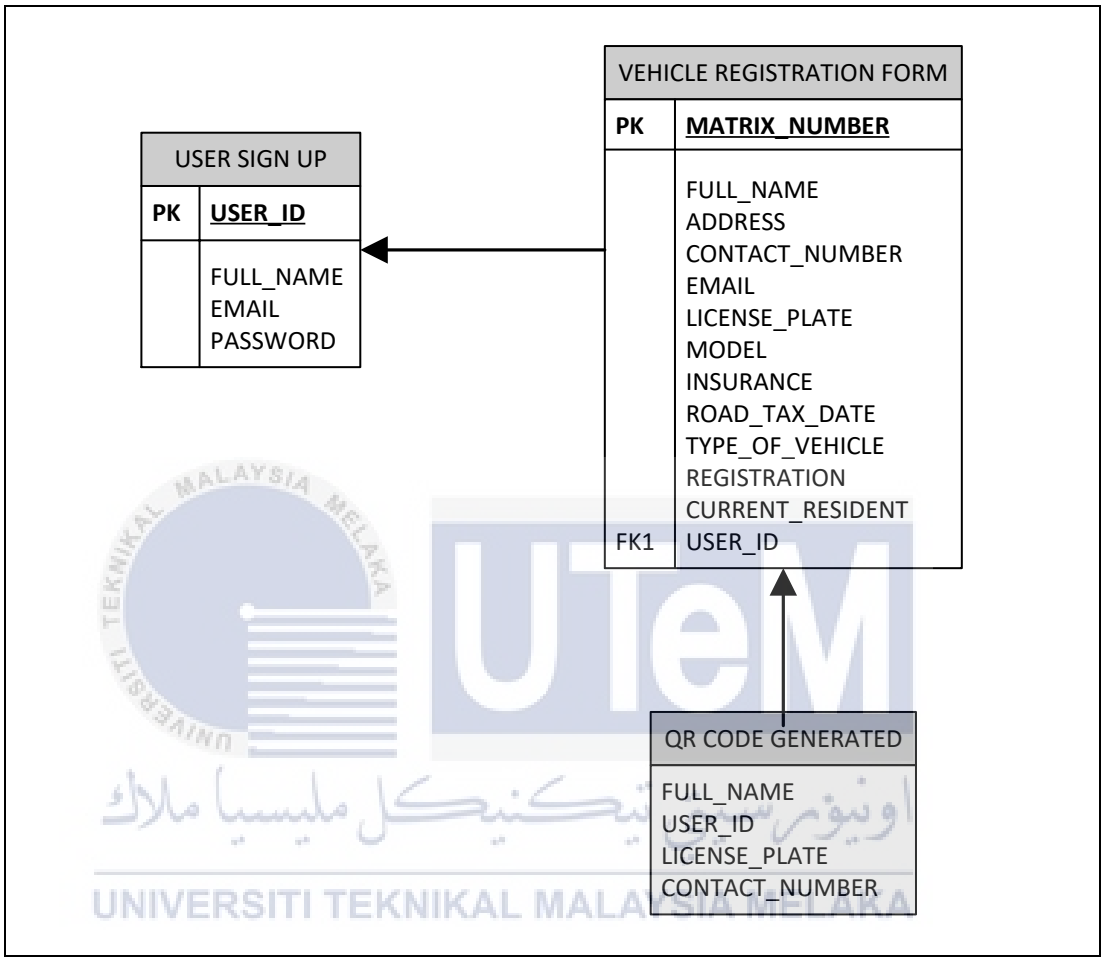


Figure 4.8: ERD of vehicle information system with QR Code

The entity relationship diagram show the process of data store in vehicle information system. On vehicle registration form table, matrix number will be the primary key it will be easier to search in list of registered vehicle web page. For QR code generated table, it will only view the selected data get from vehicle registration table. It will display full name of the owner, user id, license plate and contact number.

4.5 Detailed Design

4.5.1 Software Design

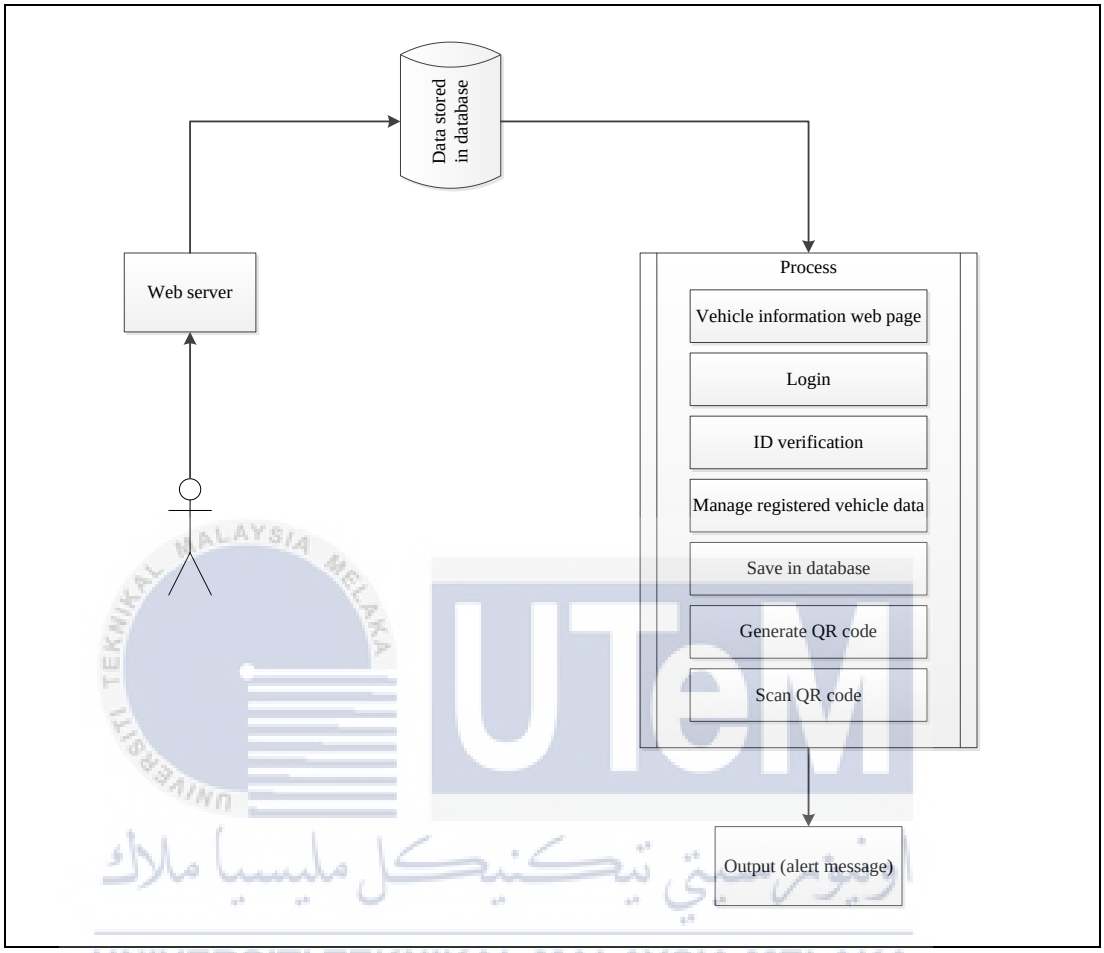


Figure 4.9: Use case diagram for vehicle information system

The use case diagram is about the process occur in vehicle information system. The user will surf the internet which is send request to the web server and server will response whether they are allowed or deny from enter the system. All the data is stored in database which is MySQL. When user were able to get into the system, they can register and save their input in the database. QR code will be generated when it gets data from the vehicle registration form table in database. When the QR code is scan, all the information is there including contact number where the alert message will be sent.

Here is the overview in creating QR code.

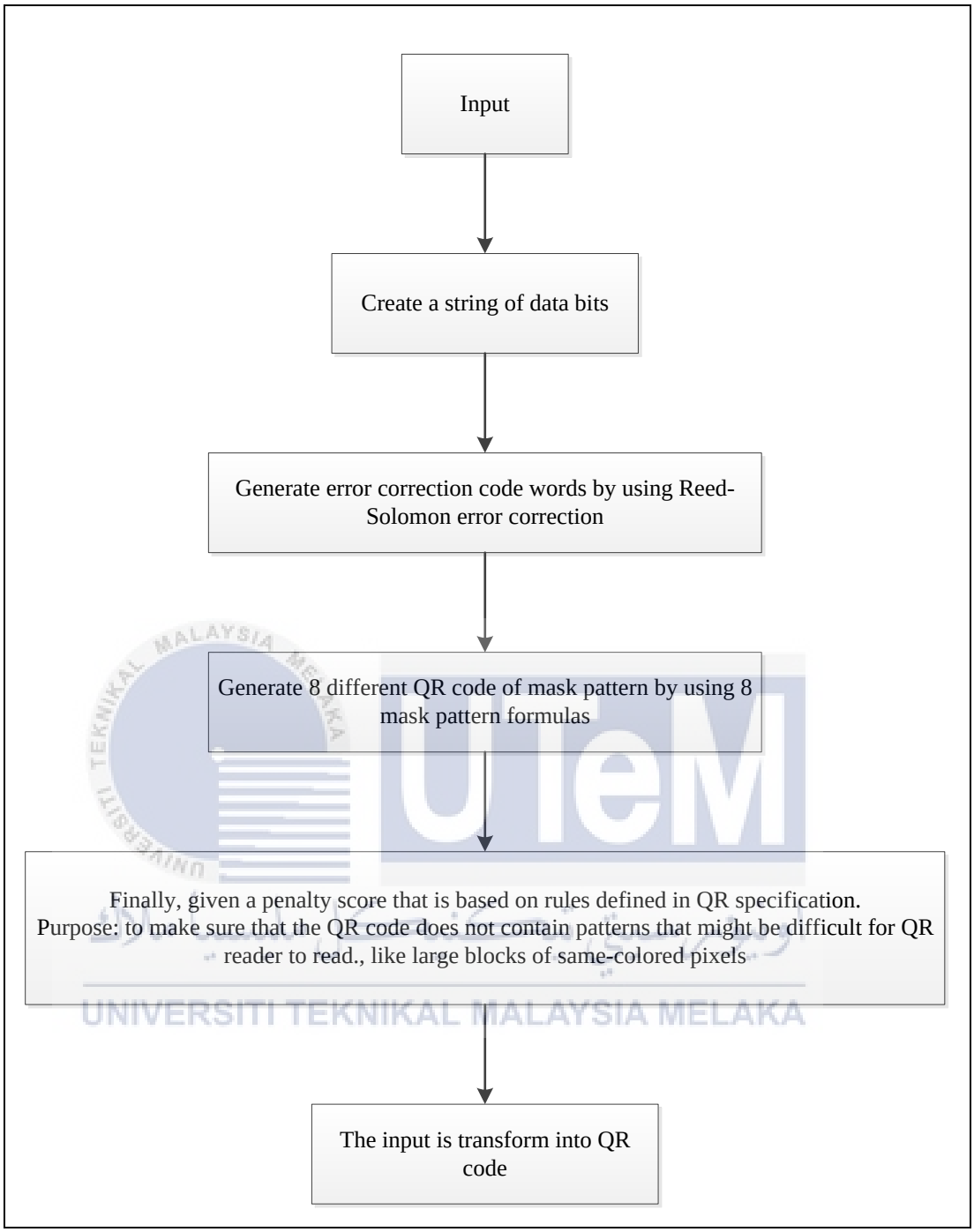


Figure 4.10: Flow in creating QR Code

4.6 Conclusion

As the conclusion, this chapter has defined the problem analysis such as describe current system flow and its problem statement. Besides that, this chapter also explained the main functional requirement of the new system that will replace the current system. It explained in detail on how the QR code is generate. Moreover, it also state the hardware, software and network requirement for this system to be developed. Next chapter will discuss about implementation of proposed system.

CHAPTER V

IMPLEMENTATION

5.1 Introduction

This chapter will explain about implementation of the system. Implementation is phases where developer will run the system in order to see the result after certain input is inserted. Then the result is compare with actual output. This is to check or validate whether the system work correctly or not. Based on this system, there are several activities that need an input from the user in order to perform the output. For example, users need to key in their data before all the details can be save in database. A QR code is generated when the user already register their vehicle through the system.

5.2 Software and Hardware Development Environment Setup

Diagram below show how environment is setup for this project. Laptop which is workspace gets connected to database.

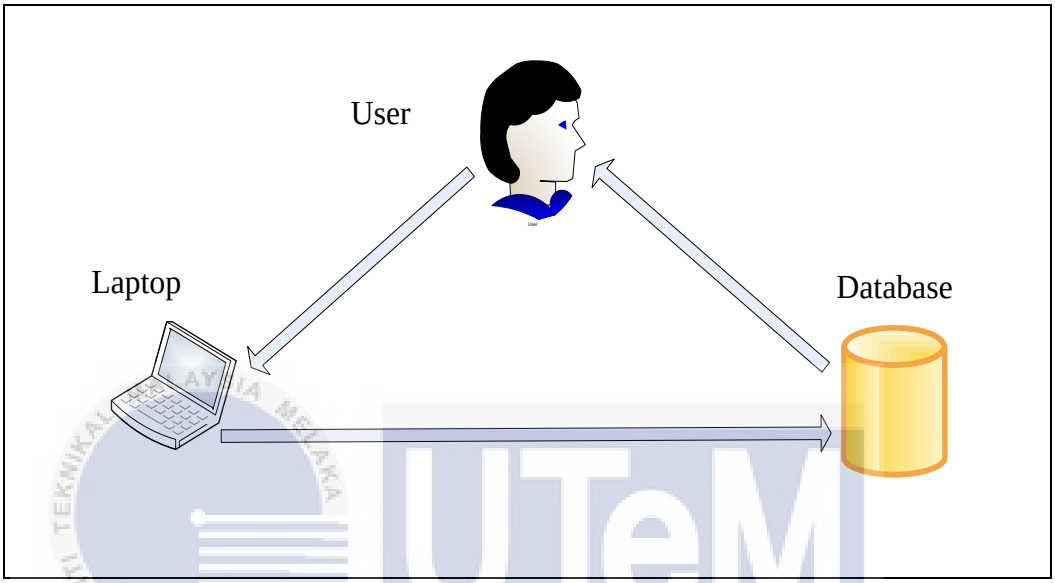


Figure 5.1 Environment setup

Software and hardware development will be discuss in this project from the start of the project until the end of the project.

Software that been use to develop this system are:

a. Windows 10 Education

Windows 10 Education, 64-bit operating system. This is the main software required in order to start develop the system. All the setting be made in Windows 10 Education environment

Figure 5.2: Windows 10 Education

b. Hypertext Preprocessor (PHP)

PHP is a programming language designed for web development but also used as a general-purpose programming language. This language is used in order to generate QR code

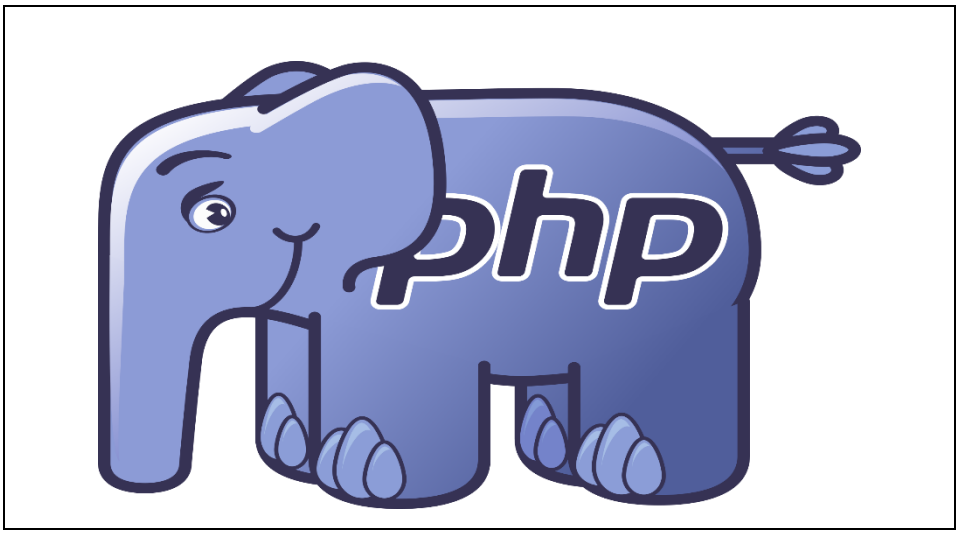


Figure 5.3: Hypertext Preprocessor (PHP)

c. WAMP

WampServer is a Windows web development environment. It allows to create a web applications with Apache2, PHP and a MySQL database. Alongside, PhpMyAdmin allows you to manage easily the database.

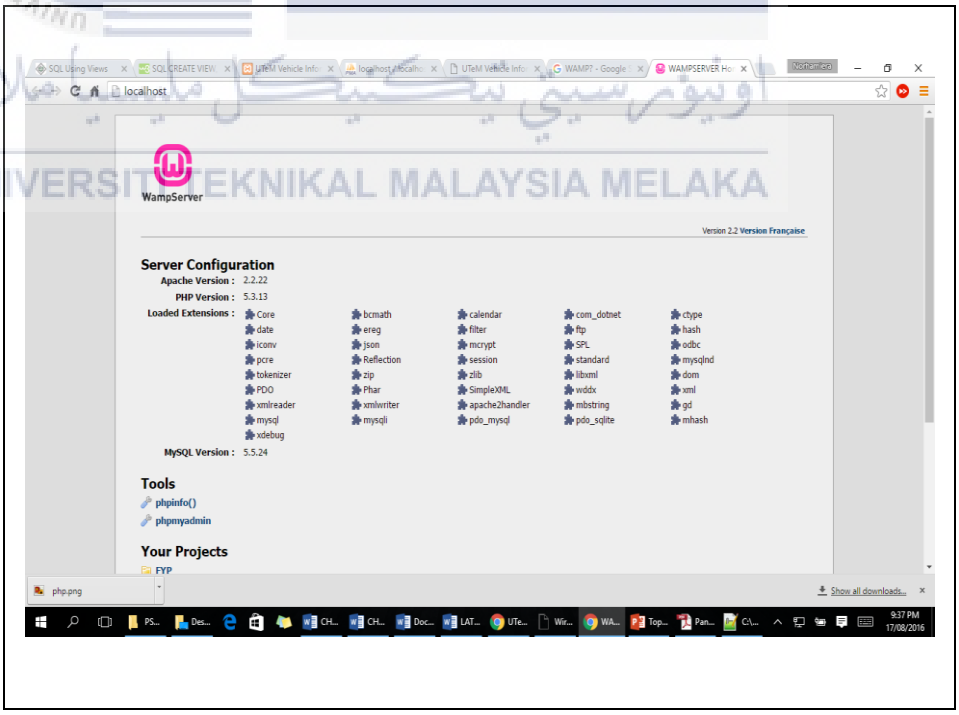


Figure 5.4: WampServer

d. Macromedia Dreamweaver

Macromedia Dreamweaver is an easy, powerful, and open authoring tool that every member of the development team can use to quickly build robust websites and Internet applications.

Figure 5.5: Macromedia Dreamweaver

e. QR code reader

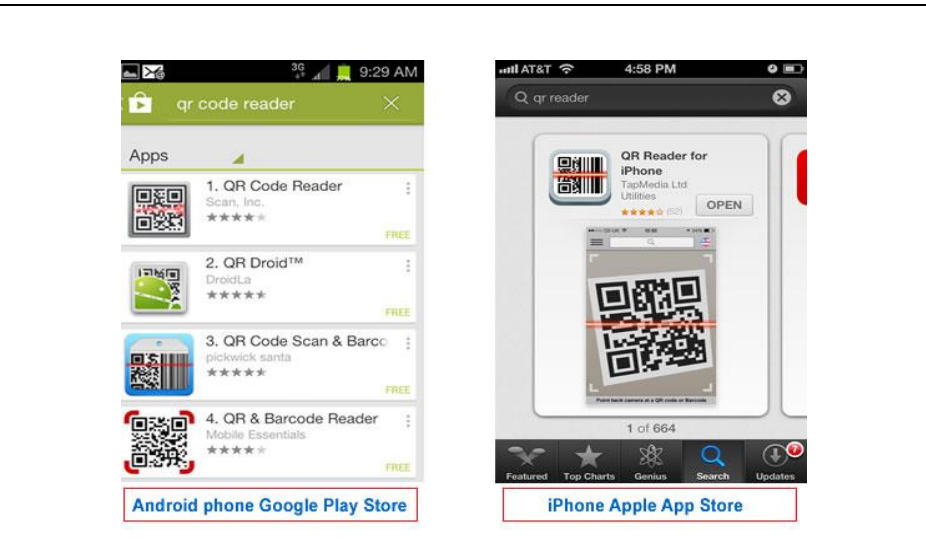


Figure 5.6: QR code reader

Hardware that been use in order to build and testing this system are:

a. Acer Aspire V5-473PG

Acer Aspire V5-473PG is the main hardware used for this system because this system is develop inside this laptop. It is also act as a platform that will complete all the development process including the designing and the source code. Some setting need to set up to make sure all the connections success from failure using Windows 10 Education as an operating system. The processor used is Intel(R) Core(TM) i5-5200U CPU @ 2.20GHz 2.19GHz with RAM 4.00 GB. Figure 5.3 below shows the image of Acer Aspire V5-473PG.

Figure 5.7: image of Acer Aspire V5-473PG

b. Oppo R1L

Figure 5.8: image of Oppo R1L where QR scanner is downloaded.

5.3 Software Configuration Management

In software configuration management phase, is giving explanation about the tools used for configuration which is Macromedia Dreamweaver to develop the interface design and function of the applications. Through the development of this application, different file formats are use such as .html and .php file type.

5.3.1 Configuration Environment Setup

This setup is important to configure because this is where the development process and testing are placed. Without proper configuration, it can affect the process of developing the system. This is because all the connection between application and databases are also been configure in this environment. For more detail, see Appendix.

5.3.2 Version Control Procedure

Version control is mostly used by software developers or system builders to put source code in one central place and track different versions of code, which are generated along with each day work. Most version control systems can be integrated with IDE (Independent Development Environment).

Revision control also known as version control is the management of changes to documents, programs, and other information stored as computer files. It is most commonly used in software development, where a team of people may be changing the same files. Besides that, version control can be used to restore older version if the latest version crashed or failed to run.

For project UTeM Vehicle Information System using QR code, in the term of managing source code is just by manual where the written codes will be managed by doing many copies of backups and stores it in external hard disk. There are so many backups for this system where each backup has an update from older version.

5.4 Implementation Status

This system is just like other system's login. User need to enter valid username and password to login. User has to sign up first to get their username and password in order to get into the system. Below are listed modules for the system with its component in detail.

5.4.1 Login Module

Module name:	Login
Explanation:	This module will need user to sign in before can go to home page. It will require user's username and password to login. Username are based on user's id. Therefore username will be a unique attribute and it will not have more than one same username.
Duration to complete:	2 days
Date complete:	29 April 2016

5.4.2 Logout Module

Module name:	Logout
Explanation:	This module need user to logout before exit the system in proper way. It is to ensure that no one else can modify the data.
Duration to complete:	2 days
Date complete:	29 April 2016

5.4.3 Sign up Module

Module name:	Sign up
Explanation:	This module is created for the first time user, who do not have account, they are not allow to enter this system. In order to use this system, they need to register before proceed to next stage.
Duration to complete:	3 days
Date complete:	04 Mei 2016

5.4.4 Vehicle Registration Module

Module name:	Vehicle Registration
Explanation:	This module is created to replace the current method where user has to fill in form manually. By having this system it utilizes the use of IT systems to reduce the use of paper in response to the recommendations of the government.
Duration to complete:	7 days
Date complete:	13 Mei 2016

5.4.5 View Registered Vehicle Module

Module name:	View Registered Vehicle
Explanation:	This module is develop to view all user that already register their vehicle and the QR code generated for each user
Duration to complete:	7 days
Date complete:	20 Mei 2016

5.4.6 View QR code Module

Module name:	View QR code
Explanation:	This module is created to view QR code generate for each user to be implemented on vehicle sticker.
Duration to complete:	14 days
Date complete:	03 June 2016

5.5 Conclusion

As a conclusion, this chapter has defined all the activities that involve in the implementation phase. This include define environment setup in details. It shows in step how to configure the setup that been use to develop the system. This chapter also stated the duration takes for every module to complete before end date. Next chapter will discuss about testing phase. It is the last phase before the system is taking over by end-user. This phase will determine whether the system runs according to the given input and procedure expected result.

CHAPTER VI

TESTING

6.1 Introduction

This chapter will explain about testing phase. In this phase, the system will be test based on test strategy that been chosen with certain inputs and actual output. This is to check if the system processes the data and produce output same with actual output or not. Besides that, by doing testing, we can state if the function fail or pass. So, if the function is fail then it will state details description of the problem so that in the future the system's function can be upgrade or do some amendments.

6.2 Test Plan

Test plan is a document describing the approach, resources and schedule of intended test activities. It identifies amongst others test items, the features to be tested, the testing tasks, who will do each task, degree of tester independence, test environment, test design techniques and entry and exit criteria to be used and the rationale for their choice and any risks requiring contingency planning. It is a record of the test planning process.

6.2.1 Test Organization

An independent test organization is an organization, person or company that tests products, materials, software, etc. according to agreed requirements. The test organization can be affiliated with the government or universities or can be independent testing laboratory. They are independent because they are not affiliated with the producer or the user of the item being tested: no commercial bias is present. These “contract testing” facilities are sometimes called “third party” testing or evaluation facilities.

Independent testing might have a variety of purposes, such as determine if, or verify that, the requirements of a specification, regulation or contract are et, decide if a new product development program is on track: Demonstrate proof of concept, provide standard data for other scientific, engineering and quality assurance functions and validate suitability for end-use, provide a basis for technical communication and more. (Cross posted from Wikipedia, Aug 25, 2012)

But for this project UTeM Vehicle Information System by using QR code, there is no specific test organization assigned and it is tested by the developer individually.

6.2.2 Test Environment

A testing environment is a setup of software and hardware on which the testing team is going to perform the testing of the newly built software product. This setup consists of the physical setup which includes hardware, and logical setup that includes Server Operating system, client operating system, database server, front end running environment, browser (if web application). IIS (version on server side) or any other software components required to run this software product. The test environment set for this project was just covered in ADOBE Dreamweaver CS4 where the software ran through browser with assist of several test plans.

6.2.3 Test Schedule

Test schedule includes the testing steps or tasks, the target start and end dates and responsibilities. It should also describe how the test will be reviewed, tracked and approved. Test schedule for this project was basically based on the completion of each modules or functions.

Activities	Description	Duration	Start Date	End Date
Unit Testing	**Unit Testing** is a test to ensure the unit of the project meets with all the requirements that stated in previous Chapter III.	4 weeks	20.07.2016	17.08.2016
Integration Testing	**Integration Testing** is a test to ensure that the modules developed for this project is integrated properly as planned.	18 weeks	25.04.2016	17.08.2016

Table 6.1: Test Schedule

6.3 Test Strategy

Testing is a phase that will show to us if the system runs properly like what had been planning from the first step. This also will tell us if the system is well performed and reach the specification. Testing may has different levels for example system testing, unit testing and acceptance testing. System testing falls within the scope of black box testing. System testing is performed on the entire system in the context of a Functional Requirement Specification(s) (FRS) and / or a System Requirement Specification (SRS). System testing is tests not only the design, but also the behaviour and even believed expectations of the customer. It is also intended to test up to and beyond the bounds defined in the software or hardware requirements specifications.

Unit testing is the testing of individual components (units) of the software. Unit testing are usually written by developers as they work on code (white-box style), to ensure that the specific function is working as expected. One function might have multiple tests. Acceptance testing maybe performed as part of the hand-off process between any two phases of development by the customer. This will test if end user can accept and use the system successfully.

The purpose of integration testing is to detect any inconsistencies between the software units. Each module that been created will be test to see if there has an error or not testing each module before combine is easier when it comes to find and fix the error than testing all modules at a time. System can be test by entering valid and invalid input. The result will be two choices which is fail or success.

On the course to complete this project, two types of testing has been done which are unit testing and acceptance testing. Both testing will be described in next subsections.

6.4 Test Design

Test design need to be done to make sure that the system is free from errors. If there is an error, developer can easy fix it. So, when end user try, the system will be running smoothly.

6.4.1 Test Description

System	:	UTeM Vehicle Information System Using QR code with Alert Message	Version	:
Module / Unit	:	Login	Revision	:
Was done by	:	Norhamiera Nordin	Date	:

Testing Number	Test Case	Expected Result
L10000	Login validation	
L10001	Enter an invalid input and login button is clicked	Login fail. Automatically go to login fail page.
L10002	Enter valid input and login button is clicked	Login success. Proceed to homepage
L10003	Leave the field blank and login button is clicked	Login fail. Automatically go to login fail page.

Table 6.2: Login validation

System	:	UTeM Vehicle Information System Using QR code with Alert Message	Version	:
Module / Unit	:	Manage File	Revision	:
Was done by	:	Norhamiera Nordin	Date	:

Testing Number	Test Case	Expected Result
L20000	Manage file validation	
L20001	Add button is clicked	Proceed to registration form
L20002	Delete button is clicked	The system will delete the selected data

Table 6.3: Manage File validation

Table 6.3 above describe about manage file function. It will do nothing if user did not click the delete or add button and the process will not success.

System	:	UTeM Vehicle Information System Using QR code with Alert Message	Version	:
Module / Unit	:	Generate QR code	Revision	:
Was done by	:	Norhamiera Nordin	Date	:

Testing Number	Test Case	Expected Result
L30000	Generate QR code validation	
L30001	QR code button is clicked	Display QR code generated

Table 6.4: Generate QR code validation

Table 6.4 above describe about generate QR code validation for user. It shows the possibility or expected result when user done register their vehicle.

System	:	UTeM Vehicle Information System Using QR code with Alert Message	Version	:
Module / Unit	:	Scan QR code	Revision	:
Was done by	:	Norhamiera Nordin	Date	:

Testing Number	Test Case	Expected Result
L40000	Scan QR code validation	
L40001	The QR code is scanned by using mobile phone camera	Automatically display owner of the vehicle details.

Table 6.5: Scan QR code validation

Table 6.5 above describe about scan QR code testing. It will shows the details of owner of the vehicle that has been stored in database.

6.5 Test Results and Analysis

6.6 Conclusion

In this chapter which is the last stage where the system is tested by insertion valid input to see the output accordingly. One of the system testing test plan. It shows test procedures, expected result and result. After analyse and design the system, hope the system will run properly like what been planned from the first step. By according to table above, we will know that the system is following the process or not and it is easier to check which part has an error. The result will show pass or fail.

CHAPTER VII

PROJECT CONCLUSION

7.1 Introduction

Project conclusion phase will discuss the conclusion of the whole project from the beginning of the project until the end of the project task. This phase will describe about the contribution, limitations and future works of this project will be included in this last chapter.

7.2 Project Summarization

From the beginning of this project, had stated the objectives and achieve partially the objectives at the end of this project. This project has stated three objectives which are to develop a web-based system where user can organize vehicle information systematically, to create and generate QR code that contain owner of vehicle details

and to test the system by sending alert message. All three objectives need to achieve in the implementation phase which is the developing of this system is using PHP language.

This project will embark on developing a web-based system where user can store related information of the vehicle, create vehicle smart sticker with implementation of QR Code that contain details of the vehicle and find solution for manually data record. The expected output of this project is to provide a smart information system that can tracing any information of a vehicle without delay any minute. Other than that, this project will also proposed a system that apply the new technology that are computerized information and systematic data handling.

7.3 Project Contribution

After the development of UTeM Vehicle Information System using QR code with alert message, the results shows that this system capable to help to smooth and enhance the vehicle management in UTeM. This system is designed to replace the current method where user has to fill in the form manually. By having this system it utilizes the use of IT systems to reduce the use of paper in response to the recommendations of the government.

7.4 Project Limitation

7.5 Future Works

For project enhancement, this project can be upgraded by adding a new module where user can took a picture of QR code, upload the picture, and the system itself will be as QR code reader to translate the QR code. So that, amount of cost to develop this system can be reduce as the system itself became the reader.

7.6 Conclusion

This project has made me understand more than before about develop a system. It requires a lot of knowledge and creativity to design and planning a good system which are the most important element for developer to have. Besides that, systems that are user friendly, multifunction and convenient are a perfect system. It makes the system attractiveness and easy for user to handle and use it.

Objective for this project is to develop a web-based system where user can organize vehicle information smoothly. Besides that, it is also to create and generate QR code that contain owner of vehicle details thus, give an alert message to the owner of the vehicle who do not follow the rules. Unfortunately, testing for giving alert message could not be completed. So that, this system, it had fulfilled partially of the objective.

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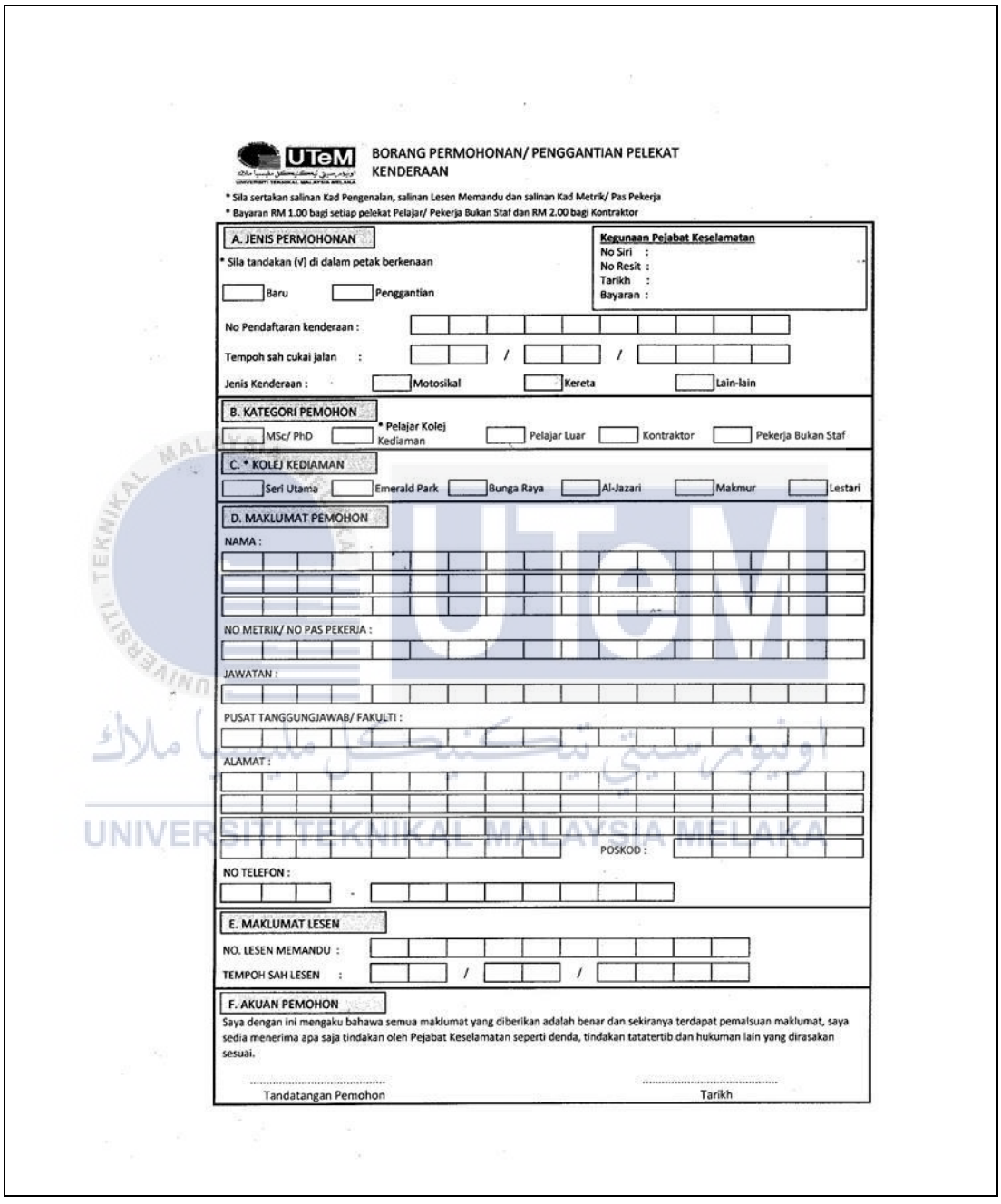
APPENDICES

Current form use in UTeM to register sticker for vehicles



UTeM

BORANG PERMOHONAN/ PENGGANTIAN PELEKAT KENDERAAN

* Sila sertakan salinan Kad Pengenalan, salinan Lesen Memandu dan salinan Kad Metrik/ Pas Pekerja
* Bayaran RM 1.00 bagi setiap pelekat Pelajar/ Pekerja Bukan Staf dan RM 2.00 bagi Kontraktor

A. JENIS PERMOHONAN

* Sila tandakan (√) di dalam petak berkenaan

☐ Baru ☐ Penggantian

Kegunaan Pejabat Keselamatan
No Siri :
No Resit :
Tarikh :
Bayaran :

No Pendaftaran kenderaan :

Tempoh sah cukai jalan : / /

Jenis Kenderaan : ☐ Motosikal ☐ Kereta ☐ Lain-lain

B. KATEGORI PEMOHON

☐ MSc/ PhD ☐ * Pelajar Kolej Kediaman ☐ Pelajar Luar ☐ Kontraktor ☐ Pekerja Bukan Staf

C. * KOLEJ KEDIAMAN

☐ Seri Utama ☐ Emerald Park ☐ Bunga Raya ☐ Al-Jazari ☐ Makmur ☐ Lestari

D. MAKLUMAT PEMOHON

NAMA :

NO METRIK/ NO PAS PEKERJA :

JAWATAN :

PUSAT TANGGUNGJAWAB/ FAKULTI :

ALAMAT :

POSKOD :

NO TELEFON :

E. MAKLUMAT LESEN

NO. LESEN MEMANDU :

TEMPOH SAH LESEN : / /

F. AKUAN PEMOHON

Saya dengan ini mengaku bahawa semua maklumat yang diberikan adalah benar dan sekiranya terdapat pemalsuan maklumat, saya sedia menerima apa saja tindakan oleh Pejabat Keselamatan seperti denda, tindakan tatatertib dan hukuman lain yang dirasakan sesuai.

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Tandatangan Pemohon Tarikh