E-PASS UTeM (NON-STAFF)

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BORANG PENGESAHAN STATUS TESIS

JUDUL: E-PASS UTeM (NON-STAFF)

SESI PENGAJIAN: 2015/16

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E-PASS UTeM (NON-STAFF)

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This report is submitted in partial fulfillment of the requirements for the

Bachelor of Computer Science (Software Development)

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2016

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DECLARATION

I hereby declare that this project report entitled

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

STUDENT : _____ Date: 19/8/2016
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DEDICATION

I would like to dedicate my work to my parents for their endless love, support and encouragement. Next, to my best friend for his non-stop motivation to make me finish this project and not easily give up to make me rise up again. Not forgetting, to my colleagues for willing to sacrifice their time to help me around with develop this project. Lastly, to my aunty that introduce me this course to give me opinion why should I pursue this course according to the new era technologies which is swiftly developed parallel to the current timelines.

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"Question everything"

Dr Michio Kaku

First and foremost, I would like to thank Allah swt in giving me strength and ability to finish this project until the end. Next, I would like to thank to my parents for their love and support throughout my life and always believe in my capabilities. Never in a million times they look down on me and always pray for my successful.

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Finally, I would like to leave the remaining space in memory of my Ummi (1972-2016), a strong independent single mother. I would never forget your endless love, support and encouragement to not let me give up on my study and you are always on my mind.

I would like to finish my acknowledgment with a quote that given by my best friend:

"Enjoy the little things in life."

"Life is too short to not see what is infront of you."

"Those who can do, those who cannot teach."

ABSTRACT

Final Year Project (FYP) is introduced to all 3rd year Bachelor Degree students as a platform to prepare students before undergoing Industrial Training. During FYP students will work in individual and are required to develop a project based on major course. Final Year Project provides an opportunity to students to practice knowledge that learned from previous subjects and gain experience from it. Students are also able to develop their understanding of problem solving techniques to solve a particular problem based on their respective project. E-Pass UTeM (Non-Staff) is a project of a mobile application and web-based system to help user apply the pass application and admin to store the data received in well-organized. The system enables users apply the application pass by using their mobile devices by installing the application at the website by clicking to the given link. e-Pass UTeM (Non-Staff) will ease the user to apply without fill up the form manually that should be taken in the office. The administrator will be able to made payment through web-based service and notify the user through e-mail. e-Pass UTeM (Non-Staff) will be developed using Android Studio, PHP script, Apache server and also MySQL server. The methodologies that have been used are SSADM (Structured System Analysis and Design Method) and OOAD (Object-Oriented Analysis and Design).

ABSTRAK

Projek Sarjana Muda (PSM) diperkenalkan kepada semua pelajar Tahun Tiga Ijazah Sarjana Muda Sains Komputer sebagai satu platform untuk membimbing pelajar sebelum menjalani Latihan Industri. Semasa PSM, pelajar akan bekerja secara individu untuk membangunkan satu sistem berdasarkan kursus yang diambil. Projek Sarjana Muda memberi peluang kepada pelajar untuk mempraktikan diri dengan ilmu pengetahuan yang sudah dipelajari daripada pembelajaran subjek yang diambil pada semester sebelumnya dan menimba pengalaman daripada hasil pembelajaran itu. Pelajar juga dapat memgukuhkan kefahaman mereka terhadap teknik penyelesaian masalah untuk menyelesaikan sesuatu masalah berdasarkan projek yang dibangunkan e-Pass UTeM (Non-Staff) adalah projek antara aplikasi mudah alih dan web sistem untuk membantu pengguna dalam memohon pemohonan pas serta memberi kemudahan kepada admin dalam menyimpan maklumat yang diterima dengan lebih teratur. Sistem ini membolehkan pengguna memohon permohonan pas dengan menggunakan telefon mudah alih untuk muat turun aplikasi di website dan hanya klik ke pautan yang diberi. e-Pass UTeM (Non-Staff) akan memudahkan pengguna tanpa mengisi boring secara manual yang perlu diambil di pejabat. Sistem ini juga membolehlan admin menguruskan bayaran berkenaan pas dan memberi notifikasi kepada pengguna memlaui e-mel. e-Pass UTeM (Non-Staff) akan dibangunkan dengan menggunakan Android Studio, PHP script, Apache server dan juga MySQL server. Metodologi yang digunakan adalah SSADM (Structured System Analysis and Design Method) dan OOAD (Object-Oriented Analysis and Design).

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CHAPTER I

INTRODUCTION

1.1 Introduction

The propose system is e-Pass UTeM(Non-Staff). This system is approach to ease the user to apply non-staff pass to enter the university. Besides, this system is develop in digitalized form by using mobile devices to make the work flow much easier for the staff to handle by referring the information that send by the user through database. The information that will be filled up by the user is categorized into two which are applicant category and applicant information attached with the taken picture. After get the approval, the staff will send the notification to the user to get the non-staff pass at the office. The staff will print out the non-staff pass that stated the user's information which are name, pass no and end date pass attached with the picture on it.

1.2 Problem Statement

a) The current situation which create the difficulty for the applicant to apply the form by hand-writing.

b) The lack of capable of collecting, categorizing and giving the approval form that given by the applicants.

c) The use of paper may eventually fill up the room or office spaces and may cause missing due to stack of papers as the staff received many applicants' form.

1.3 Objectives

a) To create a system to store the pass application.
b) To allow the admin search and update the application status.
c) To notify the applicants about his/her application.
d) To allow application through mobile devices.

1.4 Scope

- The system is for the user to fill up the digitalized form by using mobile devices
- The user needs to install the application to apply the form.
- The e-Pass UTeM(Non-Staff) is a system that will ease the user to apply the non-staff pass without take the form in the office.
- This system is designed as a mobile-based platform and web-based platform so that it will be easy for the user and administrator to access anytime and anywhere.

1.5 Project Significance

This project will ease the user to apply the non-staff pass without taking the form in the office. Besides, it will ease the staff to give an approval by viewing the apply form from the system without searching stack of forms given by the applicants as how the manual way worked.

1.6 Expected Output

The project is expected to give a benefit for both applicants and staffs by outlining how to minimize the duration of time giving an approval to the applicants for the non-staff pass.

1.7 Conclusion

The conclusion is this project can consume time that will ease the user to apply the form for non-staff pass to enter the university. Besides, it can help the staffs in capable of collecting, categorizing and giving the approval form that given by the applicants. To analyse the e-Pass UTeM(Non-Staff), the assessment of three existing systems will be discussed on the next chapter in Chapter 2.

CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLGY

2.1 Introduction

This chapter is a preview about literature and project methodology for the e-Pass UTeM (Non-Staff). This chapter is categorized into several subtopics which are Facts and findings, Project Methodology, Project Requirements, Project Schedule and Milestones and Conclusion.

2.2 Facts and findings

The section are categorized into three subtopics which are Domain, Existing System and Technique.

2.2.1 Domain

This domain outlines a safety guideline in UTeM as approached in *Pejabat Keselamatan UTeM* website as given in the Figure 2.1 below.

Figure 2.1 Portal Keselamatan UTeM main page

There are several main menu displayed at both sidebar left and navigation bar at the top. At navigation bar at the top, there are seven modules displayed which are 'Visi&Misi', 'Objektif', 'Carta Organisasi', 'Direktori', 'Tips Keselamatan', 'Soalan lazim' and 'Hubungi'. As for both sidebar left displayed six modules which are 'Utama', 'Polis Bantuan', 'Sistem', 'Aktiviti', 'Galeri', 'Peraturan Lalulintas UTeM' and 'Muat Turun Borang'.

As shown in the Figure 2.2, Figure 2.3 and Figure 2.4 below, in the system module there are one current system including in-developing systems which are Rakan Keselamatan Universiti, E-Pelekat and E-Saman.

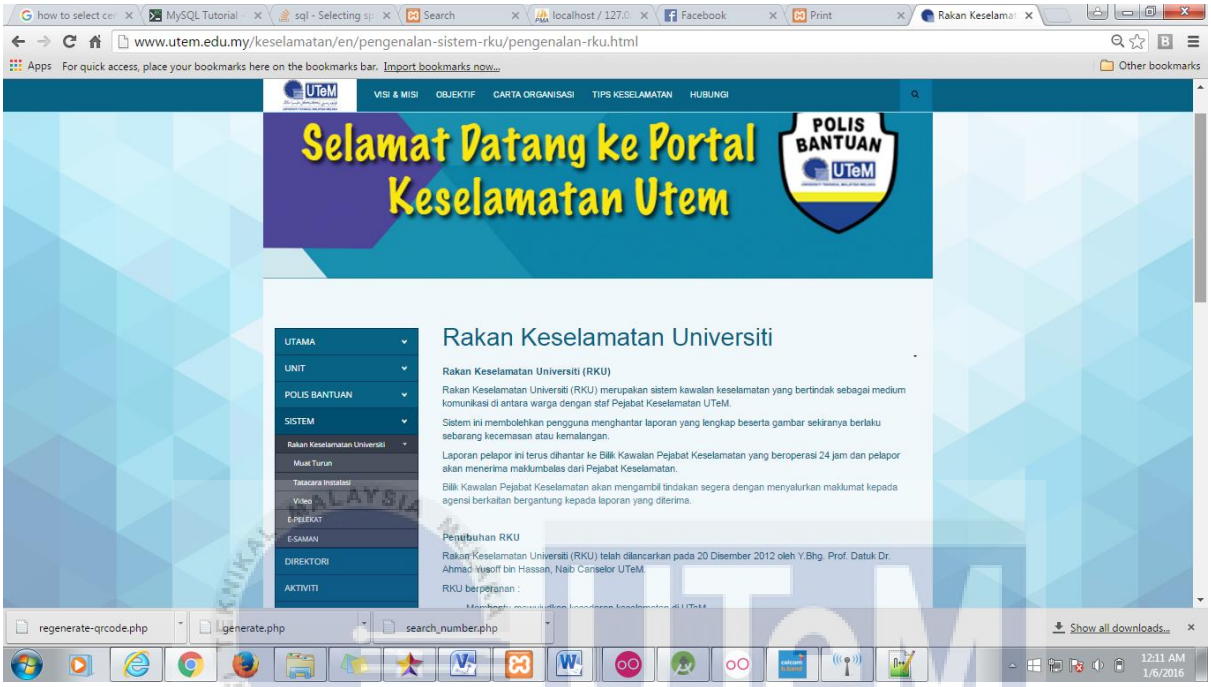

Figure 2.2: Rakan Keselamatan Universiti page

Figure 2.3: E-Pelekat page

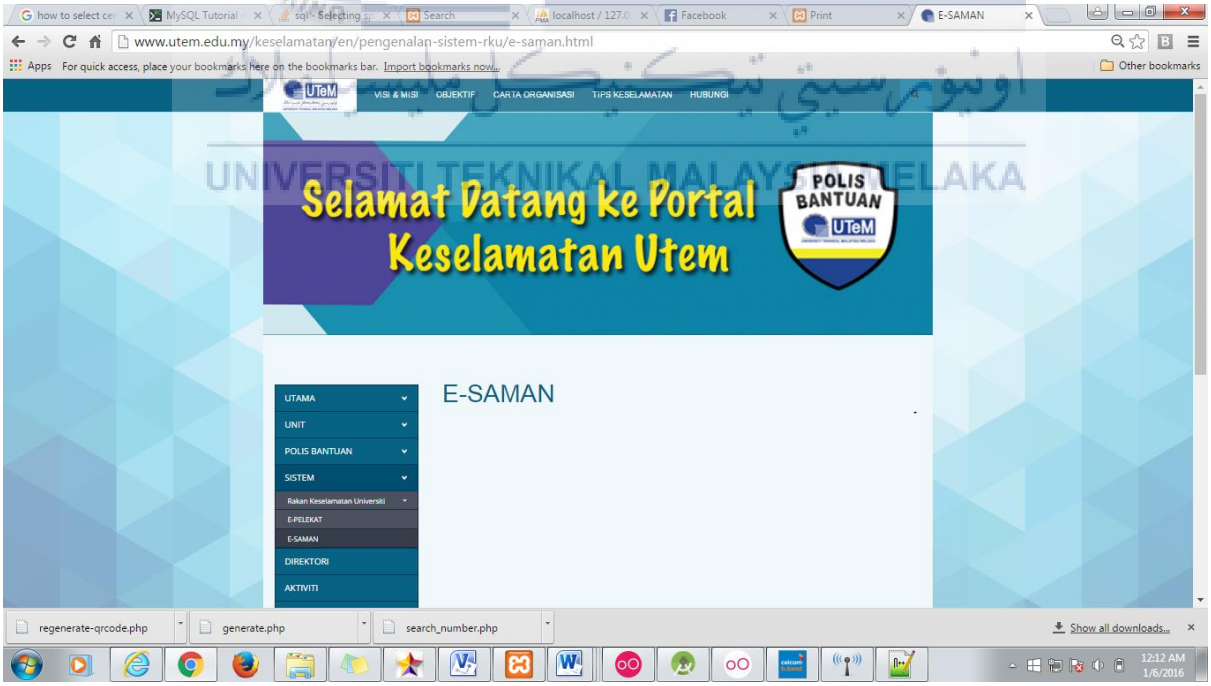

Figure 2.4: E-Saman page

Rakan Keselamatan Universiti (RKU) is a security system which acts as a communication medium between the user and *Pejabat Keselamatan UTeM Staf*. Initially, RKU system only can be contacted through telephone and SMS before the system upgraded for the use of internet application for smartphone user who owns android application. This system allows the user to send a full report attached with picture if there are any emergency or accident. The complainant's report will directly send to *Bilik Kawalan Pejabat Keselamatan* which operates 24 hours and the complainant will received feedback from security office. *Bilik Kawalan Pejabat Keselamatan* will take immediate action to provide information to relevant agencies depending on the reports received. It enables *Polis Bantuan UTeM* identify the "Hotspot" location and there is no charge needed for any complaint. As for E-Pelekat and E-Saman, the systems are still in process in developing. Furthermore, there is one suggestion system from *Pejabat Keselamatan UTeM* which is *Borang Permohonan Pas Pekerja Bukan Staf* as the system lack of organizing in a manual way by using paper to apply the form. The proposed system is intended to fulfil this requirement by using the mobile application and web-based platform (Portal Keselamatan UTeM, 2012).

2.2.2 Existing System

There are two existing systems for apply online application form which are Citizenship and Immigration Canada and e-Visitor Online Application.

2.2.2.1 Citizenship and Immigration Canada

Citizenship and Immigration Canada (CIC) is a web-based system which allows the user to check the status of your application, find a form, find an office, pay your fees, find out if you need a medical exam or police check, or apply online to study, work or visit Canada. There are several online application forms and some of them are 'Visiting, studying and working temporarily', 'Citizenship' and 'Replacing or amending documents verifying status'. At Check Application Status section, some CIC clients may check status of their immigrant or citizenship application online anytime and anywhere, (24 hours a day, 7 days a week). This

tool allows the applicants to securely view the status of their application online. The applicants need to agree the Terms and Conditions before fill up certain information such as Identification Type, Identification Number et cetera. If the applicants cannot use the Check Application Status tool, the applicants can Check Application Processing Times as a guide to determine how long it takes to process the type of their application.

At Check Application Processing Times section there are three required field to fill up before get the processing time. Processing times can vary, depending on how many applications Immigration, Refugees and Citizenship Canada (IRCC) receives. The application may be delayed if it's not complete. As for the 'Visiting, studying, working temporarily' form, the processing time is depends on what the applicants applying for, which temporary residence application and where are the applicants applying from. The processing time for the 'Citizenship' form is depends on what the applicants applying for, which type of citizenship application and if the applicants have already applied, need to fill up when did the applicants applied. While for 'Replacing or amending documents verifying status' form, the processing time depends on what are the applicants applying for and which type of document. MyCIC is used for all online applications and with the account, the user submit application online, pay fees and check application status. The user can either create a MyCIC account using online banking login (**Sign-In Partner**) or a Government of Canada login (**GCKey**). MyCIC uses these logins for security purposes (Citizenship and Immigration Canada, Department of Immigration, Refugees and Citizenship, 1994).

2.2.2.2 eVisitor Online Application Australia

eVisitor Online Application Australia is a web-based system for Australian Government in Department of Immigration and Border Protection. There are several online application forms for applying Visa in Individuals and Travellers section which are 'Visiting Australia', 'Entering or leaving Australia', 'Life in Australia', 'Visa Support', 'Importing or buying from overseas', 'Studying in Australia', 'Working in Australia', 'Bringing your family or partners',

'Refugee and humanitarian' and 'Australian citizenship'. For the Visa Support, it provides Immi Account. It is an online service which will allow the user to lodge a visa or citizenship

application and check the progress of the user's applications. Besides, it provides Electronic Visa Record which contains information on checking the user visa status online and our visa notification process. It also provides the tool for the user to find the cost of the visa. This system provides Visa Finder for the user track what type of Visa to be applied for.

The user needs to fill up the provided field which are 'Applying from', 'Passport', 'Purpose (All, Visit Australia, Study in Australia, Work in Australia and Live in Australia)' , 'Age', 'Temporary/Permanent', 'Length of Stay', 'Allow me to bring and Sponsored/Nominated'.

eVisitor Online Application Australia is an electronically stored authority for travel to Australia. This visa enables the user to visit or for business visitor purposes and this is a free visa. The user might be able to get an eVisitor if the user is outside Australia and/or a passport holder of a certain country. eVisitor can be accessed by airlines, travel agents and Australian border agencies. This system is linked to the passport number that the user use in the application, and the user should use the same passport to travel to Australia. If the user does not receive an email within 12 hours of lodging the application, login to ImmiAccount to check the status of the application. The eVisitor last for up to three months on each visit within 12 months from the date eVisitor is granted (Australian Government, Department of Immigration and Border Protection, 2008).

Analysis for two existing systems:

Table 2.1: Analysis for two existing systems

Existing systems	Citizenship and Immigration Canada	eVisitor Online Application Australia
Authentication	• **Client Application**	This system is linked to the

	Status tool- the user need to gather all the documents user has received regarding user application and has identification number from these documents to log in. • **MyCIC** account using online banking login (**Sign-In Partner**) or a Government of Canada login • (**GCKey**) -the user submit application online, pay fees and check application status	passport number that the user use in the application, and the user should use the same passport to travel to Australia
Notification	Notify the user through MyCIC account- to check the status of the application	Notify the user through ImmiAccount that had been created by the user- to check the status of the application
Timing	The processing time depends on what type of application the applicants apply.	It last for up to three months on each visit within 12 months from the date eVisitor is granted.
Tracking	None	Visa Finder- to allow the user track what type of Visa to be applied which provided the Features and Requirements.

2.2.3 Technique

The selected technique used in this project is hybrid application which is the combination between two platforms which are mobile application and web-based. Hybrid applications are web applications (or web pages) in the native browser, such as UIWebView in iOS and WebView in Android (not Safari or Chrome). Hybrid apps are developed using HTML, CSS and Javascript, and then wrapped in a native application using platforms like Cordova. It allows to use any web-native framework you want, and there are plenty of these (Aldo Ziflaj, 2014).

Hybrid apps are developed using web technologies: HTML5, CSS and JavaScript, then put inside a native container such Adobe PhoneGap. These native containers run the web application code and package it into an app (Comentum, 2016).
In the proposed system, there are two platform involved which are mobile application and web-based platform. In mobile application, there are some pages need to filled up. The user need to select the categories from Kategori Pemohon then fill up the Maklumat Pemohon section before take photo at Passport page. After that, the user need to submit the application. While in web-based, the admin need to login the system before review the application that submitted by the user. Then, the admin need to approve the application thus notify the user to collect the non-staff pass. Lastly, the approved pass will be printed out for the user.

There are two main competitors in this field. One is Cordova (and Cordova-based tools like PhoneGap) and the other is Appcelerator Titanium. Both target mobile platforms but work in very different ways. Developing with Cordova is just like developing a webpage. First, need to create HTML,CSS and Javascript local files, test them in the browser and then wrap them in a native web view with Cordova (still need native SDKs and development tools for this step). But, using Titanium is a bit different, there is no need any HTML, CSS files, unless to create an application that uses both native HTML-based user interfaces. Titanium provides a very useful mobile tool set that helps to emulate (or simulate) the application on the real platform, not in the browser. When app is run on the device, it does not get wrapped into a web view, but gets interpreted by a Javascript engine (JavaScriptCore in iOS or Rhino in

Android). Appcelerator provides a good tutorial (surprisingly not a ToDo application). There are also several other less known hybrid development options such as Xamarin, Rho, Corona and MoSync. In fact, there are two ways to implement a hybrid app.

- **Local** – You can package HTML and JavaScript code inside the mobile application binary, in a manner similar to the structure of a native application. In this scenario you use REST APIs to move data back and forth between the device and the cloud.
- **Server** – Alternatively you can implement the full web application from the server (with optional caching for better performance), simply using the container as a thin shell over the UIWebView

The application development is faster, simpler, more rapid and the application is easier to maintain. Besides, it can change platforms anytime needed as Cordova let it build the application for more than one platform just by one adding line of code. As for the phone hardware such as the camera or Bluetooth, Cordova has a large repository of plugins it may use. The main problem with hybrid apps is that they still depends on the native browser, which means they are not as fast as native apps.

2.3 Project Methodology

There are two selected methodologies used in this project which are SSADM and OOAD. SSADM (Structured Systems Analysis & Design Method) is a widely-used computer application development method in the UK by CCT (Central Computer and Telecommunication Agency) in the early 1980s, where its use often specified as a requirement for government computing projects. It is the UK government's standard method for carrying out the system analysis and design stages of an information technology project. Besides, it is another method dealing with information systems design. SSADM has been traditionally used for the development of medium or large systems. SSADM starts from defining the information system strategy and then develops a feasibility study module. These

are followed by requirements analysis, requirements specification, logical system specification and a final physical system design.

SSADM sets out a cascade or waterfall view of systems development, in which there are a series of steps, each of which leads to the next step. (This might be contrasted with the rapid application development - RAD - method, which pre-supposes a need to conduct steps in parallel).

SSADM consists of 5 main stages (which are broken-down in several sub-stages). The 5 main stages are:

- **Feasibility Study**: The Feasibility Study involves a high level analysis of a business area to determine whether it's feasible development for a particular system. Data Flow Modelling and (high-level) Logical Data Modelling can be used as technique during this stage.

- **Requirements Analysis**: In the Requirements Analysis stage, requirements are identified and the current business environment is modelled, business system options are produced and presented. One of these options will be chosen then refined. Data Flow Modelling and Logical Data Modelling can be used as technique during this stage.

- **Requirements Specification**: In the Requirements Specification, the functional and non-functional requirements are specified as a result of the previous stage. Data Flow Modelling, Logical Data Modelling and Entity Event Modelling can be used as technique during this stage.

- **Logical System Specification**: In the Logical System Specification, the development and implementation environment are specified, and the logical design of update and enquiry processing and system dialogues are carried out.

- **Physical Design**: During the Physical Design stage, the logical system specification and technical specification are used to create a physical design and a set of program specifications.

For each stage, SSADM sets out a series of techniques and procedures, conventions for recording and communicating information pertaining to these - both in textual and diagrammatic form as well. Besides, SSADM is a very comprehensive model. However, a characteristic of the method is that projects may use only those elements of SSADM appropriate to the project. Moreover, SSADM is supported by a number of CASE tool providers.

The advantages of SSADM are precise definition and support of so-called "non-functional requirements". Such requirements define the level of the quality with which the system must execute its functions. For example, access limitations, the mean time of life length to denial, time of the response, safety requirements, etc.

OOAD (Object-Oriented Analysis and Design) is a popular technical approach for analysing, designing an application, system, or business by the applying object-oriented paradigm and visual modelling throughout the development life cycles to foster better stakeholder communication and product quality (Wikipedia, 2016). OOAD is a technological approach to analyse, design a software system or business by using Object Oriented (OO) concept. Object Oriented Analysis (OOA) is the investigation of objects. Object Oriented Design (OOD) is the relationships of identified objects (Rashed, 2015). Object-Oriented Analysis (OOA) is the procedure of identifying software engineering requirements and developing software specifications in terms of a software system's object model, which comprises of interacting objects (Tutorialspoint, 2016).

The most important purpose of OO analysis is to identify the objects of a system that have to be implemented. The summary of the purpose of OO analysis and design in this following way:

- **Identifying the objects of a system**

  The object of the proposed system is the applicant and admin.

- **Identify their relationships**

  The relationship between the applicant and admin the applicant submit the application form through mobile devices and the admin will be received data. After the admin review, the user will be notified after the application has been approved .The printed pass will be given to the applicant at the office.

- **Generate a design which can be converted into applications using OO languages**

The Figure **2.5** below shows the proposed system.

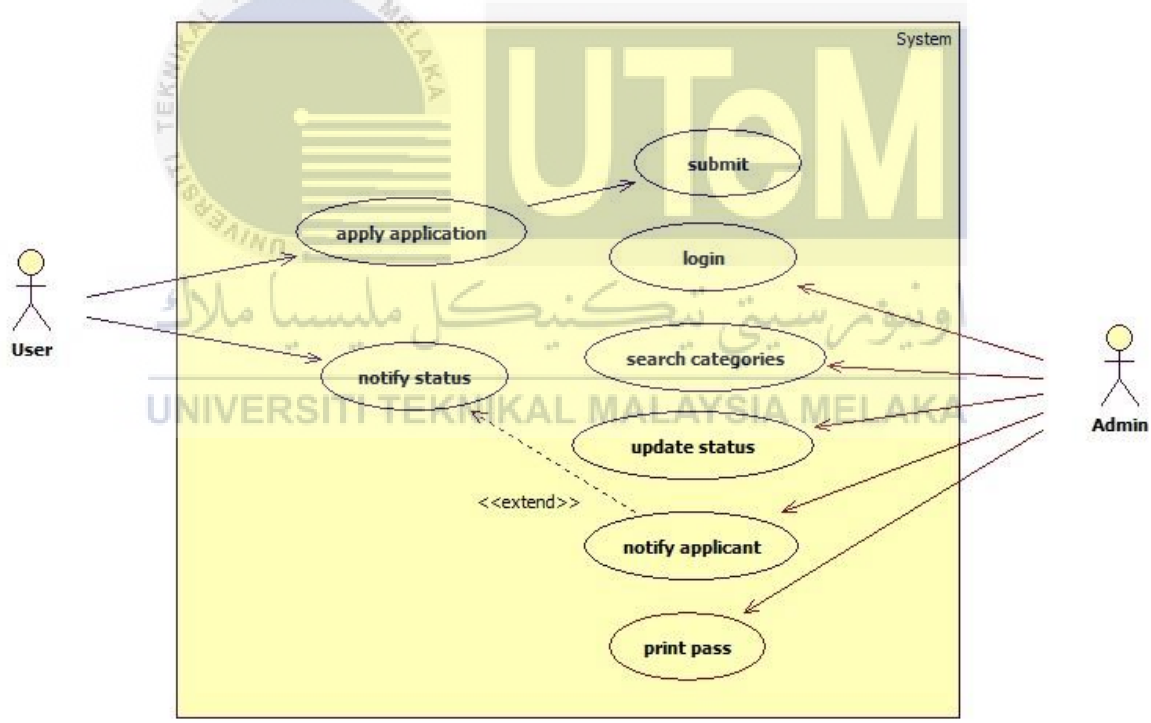

Figure 2.5: Use case for propose system

2.4 Project Requirements

2.4.1 Software Requirement

This is the collection of software that is being used during the development stages as follow:

- Android Studio (Version 1.4) – Android Studio is the official IDEA of Android application development
- XAMPP – Local server during the development
- Genymotion – Android Emulator for app testing and presentation
- Microsoft Office 2010 – To produce documentation during the development
- StarUML (Version 5.02.1570) – StarUML is an open source software modelling and that supports unified modelling language (UML)

2.4.2 Hardware Requirement

Collection of hardware that is being used during the development stages as follows:

- PCs -Windows 7
- Server - Apache Web server
- Data storage -4 GB
- Laptop - The main unit during the development stages
- Printer – To print the documentation
- Smartphones - To test the mobile application (apps)

2.5 Project Schedule and Milestones

2.5.1 Table of Project Activities

This is the table of project activities:

Table 2.2: Project Activities

Week	Session	Contents	Delivery Methods
1	Meeting 1	Assessment – PSM Committee Level: a. Project Title approval b. Supervisor and Examiner Assignment Action - Student Action – PSM Committee, Supervisor	PSM Binding Supervisory Meeting Deliverable: **Proposal** **List Of Supervisor/Project Title**
2		Assessment – Supervisor and examiner together with student c. Project Title approval d. Scope and module that appropriate with the level of PSM Action – PSM Committee, Supervisor, Examiner	Supervisory Meeting Deliverable: **List Of Supervisor/Project Title**
3	Meeting 2	Proposal Presentation Chapter 1	Deliverable: **Proposal**

		Action – PSM Committee, Supervisor, Examiner Supervisory Meeting	**Presentation (P)**
4		Chapter 1 Chapter 2 Action –Student	Independent Learning Deliverable: **Chapter 1**
5		Chapter 2 Action-Student	Independent Learning
6	Meeting 3	Chapter 2 Chapter 3 Action – PSM Committee, Supervisor, Student	Supervisory Meeting Deliverable: **Chapter 2** **Progress Presentation (PR) 1**
7		Chapter 3 Action-Student	Independent Learning
8		**MID SEMESTER BREAK**	

9		Chapter 3 Chapter 4 Action – Student	Independent Learning Deliverable: **Chapter 3**
10	Meeting 4	Chapter 4 Action – PSM Committee, Supervisor, Student	Supervisory Meeting Deliverable: **Progress Presentation (PR) 2**
11	Demonstration	Demo Determination the status of students Action – PSM Committee, Supervisor, Examiner	Presentation & Demo Deliverable: **Status Remain/Drop**
12		Final Year Report Presentation schedule Action – PSM Committee, Supervisor, Student	Independent Learning Deliverable: **Presentation schedule**
13	Meeting 5	Demo Final Year Project Report	Supervisory Meeting

		Action – PSM Committee, Supervisor, Examiner, Student	
14		Final Year Project Report Action – PSM Committee, Supervisor, Student	Independent Learning Deliverable: Complete Final Year Project
15	Final Presentation & Demonstration	**FINAL PRESENTATION** Action – PSM Committee, Supervisor, Examiner, Student	Presentation & Demo
16		Correction based on the draft report by the supervisor and accessor reprimand during the final presentation session. Action – PSM	Deliverables: **Overall score** **Submission to PSM Committee**

		Committee, Supervisor, Examiner, Student	
		FINAL EXAMINATION	

2.5.2 Gantt chart

The figure below shows the Gantt chart for the project timeline in PSM I.

Figure 2.6: Gantt chart for PSM I

No	Task	Week														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1.	Find a supervisor															
2.	Prepare a pre-proposal with title and submit to supervisor															
3.	Discuss with the supervisor and examiner to get approval for the Project Title that appropriate with the level of PSM															
4.	Prepare the Proposal Presentation Chapter 1															
5.	Prepare Chapter 2 and submit Chapter 1															
6.	Construct the report by finishing up Chapter 2															
7.	Prepare Chapter 3 and submit Chapter 2 for the progress presentation															
8.	Construct Chapter 3															
9.	Prepare Chapter 4 and submit Chapter 3															
10.	Construct Chapter 4for progress presentation															
11.	Demonstration															
12.	Prepare for Final Year Project Report presentation															
13.	Demo for Final Year Project Report															
14.	Submit complete report Final Year Project Report															
15.	Final presentation and demonstration															

The figure below shows the Gantt chart for the project timeline in PSM II.

Figure 2.7: Gantt chart for PSM II

No	Task	Week								
		1	2	3	4	5	6	7	8	9
1.	Submit Chapter 4 and prepare Chapter 5									
2.	Submit Chapter 5 and present the progress in front of the supervisor									
3.	Modify Chapter 5 that have been checked and prepare Chapter 6									
4.	Submit Chapter 6 and present the test case of the system in front of supervisor									
5.	Modify Chapter 6 that have been checked and prepare Chapter 7									
6.	The presentation date will been announced									
7.	Submit Chapter 7 and draft of full report PSMII									
8.	The status of student will be declared									
9.	Final presentation									
10.	The correction of full report PSMII and submit marks.									
11.	Uploading full report, logbook that have been signature, source codes and turnitin.									

2.6 Conclusion

As for the conclusion, this whole chapter explains on two existing system from different research that using online application form in the system to complete the project. To analyse the phase of e-Pass UTeM (Non-Staff), it will be discussed on the next chapter in Chapter 3.

CHAPTER III

ANALYSIS

3.1 Introduction

This chapter is preview about analysis for the e-Pass UTeM (Non-Staff). System analysis is an important phase to determine whether the requirements shall be implemented or not. It will be analysed how to relate that requirements from other information such as system design, implementation and user documentation. It is known to be the process of studying a procedure or business in order to identify the goals and purposes and creating the systems and procedures that will achieve them in an efficient way. There are two different methods used in system analysis known as Structured Systems Analysis and Design Method (SSADM) and Object-Oriented Analysis and Design which commonly known as OOAD that will be used to prepare the system model for a project. SSADM is a system approach to the analysis and design of information system. It is one of the numbers of such methodologies that arose as a response to the large number of information system projects that either will be failed completely or did not adequately fulfil the customer expectations. In the other hand, OOAD is a technique that manages the complexity inherent in analysis, design, and implementation part. This technique is focus on analysis and design of the system. Thus, OOAD is selected for this PSM project. At last but not least, this chapter explains documentation on the analysis of the current system and the problem that arise from the current system. On top of that, this chapter would cover the detailed explanation and the analysis of the system which will cover about the system model of the system that will build.

3.2 Problem Analysis

According to the current situation, there is a difficulty for the applicant to apply the pass's form for non-staff which submitted by hand-written. Besides, there is a lack of capable of collecting, categorizing and giving the approval form that given by the applicants. A part of that, the use of paper may eventually fill up the room or office spaces and may cause missing due to stack of papers as the staff received many applicants' form.

In order to overcome all the problems faced by the applicants and staffs, e-Pass UTeM (Non-Staff) will be developed according to the user's needs. This is important to develop a digitalized form to allow the applications through mobile devices for the applicants to apply. Thus, there will be a notification to notify the applicants about his/her application. It also enable to store the pass application in well-organized. Lastly, it allows the admin to search and update the application status.

3.3 Requirement Analysis

The requirement analysis describe data requirement, functional requirement, non-functional requirement and others requirement.

3.3.1 Data Requirement

This section explains illustrated Data Dictionary of e-Pass UTeM(Non-Staff)

3.3.1.1 Data Dictionary

Data Dictionary described six tables which are *admin, kontraktor, latihan industri, pembantu penyelidik pensyarah sambilan/alumni, pas pekerja* and *temporary*.

3.3.2.1 Admin Table

Table 3.1: Admin Table

ENTITY	ATTRIBUTE	TYPE	KEY
admin_reference	Username	varchar(20)	
user_register	Password	varchar(20)	

3.3.2.2 Kontraktor Table

Table 3.2: Kontraktor Table

ENTITY	ATTRIBUTE	TYPE	KEY
admin_reference	user_id	int(11)	Primary
user_register	Nama	varchar(20)	
user_register	No_Kad Pengenalan	varchar(20)	
user_register	Jawatan	varchar(20)	
user_register	Bahagian_Unit	varchar(20)	
user_register	No_Tel	varchar(20)	
user_register	Alamat	varchar(200)	
user_register	Nama_Syarikat	varchar(20)	
user_register	Alamat_Syarikat	varchar(200)	
user_register	Gambar	Blob	

3.3.2.3 Latihan Industri Table

Table 3.3: Latihan Industri Table

ENTITY	ATTRIBUTE	TYPE	KEY
admin_reference	user_id	int(11)	Primary
user_register	Nama	varchar(20)	
user_register	No_Kad Pengenalan	varchar(20)	
user_register	Jawatan	varchar(20)	
user_register	Bahagian_Unit	varchar(20)	
user_register	No_Tel	varchar(20)	
user_register	Alamat	varchar(200)	
user_register	Nama_Syarikat	varchar(20)	
user_register	Alamat_Syarikat	varchar(200)	
user_register	Gambar	Blob	

3.3.2.4 Pembantu Penyelidik Table

Table 3.4: Pembantu Penyelidik Table

ENTITY	ATTRIBUTE	TYPE	KEY
admin_reference	user_id	int(11)	Primary
user_register	Nama	varchar(20)	
user_register	No_Kad Pengenalan	varchar(20)	
user_register	Jawatan	varchar(20)	
user_register	Bahagian_Unit	varchar(20)	
user_register	No_Tel	varchar(20)	
user_register	Alamat	varchar(200)	
user_register	Nama_Syarikat	varchar(20)	
user_register	Alamat_Syarikat	varchar(200)	
user_register	Gambar	Blob	

3.3.2.5 Pensyarah Sambilan / Alumni Table

Table 3.5: Pensyarah Sambilan/ Alumni Table

ENTITY	ATTRIBUTE	TYPE	KEY
admin_reference	user_id	int(11)	Primary
user_register	Nama	varchar(20)	
user_register	No_Kad Pengenalan	varchar(20)	
user_register	Jawatan	varchar(20)	
user_register	Bahagian_Unit	varchar(20)	
user_register	No_Tel	varchar(20)	
user_register	Alamat	varchar(200)	
user_register	Nama_Syarikat	varchar(20)	
user_register	Alamat_Syarikat	varchar(200)	
user_register	Gambar	Blob	

3.3.2.6 Pas Pekerja Table

Table 3.6: Pas Pekerja Table

ENTITY	ATTRIBUTE	TYPE	KEY
admin_reference	Pass_No	varchar(20)	Primary
admin_reference	No_Kad_Pengenalan	varchar(20)	
admin_update	End_Date	Date	
admin_update	Status	varchar(20)	

3.3.2.7 Temporary Table

Table 3.7: Temporary Table

ENTITY	ATTRIBUTE	TYPE	KEY
admin_reference	IdK	int(11)	
admin_reference	IdLI	int(11)	
admin_reference	IdPP	int(11)	
admin_reference	IdPA	int(11)	

3.3.2 Functional Requirement

a) Digitalized form

- To allow applications through mobile devices.

b) Notification

- To notify the applicants about his/her application.

c) Search categories

-To allow the admin search and update the application status

d) Print

- To store the pass application and print out the pass that provide the information such as picture, name, pass no and end date pass.

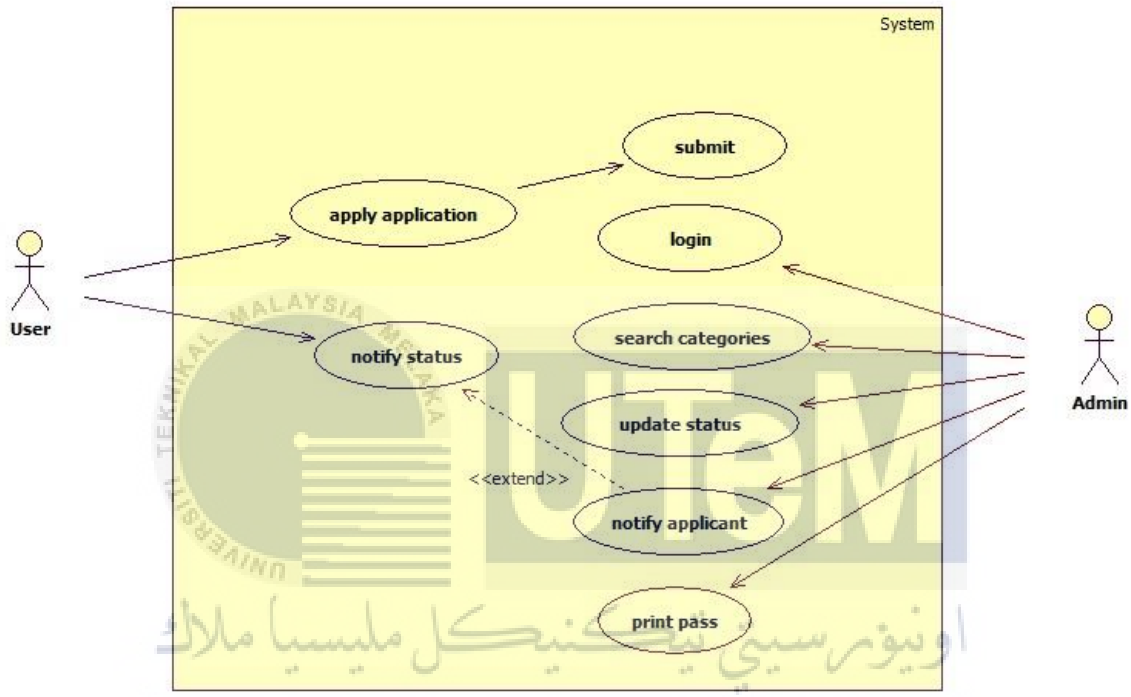

Figure 3.1 Use case diagram for propose system

The figure above shows the business process covers both part of user and admin. Users are the applicants who apply the pass form to submit to the admin through mobile devices. Admin are the people who can search, update status and notify the user about the user application.

This system will store the pass application that submitted by the applicants. Users do not need to login the system. The user needs to download the mobile application at the play store (Android). The user can apply the application and submit. The user can get the status notification about his/her application.

For the admin, he/she need to login the system by entering the username and password. Since, it is a default user so there is no required to sign up or register to access the system. The administrator can search and update the application status. Thus, it can notify the applicants about his/her application. This is important to notify the applicant to collect his/her printed pass from the office.

3.3.3 Non-functional Requirement

a) Intuitiveness – The familiar and natural way of applying the application form of using the system through mobile devices

b) Recoverability – The elegance way which the system can be recovered from a failure.

c) Response Time – The waiting time when a system receives a process request. This system is depends on the internet connection between mobile devices and laptop as the data send by the user will be linked to the database through XAMPP.

d) Throughput – The success rate of message delivery over a communication channel. Data send from the mobile devices to laptop.

e) Adaptability – The ability of a system to adapt itself efficiently and responsiveness to changes circumstances.

3.3.4 Others Requirement (hardware and software)

a) **PHP** – PHP is a server scripting language, and a powerful tool for making dynamic and interactive Web pages.

b) **Android Studio (Version 1.4)** – Android Studio is the official IDEA of Android application development

c) **XAMPP** – Local server during the development

d) **Genymotion** – Android Emulator for app testing and presentation

e) **Microsoft Office 2010** – To produce documentation during the development

f) StarUML (Version 5.02.1570) – StarUML is an open soure software modelling tool that supports unified modelling language (UML)

g) **PCs** -Windows 7

h) **Serve**r - Apache Web server

i) **Laptop** – The main unit during the development stages

j) **Printer** – To print the documentation

k) **Smartphones** – To test the mobile application (apps)

3.4 Conclusion

The conclusion is the e-Pass UTeM (Non-Staff) will be developed to overcome the difficulty that user face in current situation. It make easier for the user to apply the application without submit it by hand-written to the office. Thus, the processing time to get the approval from application that made will be shortened. Besides, the staff can manage the application form from the applicants in well-organized.

CHAPTER IV

DESIGN

4.1 Introduction

This chapter esplains about the system design for the e-Pass UTeM online application form. The design of the system is important to help the software developer get the overview of the system flow. This will be use as one of the baseline requirement for developing this new system. The system design is the process defining the architecture, components, modules, interfaces, and data for a system to satisfy specified requirements. System design could be seen as the application of the system theory to product development. There is some overlap with the disciplines of system analysis, system architectures and system engineering.

This project use Entity Relationship Diagram (ERD) for representing the database design and the screen design for representing the module design. The Entity Relationship Diagram (ERD) can be used to validate business rules while the screen design is designed for two platforms which are Mobile Application Platform and Web-based Platform. This document is one of the crucial documents because it will give a snap-short overview of the system implementation and its contents.

4.2 High-Level Design

4.2.1 System Architecture

The software architecture of a program or computing system is the structures of the system. It will describe the architecture on integration between web based and mobile application.

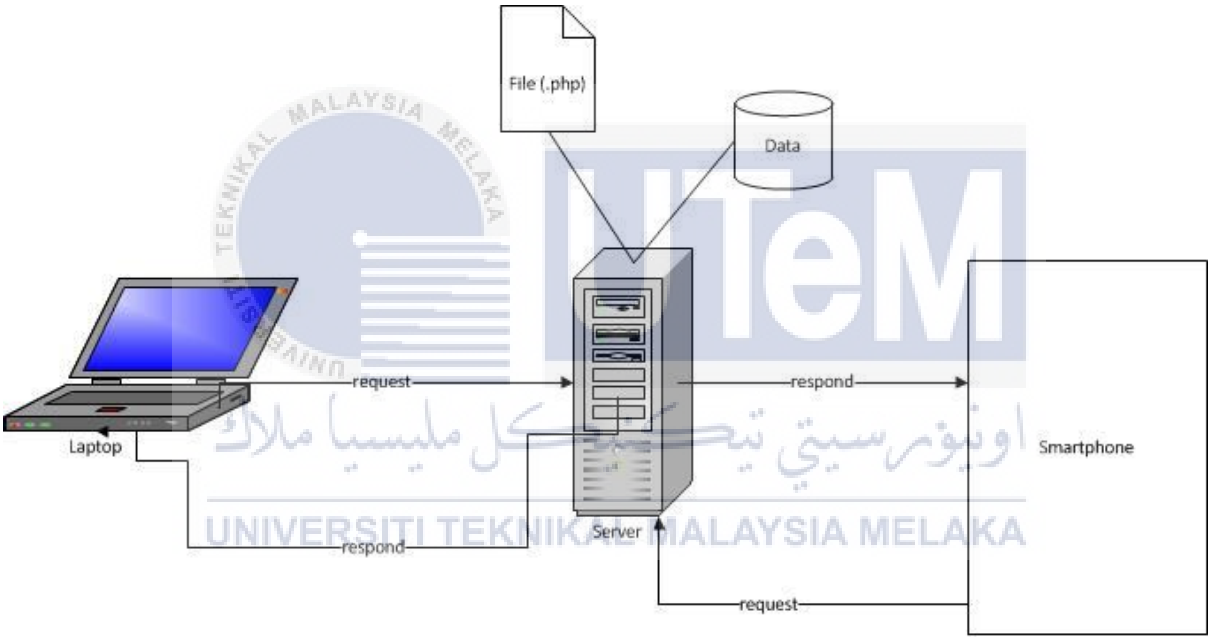

Figure 4.1: System Architecture of e-Pass UTeM (Non-Staff)

The Figure 4.1 shows the system architecture of this system. There are two environment involved which are mobile application and web-based. All the file and database storage are stored on the database. This system is a distribution application development which is hybrid application, therefore to make sure the data can be transfer faster between laptop and mobile devices. The JSON has been chosen. JSON means JavaScript Object Notation; is a lightweight data-interchange format. The benefit is easy for machines to parse and generate.

4.2.2 User Interface Design

i. Navigation Design

Mobile Application

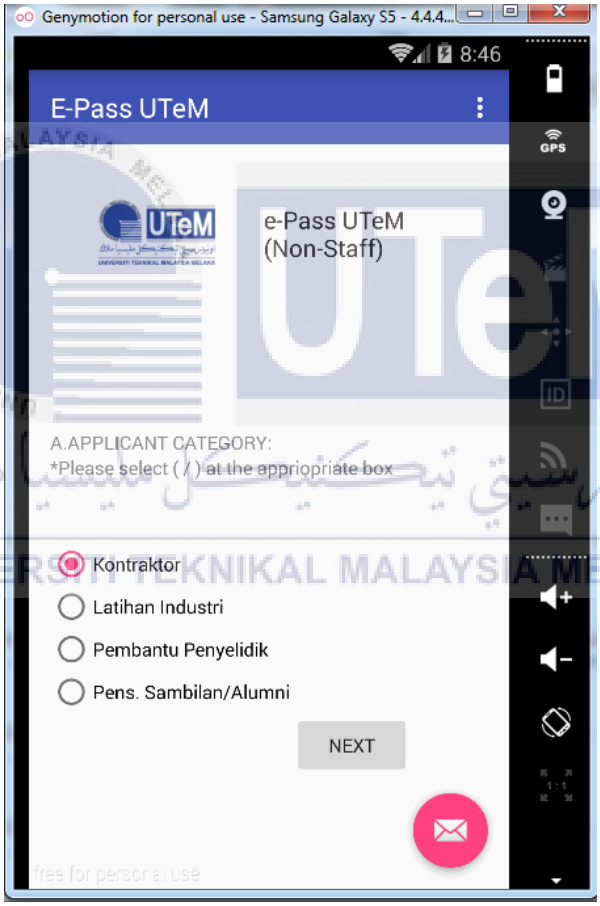

Figure 4.2: Main page of e-Pass UTeM (Non-Staff)

In Figure 4.2, it shows the main page of e-Pass UTeM (Non-Staff) application in mobile application. The user needs to select which category the user belong to before press the *Next* button.

Web-based

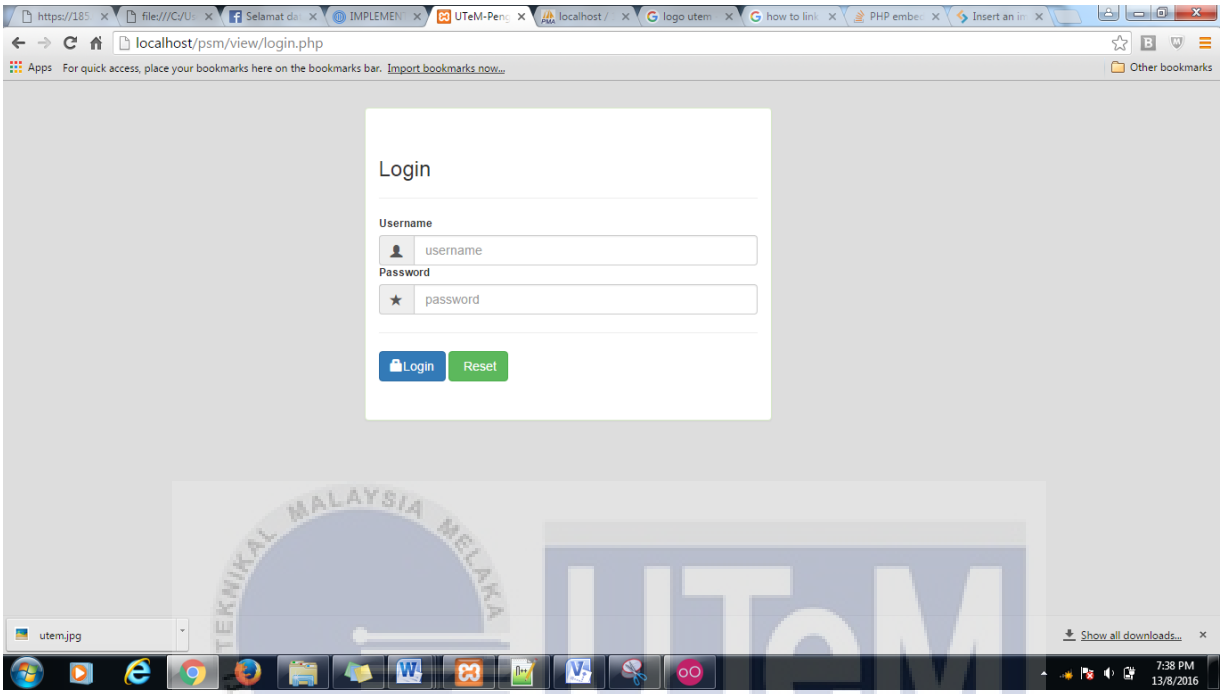

Figure 4.3: Admin login page of e-Pass UTeM (Non-Staff)

In Figure 4.3, it shows admin login page in web-based. The admin need to enter the default username and password then click the *Login* button before access the system. If the admin enter in the incorrect username and/or password, the admin can click the *Reset* button and enter the correct one.

i. Input Design

Mobile Application

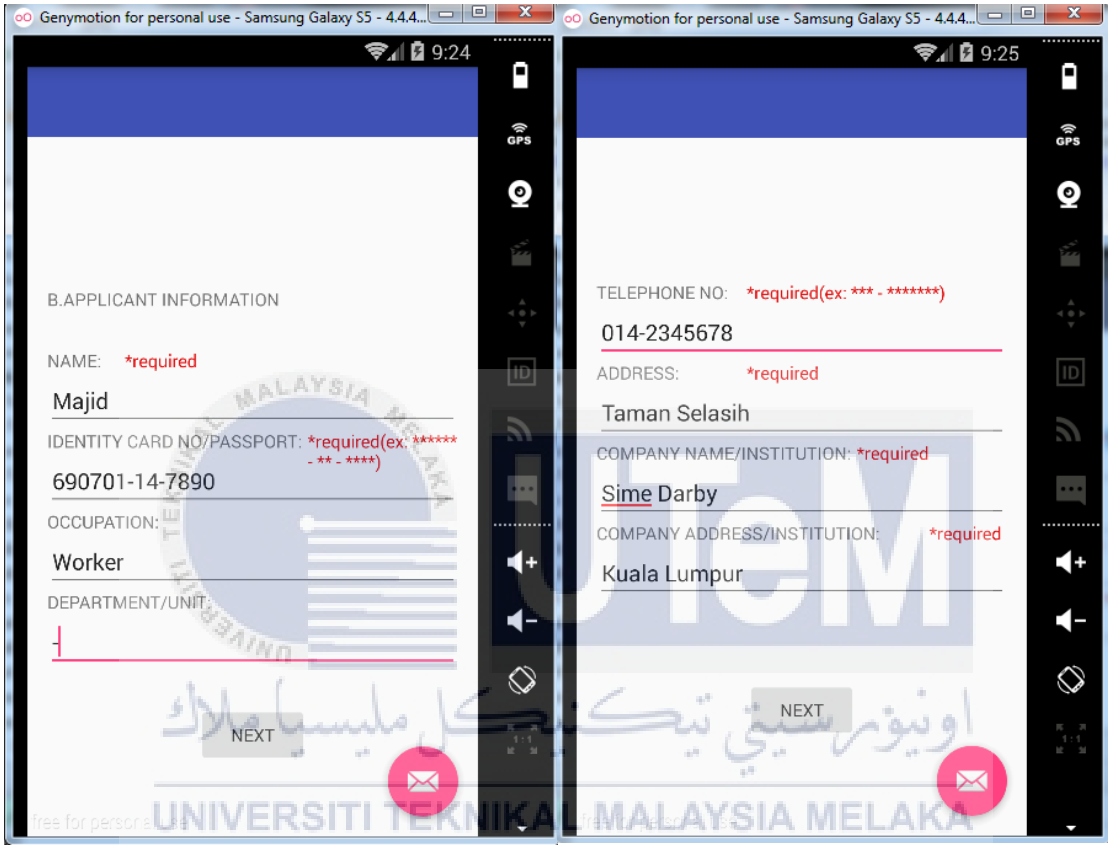

Figure 4.4: User information page of e-Pass UTeM (Non-Staff)

In Figure 4.4, it shows the user information page. The user required to enter all the information in the field given before click the *Next* button.

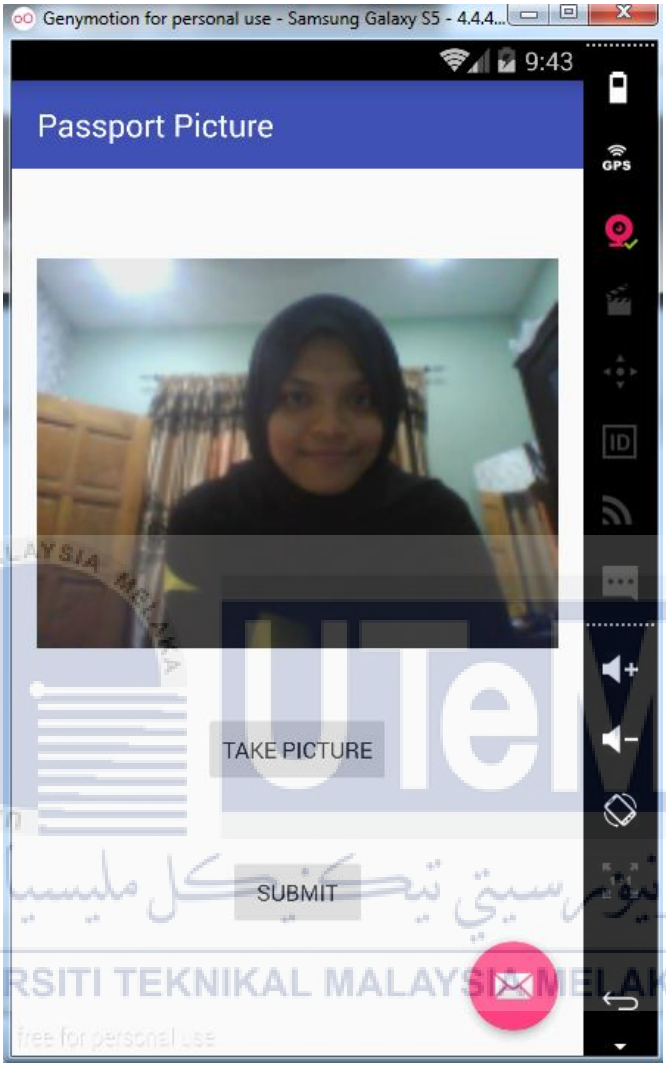

Figure 4.5: Passport picture page of e-Pass UTeM (Non-Staff)

In Figure 4.5, it shows passport picture page. The user needs to take photo before click the *Submit* button to send the application to the system.

ii. Output Design

Web-based

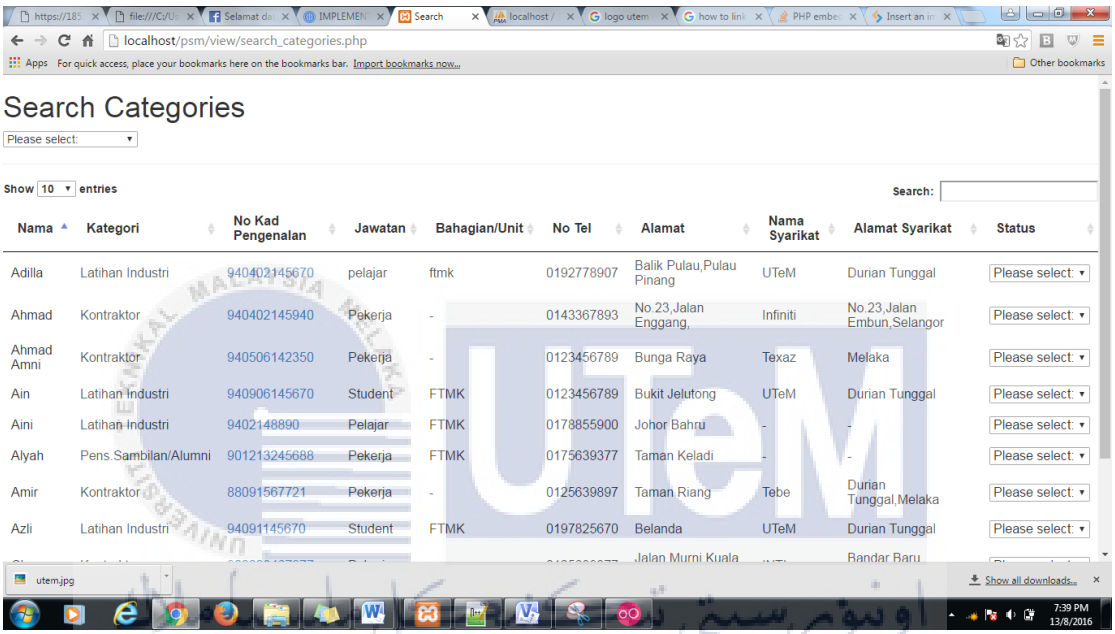

Figure 4.6: Search Categories main page of e-Pass UTeM (Non-Staff)

In Figure 4.6, it is shows the search categories. The admin will check the list of the users' application by *Search categories* and the list will be viewed.

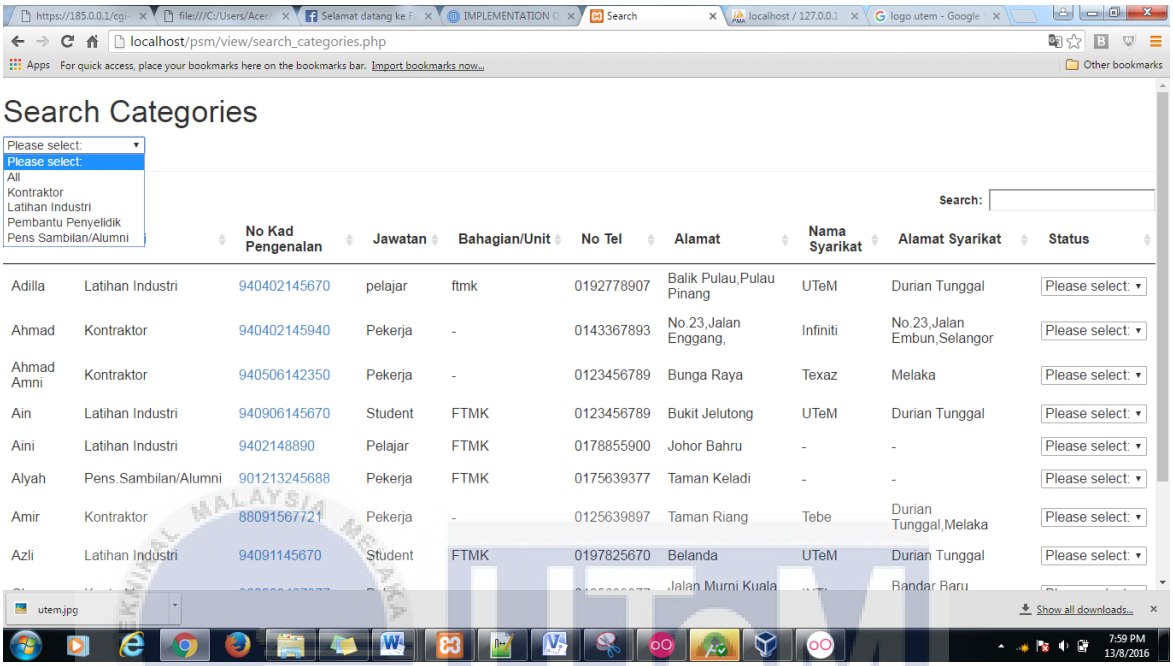

Figure 4.7: Search Categories main page of e-Pass UTeM (Non-Staff) –*Please Select:* combo-box

In Figure 4.7, it shows at *Please select:* combo-box, the admin can select either *All* or categories which are *Kontraktor, Latihan Industri, Pembantu Penyelidik* and *Pens. Sambilan/ Alumni.*

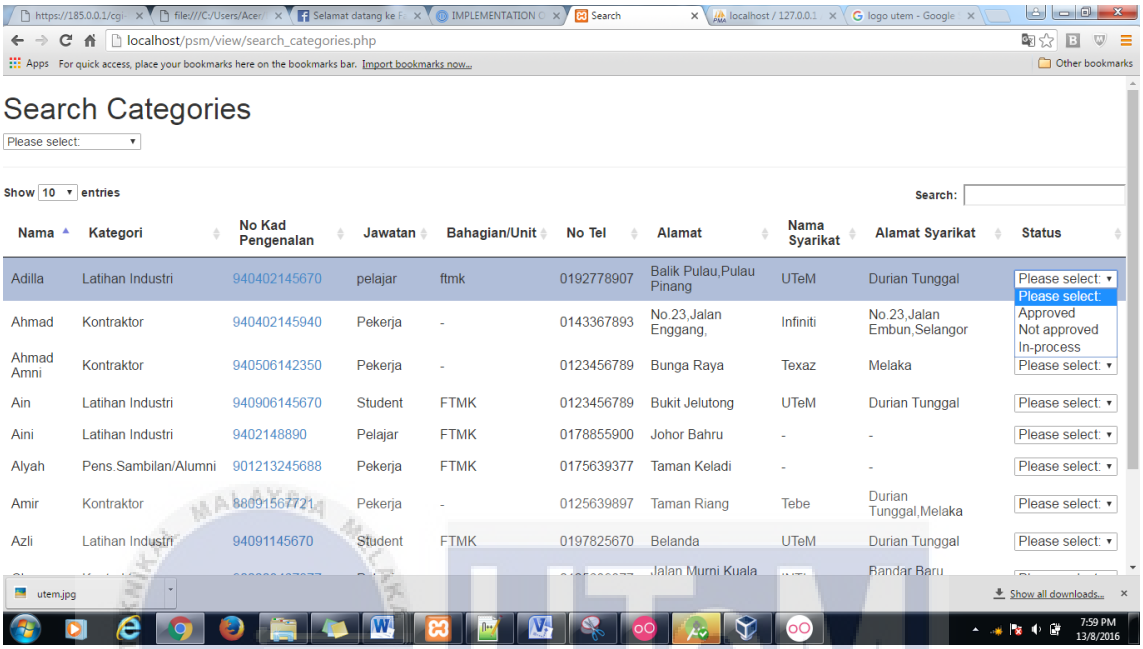

Figure 4.8: Search Categories main page of e-Pass UTeM (Non-Staff) –*Status* of application

In Figure 4.8, it is shows the admin will review the application and select the *Status* of application either *Approved* or *Not approved* or *In-process.*

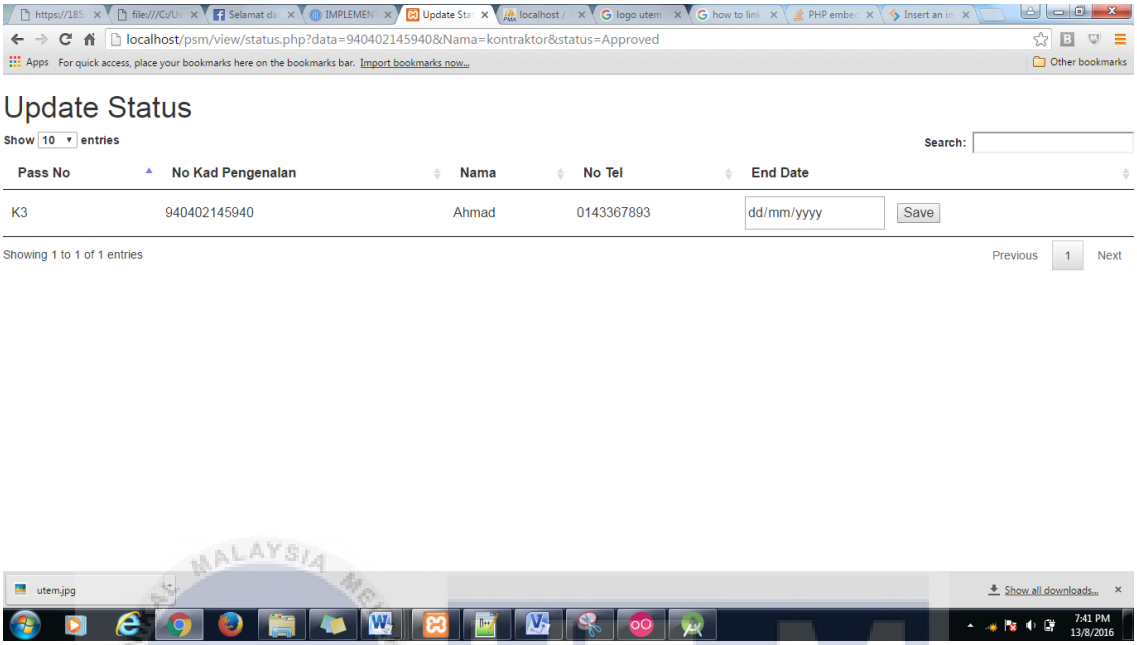

Figure 4.9: Update Status main page of e-Pass UTeM (Non-Staff)

In Figure 4.9, it is shows the page status page. The Pass No is auto-generated. This page is used for the admin need to enter the End Date for the user.

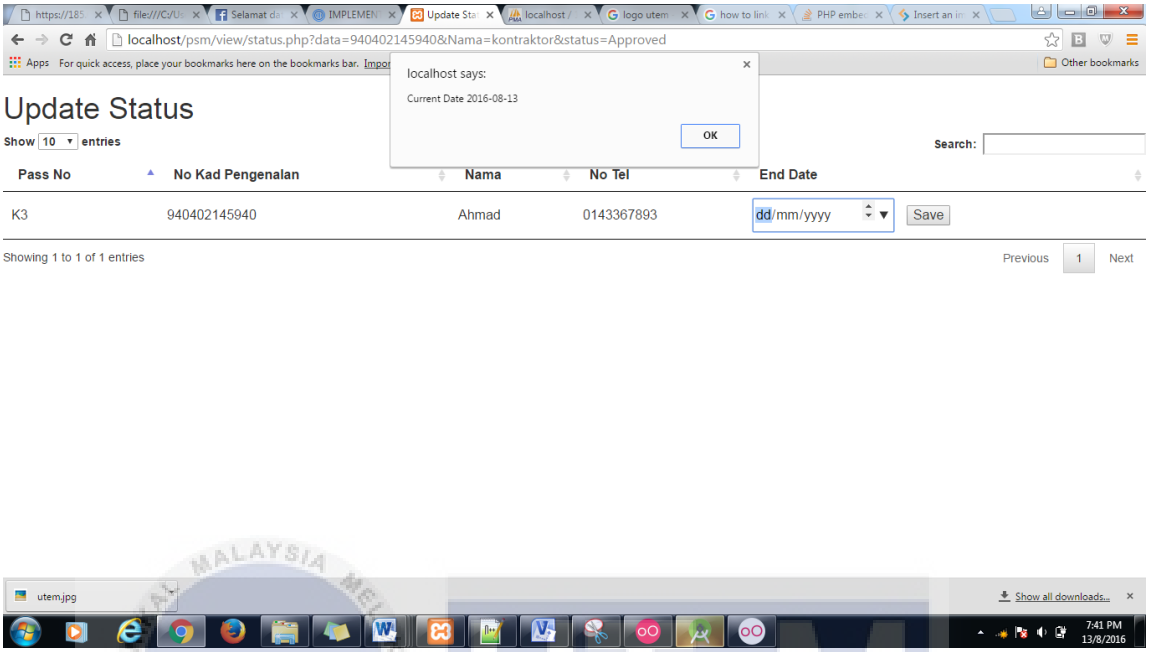

Figure 4.10: Update Status main page of e-Pass UTeM (Non-Staff) –current date

In Figure 4.10, it is shows the page status page. When the admin select the end date, there is a window alert that state *Current Date: yyyy-mm-dd.*

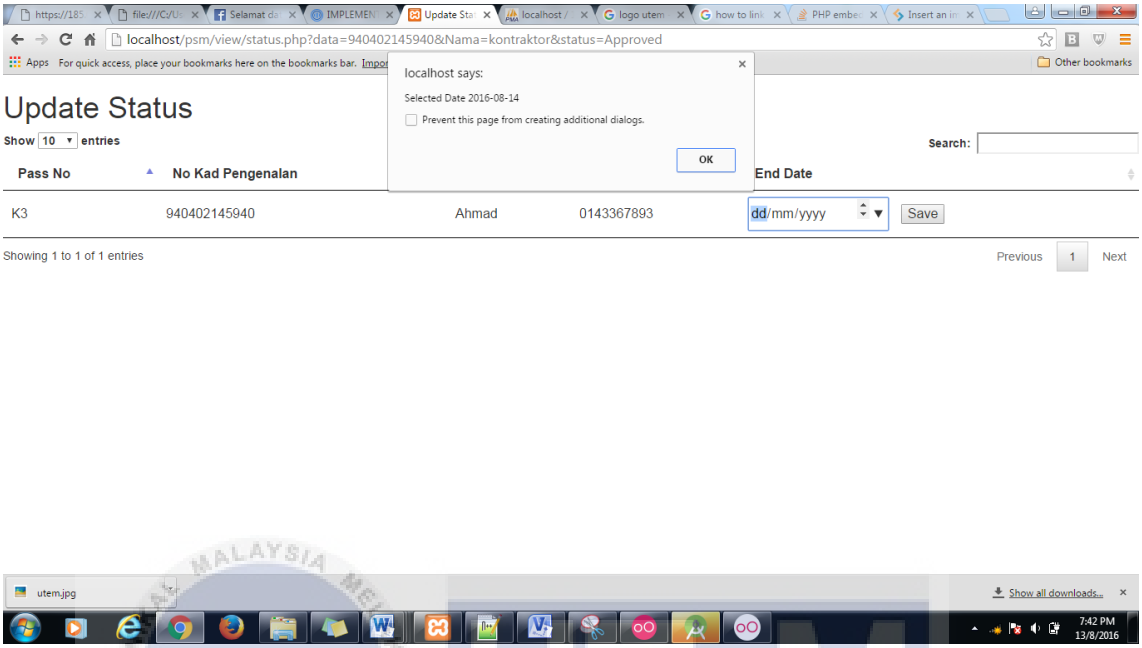

Figure 4.11: Update Status main page of e-Pass UTeM (Non-Staff) –selected date

In Figure 4.11, it is shows the page status page. Next, the window alert shows *Selected Date: yyyy-mm-dd.*

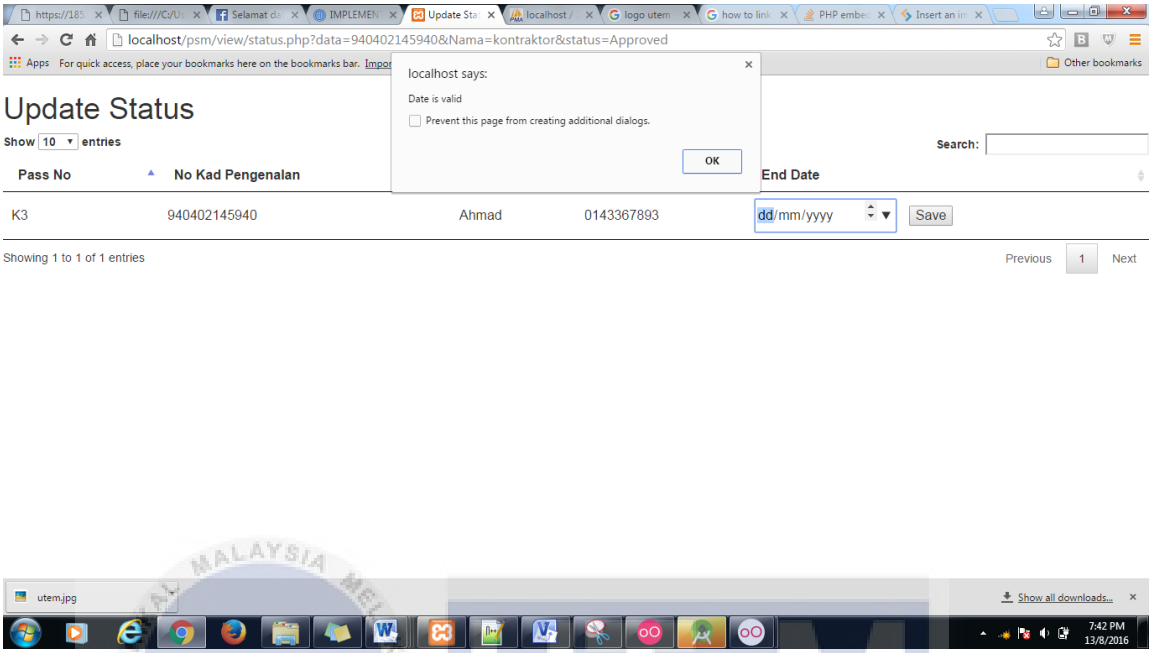

Figure 4.12: Update Status main page of e-Pass UTeM (Non-Staff) –alert state of date (*Valid* or *Invalid* or *Equal*)

In Figure 4.12, it is shows the page status page. Lastly, the window alert state either the date is *Valid* or *Invalid* or *Equal*. Then, the admin click the Save button to save the data in database.

Mobile application

Figure 4.13: Notification alert by SMS

In Figure 4.13, it shows notification alert page .The admin will notify the user the application status through SMS. The user will be received the notification alert from his/her mobile devices and inform the user to collect the printed pass from the office.

Web-based

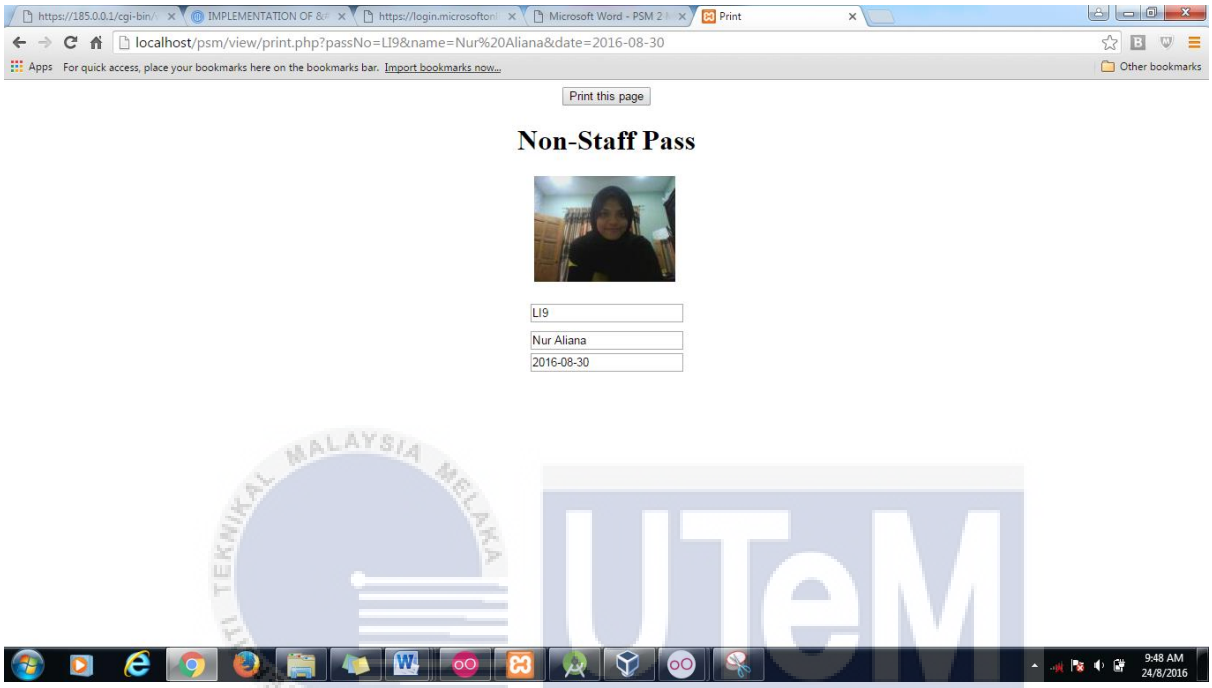

Figure 4.14: Print main page of e-Pass UTeM (Non-Staff)

In Figure 4.14, it shows the page that will be printed out. The admin will click the *Print this page* to go to the print page.

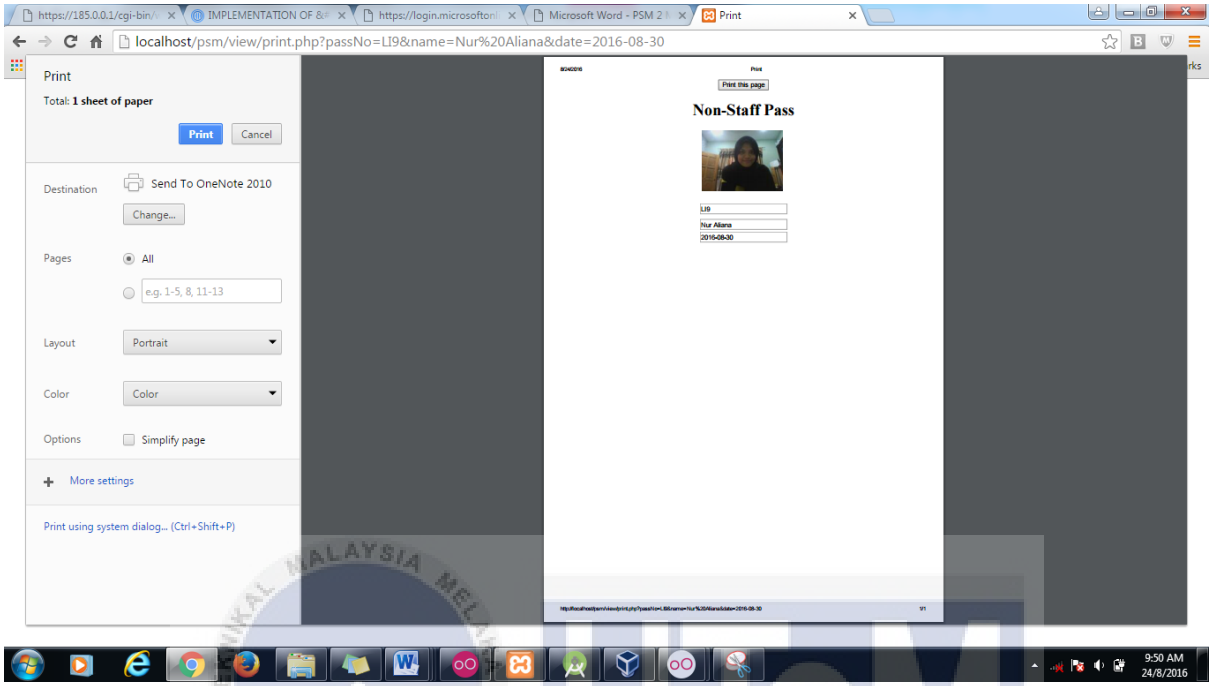

Figure 4.15: Print review page of e-Pass UTeM (Non-Staff)

In Figure 4.15, it shows the print page. The admin will print the pass which included the photo, pass no, name and end date.

4.2.3 Database Design

The database need to be design to ensure the consistent data, elimination of data redundancy, efficient execution of queries and high performance application. This section is describing the database design for the e-Pass UTeM system. The system's database design is represented using the Entity Relationship Diagram (ERD) and the data dictionary.

4.2.3.1 Conceptual and Logical Database Design

This section will be explained about conceptual and logical database design that will be used in this system. There are Entity Relationship Diagram (ERD) and Data Dictionary.

4.2.3.1.1 Entity Relationship Diagram (ERD)

The figure below describe the ERD of e-Pass UTeM (Non-Staff).

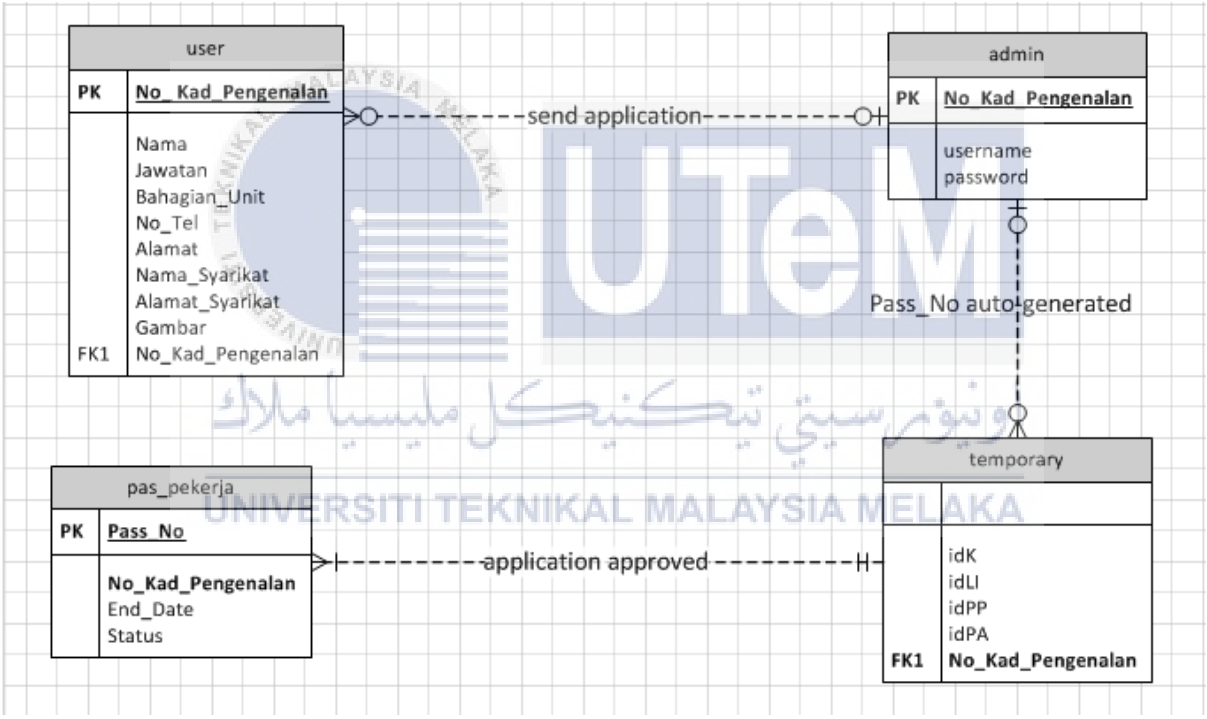

Figure 4.16: ERD of e-Pass UTeM (Non-Staff)

The figure above shows the ERD for the *user*, the *admin, pass_pekerja* and *temporary.* The user has four categories which are *Kontraktor, Latihan Industri, Pembantu Penyelidik* and *Pens. Sambilan/Alumni.* The primary key between the user and admin is *No_Kad_Pengenalan* which is Foreign Key as well. The admin identify the user by the *Pass_No* that is auto-generated. The *pas_pekerja* table identify the *No Kad Pengenalan* from *temporary* table to view the approved application.

4.2.3.1.2 Data Dictionary

Data Dictionary is a collection of description of the entities. There are seven tables in the system*: admin, kontraktor, latihan_industri, pembantu_penyelidik, pens_sambilan_alumni, pas_pekerja* and *temporary*. The description of the entities as follows:

Table 4.1: Table - admin

Attribute	**Data Type**	**Null**	**Auto-Increment**	**Primary Key**	**Foreign Key**
Username	Varchar(20)	_	-	-	-
Password	Varchar(20)		-	-	-

Table 4.2: Table - kontraktor

Attribute	**Data Type**	**Null**	**Auto-Increment**	**Primary Key**	**Foreign Key**
Id_no	Integer(11)	-	Yes	Yes	-
Nama	Varchar(20)	-	-	-	-
No_Kad_Pengenalan	Varchar(20)	-	-	-	-
Jawatan	Varchar(20)	-	-	-	-
Bahagian_Unit	Varchar(20)	-	-	-	-
No_Telefon	Varchar(20)	-	-	-	-
Alamat	Varchar(200)	-	-	-	-
Nama_Syarikat	Varchar(20)	-	-	-	-
Alamat_Syarikat	Varchar(200)	-	-	-	-
Gambar	Blob	-	-	-	-

Table 4.3: Table –latihan_industri

Attribute	Data Type	Null	Auto-Increment	Primary Key	Foreign Key
Id_no	Integer(11)	-	Yes	Yes	-
Nama	Varchar(20)		-	-	-
No_Kad_Pengenalan	Varchar(20)	-	-	-	-
Jawatan	Varchar(20)	-	-	-	-
Bahagian_Unit	Varchar(20)	-	-	-	-
No_Telefon	Varchar(20)	-	-	-	-
Alamat	Varchar(200)	-	-	-	-
Nama_Syarikat	Varchar(20)	-	-	-	-
Alamat_Syarikat	Varchar(200)	-	-	-	-
Gambar	Blob	-	-	-	-

Table 4.4: Table – pembantu_penyelidik

Attribute	Data Type	Null	Auto-Increment	Primary Key	Foreign Key
Id_no	Integer(11)	-	Yes	Yes	-
Nama	Varchar(20)		-	-	-
No_Kad_Pengenalan	Varchar(20)	-	-	-	-
Jawatan	Varchar(20)	-	-	-	-
Bahagian_Unit	Varchar(20)	-	-	-	-
No_Telefon	Varchar(20)	-	-	-	-
Alamat	Varchar(200)	-	-	-	-
Nama_Syarikat	Varchar(20)	-	-	-	-
Alamat_Syarikat	Varchar(200)	-	-	-	-
Gambar	Blob	-	-	-	-

Table 4.5: Table – pens_sambilan_alumni

Attribute	Data Type	Null	Auto-Increment	Primary Key	Foreign Key
Id_no	Integer(11)	-	Yes	Yes	-
Nama	Varchar(20)		-	-	-
No_Kad_Pengenalan	Varchar(20)	-	-	-	-
Jawatan	Varchar(20)	-	-	-	-
Bahagian_Unit	Varchar(20)	-	-	-	-
No_Telefon	Varchar(20)	-	-	-	-
Alamat	Varchar(200)	-	-	-	-
Nama_Syarikat	Varchar(20)	-	-	-	-
Alamat_Syarikat	Varchar(200)	-	-	-	-
Gambar	Blob	-	-	-	-

Table 4.6: Table – pas_pekerja

Attribute	Data Type	Null	Auto-Increment	Primary Key	Foreign Key
Pass_No	Varchar(20)	-	-	Yes	-
No_Kad_Pengenalan	Date	-	-	-	-
End_Date	Varchar(20)	-	-	-	-
Status	Varchar(20)	-	-	-	-

Table 4.7: Table – temporary

Attribute	Data Type	Null	Auto-Increment	Primary Key	Foreign Key
idK	int(11)	-	Yes	-	-
idLI	int(11)	-	Yes	-	-
idPP	int(11)	-	Yes	-	-
IdPA	int(11)	-	Yes	-	-

4.3 Detailed Design

This section explains about detailed design of e-Pass UTeM (Non-Staff)

4.3.1 Software Design

The proposed system described the structured chart of e-Pass UTeM (Non-Staff) for the software design.

4.3.1.1 Structured Chart

The Figure 4.17 describe the structured chart of e-Pass UTeM (Non-Staff).

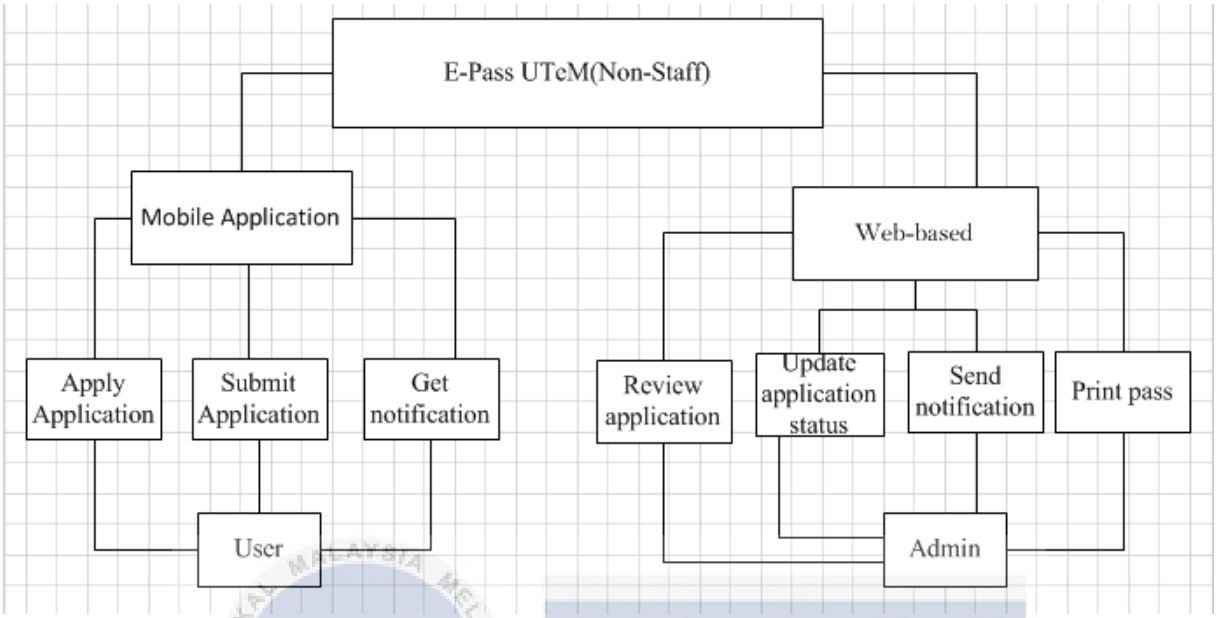

Figure 4.17: Structured Chart of e-Pass UTeM (Non-Staff)

As shown in the Figure 4.17, the system divided by two platforms which are Mobile Application and Web-based. In Mobile Application, the modules are only for the user. The user need to filled up the form that contain *Kategori Pemohon, Nama, No tel, Alamat, Jawatan, Bahagian/Unit and Nama Syarikat/Institusi and Alamat Syarikat/Institusi.* Then, the user need to submit the application and will get notification by SMS after the application has

been approved. While for the Web-based, the modules only for the admin. The admin will reviewed the application then update the application by update the End Date and Status of application. Then, the admin will send the notification to user by SMS.

4.3.2 Physical Database Design

This section explains about physical database design of e-Pass UTeM (Non-Staff)

4.3.2.1 Context Diagram

The figure below describe the Context Diagram of e-Pass UTeM (Non-Staff).

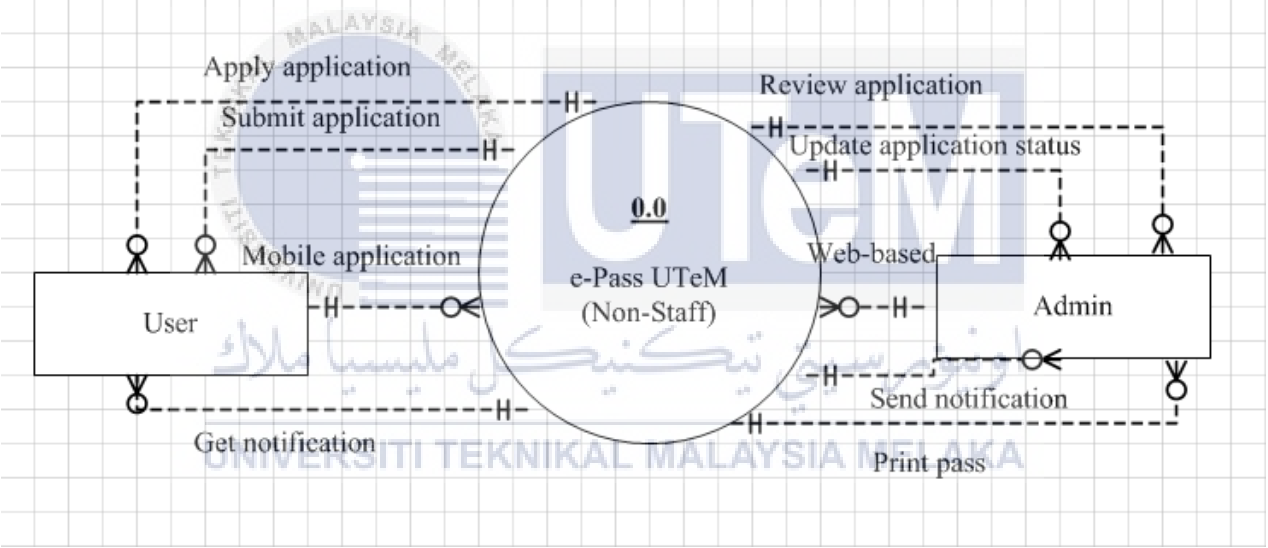

Figure 4.18: Context Diagram of e-Pass UTeM (Non-Staff)

The Figure 4.18 show the flow of the e-Pass UTeM (Non-Staff) system which is combination between Mobile Application and Web-based. The user needs to apply application and submit application through mobile devices. The user will get notification due to the application status by SMS. The admin will review the application that send by the user and update the application status. The admin will send notification by SMS to notify user about his/her application. The admin also will print out the pass application that has been approved and will be collected by the user at the office.

4.3.2.2 Data Flow Diagram

The figure below describe the Level 0 Data Flow Diagram of e-Pass UTeM (Non-Staff).

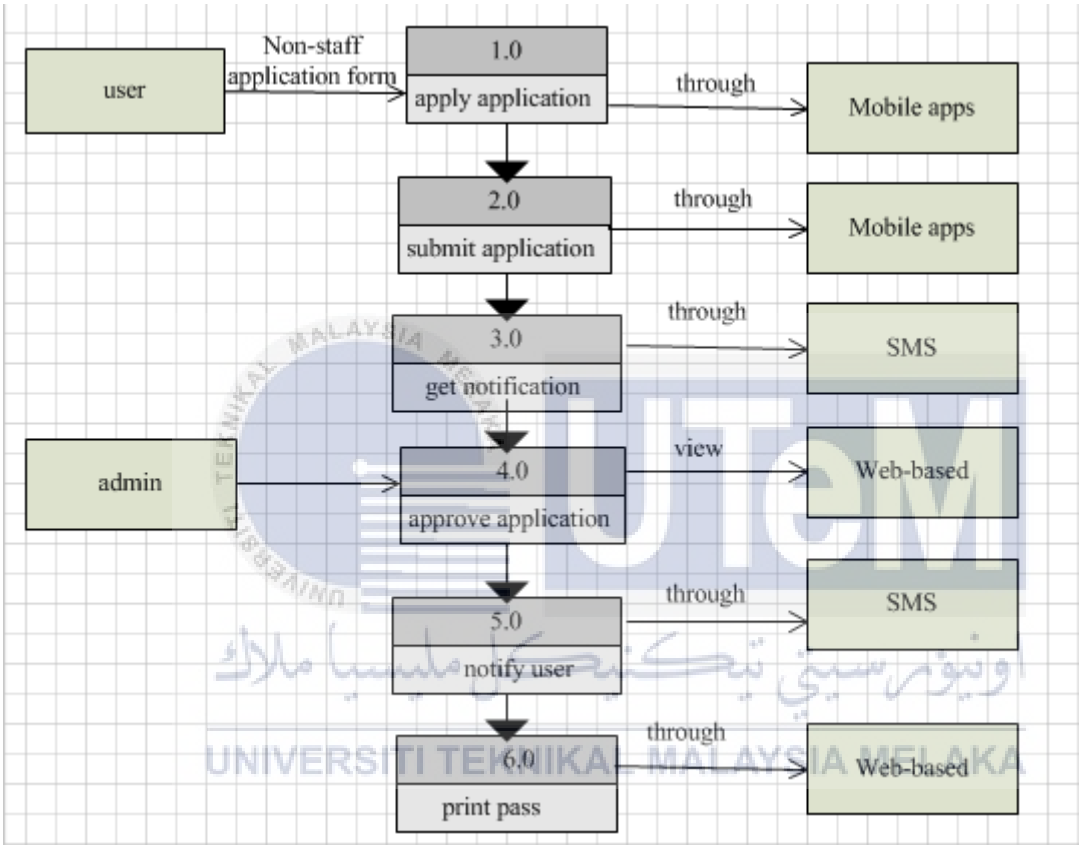

Figure 4.19: Level 0 Data Flow Diagram of e-Pass UTeM (Non-Staff)

The Figure 4.19 describe the Level 0 Data Flow Diagram of e-Pass UTeM (Non-Staff). There are two platforms for this system which are Mobile Application and Web-based. The user need to install the application so the user can apply pass application form and submit through mobile devices. The user will get the notification about his/her application status through SMS. The admin will give approval to the application that send by the user through Web-based. Then, the user will notify the user about his/her application status through SMS. The pass will be printed out once the approval has been made and it will be collected by the user at the office.

4.4 Conclusion

This chapter has set out how to implement the e-Pass UTeM (Non-Staff) system based on the database design and the module design. Database Design describes the business flow in the e-Pass UTeM (Non-Staff) system using the ERD diagram. Module design shows the minimum screen design that should be built in this system.

CHAPTER V

IMPLEMENTATION

5.1 Introduction

This chapter explains about implementation of e-Pass UTeM(Non-Staff) through this chapter, it will define the implementation of e-Pass UTeM (Non-Staff) on what software that used to develop this tool and how to install them.

5.2 Software Development Environment Setup

e-Pass UTeM(Non-Staff) is one of the application. This apps can be installed to any of mobile devices that has Android. During the development process of this e-Pass UTeM(Non-Staff), Android Studio used for design the layout for the interface in mobile devices and code editor. While Xampp is a platform for PHP is a server scripting language, and a powerful tool for making dynamic and interactive Web pages.

5.2.1 Android-Studio

Android-studio is the official IDE for Android Development. A single download includes everything that is needed to begin developing Android apps, example IntelliJ IDE + Android Studio plugin, Android SDK Tools, Android Platform-tools, a version of Android platform and Android system image for the emulator.

5.2.2 XAMPP

XAMPP stands for Cross-Platform (X), Apache (A), MySQL (M), PHP (P) and Perl (P). It is a simple, lightweight Apache distribution that makes it extremely easy for developers to create a local web server for testing purposes. Everything that is needed to set up a web server – server application (Apache), database (MySQL), and scripting language (PHP) – is included in a simple extractable file. XAMPP is also cross-platform, which means it works equally well on Linux, Mac and Windows. Since most actual web server deployments use the same components as XAMPP, it makes transitioning from a local test server to a live server extremely easy as well.

5.3 Software Configuration Management

The section explains about the configuration environment setup and version control procedure.

5.3.1 Configuration Environment Setup

The figure below shows the configuration environment setup

Figure 5.1: Android application (Source: Google Image)

As shown in Figure 5.1, e-Pass UTeM (Non-Staff) system need to be installed in the mobile devices and only for the Android users so that the application can be used. The apps need the local host to respond and request among laptop, server and mobile devices.

5.3.2 Version Control Procedure

This figure describe the version control procedure of e-Pass UTeM (Non-Staff)

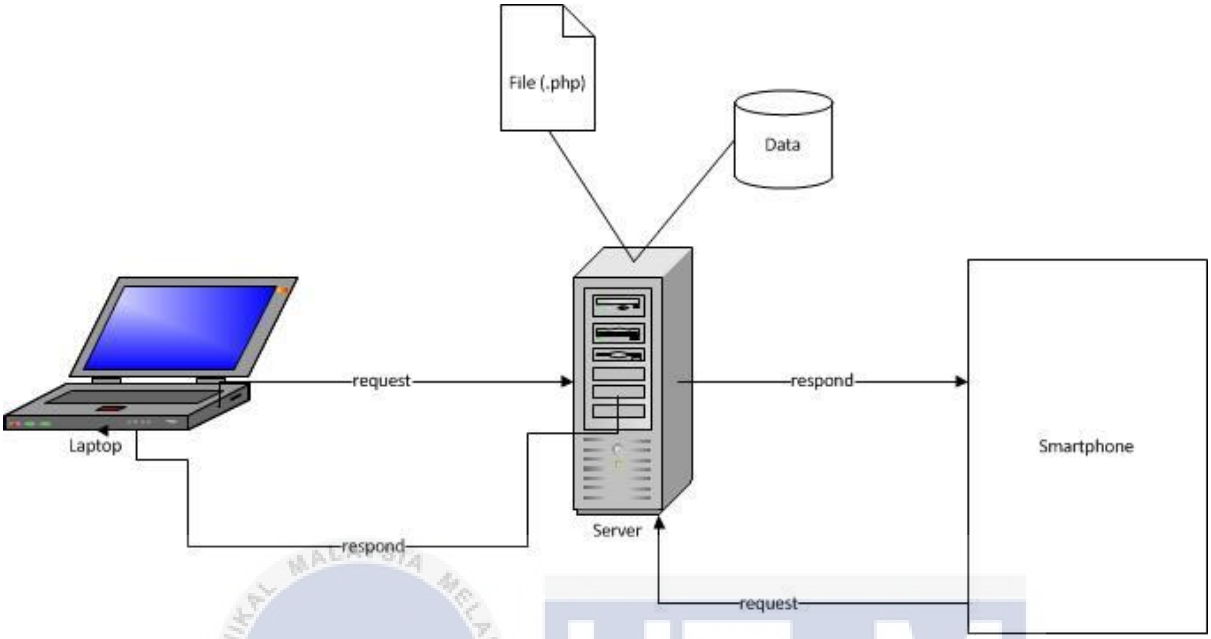

Figure 5.2: Connection of e-Pass UTeM (Non-Staff**)**

The diagram above shows that mobile application and web management are connecting to server with internet connection. MySQL database and Apache are installed in the same server. All data is store in the MySQL database and access through the web server. With the internet connection, mobile application request HTTP to server and the server response to application through JSON. The same ways use by web management system by connecting to the MySQL database with the aid of internet connection and web server.

5.4 Implementation Status

This section explains about implementation status of e-Pass UTeM (Non-Staff)

5.4.1 Beginner Implementation Status of e-Pass UTeM (Non-Staff)

This table explained the beginner implementation status of e-Pass UTeM (Non-Staff)

Table 5.1: Beginner Implementation Status of e-Pass UTeM (Non-Staff)

Module Name	Description	Status
Apply application form	User module to apply application form through mobile devices	Done
View application	Administration module to manage the application form by review the information that send by the user	Done
Update the status application	Administrator module to update the application by updating the End Date and Status.	In-progress
Notify the user	Administrator module to notify the user status application by SMS after the user send the application	Done
Print pass	Administrator module to print the approved pass	In-progress

The first column describe the module name, the second column describe the description and the third column describe the status.

5.4.1 Current Implementation Status of e-Pass UTeM (Non-Staff)

After have been observed, there is an improvement made in this system. This table explained the current implementation status of e-Pass UTeM (Non-Staff)

Table 5.2: Current Implementation Status of e-Pass UTeM (Non-Staff)

Module Name	Description	Status
Apply application form	User module to apply application form through mobile devices	Done
View application	Administration module to manage the application form by review the information that send by the user	Done
Update the status application	Administrator module to update the application by updating the End Date and Status.	Done
Notify the user	Administrator module to notify the user status application by SMS after the user send the application	Done
Print pass	Administrator module to print the approved pass	Done

The first column describe the module name, the second column describe the description and the third column describe the status.

5.5 Conclusion

This chapter explain the implementation process and tools to e-Pass UTeM (Non-Staff) system by installing the apps using Android. Connection among application, web, MySQL and server in the process of e-Pass UTeM(Non-Staff)development is illustrates in details with the aids of diagram. The next chapter will proceed to system testing to develop test plan for testing process.

CHAPTER V1

TESTING

6.1 Introduction

Testing is a process where all the bugs in a system will be detected and fixed in order to make sure that the system can run smoothly without any problem. It is also to make sure that the system is meets all the requirement and user needs. Usually, the testing was done to evaluate the functional and non-functional requirements of the system. There are many types of testing can be used to test the system.

The example of testing are system testing, unit testing, integration testing and acceptance testing. System testing is a testing that will check overall system. System designer will review the document which is the user requirement document. To develop e-Pass UTeM(Non-Staff), system designer need to review user requirement document to design the interface that suitable with the function of the system as enter the information through mobile devices and get the data to approve the application pass. For example how the form should be arrange, how the button design, what the interface color and other suitable function.

Next, developer must carry out the unit testing in 'Expectation' of e-Pass UTeM(Non-Staff) in other to achieve the technical specification. Technical specification is more specify and detailed design information such as coding, system design, tools used, and data related specification, and components use to build the tool. Programmer will separate all modules in to smaller unit. Then the code will be tested by unit that has been separate to make sure every function of system will execute well. Programmer will analyze every code to make sure do not have any error. If an error has occurred, the programmer will solve it.

Besides that, developer must carry out the integration testing to achieve the detail concept of the mobile application and web-based. In the concept details developer will start to design the system in high level design. So in order to meet the integration testing, programmer will make sure every pages of the system will integrate well with each other.

Last but not least, developer should conduct acceptance testing in other to achieve the client desire that asked by user. In acceptance testing for e-Pass UTeM(Non-Staff), user will test on the interface of the system in mobile devices to enter the information. User will test regarding the field given to enter the information before click the Next button to the next page. As for web-based, admin will test regarding to get the data from the application form that user sent and approve the application status then notify the user.

6.2 Test Plan

This is the System Test Plan for e-Pass UTeM (Non-Staff). The propose of the system are to create a system to store the pass application, to allow the admin search and update the application status, to notify the applicants about his/her application and to allow application through mobile devices.

6.2.1 Test Organization

Test organization is state the personnel that involve and the responsibilities in this testing phase. The personnel that involve is to carry out the testing is the developer. Table below shows Test Organization.

Table 6.1: Test Organization

Tester	Responsibilities
Developer	Test planning, guidance, monitoring and test control.
	Test data collection, generating test scenarios.
	Test case documentation, test execute, defect reporting and tracking for admin module.
	Test case documentation, test execute, defect reporting and tracking for user module.

6.2.2 Test Environment

Test environment describe the location of testing to be carried out and define the software and hardware in other to do the testing phase. The location of testing to be carried out is anywhere as long as there has computer and mobile devices to run e-Pass UTeM (Non-Staff). The software and hardware needed to do the testing are:

6.2.2.1 Software

Android Studio IntelliJ Platform (Version 1.5.1)
Genymotion (Android emulator as a virtual device)
Microsoft Visio 2010
Microsoft Word 2010 (for documentation)
Operating System : Windows 7 Professional
Web Browser: Mozilla Firefox or Internet Explorer or Chrome

6.2.2.2 Hardware

This section explains what type of hardware is used to develop the system.

6.2.2.2.1 Laptop

Brand: Acer
Model: Aspire V5-431
Graphic: Intel HD Graphics
Processor: Intel(R) Celeron(R) CPU 1017U @ 1.60GHz 1.60 GHz
Installed Memory (RAM) : 4.00 GB (3.80 GB usable)
System Type: 64 Bit Operating System
Pen and Touch: No pen or touch input is available for this Display

6.2.3 Test Schedule

This test schedule shows the stages and duration of testing that to be conducted.

Table 6.2: Test Schedule

Test Stages	Target Date	End Date	Remark
Unit Testing	22.6.20016	24.6.2016	Pass
Integration Testing	22.6.2016	2.7.2016	Pass
System Testing	25.7.2016	27.7.2016	Pass
Acceptance Testing	4.8.2016	10.8.2016	Pass

6.3 Test Strategy

The test approach that has been used in this strategy is white box and black box testing. Black box testing (also known as functional testing) is a software testing method in which the internal structure/design/implementation of the item being tested is not known to the tester. Tests are using software interfaces and trying to ensure that they work as expected. Tests should pass even if internals are changed but the functionality of interfaces should remain unchanged. Tester is aware of what the program should do but does not have the knowledge of how it does it. Black box testing is most commonly used type of testing in traditional organizations that have testers as a separate department, especially when they are not proficient in coding and have difficulties to understand the code. It provides external perspective of the software under test. Black box testing requires requirement specifications as a basis for test cases. The example that we can see in this system is it is use the user validate based on functional requirement and non-functional requirement as a guide to test. The table below shows the advantages and disadvantages of black box testing.

Table 6.3: Advantages and disadvantages of black box testing

Advantages	**Disadvantages**
Efficient for large segments of code	Limited coverage since only a fraction of test scenarios is performed
Code access is not required	Inefficient testing due to tester's luck of knowledge about software internals
Separation between user's and developer's perspectives	Blind coverage since tester has limited knowledge about the application

White box testing (also known as clear box testing, glass box testing, transparent box testing and structural testing) is a software testing method in which the internal structure/design/implementation of the item being tested is known to the tester. It looks inside the software that is being tested and uses that knowledge as part of the testing process. White box testing requires detail design as a basis for test cases. The example that we can see in this system is it is use structured chart, context diagram and Level 0 Data Flow Diagram.

The table below shows the advantages and disadvantages of white box testing.

Table 6.4: Advantages and disadvantages of white box testing

Advantages	**Disadvantages**
Efficient in finding errors and problems	Might not find unimplemented or missing features
Required knowledge of internals of the software under test is beneficial for thorough testing	Requires high level knowledge of internals of the software under test
Allows finding hidden errors	Requires code access
Programmers introspection	
Helps optimizing the code	
Due to required internal knowledge of the software, maximum coverage is obtained	

6.3.1 Classes of tests

The table below shows classes of test.

Table 6.5: Classes of test

Test Stage	Strategy
Unit Testing	White box testing
Integration Testing	White box and black box testing
System Testing	White box and black box testing
Acceptance Testing	Black box testing

Unit Testing

In the unit testing the developer will test on the code of the e-Pass UTeM (Non-Staff). The developer will define error of the e-Pass UTeM (Non-Staff) and make a solution to prevent the problem of error from occur. In the unit testing the programmer will test in all the form and function that has in this tool.

Integration Testing

The second one is integration testing. The activities that involved in the integration testing are to test the integration between mobile application and web-based in the e-Pass UTeM (Non-Staff). It means it test on the integration between two platforms and function in this system. For example the user of e-Pass UTeM (Non-Staff) enter the information in the digitalized application form through mobile devices then click the submit button. This test is to observe whether the data received by the admin or not. The developer need to record if there are any error occurs during the integration between two platforms.

System Testing

System testing is to test the whole system. It is to make sure that whether it meet the requirement or not. This testing is test on the complete system that be tested by developer. The testing use the black-box testing because need to check the complete system on interface and not in the code design of this system.

Acceptance Testing

In the e-Pass UTeM (Non-Staff) acceptance testing will be test on activities between the developer team and the end user of the system. For example, the admin need to update the status application form and send notification to the user. If there is any error during the testing the developer need to take note and fix the problems.

6.4 Test Design

In this section there are two parts of test design which are Test Description and Test Data. In each part there will be more detail explanation on Mobile application and Web-based platform.

6.4.1 Test Description

In this section provide the test-cases for testing the e-Pass UTeM (Non-Staff) mobile application and its web-based site. This is because, to ensure that the system can be functional according to the requirement stated at the planning phase earlier. The result of the testing is based on the testing with the supervisor and they are recorded as in the tables below.

6.4.1.1 Test Case: Mobile application

There are one test has been test to the e-Pass UTeM (Non-Staff) mobile application which is Enter Information. The result of the testing is based on the testing with the supervisor and it is recorded as in the tables below.

Table 6.6: Test Case: Mobile application

No	Functional Requirement	Test Requirement	Pre Condition	Input Data	Steps	Expected
M01	Enter information	Validate that the system are able to enter information	Users are able to access the system	**Valid:** Name: Liyana Identity Card/Passport: 940807-14-5890	1)Enter the information 2)Click *Next* 3)Click *Submit*	The information successfully saved

				Telephone No: 014-6789670 Address: Taman Burung		
				Invalid: 1)Name: “ ” Identity Card/Passport: “ ” 2)Name: “ ” Identity Card/Passport: 940807-14-5890 3)Name: Liyana Identity Card/Passport: “ ”	1)Enter the information 2)Click *Next* 3)Click *Submit*	The user need to fill up the form before submit
				Invalid: 1)Telephone No: “ ” Address: “ ” 2)Telephone No: 014-6789670 Address: “ ”		

				3)Telephone No: “ ” Address: Taman Burung		
M02	Enter the Identity Card/Passport	Validate the maximum length is at most 14 characters	Users are able to go to the next page	**Valid:** Identity Card/Passport: 940807-14-5890	1)Enter the information 2)Click *Next* 3)Click *Submit*	The information successfully saved.
				Invalid: Identity Card/Passport: 940807-14-58907866		The user need to fill up the form before submit.
M03	Enter the Telephone No	Validate the maximum length is at most 11 characters	Users are able to go to the next page	**Valid:** Telephone No: 014-6789670	1)Enter the information 2)Click *Next* 3)Click *Submit*	The information successfully saved

				Invalid: Telephone No: 014-67896705678		The user need to fill up the form before submit
M04	Take a picture	Validate the system can take a picture	Users are able to take picture and successfully submit	**Valid:** Picture: *image*	1)Click *take a photo* 2)Click *submit*	The user successfully submitted and the picture displayed at print page
				Invalid: Picture: *image*		The user need to take picture and the picture will be displayed at print page

6.4.1.2 Test Case: Web-based

There are several functional requirements to be tested including login, view information, search status, update status and notification.

6.7: Test Case: Web-based

No	Functional Requirement	Test Requirement	Pre Condition	Input Data	Steps	Expected
W01	Login	Validate that the system are authenticate	Admin is able to access the system	**Valid:** Username: admin Password: admin	1)View the application page 2)Enter username and password. 3)Click Login	The admin can view the user's application information
				Invalid: 1)Username: " " Password: " " 2)Username: " " Password: admin 3)Username: admin Password: " "	1)View the application page 2)Enter username and password. 3)Click Login	The admin need to enter the correct username and password

W02	View information	Validate that the system are able to view the selected category	Admin is able to access the system	**Valid:** Please Select: All/Kontraktor/ Latihan Industri/ Pembantu Penyelidik/ Pens. Sambilan/ Alumni	1)Select from dropdown 2)Choose category	Display the selected category
				Invalid: Please Select: “ ”	1)Select from dropdown 2)Choose category	Display the default category
W03	Search status	Validate the system are able to search the status	Admin are able to access the system	**Valid:** Status: Approved	1)Select *Status* 2)Choose either *Approved/Not approved/In-process* 3)Then *Enter*	Display the Approved user’s information

				Invalid: 1)Status: “ ” 2)Status: Not approved 3)Status: In-process	1)Select *Status* 2)Choose either *Approved/Not approved/In-process* 3)Then *Enter*	Cannot display the user’s information
W04	Update End date	Validate that the system are able to update the user’s end date pass which is not the expired date	Admin is able to access the system	**Valid:** current date:18/6/2016 End date: 20/6/2016	1)Click hyperlink at *No Kad Pengenalan,* 2)Enter *End Date* 3)Click Save	Can save the update End Date
				Invalid: current date:18/6/2016 1)End date: 20/6/1994 2)End date: “ ”	1)Click hyperlink at *No Kad Pengenalan* 2)Enter *End Date* 3)Click Save	Cannot save the update End Date
W05	Print pass	Validate the system can print the pass included the information needed	Admin is able to access the system	**Valid:** Picture: *image* Name: Liyana End Date:30/7/2016	Click Print	Can print the pass

				Invalid: Picture: “ ” Name: “ ” End Date: “ ”	Click Print	Cannot print the pass
W06	Notification	Validate the system can notify the user by sending SMS	Admin is able to access the system	**Valid:** Message Sender:012345678 Destination Address: 0142673197(Recipient)	Connect at localhost	The notification is received by the recipient
				Invalid: Message Sender: “ ” Destination Address: “ ”	Connect at localhost	The notification is not received by the recipient

6.4.2 Test Data

In this section, there are two tables for test data which are test data for mobile application and web-based.

6.4.2.1 Test Data: Mobile application

There are one test has been test to the e-Pass UTeM (Non-Staff) mobile application which is Enter Information. The result of the testing is based on the testing with the supervisor and it is recorded as in the tables below.

6.4.2.1.1 First trial for Test Data: Mobile application

The table of a first trial for test data in mobile application shows in Appendix C.

6.4.2.1.2 Second trial for Test Data: Mobile application

The table of a second trial for test data in mobile application shows in Appendix D.

6.4.2.2 Test Data: Web-based

There are several functional requirements to be tested including login, view information, search status, update status and notification.

6.4.2.2.1 First trial for Test Data: Web-based

The table of a first trial for test data in web-based shows in Appendix E

6.4.2.2.2 Second trial for Test Data: Web-based

The table of a second trial for test data in web-based shows in Appendix F

6.5 Test Results and Analysis

Testing is divided into two parts which are in mobile application and web-based. The purpose of the testing is to detect the bugs at the early stages and after tested on my own there are many bugs are detected. There are first trial and second trial for both mobile application and web-based in test data. It should do the testing and analysing the bugs at the early stages. Then, the test cases are tested by supervisor. The test data tables show there are 80% passes the test cases in the first trial for both mobile application and web-based however the bugs have been detected and the correction has been made in second trial for both parts.

6.6 Conclusion

As a conclusion, the testing process is very important to be carried out in order to analyse and observe better based on how good the e-Pass UTeM(Non-Staff) are functioning. If there were any problems or mistakes that the developer did, a solution will be taken to overcome the problems that may occur before this system being deployed and released. Even though the problems of this system had been tested, improvements process will be taken. There are some limitations this e-Pass UTeM(Non-Staff) would have such as the problems might occur like server problem to notify the user through SMS and others. While in the next chapter, the overall conclusion for the system will be covered. The observation on Weakness and Strengths, Propositions for Improvement and Project Contribution of the e-Pass UTeM(Non-Staff) also will be listed in the next chapter.

CHAPTER V11

CONCLUSION

7.1 Observation and Weaknesses and Strengths

There are several weaknesses and strengths on this e-Pass UTeM (Non-Staff) system. At the beginning of the project there is a problem to connect the mobile devices with the laptop to do coding and layout in Android. Despite of that, there is another alternative which install the Android emulator, Genymotion. After many times install the Genymotion, the installation is successfully installed and the project is carried on the next stage. Besides, there is a problem to connect the mobile devices with the database to view the data sent from mobile devices in website. The bugs have been detected and the correction has been made which give results the connection is successfully connected. Then, there is a problem to receive the image that taken from the mobile devices to display at web-based. The solution is that the developer has to do another *.php* to display the image. The notification that will be sent by the admin through SMS depends on the server. If there is a problem with the server, the notification that will be sent by the admin through SMS turned out to be failed. The selected server for SMS is ViaNettSMS which the user has to register using e-mail which one account can send 5 SMS free of charge for trial and for the next SMS the user has to pay the bill. This method will cost money every time the admin receive the new applicant to notify them.

The strengths that can be find in this system is it gives ease to the user to apply the application pass as it is a digitalized form through mobile devices. It gives the ease of installation of the software to the user by just click the provided link at the website. Next, the system can ease the admin to view, categorize and update the application status. Furthermore, the system can print the pass for the user to use.

7.2 Propositions for Improvement

Based on Software Customer Satisfaction Survey (refer Appendix A and B) that has been made on two persons which are from the officer *Polis Bantuan UTeM* and also my friend of mine which is currently doing her Final Year Project as an end-user for this system, there are lot of improvement that should be aware to produce a beneficial system and make things easier for the user to use. Next, this system is very simple in design. The system needs the user to install the apps in mobile devices and only for the Android user and the next improvement it can be used by all platform.

The system need to achieve the completeness and accuracy of installation as there is still unsure thing how the user to install the application for using it as its importance is demand in this system. Next, the system need to do more testing as it required to achieve the ability of the initially delivered software to function without errors or problems and without crashes or service interruptions as well. Besides, the ability of the user to easily performed required tasks using the software and user friendliness of the software need to do more enhancement as the system have a lot page to view and there are some function is not useful for the system. Moreover, the completeness of the software in providing all of the functions that need for the user to do job is very important to make work going smoothly and save time which the user can being very satisfied while using it as the system lacked of filter by date of pass application for reference. The completeness and usefulness of the user documentation need to enhance to being satisfied by the user as it is very important in this system. The system also need to provide the method that make the payment for the pass ease to made and notify the user by e-mail after the application has been made as it save cost and time.. Therefore, to elevate user the error prevention to enable undo and redo from common mistake and deliver popup message or confirmation before user proceed to any task. Last but not least, the overall satisfaction with the e-Pass UTeM (Non-Staff) received from the feedback is natural as the system need to be more easily understand so the user do not have difficulty to perform required tasks while using the system as many of them are the end-user and not from software background. Lastly, the overall comment received from the feedback is stated the system that has been developed can be used in *Pejabat Keselamatan UTeM* for the improvement in the current system. The information will be stored properly and well-organized.

7.3 Project Contribution

The contribution of this e-Pass UTeM(Non-Staff) is what actually this system will produce at the end of development. This system will give a beneficial and contribute to *Pejabat Keselamatan UTeM*. Through this system, user can easily apply the pass application through mobile devices as it has been converted to digitalized form. Besides, the admin can easily process the pass application without checking one by one in one whole stack of paper. The payment for the pass application easily can be made and it can be viewed by filter the date from the application that has been made. Moreover, this system will be printed out the pass application that has been approved.

7.4 Conclusion

Within the time constraint given, e-Pass UTeM (Non-Staff) was successfully developed to meet the objectives stated and fulfil requirements of passing Project Sarjana Muda subject. Although the system completed with a bit of usage or feedback dissatisfaction, there are some evidence to prove useful to anyone who using this system. With a bit of enhancement to be made in future plan, people can know more about this system and providing more useful feedback. The information obtained would be valuable to progress more and increase the system efficiency, effectiveness and demands.

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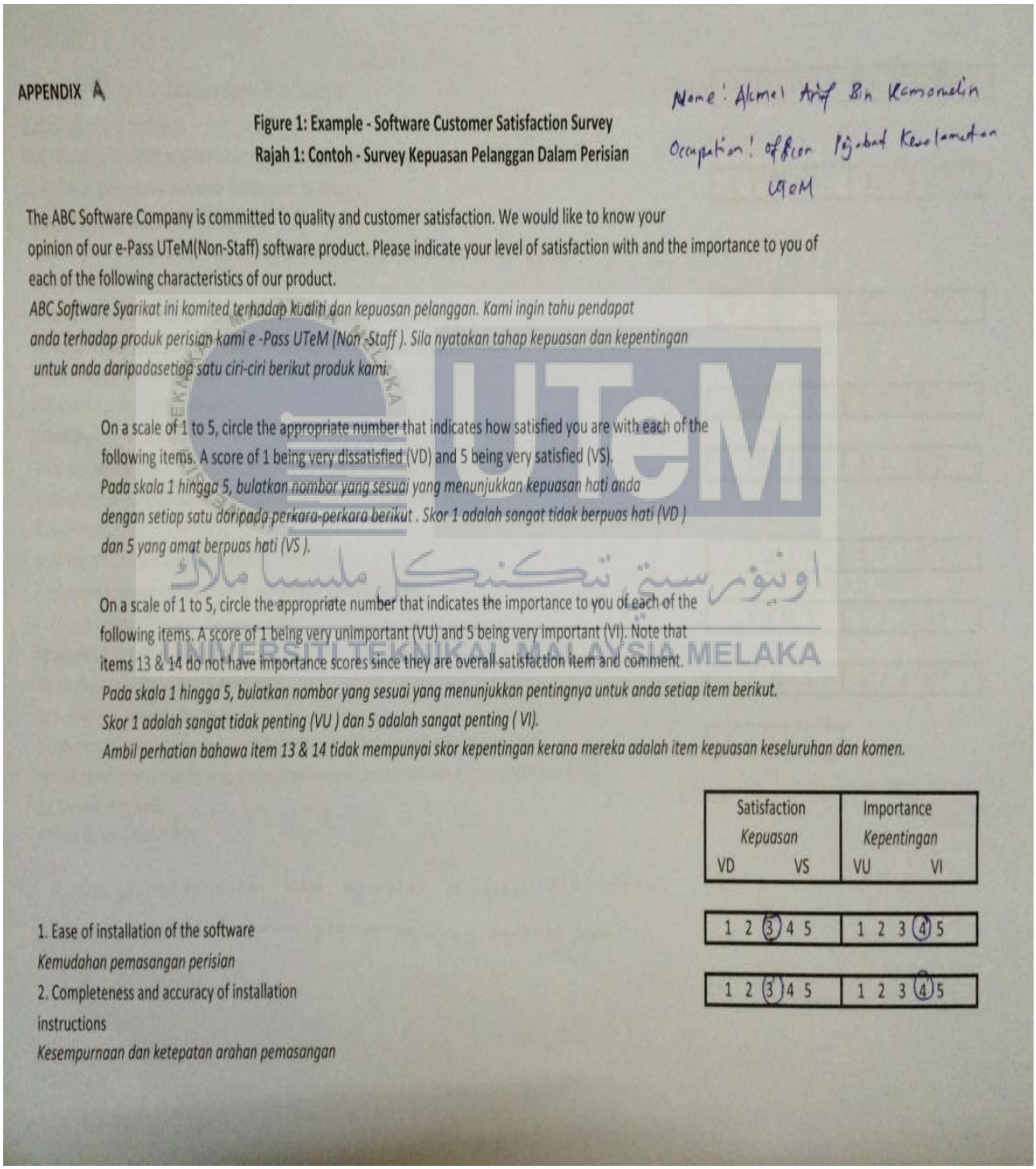
APPENDICES

APPENDIX A



APPENDIX A

Name: Akmal Arif Bin Kamaruddin
Occupation: officer Pejabat Keselamatan UTeM

Figure 1: Example - Software Customer Satisfaction Survey
Rajah 1: Contoh - Survey Kepuasan Pelanggan Dalam Perisian

The ABC Software Company is committed to quality and customer satisfaction. We would like to know your opinion of our e-Pass UTeM(Non-Staff) software product. Please indicate your level of satisfaction with and the importance to you of each of the following characteristics of our product.

ABC Software Syarikat ini komited terhadap kualiti dan kepuasan pelanggan. Kami ingin tahu pendapat anda terhadap produk perisian kami e -Pass UTeM (Non -Staff). Sila nyatakan tahap kepuasan dan kepentingan untuk anda daripadasetiap satu ciri-ciri berikut produk kami.

On a scale of 1 to 5, circle the appropriate number that indicates how satisfied you are with each of the following items. A score of 1 being very dissatisfied (VD) and 5 being very satisfied (VS).
Pada skala 1 hingga 5, bulatkan nombor yang sesuai yang menunjukkan kepuasan hati anda dengan setiap satu daripada perkara-perkara berikut . Skor 1 adalah sangat tidak berpuas hati (VD) dan 5 yang amat berpuas hati (VS).

On a scale of 1 to 5, circle the appropriate number that indicates the importance to you of each of the following items. A score of 1 being very unimportant (VU) and 5 being very important (VI). Note that items 13 & 14 do not have importance scores since they are overall satisfaction item and comment.
Pada skala 1 hingga 5, bulatkan nombor yang sesuai yang menunjukkan pentingnya untuk anda setiap item berikut.
Skor 1 adalah sangat tidak penting (VU) dan 5 adalah sangat penting (VI).
Ambil perhatian bahawa item 13 & 14 tidak mempunyai skor kepentingan kerana mereka adalah item kepuasan keseluruhan dan komen.

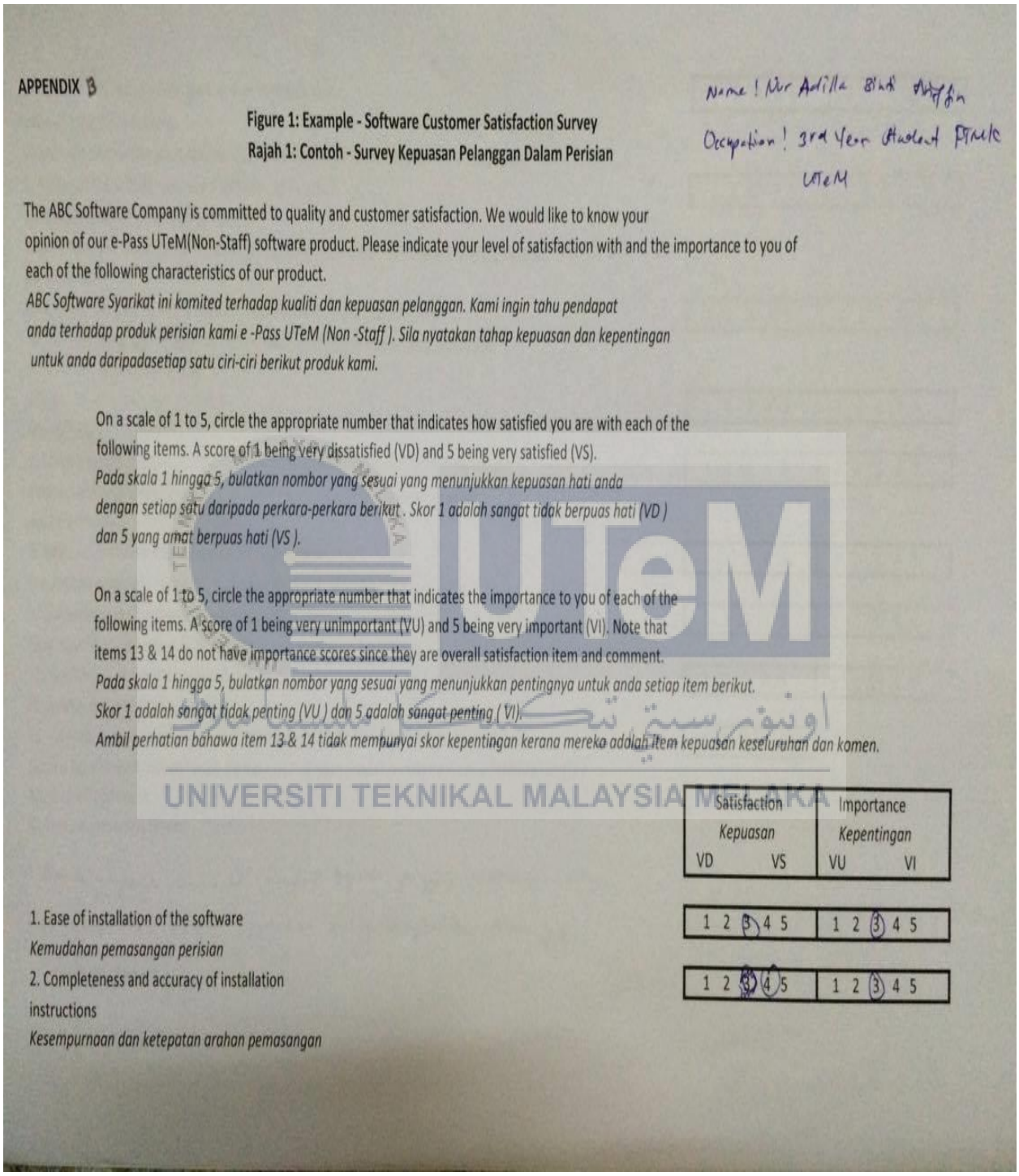
	Satisfaction *Kepuasan* VD VS	Importance *Kepentingan* VU VI
1. Ease of installation of the software *Kemudahan pemasangan perisian*	1 2 (3) 4 5	1 2 3 (4) 5
2. Completeness and accuracy of installation instructions *Kesempurnaan dan ketepatan arahan pemasangan*	1 2 (3) 4 5	1 2 3 (4) 5

3. Ability of the initially delivered software to function without errors or problems *Keupayaan permulaan penghantaran perisian berfungsi tanpa kesilapan atau masalah*	1 2 (3) 4 5	1 2 3 (4) 5
4. Ability of the initially delivered software to function without crashes or service interruptions *Keupayaan permulaan penghantaran perisian berfungsi tanpa kemalangan atau gangguan perkhidmatan*	1 2 (3) 4 5	1 2 3 (4) 5
5.Ability of the user to easily perform required tasks using the software *Keupayaan pengguna dengan mudah melaksanakan tugas-tugas yang diperlukan dengan menggunakan perisian*	1 2 (3) 4 5	1 2 3 (4) 5
6.User friendliness of the software *Mesra pengguna perisian*	1 (2) 3 4 5	1 2 3 (4) 5
7. Completeness of the software in providing all of the functions I need to do my job *Kesempurnaan perisian dalam menyediakan semua fungsi yang saya perlukan dalam kerja saya*	1 2 (3) 4 5	1 2 3 (4) 5
8. Ability of technical support to solve my problems *Keupayaan sokongan teknikal untuk menyelesaikan masalah saya*	1 2 (3) 4 5	1 2 3 (4) 5
9. Completeness of the user documentation *Kesempurnaan dokumentasi pengguna*	1 2 (3) 4 5	1 2 3 (4) 5
10. Usefulness of the user documentation *Kegunaan dokumentasi pengguna*	1 2 (3) 4 5	1 2 3 (4) 5
11. Overall, how satisfied are you with the e-Pass UTeM(Non-Staff) software product? *Secara keseluruhan, adakah anda berpuas hati dengan produk perisian e -Pass UTeM(Non-Staff) ?*	1 2 (3) 4 5	

12. Overall comment :
Komen secara keseluruhan:

Sistem yang dibangunkan boleh dijuncpaka di pejabat keselamatan dalam penambahbaikan sistem yang sedia. Penyimpanan maklumat lebih baik dan teratur.

APPENDIX B



APPENDIX B

Name : Nur Adilla Binti Abdullah
Occupation : 3rd Year Student FTMK UTeM

Figure 1: Example - Software Customer Satisfaction Survey
Rajah 1: Contoh - Survey Kepuasan Pelanggan Dalam Perisian

The ABC Software Company is committed to quality and customer satisfaction. We would like to know your opinion of our e-Pass UTeM(Non-Staff) software product. Please indicate your level of satisfaction with and the importance to you of each of the following characteristics of our product.
ABC Software Syarikat ini komited terhadap kualiti dan kepuasan pelanggan. Kami ingin tahu pendapat anda terhadap produk perisian kami e -Pass UTeM (Non -Staff). Sila nyatakan tahap kepuasan dan kepentingan untuk anda daripadasetiap satu ciri-ciri berikut produk kami.

On a scale of 1 to 5, circle the appropriate number that indicates how satisfied you are with each of the following items. A score of 1 being very dissatisfied (VD) and 5 being very satisfied (VS).
Pada skala 1 hingga 5, bulatkan nombor yang sesuai yang menunjukkan kepuasan hati anda dengan setiap satu daripada perkara-perkara berikut . Skor 1 adalah sangat tidak berpuas hati (VD) dan 5 yang amat berpuas hati (VS).

On a scale of 1 to 5, circle the appropriate number that indicates the importance to you of each of the following items. A score of 1 being very unimportant (VU) and 5 being very important (VI). Note that items 13 & 14 do not have importance scores since they are overall satisfaction item and comment.
Pada skala 1 hingga 5, bulatkan nombor yang sesuai yang menunjukkan pentingnya untuk anda setiap item berikut. Skor 1 adalah sangat tidak penting (VU) dan 5 adalah sangat penting (VI). Ambil perhatian bahawa item 13 & 14 tidak mempunyai skor kepentingan kerana mereka adalah item kepuasan keseluruhan dan komen.

	Satisfaction *Kepuasan* VD VS	Importance *Kepentingan* VU VI
1. Ease of installation of the software *Kemudahan pemasangan perisian*	1 2 (3) 4 5	1 2 (3) 4 5
2. Completeness and accuracy of installation instructions *Kesempurnaan dan ketepatan arahan pemasangan*	1 2 (3) (4) 5	1 2 (3) 4 5

3. Ability of the initially delivered software to function without errors or problems *Keupayaan permulaan penghantaran perisian berfungsi tanpa kesilapan atau masalah*	1 2 3 **4** 5	1 2 3 4 **5**
4. Ability of the initially delivered software to function without crashes or service interruptions *Keupayaan permulaan penghantaran perisian berfungsi tanpa kemalangan atau gangguan perkhidmatan*	1 2 **3** 4 5	1 2 3 4 **5**
5.Ability of the user to easily perform required tasks using the software *Keupayaan pengguna dengan mudah melaksanakan tugas-tugas yang diperlukan dengan menggunakan perisian*	1 2 3 **4** 5	1 2 3 **4** 5
6.User friendliness of the software *Mesra pengguna perisian*	1 2 3 **4** 5	1 2 3 **4** 5
7. Completeness of the software in providing all of the functions I need to do my job *Kesempurnaan perisian dalam menyediakan semua fungsi yang saya perlukan dalam kerja saya*	1 2 **3** 4 5	1 2 **3** 4 5
8. Ability of technical support to solve my problems *Keupayaan sokongan teknikal untuk menyelesaikan masalah saya*	1 **2** 3 4 5	1 2 **3** 4 5
9. Completeness of the user documentation *Kesempurnaan dokumentasi pengguna*	1 2 **3** 4 5	1 2 **3** 4 5
10. Usefulness of the user documentation *Kegunaan dokumentasi pengguna*	1 2 3 **4** 5	1 2 **3** 4 5
11. Overall, how satisfied are you with the e-Pass UTeM(Non-Staff) software product? *Secara keseluruhan, adakah anda berpuas hati dengan produk perisian e-Pass UTeM(Non-Staff)?*	1 2 **3** 4 5	

12. Overall comment :
Komen secara keseluruhan:

Sistem yang baik dan mesra memberi kepada pengguna. Walaubagaimanapun, penambahbaikan sistem diperlukan untuk menghasilkan sistem yang mesra pengguna.

APPENDIX C

No	Functional Requirement	Test Requirement	Pre Condition	Input Data	Steps	Expected	Pass/Fail
M01	Enter information	Validate that the system are able to enter the information	Users are able to access the system	**Valid:** Name: Liyana Identity Card/Passport: 940807-14-5890	1)Enter the information 2)Click *Next* 3)Click *Submit*	The information successfully saved	Pass
				Valid: Telephone No: 014-6789670 Address: Taman Burung			Pass
				Invalid: 1)Name: “ ” Identity Card/Passport: “ ” 2)Name: “ ” Identity Card/Passport: 940807-14-5890	1)Enter the information 2)Click *Next* 3)Click *Submit*	The user need to fill up the form before submit	Fail

				3)Name: Liyana Identity Card/Passport: “ ”			
M01				**Invalid:** 1)Telephone No: “ ” Address: “ ” 2)Telephone No: 014-6789670 Address: “ ” 3)Telephone No: “ ” Address: Taman Burung			Fail
M02	Enter the Identity Card/Passport	Validate the maximum length is at most 14 characters	Users are able to go to the next page	**Valid:** Identity Card/Passport: 940807-14-5890	1)Enter the information 2)Click *Next* 3)Click *Submit*	The information successfully saved.	Fail

				Invalid: Identity Card/Passport: 940807-14-58907866		The user need to fill up the form before submit.	Fail
M03	Enter the Telephone No	Validate the maximum length is at most 11 characters	Users are able to go to the next page	**Valid:** Telephone No: 014-6789670	1)Enter the information 2)Click *Next* 3)Click *Submit*	The information successfully saved	Fail
				Invalid: Telephone No: 014-67896705678		The user need to fill up the form before submit	Fail
M04	Take a picture	Validate the system can take a picture	Users are able to take picture and successfully submit	**Valid:** Picture: *image*	1)Click *take a photo* 2)Click *submit*	The user successfully submitted and the picture displayed at print page	Fail

				Invalid: Picture: *image*		The user need to take picture and the picture will be displayed at print page	Fail

APPENDIX D

No	Functional Requirement	Test Requirement	Pre Condition	Input Data	Steps	Expected	Pass/Fail
M01	Enter information	Validate that the system are able to enter the information	Users are able to access the system	**Valid:** Name: Liyana Identity Card/Passport: 940807-14-5890	1)Enter the information 2)Click *Next* 3)Click *Submit*	The information successfully saved	Pass
				Valid: Telephone No: 014-6789670 Address: Taman Burung			Pass
M01				**Invalid:** 1)Name: “ ” Identity Card/Passport: “ ”	1)Enter the information 2)Click *Next* 3)Click	The user need to fill up the form before submit	Pass

				2)Name: “ ” Identity Card/Passport: 940807-14-5890 3)Name: Liyana Identity Card/Passport: “ ”	*Submit*		
M01				**<u>Invalid:</u>** 1)Telephone No: “ ” Address: “ ” 2)Telephone No: 014-6789670 Address: “ ” 3)Telephone No: “ ” Address: Taman Burung			Pass

M02	Enter the Identity Card/Passport	Validate the maximum length is at most 14 characters	Users are able to go to the next page	**Valid:** Identity Card/Passport: 940807-14-5890	1)Enter the information 2)Click *Next* 3)Click *Submit*	The information successfully saved.	Pass
				Invalid: Identity Card/Passport: 940807-14-58907866		The user need to fill up the form before submit.	Pass
M03	Enter the Telephone No	Validate the maximum length is at most 11 characters	Users are able to go to the next page	**Valid:** Telephone No: 014-6789670	1)Enter the information 2)Click *Next* 3)Click *Submit*	The information successfully saved	Pass
				Invalid: Telephone No: 014-67896705678		The user need to fill up the form before submit	Pass

M04	Take a picture	Validate the system can take a picture	Users are able to take picture and successfully submit	**Valid:** Picture: *image*	1)Click *take a photo* 2)Click *submit*	The user successfully submitted and the picture displayed at print page	Pass
				Invalid: Picture: *image*		The user need to take picture and the picture will be displayed at print page	Pass

APPENDIX E

No	Functional Requirement	Test Requirement	Pre Condition	Input Data	Steps	Expected	Pass/Fail
W01	Login	Validate that the system are authenticate	Admin is able to access the system	**Valid:** Username: admin Password: admin	1)View the application page 2)Enter username and password. 3)Click Login	The admin can view the user's application information	Pass
				Invalid: 1)Username : " " Password: " " 2)Username : " " Password: admin 3)Username : admin Password: " "	1)View the application page 2)Enter username and password. 3)Click Login	The admin need to enter the correct username and password	Pass

W02	View information	Validate that the system are able to view the selected category	Admin is able to access the system	**Valid:** Please Select: All/Kontraktor/Latihan Industri/ Pembantu Penyelidik/ Pens. Sambilan/ Alumni	1)Select from dropdown 2)Choose category	Display the selected category	Fail
				Invalid: Please Select: “ ”	1)Select from dropdown 2)Choose category	Display the default category	Pass
W03	Search status	Validate the system are able to search the status	Admin are able to access the system	**Valid:** Status: Approved	1)Select *Status* 2)Choose either *Approved/Not approved/In-process* 3)Then *Enter*	Display the Approved user’s information	Fail
				Invalid: 1)Status: “ ”	1)Select *Status* 2)Choose either	Cannot display the user’s information	Fail

				2)Status: Not approved 3)Status: In-process	*Approved/Not approved/In-process* 3)Then *Enter*		
W04	Update End date	Validate that the system are able to update the user's end date pass which is not the expired date	Admin is able to access the system	**Valid:** current date:18/6/2016 End date: 20/6/2016	1)Click hyperlink at *No Kad Pengenalan,* 2)Enter *End Date* 3)Click Save	Can save the update End Date	Fail
				Invalid: current date:18/6/2016 1)End date: 20/6/1994 2)End date: " "	1)Click hyperlink at *No Kad Pengenalan,* 2)Enter *End Date* 3)Click Save	Cannot save the update End Date	Fail
W05	Print pass	Validate the system can print the pass included the information needed	Admin is able to access the system	**Valid:** Picture: *image* Name: Liyana End Date:30/7/2016	Click Print	Can print the pass	Fail

				Invalid: Picture: “ ” Name: “ ” End Date: “ ”	Click Print	Cannot print the pass	Fail
W06	Notification	Validate the system can notify the user by sending SMS	Admin is able to access the system	**Valid:** Message Sender:012 345678 Destination Address: 0142673197 (Recipient)	Connect at localhost	The notification is received by the recipient	Pass
				Invalid: Message Sender: “ ” Destination Address: “ ”	Connect at localhost	The notification is not received by the recipient	Pass

APPENDIX F

No	Functional Requirement	Test Requirement	Pre Condition	Input Data	Steps	Expected	Pass/Fail
W01	Login	Validate that the system are authenticate	Admin is able to access the system	**Valid:** Username: admin Password: admin	1)View the application page 2)Enter username and password. 3)Click Login	The admin can view the user’s application information	Pass

				Invalid: 1)Username: “ ” Password: “ ” 2)Username: “ ” Password: admin 3)Username: admin Password: “ ”	1)View the application page 2)Enter username and password. 3)Click Login	The admin need to enter the correct username and password	Pass
W02	View information	Validate that the system are able to view the selected category	Admin is able to access the system	**Valid:** Please Select: All/Kontraktor /Latihan Industri/ Pembantu Penyelidik/ Pens. Sambilan/ Alumni	1)Select from dropdown 2)Choose category	Display the selected category	Pass
				Invalid: Please Select: “ ”	1)Select from dropdown 2)Choose category	Display the default category	Pass

W03	Search status	Validate the system are able to search the status	Admin are able to access the system	**Valid:** Status: Approved	1)Select *Status* 2)Choose either *Approved/Not approved/In-process* 3)Then *Enter*	Display the Approved user's information	Pass
				Invalid: 1)Status: " " 2)Status: Not appproved 3)Status: In-process	1)Select *Status* 2)Choose either *Approved/Not approved/In-process* 3)Then *Enter*	Cannot display the user's information	Pass
W04	Update End date	Validate that the system are able to update the user's end date pass which is not	Admin is able to access the system	**Valid:** current date:18/6/2016 End date: 20/6/2016	1)Click hyperlink at *No Kad Pengenalan,* 2)Enter *End Date* 3)Click Save	Can save the update End Date	Pass

		the expired date		**Invalid:** current date:18/6/2016 1)End date: 20/6/1994 2)End date: “ ”	1)Click hyperlink at *No Kad Pengenalan*, 2)Enter *End Date* 3)Click Save	Cannot save the update End Date	Pass
W05	Print pass	Validate the system can print the pass included the information needed	Admin is able to access the system	**Valid:** Picture: *image* Name: Liyana End Date:30/7/2016	Click Print	Can print the pass	Pass
				Invalid: Picture: “ ” Name: “ ” End Date: “ ”	Click Print	Cannot print the pass	Pass
W06	Notification	Validate the system can notify the user by sending SMS	Admin is able to access the system	**Valid:** Message Sender:012345678 Destination Address: 0142673197(Recipient)	Connect at localhost	The notification is received by the recipient	Pass

				Invalid: Message Sender: “ ” Destination Address: “ ”	Connect at localhost	The notification is not received by the recipient	Pass