

FACULTY OF SYSTEM COMPUTER AND SOFTWARE ENGINEERING

ASSET MANAGEMENT USING RFID

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APPENDIX A6

ABSTRACT

Nowadays, many application system use online system and software to interact with the user. It is because online system has many advantages rather than using manual system. Asset management using RFID (Radio Frequency Identification) is very important to organization. System is an example of asset system that will be develop for lab administrators to manage all device in the labs. In this project system using RFID, several modules will be applied to the lab management system. All these modules are choosing based on the lab administrator and user request. This project has its objectives and problem statements that give the reason why this asset management system should be develop. Before developing the project, the developers should make a plan that consist the objectives, problem statements, scopes, and methodology including the system analysis, system design and system requirement that will used. All these components will helps the developers what should they develops and how to develops the system. Asset management is produce an easy platform for both new student and faculty administrator in registration process.

APPENDIX A7 TRANSLATION OF ABSTRACT

ABSTRAK

Pada masa kini, banyak sistem aplikasi menggunakan sistem dalam talian dan perisian untuk berinteraksi dengan pengguna. Ia adalah kerana sistem dalam talian mempunyai banyak kelebihan berbanding menggunakan pengurusan system. Asset manual menggunakan RFID (Radio Frequency Identification) adalah sangat penting kepada organisasi. Sistem adalah satu contoh sistem aset yang akan membangunkan bagi pentadbir makmal untuk menguruskan semua peranti dalam makmal. Dalam sistem projek ini menggunakan RFID, beberapa modul akan digunakan untuk sistem pengurusan makmal. Semua modul-modul memilih berdasarkan pentadbir makmal dan permintaan pengguna. Projek ini mempunyai objektif dan penyata masalah yang memberikan sebab mengapa sistem pengurusan aset ini harus membangunkan. Sebelum membangunkan projek, pemaju perlu membuat satu pelan yang terdiri objektif, kenyataan masalah, skop, dan metodologi termasuk analisis sistem, reka bentuk sistem dan keperluan sistem yang akan digunakan. Semua komponen ini akan membantu pemaju apa yang sepatutnya mereka membangun dan bagaimana untuk membangunkan sistem. Pengurusan aset adalah menghasilkan satu platform yang mudah bagi kedua-dua pelajar baru dan pentadbir fakulti dalam proses pendaftaran.

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CHAPTER 1

INTRODUCTION

This chapter briefly discuss on the overview of this research. It contains five sections. The first section is introduction; follow by the problem statement. Next are the objectives where the project's goal is determined. After that are the scopes of the system and lastly is the thesis organization which briefly describes the structure of this thesis.

1.0 Introduction

Nowadays, Faculty of System Computer and Software Engineering Asset Management Using RFID is a program that help user that manage several task of Faculty of System Computer and Software Engineering(FSKKP) laboratories and office at University Malaysia Pahang(UMP). This system will manage in FSKKP laboratories such as tools borrowing, lab tool maintenance and report the using of all faculty tool.This system will be develop to help the lab administrators to set up and manage the faculty easily using the Microsoft application.

Radio Frequency Identification (RFID) systems consist of electric tags or transponder, tag reader and transceivers. Therefore, every electric tag provides a worldwide unique identification. The chip is mated to an antenna. Some electric tags also provide extra memory space and have the read-write functionality.

Generally, this system will be developed using Microsoft Visual Studio 2010 to make that system more structured and systematic beside can make the administrator more easier than before. The device is Radio-frequency identification (RFID). So, this method will make the user easy to access by using system application. This system also can be upgrade by adding more module if there are new modules need to be recorded into this system that related to the FSKKP admin. So, this system quite important to the FSKKP administrators to make the management at UMP more advance than other universities.

1.1 Problem statements

Problem statement is the description of an issue currently existing which needs to be addressed. This problem provides the context for the research study and generates the questions which your research aims to answer. The process using previous system (manual system) has several problems. The problems statements are:

- i. The recorded data easily lost if the use the manual system. So, this issue will create another big problem to the student and staff.
- ii. Hard to manage the task in different location by using manual system.
For example, the user such as staffs cannot monitoring all tool at the lab.
- iii. When tool and device borrow by user and user using the tool don't detect location.

1.2 Project Objectives

There are several objectives of this research:

- i To develop several records in management system.
- ii To manage the recording data about tools in FSKKP Asset Management easily and securely.
- iii To help the staff track tools and devices anywhere.

1.3 Project scopes

The scopes of this project are:

- i The scope of this project is at University Malaysia Pahang (UMP) only.
- ii The system runs using devices running in the same Local Area Network Connection.

1.4 Thesis Organization

This thesis consists of four (4) chapters. Chapter 1: Introduction briefly describes and introduces the system. This system preliminary shows the basic concept of the system, problem statements of the system, objectives, scopes, and how the report is organized. Chapter 2: Literature Review depicts the manual systems and the existing systems as the case studies of the project. This chapter also reviews the technique, method, equipment, and technology that had been used in the case studies. Chapter 3: Methodology discusses about the overall workflow in the development of the project. This chapter also discusses the method, technique or approach that has been used while designing and implementing the project. Chapter 4: Conclusion briefly summarizes the project.

CHAPTER 2

LITERATURE REVIEW

This chapter briefly discusses about the literature review of FSKKP Asset Management Using RFID (Radio Frequency Identification). There are seven main sections in this chapter. The first main section is introduction of this chapter. Then, the next main section describes the concept. After that, the manual system of the project will be discussed. Next, there are two main sections which discuss several technologies and techniques separately. The next main section discusses the existing system while the last main section reviews the methodologies used to develop application.

2.0 Introduction

Literature review surveys on scholarly articles, books, journal and other literature sources relevant to the area of research for this project. The aim for literature review is to gain a clearer perceptive in developing this project. So, this chapter will explain on all information gathered from previous researches for this project. Firstly, it will include a description of the concepts for this project. The main concepts of this system are lab management. This chapter will also include the description of development technology, techniques, and the methodology to develop the system in previous similar case study. The technology section explains the biofeedback devices especially the pulse sensor and other sensors as well as the smart card reader. It includes a description of RFID, components of RFID, tags, passive tags and reader. The technique section depicts the lab management techniques used to develop tracking lab

tool. The methodology section in this chapter discusses the methodologies that are related to lab management development. Studies on the manual system and existing lab management have also been done to discover the strengths and weaknesses of those systems.

2.1 Existing System Review

This section is to review the current system and the existing system that related to handicraft products. Online registration system is a system that use service of internet to access the system through. The requirement needed to access the system is a physical device which is computer or any notebook, then make sure there have any web browser in the devices.

2.1.1 Portal Technical University of Malaysia Malacca, UTEM

Technical University of Malaysia Malacca, UTEM has been using the online registration system. UTEM need the user to have these requirements to access their system. If the requirement fulfilled, user have granted to use the system. The requirements are shown below:

- a. Please use **Internet Explorer 6.0** and above.
- b. Please Make Sure Your Browser is Configured to Accept '**Cookies**'.

User need to browse to web browser to access the online registration system provide by UTEM. User should be at Enrolment to Undergraduate Programs page to begin the registration process.



Figure 1.0 : View of homepage show e-Lab

Figure 1.0 user need to choose their e-Lab only. Then user needs to fill in the PERSONAL DETAILS form.

2.1.2 Portal University of Technology Malaysia, UTM

The screenshot shows the homepage of the Faculty of Computer Science and Information Systems at UTM. The header includes the UTM logo, the faculty name, and navigation links like 'Staff Directory', 'Contact Us', 'Sitemap', and 'News & Events'. Below the header is a search bar and a 'Quick Links' dropdown menu. The main content area is organized into three columns:

- INFORMATION ABOUT:** A sidebar menu with links to Home, Academic Programs, Research & Resources, Admission, Departments, About The Faculty, Publication, Internationalization, Administration, News & Events, Directories, and Media Section.
- LABORATORIES AT THE FACULTY:** A central section featuring a photograph of a computer lab with the text "FSKSM Laboratories". Below the image, it states "The laboratories are divided by departments." and lists:
 - Laboratories in Department of Information System
 - Laboratories in Department of Software Engineering
 - Laboratories in Department of Computer Graphics & Multimedia
 - Laboratories in Department of Industrial Computing and Modelling
 - Laboratories in Department of Computer Systems & Communication
- RESEARCH & RESOURCES:** A list of links including Overview, Research Groups, Laboratories, Information System Laboratory, Software Engineering Laboratory, Computer Graphics & Multimedia Laboratory, Industrial Computing And Modelling Laboratory, and Computer System & Communication Laboratory.

At the bottom left, there is a calendar for November 2011.

Figure 2.0 : View of homepage

Figure 2.0 show don't found lab management. The user must to using manual system.

2.1.3 Portal University Malaysia Pahang, UMP

Portal Rasmi
Fakulti Sistem Komputer & Kejuruteraan Perisian
http://fsk.kk.p.u.m.p.edu.my

***MAIN MENU**

- Home
- Entry Requirement
- 5 Reason to Choose Us
- Overview
- Academic Programme
- Research
- Consultation
- Facilities
- Lab & Equipment Rental
- Phone Directory
- Portal Taskforce
- FSKPP Forum
- Image Gallery
- Video Galleries

***STAFF**

- Technics Unit
- Academic Staff
- Non Academic Staff
- Staff Download
- Internal Committee (JK)

Home » Lab & Equipment Rental

Lab & Equipment Rental

LAB AND EQUIPMENT RENTAL

We are offering lab and equipment rental based on request. If interested (request for quotation) please contact En Abdullah
 ☎ +609-5492125 📧 (abdullah@ump.edu.my)

| LAB | SPEC S | RENT ONE HOUR | RENT HALF DAY | RENT ONE DAY (weekday) | RENT ONE HOUR | RENT HALF DAY | RENT ONE DAY (weekend) |
|--|--|---------------|---------------|------------------------|---------------|---------------|------------------------|
| FSK4,FSK4B,FSK5,FSK6, FSK6B,FSK7,FSK9,FSK10 dan FSK10B, FSK15 (10 Labs available) | Air cond, PC, LCD Projector, Audio System, Internet, Desk and Chair | RM90 | RM310 | RM620 | RM54 | RM330 | RM660 |
| FSK2,FSK11 (CCNA Lab) (2 Labs available) | Air cond, PC, LCD Projector, Audio System, Internet, Desk and Chair, Cisco Network Equipment | RM120 | RM420 | RM840 | RM130 | RM430 | RM860 |
| FSK7B, FSK16 (ICT Workshop) | Air cond, PC, LCD Projector, Audio System, Internet, Desk and Chair, Computer component and | RM90 | RM310 | RM620 | RM90 | RM310 | RM620 |

Figure 3.0: The homepage show Lab & Equipment Rental

Figure 3.0 show Lab & Equipment Rental only. The progress must using manual system and contact the person in charge.

2.2 Comparison between existing system

The table2.0 shows the existing systems that have been through studies and analysis.

The results from the studies is shown in the table2.0

| Online Registration System in | Technical University Malaysia Malacca, | University Technology Malaysia, UTM | University Malaysia Pahang, UMP |
|--------------------------------------|---|--|---|
| Feature | Not found | Not found | Found and register manually |
| Application | - | - | Manually |
| Advantage | - | - | -have guide which contain one-by-one step. -easy to navigate |
| Disadvantage | - | - | Basically the system to online registration |

Table 2.0 : Comparison between existing systems

2.3 Radio Frequency Identification(RFID)

Through the radio frequency communication with RFID tags, a RFID reader reads or writes the data which are stored in a RFID tag memory, and also does other memory access tasks including locking/unlocking the data as well as disabling a tag functionality [1]

2.3.1 Components

This RFID system which is composed of a RFID tag, a RFID reader, and a host [2]. Then must have an antenna for receiving and transmitting the signal.

Tags

Generally three types of RFID tags: active RFID tags, which contain a battery and can transmit signals autonomously, passive RFID tags, which have no battery and require an external source to provoke signal transmission, and battery assisted passive (BAP) RFID tags, which require an external source to wake up but have significant higher forward link capability providing greater range.

Active Tags

Active RFID tags use internal batteries to power their circuits. An active tag also uses its battery to broadcast radio waves to a reader. Active tags that do not detect the interrogation zone of a reader hibernate by going into asleep mode, and thus they do not waste power [3]. Active tags are frequencies from 850 to 950 MHz that can be read 100 feet (30.5 meters) or more away.

Passive Tags

Passive RFID tags does not use a battery, while an active has an on-board battery that always broadcasts or beacons its signal These tags are read up to 20 feet (six meters) away, and they have lower production costs, meaning that they can be applied to less expensive merchandise. Passive tags may or may not contain an IC, memory block, or application specific IC (ASIC) [8].Due to these salient features, passive tags are used in a wide range of applications such as medical, supply chain management, and wireless sensing [4], [5].

Semi-Active Tags

Semi-passive RFID tags use internal batteries to power their circuits and tag relies on the reader to supply its power for broadcasting.It consumes much less power from the on-board battery and has a longer life compared to an active tag. After that tags broadcast high frequencies from 850 to 950 MHz that can be read 100 feet (30.5 meters) or more away.

Tags Classes

RFID readers are classified into two different types.This is fixed RFID and mobile RFID. The reader reads tags in a stationary position, it is called fixed RFID. These fixed readers are set up specific interrogation zones.This allows a very definitive reading area for when tags go in and out of the interrogation zone. On the other hand, if the reader is mobile when the reader reads tags, it is called mobile RFID.

Reader

Measuring only 38mm x 45mm, the reader module is ideal for battery operated handheld readers, mobile devices and printers. With a standard RS232 cable plus a USB connector, it is a ready “plug and play” product for desktop solution.



Figure 2.1 : Reader Module RS232

Antenna

The Antenna send wireless signals to the tags, and receive wireless message from the tags located in reachable range.

2.4 Software Component

RFID reader interface is usually implemented as a form of software, it is often considered a type of RFID software. And there have been many researches on RFID software as well as the commercialized software products for the last decade ([6], [7]-[8]).

2.4.1 System Software

Developer software requirements are the decision on usage of software development tools used by developer to develop FSKKP Lab Management Using RFID . The tool usage is shown as

| Purpose | Software |
|--|---|
| Operating System | Microsoft Windows 7 Home Premium 64 bit |
| Documentation | Microsoft Office Word 2007 |
| Planning | Microsoft Office Project 2007 |
| Admin Interface Design and Programming | Microsoft Visual Studio 2010 |
| Diagram and Gantt chart | Microsoft Project 2007 |
| Database Management | Microsoft Office Acces 2007 |
| Slide Presentation | Microsoft Office PowerPoint 2007 |
| Modeling and Designing | Microsoft Office Visio 2007 |

Table 2.1: Developer Software Requirements

User software requirement refers to the software needed to access FSKKP Lab Management Using RFID and to run it smoothly. For client-side workstation, the software required is Microsoft Windows 7 Home Premium as operating system.

2.5 Electronic Product Code

As many efforts to standardize the RFID air interface have been made from the international standard organizations as well as from the industrial forums, several specifications have been ratified since 2004, such as ISO/IEC 18000 air interface standards [9] and EPC global tag protocol specifications [10]

2.6 RFID Application- Industry

Paper is considered as one of the best organic substrates for RFID applications for several reasons. Paper is not just environmentally friendly but can also undergo large reel to reel processing and is one of the cheapest materials known. Paper can also be characterized easily for electrical properties using resonator structures [11]. Passive tags are used in a wide range of applications such as medical, supply chain management, and wireless sensing [12], [13]. The application of RFID technology to the manufacturing process will enable the possibility to obtain real-time information about the physical items involved in the process [14][15]. Many industrial settings [16] and in particular in the pharmaceutical industry [17]

CHAPTER 3

METHODOLOGY

This chapter is the main part of this system because it has the design, prototype, research and related software and hardware for this system.

3.0 System Development Life Cycle (SDLC)

When we plan to develop, acquire or revise a system we must be absolutely clear on the objectives of that system. The objectives must be stated in terms of the expected benefits that the business expects from investing in that system. The objectives define the expected return on investment.

An SDLC (System Development Life Cycle) has three primary business objectives:

- i. Ensure the delivery of high quality systems;
- ii. Provide strong management controls;
- iii. Maximize productivity.

In other words, the SDLC should ensure that we can produce more function, with higher quality, in less time, with less resource and in a predictable manner.

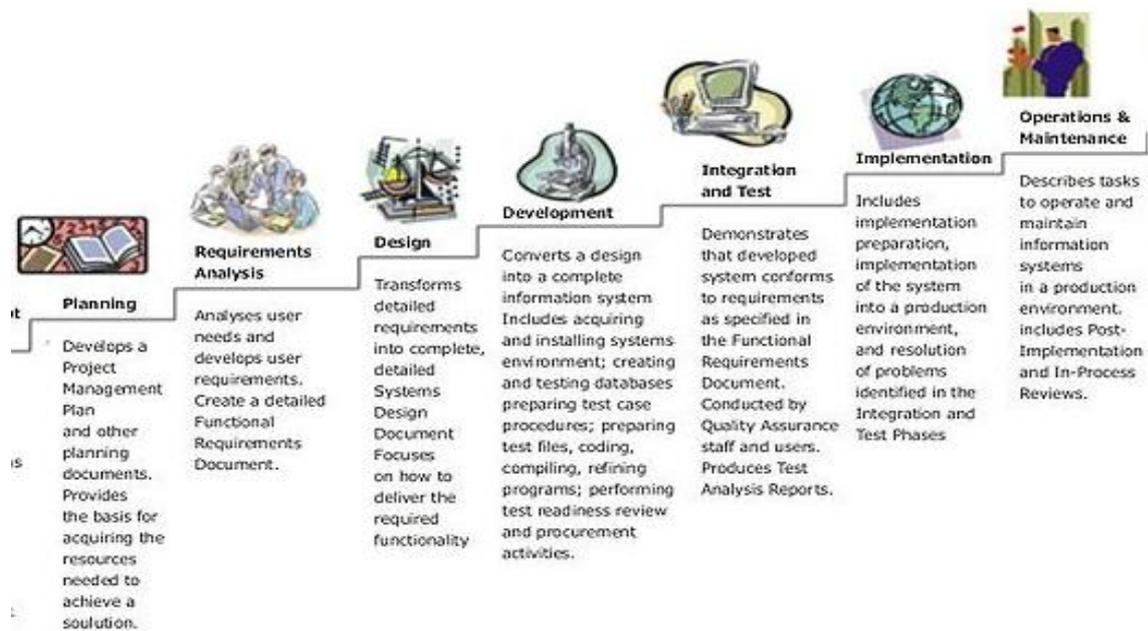


Figure 3.0 : Phases in System Development Life Cycle (SDLC)

(Source : US Department of Justice (2003). Information Resources Management .Chapter 1.Introduction)

3.1 The Justification Choosing System Development Life Cycle (SDLC)

System Development Life Cycle is also known SDLC.This is conceptual model use in project management to describe this stage involved the in information system development project from an initial feasibility study thorough maintenance of the completed application. The goal of system analysis is to determine where the problem is in an attempt to fix the system. This step involves breaking down the system in different pieces to analyze the situation, analyzing project goals, breaking down what needs to be created and attempting to engage users so that definite requirements can be defined.