UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DEVELOPMENT OF LABORATORY EQUIPMENT BORROWING SYSTEM

This report is submitted in accordance with the requirement of the UniversitiTeknikal Malaysia Melaka (UTeM) for the Bachelor of Computer Engineering Technology (Computer System) with Honours.

by

SASITHRA A/P SOCKALINGAM

BO71610864

930421086262

FACULTY OF ELECTRICAL AND ELECTRONIC ENGINEERING

TECHNOLOGY

2019

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

BORANG PENGESAHAN STATUS LAPORAN PROJEK SARJANA MUDA

Tajuk:DEVELOPMENT OF LABORATORY EQUIPMENT BORROWING SYSTEM

Sesi Pengajian: 2019

Saya **SASITHRA A/P SOCKALINGAM** mengaku membenarkan Laporan PSM ini disimpan di Perpustakaan Universiti Teknikal Malaysia Melaka (UTeM) dengan syarat-syarat kegunaan seperti berikut:

1. Laporan PSM adalah hak milik Universiti Teknikal Malaysia Melaka dan penulis.
2. Perpustakaan Universiti Teknikal Malaysia Melaka dibenarkan membuat salinan untuk tujuan pengajian sahaja dengan izin penulis.
3. Perpustakaan dibenarkan membuat salinan laporan PSM ini sebagai bahan pertukaran antara institusi pengajian tinggi.
4. **Sila tandakan (X)

☐	SULIT*	Mengandungi maklumat yang berdarjah keselamatan atau kepentingan Malaysia sebagaimana yang termaktub dalam AKTA RAHSIA RASMI 1972.

☐ TERHAD* Mengandungi maklumat TERHAD yang telah ditentukan oleh organisasi/badan di mana penyelidikan dijalankan.

☒ TIDAK TERHAD

Yang benar,

.....

SASITHRA A/P SOCKALINGAM

Alamat Tetap:

1040-D, Jalan Maharaja Lela,

36 000 Teluk Intan,

Perak.

Tarikh:

Disahkan oleh penyelia:

.....

IZADORA BINTI MUSTAFFA

Cop Rasmi Penyelia

Tarikh:

*Jika Laporan PSM ini SULIT atau TERHAD, sila lampirkan surat daripada pihak berkuasa/organisasi berkenaan dengan menyatakan sekali sebab dan tempoh laporan PSM ini

DECLARATION

I hereby, declared this report entitled DEVELOPMENT OF LABORATORY EQUIPMENT BORROWING SYSTEM is the results of my own research except as cited in references.

Signature: ……

Author : SASITHRA A/P SOCKALINGAM

Date:

APPROVAL

This report is submitted to the Faculty of Electrical and Electronic Engineering Technology of Universiti Teknikal Malaysia Melaka (UTeM) as a partial fulfilment of the requirements for the degree of Bachelor of Computer Engineering Technology (Computer System) with Honours. The member of the supervisory is as follow:

Signature: …….

Supervisor : IZADORA BINTI MUSTAFFA

Signature: …….

Co-supervisor: ROSZIANA BINTI HASHIM

ABSTRAK

Projek ini merupakansatu system yang paling pentinguntuk Fakulti Teknologi Kejuruteraan Elektrik dan Elektronik (FTKEE), UTeM. Tajuk projek ialah Development of Laboratory Equipment Borrowing System(LEBS). Sisteminisedang dibangunkan untuk menguruskan peralatan makmal FTKEE. Sistem ini mengesan masuk dan keluar peralatan makmal dari makmal tertentu. Peralatan makmal tidak akan dapat hilang dan tidak dicurikan apabila system ini membangun. Pengguna yang perlu meminjam peralatan, secara langsung boleh memilih peralatan dari system terusnya. Bahasa pengaturcaraan PHP adalah kaedah utama untuk membangunkan system ini. Sistem ini membantu meningkatkan system pinjaman peralatan makmal berbanding dengan proses manual dan melindungi peralatan makmal.

ABSTRACT

This project is most important to Faculty of Electrical and Electronic Engineering Technology (FTKEE), UTeM. The project title is Development of Laboratory Equipment Borrowing System(LEBS). This system is developing to manage the FTKEE laboratory equipment. This system traces the in and out of the laboratory equipment. The laboratory equipment will not disappear and not be stolen. User, who needs to borrow the equipment, directly can choose the equipment from the system. PHP programming language is the main method to develop this system. This system assists to improve laboratory equipment borrowing system compared to the manual process and protect the laboratory equipment.

DEDICATION

I dedicate this project to my beloved mother and lecturers for their sacrifices and prayers which always acted as a motivation in my academic life.

ACKNOWLEDGEMENTS

First, I would like to take this as an opportunity to express my sincere acknowledgement to my supervisor Madam Izadora Binti Mustaffa from Department of Electronics and Computer Engineering Technology (JTKEK), Universiti Teknikal Malaysia Melaka (UTeM) for her essential supervision, encouragement and support towards the fulfillment of this thesis.

I would like to give my greatest gratitude to Madam Rosziana Binti Hashim as co-supervisor and laboratory technologist, Mr Saifullah Bin Salam as a JTKEK lab manager and Mr Mohd Farid Bin Johari as a laboratory technologist to assist, advice and provides in the information of the laboratory department. Special thanks to the UTEM to supported fastest Wi-Fi system to complete this report.

Special thanks to my beloved mother, father and siblings for their moral support in completing this degree. Finally, thank you to everyone who had been to the central parts of this project realization.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

CHAPTER 1

INTRODUCTION

1.1 Introduction

The Development of Laboratory Equipment Borrowing System (LEBS) is an online web that manages borrowing and lending of laboratory equipment including consumable supplies. Consumable supplies are components which are used to build student's project for their activity in class or Final Year Project (PSM). Those components would not returnable.

Laboratory equipment is imperative for every university to provide the high-quality equipment on training to students these days. Laboratory equipment is one of the most important assets that should be manage properly which the equipment make teaching and learning easy for students and lecturers.

For recently, the Faculty of Electrical and Electronic Engineering Technology (FTKEE), Universiti Teknikal Malaysia Melaka (UTeM) is managing their laboratory system in manually to trace the in and out of the equipment. By this system, lots of forms are used to list out the data information of equipment and users are written by manually. So that, there are some issues occurred which the data and stuffs in the laboratory could not able to protect.

Therefore, this system develops for laboratory administrator and student of FTKEE, UTeM. The purpose of the system is to assist the laboratory administrator in tracing the in and out of laboratory equipment. At present, FTKEE laboratories are using some of manual system to trace the information of borrowing and lending of

laboratory equipment. This system is basically to overcome the current process which managing by the FTKEE laboratories.

This system will give more benefits to the laboratory management such as protect the laboratory equipment, update the stored data in the system without handwriting, easy and speedy, make the work in short time and manage the equipment in one place.

1.2 Problem Statement

The current laboratory management system occur some issues to the management and also to the students. The borrowing system of equipment is manually. Appendix 3 shows the form of borrowing equipment manually. The main issue is the written recorded data using Appendix 3 form by laboratory administrator get disappear day by day. Using that form some of student could not able to borrow laboratory equipment themselves. FTKEE stuff has burden to assist student with this. Besides that, students who need to borrow the equipment of laboratory also should walk laboratory to laboratory, to know about the equipment whether it is available or taken. By the way, the process handling by the laboratory management made difficult and take time to lend and borrow. Therefore, to avoid the issues above, LEBS is needed to overcome the problems face by the laboratory management and students. This system will give important to trace out of the laboratory equipment because the system will store the data information of borrowers and equipment in the system.

1.3 Objective

The major objectives of this project are:

i. To design a smart online web for laboratory administrator to monitor laboratory equipment.

ii. To develop the laboratory management in receiving and requesting application for equipment via online.

iii. To implement the developed system.

1.4 Scope of Project

This system is designed to borrowing, lending and searching for laboratory equipment. This system track and record the data of laboratory equipments and consumable supplies(component). The users of this system are laboratory administer and students. Administer has to login into the system to update the list, check the status of equipment and consumable supplies, and further work on. For students, they also have to login to system before make application on equipment to borrow. But, the student can search or checkout the list of equipment without login. The system also has capability to send email to the users as an alert notification whenever student and admin is sending and receiving application request respectively. Furthermore, whenever users login into system using password, there is a capability to protect the password and information of the users. And also whenever user enters wrong information, cannot even continue into the next page.

1.5 Thesis Outline

This project report consists of five chapters. The first chapter discusses introduction of the project where the statement of problem, the main objective, scope of project and the system were proposed are described. Essentially, this chapter is predetermined to provide a fine overview on what this project is all about.

Next is Chapter 2 which contains literature review of this project. This chapter explains different project that developed for database management system in the past. The methods and software of each system are explained and compared. Conclusion of which method for proposed system is given.

In Chapter 3, will discuss about the methodology of project. The flowchart has provided to show the workflow of LBES. The software implementation is explained in this chapter as well.

The following chapter is result and discussion which is Chapter 4. This chapter will present the outcome of the project and briefly discuss the outcome.

Finally, Chapter 5 concludes the result and discussion of the project. It also provides future recommendations to further develop project in the future so that it will be more attractive and competent to give more benefits in laboratory equipment borrowing system.

1.6 Conclusion

This chapter is the beginning step that able to understand an overview of the project. In this chapter, issue and target of the system are examined as both of the part are the pivotal part in developing the idea of the project.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter briefly explains about previous literature studies and research about development of online web system. The researched systems are based on systems that contains database management system (DBMS) which isused to create and manage the database of a develop system. The studied would be able to the monitor, maintain and track data of equipment. Most of the systems are software based. The aspect of software is discussed including comparison in this chapter.

2.2 Overview of Previous Project

This section isan overview of the past projects developed by University graduate students in Malaysia and overseas. The researched systems are according to laboratory management system, library management system, food ordering system, database management system and information management system. These all kind of systems are consisting of DBMS where create and monitor the information in the system. Database is usually considered by every web site creators. Database is the most top priority for every web applications to maintain and manage the data information of the system.

2.2.1 Library Management System

A library management system is a made of software to deal with the essential housekeeping elements of a library.Mayo(2016) developed a system which is Public High Schools Online Library System (PHOLS) to assist public general high school through Information and Communication technologies (ICT). This developer developed the system to overcome the obstacles by the manual processed face by the staffs in the library. PHOLS permits expansion of recently reading elements in the online list, getting and returning of reading elements, helps tracing reading elements use and accessibility, helps checking users' overdue books and reading elements and produces library report impeccably and precisely. PHOLS was designed for school librarians, library users who borrowing and returning the reading elements, principal and administrator. The programming languages used to design the system are HTML, JavaScript (JS), PHP, CSS and MySql(Mayo, 2016).

2.2.2 Food Ordering System

Food ordering is the ordering food process through the restaurant's own mobile app and website.The procedure comprises of a customer fetching their preferred item, checking the menu item, picking a item, lastly deciding to delivery. Ahluwalia et al(2016) found a capable food ordering system that developed in Food & Beverage (F&B) industry in Kampar, Perak which instead of traditional food ordering method. The Kampar people refusing traditional food ordering method because crowded of customers, food serve not in order, missing menu card or paper and mistake in write down the menu. The developers designed this system to provide convenience for both employees and consumers, to assist restaurant to plan ahead and prevention of food serves not in order. The system developers used WampServer, MySql, PHP, Apache

and Android Studio IDE to implement web services to support the Android mobile phone.

2.2.3 Information Management System

The information management system is a generated fromsoftware design toorganization, facilitate the storage and retrieval of information. Aho(2012)found a better solution for manipulating customer information by online instead of manual method at Botisto shoe companies which located in Barcelona, Spain and Seoul, South-Korea. Aho(2012)implemented working customer information, requirement documentation, build documentation and test plan document for the system. The system would be used by the employees and management of the shop and PHP programming language and MySql were used to develop the system and to monitor the database respectively.

2.2.4 Laboratory Management System

A laboratory management system is responsible for providing information of laboratory equipment or laboratory usage to lab assistant and student, particularly on how to carry out the management of laboratory. Salvador (2016)found The Equipment Inventory Management and Transaction Recording (EIMTR) Using Bar Coding Scheme via VB6. EIMTRwas developed to contribute against development in management and transaction documentation of equipment. The purpose of the author develop EIMTR is to development of AutoLab system via the Visual Basic version 6 (VB6) and the bar coding scheme inventory monitoring record(Salvador, 2016).

2.3 Software

The database, programming language and server are the main role to design and develop a system or web site. Database usually used to maintain the data information of a whole program and system. Therefore, LEBS has huge database which is used to manage the laboratory equipment and student. So that, programming languages is needed to develop the LEBS to further by testing with the server. The main role mentioned before are categorized from the past project's collected information.

2.3.1 Type of Database

i. My Structured Query Language (MySql)

MySql is a relation database which often used to store data for websites. The MySql can hold binary files, text and numeric data. MySql has a huge community of contributions. It particularly follows the acquisition, focus mainly on maintain exist features with some new features emerging occasionally. MySql is generally supported globally with the providers of hosting services(Ossipov, 2014).MySql also is a platform that manages phpMyAdmin. PhpMyAdmin is free application which creates the databases using local host server.

ii. PostgreSQL

The function of PostgreSQL is literally same as MySql but manages huge database by hiding the underlying troublesome information. This database would handle workloads ranging from single machine application to Web services with more concurrent users. The cost of ownership is low when develop applications based on PostgreSQL.