UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DATABASE SYSTEM FOR LABORATORY COMPONENTS

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

by

SITI FADILAH BINTI RAZALI
B071310639
940416-14-5976

FACULTY OF ENGINEERING TECHNOLOGY
2016
BORANG PENGESAHAN STATUS LAPORAN PROJEK SARJANA MUDA

TAJUK: DATABASE SYSTEM FOR LABORATORY COMPONENTS

SESIPENGAJIAN: 2016/17 Semester 1

Saya SITI FADILAH BINTI RAZALI

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 (✓)

☐ SULIT (Mengandungi maklumat TERHAD yang telah ditentukan oleh organisasi/badan di mana penyelidikan dijalankan)

☐ TERHAD (Mengandungi maklumat yang berdarjah keselamatan atau kepentingan Malaysia sebagaimana yang termaktub dalam AKTA RAHSIA RASMI 1972)

☐ TIDAK TERHAD

Disahkan oleh:

_________________________________________  ___________________________________________

Alamat Tetap:

NO 3,TINGKAT 8 PLAZA RAH,
JALAN RAJA ABDULLAH,
KAMPUNG BARU,KL

Tarikh:

Cop Rasmi:

_________________________________________
DECLARATION

I hereby, declare that this thesis entitled “Database System For Laboratory Components” is the result of my own research except as cited in references.

Signature : ....................................................

Name : Siti Fadilah Binti Razali

Date :
This report is submitted to the Faculty of Engineering Technology of UTeM as one of the requirements for the award of Bachelor’s Degree in Computer Engineering Technology (Computer System) with Honours. The following are the members of supervisory committee:

Supervisor: Mdm. Nurliyana binti Abd Mutalib

Co: Eng Ahmad Sayuthi Bin Mohamad Shokri
ABSTRACT

Faculty of Engineering Technology (FTK) has many laboratories. It includes many components and machine that helps students to do their laboratory work. However, components data are taken using paper form as medium to save the data. Students have to fill in the form every time they want to request for components. This situation leads to some problem where usage of paper will cause paper waste. Large of storage paper will give burden to assistant engineer to manage the data and to trace the data when problems happen. Therefore, a database system is introduced to overcome this problem. This database was ease to access and friendly user. This database helped user to manage the laboratory components and process to place order for components will be much easier. Besides, amount of data can be stored in this database system which can help to reduce the paper usage. Hence this database system considered as environmental friendly system.
DEDICATIONS

To my parents, En.Razali Bin Amat Lori and Pn.Rohana Binti Yasin for raising me become who I am today. my family who supported me physical, emotional, and financial support throughout the project.
ACKNOWLEDGEMENT

First and foremost, I would like to express my deepest gratitude to Mdm. Nurliyana binti Abd Mutalib for giving me an opportunity working under her supervision throughout this project. Also to Eng Ahmad Sayuthi Bin Mohamad Shokri for taking up her place when she’s not available during her leaves. The project would not be completed under the time frame without their supervision.

Not forgetting the staffs of Faculty of Engineering Technology; my academic advisor, En Aiman Zakwan Bin Jidin. I’m also thank to En Ahmad Fairuz for his professional advices in programming the system, and also the other staffs who had been helping me indirectly.

Special thanks to my peers, my friends Nurul Huda, Abdul Qayyum, NurNabilah, Noor Amira and Muhammed Irsyad to had been providing me remarkable ideas to improve the project.
LIST OF TABLES

2.1: Table of conclusion in previous Research .................................................. 9
2.2: Table of MySQL storage engines ................................................................. 17
3.1: Gantt chart for PSM 1(Year 3 Semester 2) ..................................................... 22
3.2: Gantt chart for PSM 1(Year 4 Semester 1) ..................................................... 22
4.1: Information For Tables ............................................................................... 46
LIST OF FIGURES

2.1: Main components of a DBMS 6
2.2: WAMP Server 11
2.3: phpMyAdmin 12
2.4: phpMyAdmin Startup 14
2.5: Apache 14
2.6: MySQL 15
2.7: MySQL Architecture 19
2.8: Example of MySQL 19
3.1: Basic idea on research flow of the project 24
3.2: Example of manual database form in FTK laboratory 26
3.3: Use Case Diagram for Database System for Laboratory Components 27
3.4: Sequence Diagram for Database System for Laboratory Components 30
3.5: Class Diagram for Database System for Laboratory Components 31
3.6: Activity Diagram for Database System for Laboratory Components 32
4.1: Database named labinventory (.sql) 35
4.2: Table involved 35
4.3: Registration page 36
4.4: User level controlled by admin 36
4.5: Homepage 37
4.6: About 38
4.7: Admin interface 38
4.8: Lecturer or user with access level 0 interface 39
4.9: User with low access interface 39
4.10: Order Management menu 39
4.11: Inventory menu 39
4.12: Views menu 40
4.13: Item Modification for Admin 41
4.14: Adding Component 41
4.15: Edit Components Information 42
<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.16</td>
<td>Item View</td>
</tr>
<tr>
<td>4.17</td>
<td>Add and Edit for Order Table</td>
</tr>
<tr>
<td>4.18</td>
<td>Add and Edit for Order Detail Table</td>
</tr>
<tr>
<td>4.19</td>
<td>Attachment that user can add while placing order</td>
</tr>
<tr>
<td>4.20</td>
<td>Order Table view</td>
</tr>
<tr>
<td>4.21</td>
<td>Order Detail Table view</td>
</tr>
<tr>
<td>4.22</td>
<td>Order Date Lecturer view</td>
</tr>
<tr>
<td>4.23</td>
<td>Order Date Lesson view</td>
</tr>
<tr>
<td>4.24</td>
<td>Stores (Laboratory) Table</td>
</tr>
<tr>
<td>4.25</td>
<td>Rooms (Factories) Table</td>
</tr>
<tr>
<td>4.26</td>
<td>Types Table</td>
</tr>
<tr>
<td>4.27</td>
<td>Unit Table</td>
</tr>
<tr>
<td>4.28</td>
<td>Report Menu</td>
</tr>
<tr>
<td>4.29</td>
<td>Printer Friendly</td>
</tr>
<tr>
<td>4.30</td>
<td>Export to HTML</td>
</tr>
<tr>
<td>4.31</td>
<td>Export to Excel</td>
</tr>
<tr>
<td>4.32</td>
<td>Export to Word</td>
</tr>
</tbody>
</table>
### List Abbreviations, Symbols and Nomenclatures

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID</td>
<td>Identification Detail</td>
</tr>
<tr>
<td>PHP</td>
<td>Hypertext Preprocessor</td>
</tr>
<tr>
<td>FTK</td>
<td>Fakulti Teknologi Kejuruteraan (Facult of Engineering Technology)</td>
</tr>
<tr>
<td>WAMP</td>
<td>Web Application Messaging Protocol</td>
</tr>
<tr>
<td>OS</td>
<td>Operating System</td>
</tr>
<tr>
<td>SQL</td>
<td>Structured Query Language</td>
</tr>
<tr>
<td>DBMS</td>
<td>Database Management System</td>
</tr>
<tr>
<td>HTML</td>
<td>Hyper Text Markup Language</td>
</tr>
</tbody>
</table>
# TABLE OF CONTENT

Abstract 
Abstrak 
Dedications 
Acknowledgement 
List of Tables 
List of Figures 
List Abbreviations, Symbols and Nomenclatures

## CHAPTER 1: INTRODUCTION

1.0 Introduction  
1.1 Background of the Project  
1.2 Problem Statement  
1.3 Objective of the Project  
1.4 Scope of Project  
1.5 Project Significance  
1.6 Thesis Outline

## CHAPTER 2: LITERATURE REVIEW

2.0 Chapter Overview  
2.1 Database System  
   2.1.1 History of Database System  
2.2 Previous Project Analysis  
   2.2.1 Finding by others and similar projects  
2.3 Software Review  
   2.3.1 WAMP Server  
   2.3.2 phpMyAdmin  
   2.3.3 Apache  
   2.3.4 MySQL  
2.4 Summary
CHAPTER 5: RESULTS AND DISCUSSIONS 51

5.0 Introduction 51
5.1 Conclusion 51
5.2 Limitation 52
5.3 Recommendation and Future Works 53

REFERENCES 54
CHAPTER 1
INTRODUCTION

1.0 Introduction

This chapter introduces the project with its background, problem statement, objectives, scope and project significance, to provide a sense of purpose and reasons to proceed with this project.

1.1 Background of the project

Database system for laboratory components was introduced to replace the current method which gives difficulties to user especially when it involves a large amount of components. To access the database, user has to login using user ID and password. The database system contains form which consists of components detail that will be filled by user. MySQL software will be used to build database system. This software comes with phpMyAdmin which is a free software tool. PhpMyAdmin is written in PHP where able to handle the administration of MySQL over the web. WAMP server will be used as the web based server. The database system will then be used to complete the components database and to check the components inventory.
1.2 Problem Statement

Most laboratories in FTK use basic methods for collecting the data by using a paper form as a collection medium. However, this method is lead to burden where a lot of laboratory control components require the use of many paper forms. In addition, the inventories of the components may be difficult as the current method is using improper filling. Users have to check the form one by one and this also leads to problems if the paper form is lost or damaged. In addition, a big amount of paper usage many require large storage space. This method also inconvenient with the nature and not environmental friendly because a lot of paper usage causes paper waste to happen.

1.3 Objective of the Project

The main objectives of this project are deeply concentrated on aspect as listed below:

i. To identify the type of component in the laboratory.

ii. To develop component database system using suitable software.

iii. To provide overall report about the laboratory component using the database system.
1.4 Scope of Project

In this project, database is the best way to store and manage data. Database make persistent and shareable in a secure way (Coronel & Morris 2016). MySQL software is uses to build database system. MySQL which is mostly compliant with the SQL:2003 standard, is a database system well known for its speed, robustness, and a small connection overhead (Oracle Corporation 2012). This software come with phpMyAdmin which is a free software tool.

PhpMyAdmin is written in PHP where able to handle the administration of MySQL over the web. The phpMyAdmin interface is composed of various panels and windows, each one having a specific function (Delisle 2009). In phphMyAdmin, the programming languages that used are C and C++ language. This database system will reduce the paper waste problem. It is also will reduce the cost of storage (Curioso et al. 2010).

WAMP is a Windows OS based program that installs and configures Apache web server, MySQL database server, PHP scripting language, phpMyAdmin which to manage MySQL database’s, and SQLiteManager which to manage SQLite database’s. WAMP is designed to offer an easy way to install Apache, PHP and MySQL package with an easy to use installation program instead of having to install and configure everything yourself. WAMP is so easy because once it is installed it is ready to go. You don’t have to do any additional configuring or tweaking of any configuration files to get it running.

There are usually two reasons why someone chooses to install WAMP. They are looking to install WAMP for development purposes or to run their own server (Asif 2012). Since the project focuses on the performances of database system, the durability of the hardware itself will not be evaluated as much as the programming. This database system will tested for functionality and reliability for components database in FTK only.
1.5 Project Significance

In a borderless world, everything is more simple and accessible due to advances in technology in almost all sectors, especially those who require great management. For laboratories component management, a manual method is inconvenient to use as many components data need to be taken. By using database system for laboratory components, it can replace existing management process of component in laboratory. This system is also managed to reduce the paper waste problem because this system is an environmental friendly system. This proposed database will help users to identify and monitor the process flow efficiently. Lastly, the system have proper filling that includes report that can be extract to Microsoft Excels for user to make overall report about the laboratory components.

1.6 Thesis Outline

This thesis is divided into five chapters. Chapter 1 consists of introduction of project that covers the project objective, scope of this project, the problem that occurs before this project been implement and expected outcome for the project. Chapter 2 is about review based on previous researches that have been done by researcher regarding the usage of database system. In this chapter also will provide a review on the researches software that is used in this project. In chapter 3, it discusses the methodology and approach that will be used in order to develop this project. The chapter 4 are discusses about the result and discussion and the last chapter, Chapter 5 will summarizes this project, discusses the limitations of this project and suggests possible future works.
CHAPTER 2

LITERATURE REVIEW

2.0 Chapter Overview

Literature review was carried out throughout the whole project to gain knowledge and skills needed to complete this project. The main sources for this project are the previous project and thesis that is related to this project. Other than that, the sources are also able to be obtained from books, journals and articles from internet. This chapter also discusses a related researches that been conducted. Hence, by analysis the project did by other researchers, there is a possibility to know what features are lacking in their project. It is very important to improve and to develop a successful project. This chapter provides understandings of theories and previous researches that are related to this final year project. This includes an overview of database system, the specifications of WAMP Server, MySQL and phpMyAdmin, similar products from all kind of sources, and more.

2.1 Database System

Database Management Systems (DBMSs) are complex and mission-critical software systems. Today’s DBMSs embody decades of academic and industrial research and intense corporate software development. Database systems were among the earliest widely deployed online server systems and, as such, have pioneered design solutions spanning not only data management, but also applications, operating systems, and network services. The early DBMSs are among the most influential software systems in computer science, and the ideas and implementation issues pioneered for DBMSs are widely copied and reinvented. (Hamilton et al. 2007)

2.1.1 History of Database System
Before Database System introduced, early manual system was used in 1950s and the previous year where data was stored as paper records. This system required a lot of man power. Besides, a lot of time was wasted. Therefore, this system is inefficient. Revolution begins in 1950s and early 1960s where data processing using magnetic tapes for storage was introduced. Tapes were providing only sequential access. Then, in late 1960s and 1970s the system change using hard disk that allow direct access to data where data stored in files. This system known as File Processing System. (Hamilton et al. 2007)

In 1970s, E.F.Codd introduced relational model where it provides a conceptual simple model for data as relations with all data visible. DB2 from IBM is the first DBMS product based on the relational model. One year later, other DBMS based on the relational model were developed in the late 1980s. Today, DB2, Oracle and SQL Server are the most prominent commercial DBMS product based on the relational model. (Hamilton et al. 2007)

![Figure 2.1: Main components of a DBMS.](Hamilton et al. 2007)

2.2 Previous Project Analysis
A number of databases systems, MySQL and phpMyAdmin already exist in the literature by various national and international organizations. Listed below is part of the past related researches.

2.2.1 Finding by others and similar projects

In (Al-Suwaidi & Zemerly 2009) research, the authors propose an application Locating Friends and Family Using Mobile Phones with Global Positioning System (GPS) based on client-server architecture that helps the users to locate their family members and receive alerts when their friends are nearby. The mobile application was implemented using J2ME where the most recent APIs and other older APIs were combined together in order to make the application reliable on all types of mobiles. The server was implemented using PHP since PHP guarantees that the server would not be overloaded. The type of the Database used in the system was MySQL.

The PLANTS Database, supported by Natural Resources Conservation service, US Department of Agriculture provides standardized information about the vascular plants, mosses, liverworts, hornworts, and lichens of the U.S. A relational and annotated database has been created for multiple drug resistant genes as potential drug target so that a user can find a particular gene as well as its putative homologues.(Bhuyan 2012)
(Ojesanmi O.A & Omotosh 2010) have conclude in their research which is designing and implementing an Electronic Courseware system using Bowen University, Nigeria, Computer Science department as a Case Study, help in improving the level of Information communication and technology (ICT) use and reducing the level of the problems being encountered and undergone during the process of giving lecture notes, and grading of tests. Using the newly developed software, students can easily download lecture materials and tutorials, making e-learning easy to adapt and implement. It can also allow the addition of more courses and their components with ease and the modification can be performed with little efforts. Records are safely stored and adequately protected from unauthorized access.

Lastly, in (Katkar & Shah and Anchor Kutchhi 2015) research, they investigate the performance of some NoSQL and SQL databases in the light of key-value stores along with features as Overall time, Transactional integrity and time. A bank application supporting these basic operations is designed and implemented using all the databases tested. Experimental results measure the timing of these operations and we summarize our findings of how the databases stack up against each other. Their results show that NoSQL database with SQL features. Foundationdb perform better than SQL and NoSQL databases. And for each database, the performance varies with each operation.

Based on those previous research, most of the research achieve in using database. The conclusion of the research is tabulate as follow
which show the database that have been used in their project help to ease the work.

Table 2.1: Table of conclusion in previous Research

<table>
<thead>
<tr>
<th>TITLE</th>
<th>AUTHOR</th>
<th>METHOD of DATABASE</th>
<th>RESULTS</th>
<th>EFFECTIVENESS using DATABASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locating Friend and Family Using Mobile Phone with GPS (2009)</td>
<td>Al-Suwaidi &amp; Zemerly</td>
<td>PHP MySQL</td>
<td>Helps user to locate their family members and receive alert when their friend are nearby.</td>
<td>Effectives</td>
</tr>
<tr>
<td>The PLANTS Database (2011)</td>
<td>Gupta &amp; M. Mishra</td>
<td>Relational</td>
<td>To helps user in multiple drug resistant as user can find a particular gene and its putative homologues</td>
<td>Effectives</td>
</tr>
</tbody>
</table>