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

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TAJUK: **DATABASE SYSTEM FOR LABORATORY COMPONENTS**

SESI PENGAJIAN: **2016/17 Semester 1**

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APPROVAL

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:

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Supervisor:Mdm. Nurliyana binti Abd Mutalib

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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.

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ABSTRAK

Fakulti Teknologi Kejuruteraan (FTK) mempunyai banyak makmal. Setiap makmal mempunyai banyak komponen dan mesin yang membantu pelajar untuk melakukan kerja-kerja makmal mereka. Walau bagaimanapun, data komponen yang diambil menggunakan bentuk kertas sebagai medium untuk menyimpan data. Pelajar perlu mengisi borang di setiap kali mereka ingin meminta untuk komponen. Keadaan ini membawa kepada beberapa masalah di mana penggunaan kertas akan menyebabkan pembaziran kertas. Penggunaan kertas yang banyak akan memberikan beban kepada pembantu jurutera untuk menguruskan data dan untuk mengesan data apabila masalah berlaku. Oleh itu, sistem pangkalan data diperkenalkan untuk mengatasi masalah ini. Pangkalan data ini adalah mudah untuk mengakses dan mesra pengguna. Pangkalan data ini membantu pengguna untuk menguruskan komponen makmal dan proses untuk membuat pesanan untuk komponen akan menjadi lebih mudah. Selain itu, jumlah data yang boleh disimpan di dalam sistem pangkalan data ini yang boleh membantu untuk mengurangkan penggunaan kertas. Oleh itu sistem pangkalan data ini dianggap sebagai sistem yang mesra alam sekitar.

DEDICATIONS

To my parents, En.Razali Bin Amat Lori and Pn.Rohana
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List Abbreviations, Symbols and Nomenclatures

ID   -   Identification Detail

PHP   -   Hypertext Preprocessor

FTK   -   Fakulti Teknologi Kejuruteraan (Facult of Engineering
                       Technology)

WAMP   -   Web Application Messaging Protocol

OS   -   Operating System

SQL   -   Structured Query Language

DBMS   -   Database Management System

HTML   -   Hyper Text Markup Language

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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)
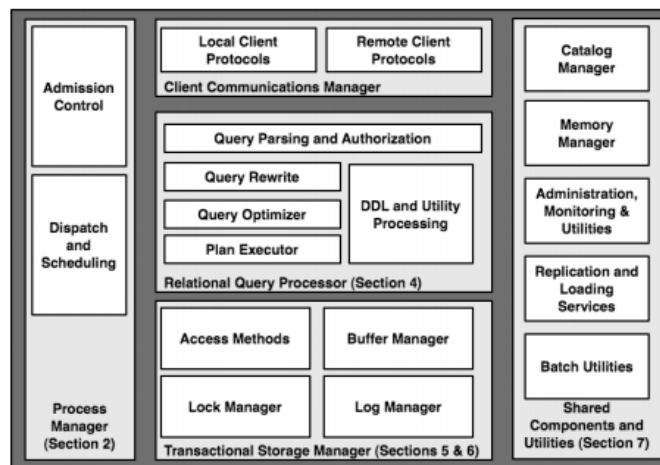

Figure 2.1: Main components of a DBMS.(Hamilton et al. 2007)

2.2 Previous Project Analysis

A number of databases system, 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

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