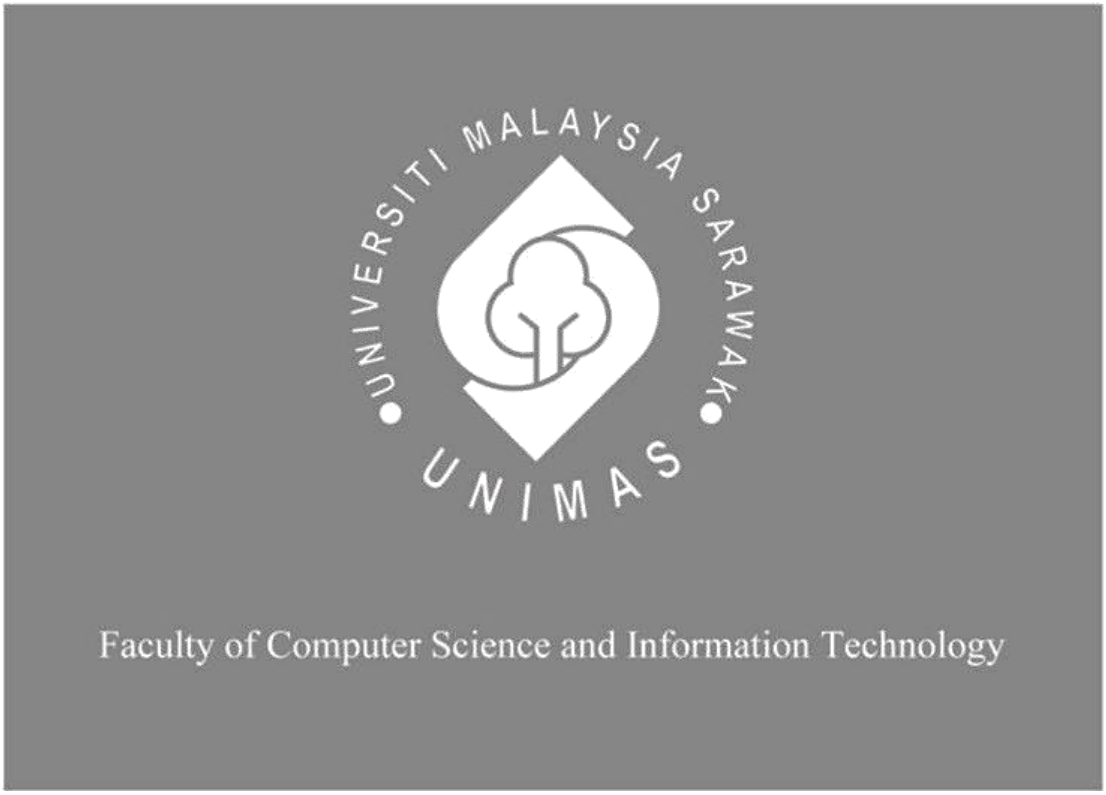

A Web-based Industrial Training Database Management System

Everett Lee Yik Zeng

Bachelor of Computer Science with Honors (Information System)

2019

A Web-based Industrial Training Database Management System

EVERETT LEE YIK ZENG

This project is submitted in partial fulfillment of the
requirements for the degree of Bachelor of Computer
Science with Honors

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At last but not the least I want to thank my friends who treasured me for my hard work and encouraged me and finally to God who made all the things possible for me till the end.

ABSTRACT

In University of Malaysia Sarawak (UNIMAS), students of Faculty of Computer Science and Information Technology (FCSIT) are compulsory to enroll the Industrial Training course which will take a semester (24 weeks) as an essential part of the Bachelor degree of Computer Science program. The main objective of the Industrial training is to prepare students by involving and exposing to an actual working environment. The intention of having this course is to not only produce outstanding graduates in the studies, but also to be a competent work force. During the course, different parties such as Industrial Training (LI) Coordinator, Faculty administrator, Supervisors, company and student are involved in data creation. Data such as weekly log book, Industrial Training report, visiting supervisor report and company supervisor's evaluation form are created through different portal. Therefore, a web-based database management system is proposed to consolidate data from different source and format into a structure centralized database system.

ABSTRAK

Di Universiti Malaysia Sarawak (UNIMAS), pelajar Fakulti Sains Komputer dan Teknologi Maklumat (FCSIT) wajib mendaftar kursus Latihan Perindustrian yang akan mengambil masa semester (24 minggu) sebagai bahagian penting dalam program Sarjana Muda Sains Komputer . Objektif utama latihan Industri adalah untuk menyediakan pelajar dengan melibatkan dan mendedahkan kepada persekitaran kerja yang sebenar. Hasrat untuk mengikuti kursus ini adalah untuk bukan sahaja menghasilkan graduan cemerlang dalam pengajian, tetapi juga untuk menjadi tenaga kerja yang kompeten. Semasa kursus, pihak yang berlainan seperti Penyelaras Latihan Industri (LI), pentadbir Fakulti, Penyelia, syarikat dan pelajar terlibat dalam penciptaan data. Data seperti buku log mingguan, laporan Latihan Industri, laporan penyelia lawatan dan borang penilaian penyelia syarikat dibuat melalui portal yang berbeza. Oleh itu, sistem pengurusan pangkalan data berasaskan web dicadangkan untuk menyatukan data dari sumber yang berbeza dan format ke dalam sistem pangkalan data struktur berpusat.

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Chapter 1: Introduction

1.1 Introduction

In University of Malaysia Sarawak (UNIMAS), students of Faculty of Computer Science and Information Technology (FCSIT) are compulsory to enroll the Industrial Training course which will take a semester (24 weeks) as an essential part of the Bachelor degree of Computer Science program. The main objective of the Industrial training is to prepare students by involving and exposing to an actual working environment. The intention of having this course is to not only produce outstanding graduates in the studies, but also to be a competent work force. During the course, different parties such as Industrial Training (LI) Coordinator, Faculty administrator, Supervisors, company and student are involved in data creation. Data such as weekly log book, Industrial Training report, visiting supervisor report and company supervisor's evaluation form are created through different portal.

All these data have to centralize in a structure database for further management. Database required a database management system (DBMS) that allow user to create, manage, retrieve and delete the data. According to Elmasri and Navathe (2016), a database management system (DBMS) is a computerized system that enables users to create and maintain a database. The fundamental characteristic of the database approach is that the database system contains not only the database itself but also a complete definition or description of the database structure and constraints. This definition is stored in the DBMS catalog, which contains information such as the structure of each file, the type and storage format of each data item, and various constraints on the data. The information stored in the catalog is called meta-data, and it describes the structure of the primary database.

1.2 Problem Statement

For the current industrial training system, data reside in different system and in different formats. The unstructured data caused difficulty in extraction and generation of information which is needed by different user. The current approach is time consuming and inefficient. A database management system with data centralization will be more efficient. There are two main actors that face the problem which are LI coordinator and faculty administrator.

For LI coordinator, unstructured and scattered data cause LI coordinator difficulty in generating report with required information. For faculty administrator, manually key in data from different source into system is required for further data management.

1.3 Scope

This project is to propose a Web based Industrial Training DBMS for FCSIT. The system is design for the Industrial training course and shall only be used by LI coordinator and administrator of FCSIT. Functionality provided for both users are same. The scope of this project include data merging, customize information search and report generation.

1.4 Aims and Objectives

The following are the objectives of the project:

- To consolidate data from different source and format into a structure centralized database system.
- To design and develop a structure web-based database management system for report generation.
- To conduct usability testing on the industrial training database management system.

1.5 Brief Methodology

The methodology chosen for this project is Object Oriented System Development (OOSD). The objects create with this method can be built as individual pieces and then put together to form a system. The beauty of objects is that they can be reused over and over in many different systems and changed without affecting other system components (Dennis, Wixom, Roth, 2012).

1.5.1 Object Oriented System Development

OOSD is a method to develop system/software by building self-contained modules that can be more easily to replaced, modified and reused the coding. There are three phases which are requirement analysis, object oriented design, object oriented implementation and testing (refer to Figure 1).

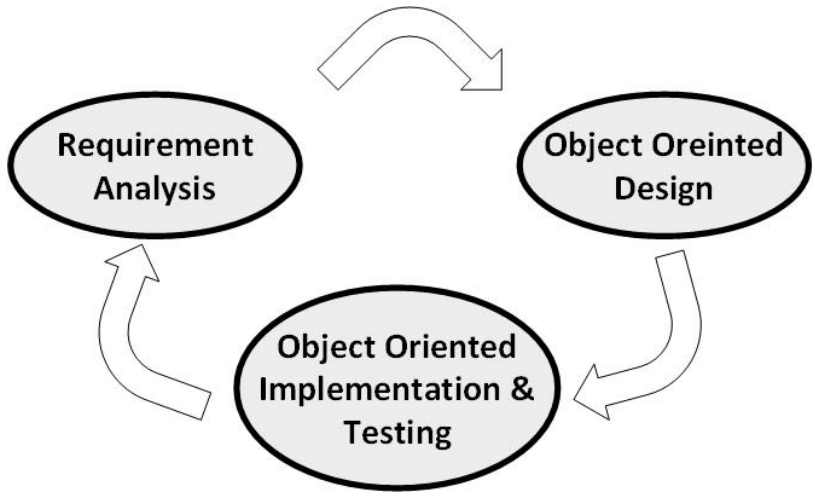

Figure 1.1: General Process of Object Oriented system development

1.5.1.1 Requirement Analysis

Requirement analysis phase also known as requirements acquisition. Requirement of system functionality and database system will be acquired from users. During analysis phase, the actors (users) will be identify and use case model will be build to describe the interaction

between user and system. Through this model, user needs and view of system can be identified. Next, the classes, class relationships, attributes, members and object will be identified and used in creating a class model which can describe the name, relationship between class, operations and object properties. This model help to increase understanding on the proposed system.

In 1997, the Unified Modeling Language (UML) was accepted as the standard language for object development (Dennis, Wixom, Roth, 2012). According to Satzinger and Orvik (2001), Unified Modeling Language (UML) is the standard language for visually describing the structure and behavior of a system. (cited by Ibrahim, 2014). Therefore, all model will be created using UML.

1.5.1.2 Object Oriented Design

Class Model from analysis phase will be refined in design phase. New classes, attributes and methods may be added for implementation purpose. In design phase, view layer, access layer and data flow diagram (DFD) will be designed. Data Flow Diagram help developer to understand the behaviors of the system. View and access layer are refer to user interface and database. These two layers are interrelated.

In design phase, general design principle that list by Wilbert O. Galitz (2007) will be used as design principle. A good interface should serve as both a connector and a separator: a connector in that it ties the user to the power of the computer, and a separator in that it minimizes the possibility of the participants damaging one another. The principle are fundamental to the design and implementation of all effective interfaces, including both GUI and Web. A perfect system design should have the characteristics of accessibility, perceptibility, operability, simplicity, forgiveness, aesthetically pleasing, availability, clarity, compatibility, configurability, consistency, control, directness, efficiency, familiarity,

flexibility, immersion, obviousness, positive first impression, predictability, recovery, Responsiveness, safety, transparency, trade-offs, and visibility. These principles are general characteristics of the interface, and they apply to all aspects (Galitz, 2007).

1.5.1.3 Object Oriented Implementation and Testing

Design is implemented and develop using a programming language such as HTML, CSS, PHP and MySQL. After development, the product will be tested and evaluated by user. Software testing is an importance process in software development life cycle (Ibrahim, 2014). This testing will help to ensure the system meet the user's requirement. Besides, the functionalities and the acceptance of the system will be tested in this phase. The test plan for the the functionality and user acceptance to the system will be designed and carry out with thee user.

1.6 Significance of Project

The significance of the conduct this project is to provide a better management system for Industrial Training, information retrieval and speed up data management. This project will help the user (LI coordinator and Administrator) by providing a system to compile all source and format of data which will help in data management and data centralization. User can communicate with database through web-based user interface. Users will able to import data and retrieve required data from database. Hence, the progress on managing data will be faster.

1.7 Project Schedule

Task Name	Duration	Start	Finish	Predecessors
Industrial training DBMS project	**142 days**	**Thu 11-10-18**	**Fri 26-04-19**	
Brief Proposal	4 days	Thu 11-10-18	Tue 16-10-18	
Full Proposal	15 days	Wed 17-10-18	Tue 06-11-18	2
Chapter 1: Introduction	5 days	Wed 07-11-18	Tue 13-11-18	3
Milestone: Chapter 1 Complete	0 days	Tue 13-11-18	Tue 13-11-18	4
Chapter 2: Background/Literature Review/State of Art	15 days	Wed 14-11-18	Tue 04-12-18	5
Milestone: Chapter 2 Complete	0 days	Tue 04-12-18	Tue 04-12-18	6
Chapter 3: Methodology/ Requirement Analysis and Design	15 days	Mon 24-12-18	Fri 11-01-19	7
Milestone: Chapter 3 Complete	0 days	Fri 11-01-19	Fri 11-01-19	8
Chapter 4: Implementation and Testing	50 days	Mon 14-01-19	Fri 22-03-19	9
Milestone: Chapter 4 Complete	0 days	Fri 22-03-19	Fri 22-03-19	10
Chapter 5: Conclusion and Future Works	21 days	Fri 29-03-19	Fri 26-04-19	11
Milestone: Chapter 5 Complete	0 days	Fri 26-04-19	Fri 26-04-19	12

Figure 1.2: Project Schedule for Project

1.8 Expected Outcome

A Database Management System cater for industrial training information where all data from different source and format are aggregated. User will able to retrieve and sort related information before generating reports from the proposed DBMS.

Chapter 2: Literature review

2.1 Introduction

Industrial training is a program to provide work experience that relevant to the field of study before graduation. Data such as company address, company's supervisor details, student details, student's logbook and report, and supervisor evaluation will be create. All these data have to manage effectively in order for LI coordinator and administrator to retrieve required information. Hence, this chapter will review and comparison on industrial training, existing industrial training system, and database management system.

2.2 Industrial Training

Industrial training is very important for undergraduate students to provide an opportunity for the students to experience real working environments first hand, while at the same time, benefit them in terms of their personal and professional development (Baharom, et al, 2017). Moreover, industrial training able to improve student's generic skills (soft skills). According to Lim and Mustafa (2013), industrial training at Goverment-Linked Comapany (GLC) is more effective for improving communication, creative and analytical, time and group management, and ICT skills; whereas, industrial training at the government department and private company are more effective in improving one's English language proficiency.

For FCSIT in UNIMAS, "Industral Training course" is part of bachelor degree program. Students are required to undergo industrial training in selected company for 6 month and complete task assigned by faculty. Industry Training processes and procedures are divided into three main parts namely pre-, during and post industrial training (Baharom, et al, 2017). Table 2.1 show the processes and the procedure for industrial training course.

Table 2.1: Process/procedure of Industrial training (Baharom, et al, 2017)

Stage of Industrial training	Process/Procedure
Pre- industrial training	- Briefing by LI coordinator. - Submit application (resume and letter) and wait for reply. - Receive offer from company. - Accept offer and get Report duty Letter from faculty.
During industrial training	- Update logbook continuously. - Visit by visiting lecturer. - Evaluate by company supervisor. - Write report.
Post- industrial training	- Submit logbook and report.

After complete the course, the mark will be given from student's report, logbook and supervisor's evaluation. These three components are tabulated to calculate final grade. Students will be awarded either PASS or FAIL from the final grade. As concluded by Meenaloshini, et al (2014), the essence of industrial training is sorting out what constitutes the real world. Hence, industrial training course is importance for student in future development.

2.3 Review of Existing Industrial Training System

Industrial training system is an application which allow all involved parties to contribute or retrieve related information. A well design system will help user manage the data more easily.

2.3.1 Web-based Industrial Training Management system (INTMS)

A web-based industrial training system is develop by Hasmin, Hirman, Muhammad and Sani in 2003. That is the first web-based industrial training system proposed for FCSIT. Rapid Application Development (RAD) method is used to develop the system. Collect data phase, analysis phase, design phase, and implementation phase are used in system

development. The main objective of INTMS is to provide a better management system, reduce the workload for LI coordinator, student and company, and simplify the process of industrial training. The system is develop to transform manual/paper system to web-based system which will be more efficiency in complete required task. All parties such as LI Coordinator, administrator, student and company will able to access through the web.

2.3.2 Internship Monitoring and Supervising System (iMAPS)

Afiza, Suziyani, Nur, Fadhli, and Nik develop a web-based system in 2017. According to Afiza, at el. (2017), iMAPS has its own specialty such as fully utilize the online system for the whole process including pre-registration process by the students, online evaluation by industrial supervisor, and support the process of pre-placement, in-placement and post-placement of internship. All parties (LI Coordinator, Administrator, Students, and Company) can communicate with one another by using the system. All information regarding the applications and host of organizations are safely kept in the database and can be retrieved by administrator for future references of other students (Jaafar, at el. 2017).

2.3.3 "Penyeliaan Pelajar" system

"Penyeliaan Pelajar" system is a web-based industrial training system that currently used in UNIMAS. The information of industrial training in "Penyeliaan Pelajar" system is linked to "eStudent" system. By using this system, student able to write daily logbook, download logbook and report template, upload signed logbook, and upload complete industrial training report. Besides, student also can check visiting supervisor from faculty which is assigned by LI coordinator through the system. Visiting supervisor can check student's progress on logbook. Figure 2.1 shows the main page/login page of "Penyeliaan Pelajar" system.

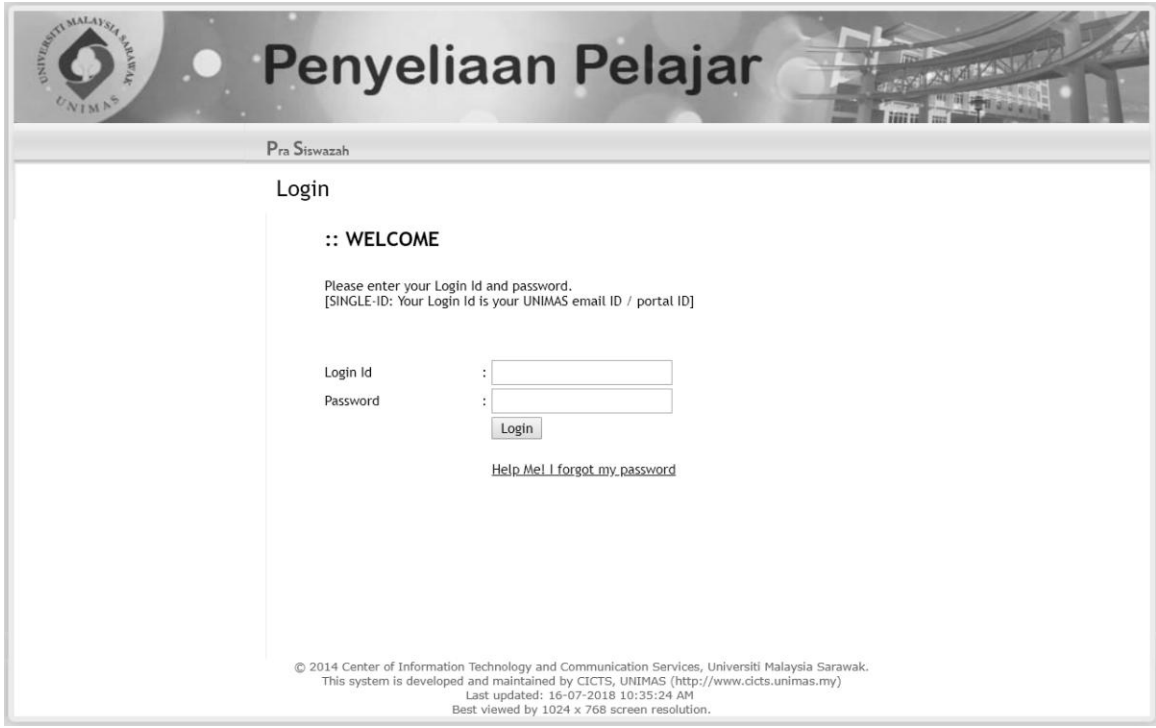

Figure 2.1: Main page of "Penyeliaan Pelajar" system (retrieve from https://estudent.unimas.my/PenyeliaanPelajar/)

2.3.4 Comparison of Existing System

Table 2.2: Comparison of existing system

Feature	Web-based Industrial Training Management system (INTMS)	Internship Monitoring and Supervising System (iMAPS)	Penyeliaan Pelajar
Student Details	Yes	Yes	Yes
Company Details	Yes	Yes	Yes
Filter Information	Yes	Yes	No
Retrieve Information	Yes	Yes	Yes
Generate Report from filtered information	No	No	Yes

From table 2.1, all systems have student and company information such as student's name, metric number, placement location, company supervisor's name and contact, logbook and report. These information can be retrieve from database by administrator or LI

coordinator. “Penyeliaan Pelajar” cannot filter information from database. However, INTMS and IMAPS system cannot generate report based on filtered information.

2.4 Review on DBMS

Database is a collection of structure data and information while database management system is the software used to manage database. User or Programmer can interact with DBMS by using Structured Query Language (SQL) to manage the data. DBMS provide an interface and systematic way for user to create, update, retrieve and delete the data. DBMS increase the protection and security of the database by restrict unauthorized access. It also reduce data redundancy and maintain data consistency,

DBMS is created based on database model (data model). “A data model tells what information is to be contained in a database, how data items in the database will be related to each other and how information will be used. Data models are necessary as they provide access methods and data structure for defining a DBMS. Data model describe the organization of data along with operations that manipulate the data. The basic building blocks of data model are entities, attributes, relationships and constraints. (Prabhjot & Sharma, 2017)”

DBMS are usually built with one data model but there are possible that the system support more than one model. There are few type of DBMS is describe in following section.

2.4.1 Hierarchical Database

In hierarchical database, data is build on hierarchical model and organized in the form of tree structure. The records represent in parent-child relationship. In the model, each parent can have many child while each child data can only link to one parent and cannot link between one another. This model is create with one to one and one to many relationship. It is very difficult to modify and design of the database in term of insertion, updation , and