STUDENT MANAGEMENT SYSTEM (SMS)
FOR KOLEJ KOMUNITI IN MESINIAGA

ANDARIAN KITIKAN

UNIVERSITI TEKNOLOGI MALAYSIA

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A project report is submitted in partial fulfillment of the
requirement for the award of the degree of
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DEDICATION

To my beloved mother and father

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All good inspirations, devotions, expressions and prayers are to God whose blessing and guidance have helped me through this entire project.

First and foremost, I would like to convey my deepest appreciation to all my lecturers for their guidance, commitment and dedication. Without them, I would not be able to succeed in this course. My heartiest thank and appreciation goes to my final year Academic Mentor, Dr. Suhaimi Ibrahim, for his support, suggestions and advises upon completing this paper.

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Last but not least, special thanks to my beloved parent for their moral and spiritual support. May they, be always well and happy.

ABSTRACT

The aim of this project is to develop a web based Student Management System (SMS) for Kolej Komuniti attachment program in Mesiniaga Bhd. This system will help Mesiniaga to administer student's related information in efficient manner. Among the main functionality of the system are managing records such as student details, subject list and semester schedule. It also enables the student to view necessary information such as subject list and online result. Software engineering methodology has been applied for entire development of the system. This includes adopting Waterfall Model as a software process and using Object Oriented Analysis and Design (OOAD) as a software technique. Both system requirements specification and system design have been carefully studied and documented using guidelines from Department of Defense (DoD), specifically, MIL-498. Ultimately, the system has been implemented using sophisticated Java web framework namely Apache Struts 2 with other emerging technology such as Apache Tiles 2, Java Persistence API (JPA) and Hibernate.

ABSTRAK

Tujuan project in dijalankan adalah untuk membangunkan Sistem Pengurusan Pelajar (SMS) berteraskan internet untuk program Kolej Komuniti yang dikelola oleh Mesiniaga Bhd. Sistem ini akan membantu Mesiniaga untuk menguruskan rekod yang berkenaan dengan pelajar secara teratur dan cekap. Antara fungsi sistem ini adalah menguruskan rekod seperti perincian pelajar, matapelajaran dan jadual semester. Sistem ini juga akan membolehkan pelajar menyemak data penting seperti senarai matapelajaran dan keputusan peperikaan. Tatacara dalam Kejuruteraan Perisian telah diaplikasikan dalam keseluruhan pembangunan sistem ini. Ini termasuklah mengambil Waterfall Model sebagai proses pembangunan perisian dan analisa berasaskan objek dan rekabentuk (OOAD) sebagai teknik pembangunan perisian. Perincian tentang kehendak dan rekabentuk sistem telah dipelajari secara berhati-hati dan telah di ditulis mengunakan tatacara yang dikeluarkan oleh Department of Defense (DoD), iaitu MIL-498. Akhir sekali, sistem ini telah di reka dengan menggunakan teknologi berasaskan Java iaitu Apache Struts 2 bersama dengan teknologi lain yang semakin popular seperti Apache Tiles 2, Java Persistence API (JPA) dan Hibernate.

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ABBREVIATIONS

AJAX	-	Asynchronous Java Script and XML
API	-	Application Programming Interface
CRC	-	Class-Responsibility-Collaboration
CRUD	-	Create-Read-Update-Delete
CSC	-	Computer Software Component
CSS	-	Cascade Style Sheets
CSU	-	Computer Software Unit
DoD	-	Department of Defense
eLMS	-	E-Learning Management System
HTML	-	Hypertext Markup Language
HTTP	-	Hypertext Transfer Protocol
IS	-	Information System
IT	-	Information Technology
JPA	-	Java Persistence API
JSP	-	JavaServer Pages
MMS	-	Maintenance and Manage Services
MoHE	-	Ministry of Higher Education
MVC	-	Model View Controller
NEP	-	New Economic Policy
OGNL	-	Object-Graph Navigational Language
OOP	-	Object Oriented Programming
ORM	-	Object to Relational Mapping
PAC	-	Presentation Abstraction Control
POJO	-	Plain Old Java Object

RUP	-	Rational Unified Process
SDD	-	Software Design Document
SDLC	-	System Development Life Cycle
SDM	-	Software Development Methodology
SRS	-	Software Requirement Specification
UI	-	User Interface (UI)
UML	-	Unified Modeling Language
URL	-	Uniform Resource Locator
UTM	-	Universiti Teknologi Malaysia
WBL	-	Work Based Learning
XML	-	Extensible Markup Language
XP	-	Extreme Programming

CHAPTER 1

PROJECT OVERVIEW

1.1 Introduction

Student management system has become important factors in modern education field. This system should help the institutional to streamline the administrative task and provide real-time access to the data. Building this system in web based interface will further help the ease of accessibility through any web browser. This chapter will provide a brief understanding about the company's profile where the project has been executed and the current problem that they face in managing student information. The study findings enable the definition of the project problem statement, its objectives, scopes and advantages of the student management system. This chapter will also cover the project plan and deliverables. The brief understanding about the organization of the thesis will be discussed towards the end of the chapter.

1.2 Company Profile

This project was done at Mesiniaga Bhd, one of the leading Information Technology (IT) Company in Malaysia. Mesiniaga Bhd was formed on December 17, 1981 with paid-up capital of RM 500,000. It was helmed by Ismail Sulaiman, formerly General Manager of IBM Malaysia, together with a team of senior ex-IBM personnel. In the early 70's, IBM was looking for ways to respond to Malaysia's New Economic Policy (NEP), to increase Bumiputera participation towards the growth of the Malaysian economy. As a result Mesiniaga has been appointed as a Bumiputera company that would serve as IBM's sole dealer and agent in Malaysia.

Today, Mesiniaga has emerged as one of the leading, local IT companies in the country with more than 700 staff. It has evolved from a hardware vendor and has become a one-stop IT solutions provider. The company's current portfolio ranges from planning and development to full implementation, system documentation, user education and assistance, systems and network management and system maintenance. Mesiniaga represents IBM, and several blue chip industry names like Avaya, Cisco Systems, Lotus, Microsoft, Tivoli and others.

Mesiniaga has various departments that tackle specific business area. Mesiniaga Academy has been form under one of it's the department namely Maintenance and Managed Services (MMS). This is one of the contributions of the company to gives its full support to government initiatives in alleviating graduate unemployment issue. The academy's main objective is to offer student in IT a chance to have work experience while undergoing comprehensive trainings in management and technical skills. In 2007, Mesiniaga has been selected by Department of Polytechnic and Community College, Ministry of Higher Education (MoHE) to manage, organize and implement a Work Based Learning (WBL) concept for Community College student.

Briefly, in WBL concept, students will have to complete 80% of total learning time in Workshop and on-job training. The other 20% of learning time will come from the theory. The learning time in theory is calculated based on lecturers, assignments, brainstorming and presentation. For workshops, the learning time is calculated based on Hands-On Lab and Project Assignment.

1.3 Project Background

In conjunction with the appointment of Mesiniaga Bhd by MoHE to carry out the WBL program, the company need to provide a proper student management system. Previously there is no proper system to manage the student information. The program documentation and record has been compiled in spread sheet format and not centralized. The information is not easily accessible either by the student or staff. The records become difficult to manage after the program has been running for more than a year. Among the data that need to manage properly are student records, subject list, student grades and program schedule.

The WBL program manager, Mr Asri Ahmad has requested to build a web based student management system that has a capacity to manage the necessary record. The student has undertaken this challenge to help the company to build the SMS subsystem. According to the discussion with the program manager the system should capable to manage student profiles, manages subject, provide online student grades and publish the program schedule.

1.4 Project Objectives

The main objective of this project is to develop a Student Management System (SMS) for Kolej Komuniti in Mesiniaga Bhd under the Work Based Learning (WBL) program. Following is the details of the project objective to archive:

- To study and understand the Struts 2 Framework and its Model-View-Controller (MVC) architecture.
- To study and analyze the requirement specifications of the Student Management System of the Kolej Komuniti.
- To produce the SRS of the Student Management System
- To produce the SDD of the Student Management System
- To develop the prototype of Student Management System using Struts 2 architecture

1.5 Project Scopes

The project scopes define the description of the work that required in delivering the student management system. Following are the scopes of work during the course of this project:

- Study and understand the requirement of this project.
- Construct Software Requirement and Specification (SRS) document of the SMS.
- Construct Software Design Document (SDD) of the SMS.
- Build prototype of the SMS using Struts 2 Framework.

1.6 Project Deliverables

The main deliverables of this project will be the complete software system and the standard software engineering documents that include

- Software Requirement and Specification (SRS)
- Software Design Document (SDD)
- Code

The software engineering documents will be constructed in accordance with the Department of Defense (DoD), MIL- 498.

1.7 Project Schedule

The project has been planned to complete in a period of 5 months in accordance with the schedule of industrial attachment requirement by UTM. Each task is predicted to be performed timely and any obstacles will delay the project. The detailed of the plan in chart format can be referred in Appendix A. The project has been divided into few phases as follows:

- Initial study. The first two weeks is dedicated to study the background of the project and proposed the objective and scope to Industrial Mentor.
- Literature Review. The background of the project will be studied, software engineering methodology and java web framework will be review in this phase.
- Software Process. This phase consists of few activities such system requirement analysis, software design, coding and debugging.
- Documentation. The documentation comprising SRS, SDD and thesis will be prepared occasionally and completed at the end of Industrial Attachment phase.

1.8 Organization of Thesis

This section describes the contents of thesis and explains how the thesis is organized. This thesis is organized into five chapters as follows.

- Chapter 1: Project Overview. This chapter explains the company background, project background, project objective and scopes, deliverables, planning, and organization structure.
- Chapter 2: Literature Review. This chapter discusses literature review that can give the implementer some guidance. Review of project background, software engineering methodology and Java web framework will be discuss.
- Chapter 3: Project Methodology. This chapter discusses the project strategy and problem solving methodology used during the course of project.
- Chapter 4: Project Discussion. This chapter discusses the implementation phase of project.
- Chapter 5: Conclusion. This chapter concludes the project findings, explain the experience gained during establishment the project and describes the future recommendation.
- References.
- Appendices.

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