raf
QA76.9.D37 .M83 2006
0000039039
Projek Sarjana Muda data warehousing (back end) /
Muhizar Aziz.

PROJEK SARJANA MUDA DATA WAREHOUSING (BACK END)

MUHIZAR AZIZ

This Report is submitted in partial fulfillment of the requirements for the
Bachelor of Computer Science (Database Management)

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
KOLEJ UNIVERSITI TEKNIKAL KEBANGSAAN MALAYSIA
2006

© Universiti Teknikal Malaysia Melaka

BORANG PENGESAHAN STATUS TESIS

JUDUL: PROJEK SARJANA MUDA DATA WAREHOUSE (BACK END)
SESI PENGAJIAN: 2006/2007

Saya MUHIZAR AZIZ mengaku membenarkan tesis (PSM/Sarjana/Doktor Falsafah) ini disimpan di Perpustakaan Fakulti Teknologi Maklumat dan Komunikasi dengan syarat-syarat kegunaan seperti berikut:

1. Tesis adalah hakmilik Kolej Universiti Teknikal Kebangsaan Malaysia.
2. Perpustakaan Fakulti Teknologi Maklumat dan Komunikasi dibenarkan membuat salinan untuk tujuan pengajian sahaja.
3. Perpustakaan Fakulti Teknologi Maklumat dan Komunikasi dibenarkan membuat salinan tesis ini sebagai bahan pertukaran antara institusi pengajian tinggi.

4. ** Sila tandakan (/)

_____ SULIT (Mengandungi maklumat yang berdarjah keselamatan atau kepentingan Malaysia seperti yang termaktub di dalam AKTA RAHSIA RASMI 1972)

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

_____ TIDAK TERHAD

(TANDATANGAN PENULIS) (TANDATANGAN PENYELIA)

Alamat tetap: NO 50 PERSIARAN
MAYANG PASIR 5
BUKIT GEDONG
11900 BAYAN LEPAS
PENANG

AMIR SYARIFUDDIN B KASIM
Nama Penyelia

Tarikh : 20/11/2006 Tarikh : 17 NOV 2006.

CATATAN: ** Jika tesis ini SULIT atau TERHAD, sila lampirkan surat daripada pihak berkuasa.
^ Tesis dimaksudkan sebagai Laporan Projek Sarjana Muda (PSM)

© Universiti Teknikal Malaysia Melaka

DECLARATION

I hereby declare that this project report entitled

PROJEK SARJANA MUDA DATA WAREHOUSING (BACK END)

is written by me and is my own effort and that no part has been plagiarized without citations.

STUDENT: _____ Date: 20/11/2006

(MUHIZAR BIN AZIZ)

SUPERVISOR: _____ Date: 17/NOV/2006

(AMIR SYARIFUDDIN B KASIM)

© Universiti Teknikal Malaysia Melaka

ACKNOWLEDGEMENT

I would like to express my gratitude to everyone who has helped me to complete my Projek Sarjana Muda (PSM). I would also like to extend my sincere gratitude appreciation to my PSM Supervisor from the Faculty of Information and Communication Technology (FTMK), Encik Mohd Amir Syaifuddin Kasim, who has guided and encouraged me during my PSM.

To the AJK PSM of FTMK thanks you so much for all the help and support that you have shown me. Among them are Cik Zeratul Izzah Mohd Yusoh, and Dr. Abdul Razak Hussain. Last but not least, I wish to say thanks you to all the friends that I have met in Kolej Universiti Teknikal Kebangsaan Malaysia (KUTKM) for their friendships and company and all family member as their support. Thank you all.

© Universiti Teknikal Malaysia Melaka

ABSTRACT

PSM Data Warehousing is one of web based application that will be developed for Faculty of Information and Communication Technology (FTMK) that will be used by AJK PSM. The application that will be used in this Project Sarjana Muda (PSM) is Microsoft SQL Server 2000 as the DBMS, Active Server Page (ASP) code as programming language and Cold Fusion report builder. Database life cycle (DBLC) will be used as methodology to make sure that this project will be developed successfully. This project will help AJK PSM to maintenance keyword, maintenance user, maintenance maintain the lecturer data, maintenance the student data, block the keyword, backup the database, Data Transformation Service (DTS) student and lecturer data, generate student and lecturer report in 3 different reports, generate student and lecturer graph in several type of graph and lastly it can view top PSM student according to their course.

© Universiti Teknikal Malaysia Melaka

ABSTRAK

"Projek Sarjana Muda Data Warehousing (Back end)" merupakan satu aplikasi berasaskan web yang akan dibangunkan untuk Fakulti Teknologi Maklumat dan Komunikasi bagi kegunaan AJK PSM. Di dalam Projek Sarjana Muda yang bakal dibangunkan ini, menggunakan Microsoft SQL Server 2000 sebagai pengurusan pangkalan data, "Active Server Page" (ASP) sebagai bahasa pengaturcaraan dan "Cold Fusion Report Builder" sebagai laporan. "Database Life Cycle" (DBLC) digunakan sebagai metodologi dalam memastikan perlaksaan projek berjalan lancar. Sistem ini dibagunkan untuk membantu AJK PSM dalam penyimpanan data pelajar, penyimpanan data pensyarah, penyimpanan data kata kunci, penyimpanan data penguna, pembatalan kata kunci, "Backup" keseluruhan pengkalan data, "Data Transfromation Service", analisis graf, analisis laporan dan paparkan maklumat pelajar yang mempunyai markah tertinggi PSM.

© Universiti Teknikal Malaysia Melaka

TABLE OF CONTENTS

CHAPTER	SUBJECT		PAGE
	ACKNOWLEDGEMENTS		iii
	ABSTRACT		iv
	ABSTRAK		v
	TABLE OF CONTENTS		vi
	LIST OF TABLES		xii
	LIST OF FIGURES		xiv
	LIST OF ABBREVIATIONS		xvi
CHAPTER I	INTRODUCTION		
	1.1	Project Background	1
	1.2	Problem Statements	2
	1.3	Objective	3
	1.4	Scopes	3
	1.5	Project Significance	4
	1.6	Expected Output	5
	1.7	Conclusion	5
CHAPTER II	LITERATURE REVIEW AND METHODOLOGY		
	2.1	Introduction	6

© Universiti Teknikal Malaysia Melaka

2.2	Fact and Finding		6
	2.2.1	Research	
		2.2.1.1 Front End and Back End Process	7
		2.2.1.2 Implementing and managing a backup solution	9
		2.2.1.3 Implementing Security Database	12
		2.2.1.4 Replication and Recovery of the database	12
		2.2.1.5 Data Warehousing	15
		2.2.1.6 Reporting service features	17
	2.2.2	Interview	19
	2.2.3	Case Study	20
	2.2.4	Internet Research	20
		2.2.4.1 Two-Tier Architecture	20
		2.2.4.2 Web base Application	21
		2.2.4.3 Quality internet delivered service	22
2.3	Project Methodology		
	2.3.1	Object Oriented Analysis and Design (OOAD)	25
		2.3.1.1 Object Oriented Model	25
		2.3.1.2 Characteristics of OOAD	25
		2.3.1.3 Planning	26
		2.3.1.4 Analysis	27
		2.3.1.5 Design	28
		2.3.1.6 Implementation	29
	2.3.2	Database Life Cycle (DBLC)	29
		2.3.2.1 Database Initial Study	29
		2.3.2.2 Database Design	31
		2.3.2.3 Implementation and Loading	32
		2.3.2.4 Testing and Evaluation	32

© Universiti Teknikal Malaysia Melaka

2.3.2.5 Operation 33
2.3.2.6 Maintenance and Evaluation 33
2.4 Project Requirement
2.4.1 Software Requirement 33
2.4.2 Hardware Requirement 34
2.4.3 Other Requirements 35
2.5 Project Schedule and Milestone 36
2.6 Conclusion 38

CHAPTER III ANALYSIS
3.1 Introduction 39
3.2 Problem Analysis
3.2.1 Background of current system 40
3.2.2 Business Process 40
3.2.2.1 Insert the data manually in store 42
3.2.2.2 Activity Diagram for the To Be System (View PSM Marks) 43
3.2.2.3 Activity Diagram for the To Be System (Maintain DB) 44
3.2.2.4 Activity Diagram for the To Be System (Graph and Report) 45
3.2.2.5 Activity Diagram for the To Be System (Analysis Data) 46
3.2.2.6 Activity Diagram for the To Be System (Generate Report) 47
3.2.3 Problem Statements 48
3.3 Requirement Analysis 49
3.3.1 User Requirement Analysis 49
3.3.2 Functional Requirement Analysis 50
3.3.3 Actor Identification 52
3.3.4 Use Case View 52

© Universiti Teknikal Malaysia Melaka

3.3.5 Use Case Description 65
3.3.5.1 Use case documentation for Login 54
3.3.5.2 Use Case Documentation for Maintain DB 55
3.3.5.3 Use Case Documentation for View Top Ten Marks 56
3.3.5.4 Use Case Documentation for Analysis data 57
3.3.5.5 Use Case Documentation for Generate Graph 58
3.3.6 Technical Requirement Analysis
3.3.6.1 Software Requirements 59
3.3.6.2 Hardware Requirements 61
3.3.6.3 Networking Requirements 61
3.3.7 Non Functional Requirement 62
3.4 Conclusion 62

CHAPTER IV DESIGN
4.1 Introduction 63
4.2 High Level Design /
4.2.1 Raw input/Data 64
4.2.2 System Architecture 64
4.2.2.1 Static Organization 65
4.2.2.2 Class Diagram 67
4.2.3 User Interface Design 70
4.2.3.1 Navigation Design 73
4.2.3.1.1 Explanation of Navigation Design 74
4.2.3.2 Input Design 75
4.2.3.3 Output Design 76
4.2.4 Database Design
4.2.4.1 Conceptual and Logical Database

© Universiti Teknikal Malaysia Melaka

		Design	77
		4.2.4.1.1 Conceptual Design	79
		4.2.4.1.2 Logical Design	82
	4.3	Detailed Design	
		4.3.1 Software Specification	93
		4.3.2 Physical Database Design	97
	4.4	Conclusion	105
CHAPTER V	IMPLEMENTATION		
	5.1	Introduction	106
	5.2	Software Development Environment Setup	107
	5.3		
	5.4	Software Configuration Management	110
		5.4.1 Configuration environment setup	110
		5.4.2 Version Control Procedure	114
	5.5	Implementation Status	115
	5.6	Conclusion	117
CHAPTER IV	TESTING		
	6.1	Introduction	118
	6.2	Test plan	119
		6.2.1 Test Organization	119
		6.2.2 Test Environment	119
		6.2.3 Test schedule	120
	6.3	Test Design	
		6.3.1 Classes of Test	121
		6.3.1.1 Unit Testing	122
		6.3.1.2 Integration Testing	123
		6.3.1.3 Functional and System Testing	123
		6.3.1.4 Acceptance Testing	124
		6.3.1.5 Regression Testing	125

© Universiti Teknikal Malaysia Melaka

		6.3.1.6 Security Testing	125
	6.4	Test Design	125
		6.4.1 Test description	126
		6.4.2 Test data	128
	6.5	Test Case Result	129
	6.6	Conclusion	131
CHAPTER VII		CONCLUSION	
	7.1	Introduction	132
	7.2	Observation On Strengths and Weaknesses	132
	7.3	Propositions For Improvement	134
	7.4	Contribution	134
	7.5	Conclusion	134
		REFERENCES	135
		APPENDICES	
		APPENDIX A: Basic, Alternative & Exception Flow	
		APPENDIX B: User Manual Interface	
		APPENDIX C: Gantt Chart	
		APPENDIX D: Testing (Test Data & Test Result)	
		APPENDIX E: Pseudo code	

© Universiti Teknikal Malaysia Melaka

LIST OF TABLES

TABLE	TITLE	PAGE
2.1	Backup Strategies for System and User Databases	11
2.2	Server components	17
2.3	Client components	18
2.4	Hardware Requirement	34
3.1	Software Requirements	59
3.2	Hardware Requirement	61
4.1	Navigation Explanation	74
4.2	Input Design	75
4.3	Output Design	76
4.4	Topic Profile	82
4.5	Course Profile	82
4.6	Student Profile	83
4.7	Proposal Profile	84
4.8	CAS Profile	84
4.9	Report Profile	85
4.10	Lecturer Profile	86
4.11	KeywordInventory Profile	96
4.12	Department Profile	97
4.13	Interest Profile	88
4.14	Area of Interest Profile	88

© Universiti Teknikal Malaysia Melaka

5.1	Implementation Environment	105
5.2	Implementation Status	113
6.1	Test Schedule	119
6.2	Test description for PSM Data Warehouse	125
6.3	Test Data	127
6.4	Result Test	128

© Universiti Teknikal Malaysia Melaka

LIST OF FIGURES

FIGURE	TITLE	PAGE
2.1	Two Tier Architecture	21
2.2	Planning Strategic	36
3.1	Current business process flow	41
3.2	Activity Diagram for View PSM Marks	43
3.3	Activity Diagram for Maintain DB	44
3.4	Activity Diagram for Graph and report	45
3.5	Activity Diagram for Analysis Data	46
3.6	Activity Diagram for Generate Report	47
3.7	Modules PSM system (back end)	50
3.8	Overall use case diagram	53
4.1	Two-tier Architecture	65
4.2	The static view of system	66
4.3	Class Diagram for Maintain DB	68
4.4	Class Diagram for Analysis Data Generate Report	69
4.5	Main Menu	70
4.6	Maintain DB Form	71
4.7	Graph Interface	72
4.8	Generate Report Interface	72
4.9	Navigation Design	73
4.10	Lecturer Entity	78
4.11	Entities	79

© Universiti Teknikal Malaysia Melaka

4.12	ERD	81
4.13	Software Specification	93
5.1	Deployment Diagram	108
5.2	Evolution graph	112

© Universiti Teknikal Malaysia Melaka

LIST OF ABBREVIATIONS

ABBREVIATIONS	TITLE
AJK	Ahli Jawatankuasa
ASP	Active Server Page
ACT	Analyst and Control Technology
CSS	Cascading Style Sheet
DBLC	Database Life Cycle
DBMS	Database Management System
DTS	Data Transformation Services
DFD	Data Flow Diagram
DNS	Domain Name System
ERD	Entity Relational Database
E-R	Entity Relational
EERD	Extended Entity Relational Database
FAQ	Frequently Ask Question
FTMK	Faculty Of Information Technology And Communication
GUI	Graphical User Interface
HTML	Hyper Text Markup Language
IIS	Internet Information Server
IT	Information Technology
KUTKM	Kolej Universiti Teknikal Kebangsaan Malaysia
LAN	Local Area Network

© Universiti Teknikal Malaysia Melaka

MEMS	**Micro-Electromechanical Systems**
Ms	**Microsoft**
NIC	**Network Interface Card**
T-SQL	**Programming Language/ Structural Query Language**
OOAD	**Object Oriented Analysis and Design**
OOP	**Object Oriented Programming**
PSM	**Projek Sarjana Muda**
SDLC	**System Development Life Cycle**
SOR	**Statement of Requirements**
SQL	**Structural Query Language**
TCP	**Transport Layer**
UML	**Unified Markup Language**
UI	**User Interface**
VB	**Visual Basic**
WW	**World Week**
XML	**Extensible Markup Language**

© Universiti Teknikal Malaysia Melaka

CHAPTER I

INTRODUCTION

1.1 Project Background

Projek Sarjana Muda Data Warehousing (Back End) is a system that will be developed to help the Ahli Jawatankuasa (AJK) PSM to see how the system can make a database backup, recovery, security and database administration. This web based application use to guide AJK PSM to help them to understand how the system will be done. Back End is the process that user cannot see how it is work so using this part, it will help the AJK PSM to know and check the status of system whether it work properly or not.

The process is focus on the database. Using this system, it will explain how the system can create a backup database with full backup to minimize data lose. The recovery database is important to backup the data in the database if the database corrupted. The data transformation service using insert bulk that run from the stored procured. Maintain keyword, student, and lecturer are using function insert the data, delete and update the data. In maintain the user the admin can change priority the lecturer to admin so the AJK PSM can access the web base. Generate the graph from the student and lecturer data. Generate the report from the student and lecturer data in

© Universiti Teknikal Malaysia Melaka

the database. And lastly it can view the PSM top ten students to know the top PSM student project according to their marks.

1.2 Problem Statement

The AJK PSM receives project softcopy from the PSM student, they have to save the softcopy of the project to view the project if they have any problem during the PSM and after the PSM. This is very important to the AJK PSM to view the softcopy of project during time to time where student doing the PSM. However, they face some problem with the current system which is done manually.

There have 3 problems in the current system that will be reduced using this system:

i) Data management

The current system did not have a backup system that can backup the data in the database with full backup. Some data in the database can not save properly and some data maybe lose because of unsystematically backup system that they used now. The current system did not have a schedule to update the data for daily, weekly or monthly in the database. Sometime the data maybe lose if the system did not have the schedule to update the data. This process is important to make sure that data will always update into the database although the server hang.

ii) The unsystematically storing data

The current process did not have a one web base application to store all the data into the database. They only store the data manually into the database. So the analysis process is difficult to do.

© Universiti Teknikal Malaysia Melaka

iii) The current system have a problem to analysis data
the current system did not have a function to analysis the data and to view in the graph representation. The current system use Microsoft Excel formats to analyze the data. The current process is not systematically and wastes a time.

1.3 Objective

The implementation of this project is expected to reach the following objectives:

i) To enable analyst data efficiently in graph view.
ii) To storing data systematically using database.
iii) To create a backup database with full backup to minimize data losing.
iv) To generate the report in several type.
v) To view the PSM student data according to their marks.

1.4 Scopes

This system will be developed for Kolej Universiti Teknikal Kebangsaan Malaysia (KUTKM). The system will use web based application. There have two modules to develop this project: front end and back end. The back end process will be develop for this project. In this project there has one main stakeholders of this custom information system to be developed is the AJK PSM. According to (Britton and Doake, 2000), a stakeholder in the context of developing software systems, is anyone who either contributes to the system development or who is affected by it. This system provides information to the students besides managing the task of the administrator. There are a few functions performed by this application:

© Universiti Teknikal Malaysia Melaka

i) Data analysis with graph view and report

In this system will use active server page (ASP) code as the language to track the data from Microsoft SQL Server 2005 database and represent it in graph view. Using this language, we van view the data in graph easily and efficiency. For the report will using the cold fusion report builder to generate the report.

ii) Data transformation services

Data transformation service can used the effectively to insert larger amount data into the database.

iii) Create a database backup

Database backup will help to recover the data and provide insight into how to protect the data. It will help to minimize data lose and this means backing up the transaction log as well as the data files. Full recovery will be used to minimize data lose, restoring both the database and transaction log backups.

iv) Maintain the PSM data

By using this web base application the AJK PSM can insert, delete and update the PSM data.

v) View top ten PSM student

Using the web base application the AJK PSM can view the top PSM student according ascending to their marks. So the AJK PSM know the top of the PSM project.

1.5 Project Significance

As the system is developed mainly to ease the task AJK PSM as administrators besides providing service to the student, both the KUTKM and the FTMK faculty will

© Universiti Teknikal Malaysia Melaka

get the benefit from it. Since the student is unaware of the events that take place around them, this system can be a reliable resource for them by providing information on those events. The AJK and lecturer of the PSM who were unable to use the services at the FTMK faculty before are able to enjoy the privileges from home by using this system. The web-based method used to develop the system is the best approach since the administrators can control the system in the FTMK.

1.6 Expected Output

Using this system, it will help the AJK and lecturer to see and understand how the process of back end of the system is run. All the step and result for each scope will explain details in this system using web base application. The problem that facing before also been settle using this system. The AJK PSM can know how the back end process work, can managing and storing the data systematically and can analysis the PSM data using the graph, and report. Meanwhile the web base also can maintain the student, lecturer and keyword table. Data transformation service also been use to transferred large amount of data into the database.

1.7 Conclusion

On whole, this project expected to enhance and improve the capabilities of service provided at the FTMK faculty. By implementing this system, the AJK and the lecturer of PSM can get the benefit from it. This type of services made available on-line is proved to be effective as some government organizations are already implementing it although there are rooms for improvement. Chapter I give the overview of the system.

© Universiti Teknikal Malaysia Melaka

CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

This chapter discusses the research conducted on past study related to the project. The research materials used includes books, articles, journals and web pages. Only issues regarding the project is searched, collected and analyzed in order to compare the methods and technology used besides finding the best solution for the problem faced. Database development methodology is usually based on a life cycle model of database development and has number stages with a set of steps and rules for each stage. According to (Britton and Doake, 2000), this methodology will prescribe in detail what tasks are involved in each step, the nature of each task, and the order in which the tasks needs to be done.

2.2 Fact and Finding

This section explains the topic in discussion with research materials from books, journals, articles, and web pages. The facts discovered form the basis for defining the requirements of the new system. The scope of the investigation is determined by the

© Universiti Teknikal Malaysia Melaka