BOOK RENEWAL REMINDER VIA SMS FOR UTeM's LIBRARY

NURHAZIANI BINTI HAZEMI

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

BOOK RENEWAL REMINDER VIA SMS FOR UTeM's LIBRARY

NURHAZIANI BINTI HAZEMI

This report is submitted in partial fulfillment of the requirements for the
Bachelor of Computer Science (Computer Networking)

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
UNIVERSITI TEKNIKAL MALAYSIA MELAKA
2010

BORANG PENGESAHAN STATUS TESIS*

JUDUL: **BOOK RENEWAL REMINDER VIA SMS FOR UTeM'S LIBRARY**

SESI PENGAJIAN: **2009/2010**

Saya **NURHAZIANI BINTI HAZEMI**
(HURUF BESAR)

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 Universiti Teknikal Malaysia Melaka
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)

Alamat tetap: No 33 Blok 5
Felda Chiku 7
18300 Gua Musang
Kelantan

Tarikh : _____

(TANDATANGAN PENYELIA)

CIK IRDA BINTI ROSLAN
Nama Penyelia

Tarikh : 25/6/2010

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

DECLARATION

I hereby declare this project report entitled

BOOK RENEWAL REMINDER VIA SMS FOR UTeM'S LIBRARY

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

STUDENT : _____ Date: _____

(NURHAZIANI BINTI HAZEMI)

SUPERVISOR : _____ Date: 25/6/2010

(CIK IRDA BINTI ROSLAN)

DEDICATION

This work is dedicated to my beloved family and siblings, who passed on a love of reading and respect for education.

To my supportive friends and my supervisor, thank you so much for assist and help.

ACKNOWLEDGEMENTS

Bismillahirrahmanirrahim

Alhamdulillah, Thanks to Allah SWT, whom with His willing give me the opportunity to complete this Final Year Project which is title Book Renewal Reminder via SMS for UTeM's Library. This final year project report was prepared for Faculty of Information and Communication Technology (FTMK), Universiti Teknikal Malaysia Melaka (UTeM), basically for student in final year to complete the undergraduate program that leads to the degree of Bachelor of Computer Science. This report is based on the methods given by the university.

Firstly, I would like to express my deepest thanks to, Miss Irda binti Roslan, a lecturer at FTMK, UTeM and also assign, as my supervisor who had guided be a lot of task during semester session 2009/2010. I also want to thanks the lecturers and staffs of UTeM's Library for their cooperation during I complete the final year project that had given valuable information, suggestions and guidance in the compilation and preparation this final year project report.

Deepest thanks and appreciation to my parents, family, special mate of mine, and others for their cooperation, encouragement, constructive suggestion and full of support for the report completion, from the beginning till the end. Also thanks to all of my friends and everyone, that has been contributed by supporting my work and helps myself during the final year project progress till it is fully completed.

ABSTRACT

This project is about the Book Renewal Reminder via Short Message Services (SMS) system for delivering message to the UTeM's students. The information regarding books borrowed by students is stored in the database and can be able accessed through Graphical User Interface (GUI). The main purpose of Book Renewal Reminder system is to develop an application that is able to send reminder message to the selected list of students and students is able to do the renewal process through mobile phone. This system will cover the registration of the students, record of the new books, borrowing process, automatically renewal process via SMS. This system is developed using Microsoft Visual Basic.Net 2005 and Microsoft Access 2003. This system is developed using Rapid Application Development (RAD) methodology. Overall, this system can facilitate UTeM's students especially in renewal of the books through mobile phone. This system also could give a lot of benefits to the UTeM's Library Management System.

ABSTRAK

Projek ini adalah tentang sistem *Book Renewal Reminder via Short Message Service (SMS) for UTeM's Library* yang digunakan untuk menyampaikan mesej kepada pelajar. Maklumatberkaitan pinjaman buku oleh pelajar yang disimpan di dalam pangkalan data dan boleh diakses melalui *Graphical User Interface (GUI).* Tujuan utama sistem ini adalah mengembangkan sebuah aplikasi yang boleh menghantar mesej peringatan kepada senarai pelajar tertentu dan pelajar boleh melakukan proses pembaharuan buku yang dipinjam melalui telefon bimbit. Sistem ini akan merangkumi pendaftaran pelajar, merekod buku-buku baru, proses pinjaman dan proses pembaharuan pinjaman buku secara automatik melalui SMS. Sistem ini dibangunkan menggunakan Microsoft Visual Basic.Net 2005 dan Microsoft Access 2003 sebagai pangkalan data. Sistem ini dibangunkan dengan menggunakan metodologi *Rapid Application Development(RAD).* Secara keseluruhan, sistem ini boleh memudahkan pelajar UTeM khususnya dalam pembaharuan pinjaman buku melalui telefon. Sistem ini juga dapat memberikan banyak manfaat kepada Sistem Pengurusan Perpustakaan UTeM..

TABLE OF CONTENTS

CHAPTER	SUBJECT	PAGE
	DECLARATION	**ii**
	DEDICATION	**iii**
	ACKNOWLEDGEMENTS	**iv**
	ABSTRACT	**v**
	ABSTRAK	**vi**
	TABLE OF CONTENTS	**vii**
	LIST OF TABLES	**xii**
	LIST OF FIGURES	**xiv**
	LIST OF ABBREAVIATIONS	**xvi**
	LIST OF ATTACHMENTS	**xvii**
CHAPTER I	**INTRODUCTION**	
	1.1 Project Background	1
	1.2 Problem Statement	2
	1.3 Objective	2
	1.4 Scope	3
	1.5 Project Significance	3
	1.6 Expected Output	3
	1.7 Conclusion	4

CHAPTER II	**LITERATURE REVIEW AND PROJECT METHODOLOGY**	
	2.1 Introduction	5
	2.2 Literature Review	5
	2.2.1 Domain	6
	2.2.2 Keyword	7
	2.2.2.1 SIM Card	7
	2.2.2.2 GSM Modem	7
	2.2.2.3 Short Message Services (SMS)	8
	2.2.2.4 Mobile Devices	9
	2.2.3 Previous Research	9
	2.2.3.1 Monash Library SMS Notification services	10
	2.2.3.2 Campus Emergency Notification System	14
	2.2.3.3 Otaniemi Campus Library's Mobile services	14
	2.3 Proposed Solution	17
	2.3.1 Project Methodology	17
	2.3.1.1 Requirement Planning	19
	2.3.1.2 User Design	20
	2.3.1.3 Construction	20
	2.3.1.4 Implementation	20
	2.4 Project Schedule and Milestone	21
	2.5 Conclusion	22
CHAPTER III	**ANALYSIS**	
	3.1 Introduction	23

	3.2 Problem Analysis	24
	3.2.1 Analysis of the Current System	24
	3.3 Requirement Analysis	26
	3.3.1 Data Requirement	26
	3.3.2 Functional Requirement	28
	3.3.2.1 Main function of Book Renewal Reminder via SMS System	28
	3.3.2.2 Use Case Diagram for Book Renewal Reminder via SMS System	30
	3.3.3 Non-functional Requirement	31
	3.3.3.1 Performance Requirement	31
	3.3.4 Others Requirement	32
	3.3.4.1 Software Requirement	32
	3.3.4.2 Hardware Requirement	33
	3.4 Conclusion	34
CHAPTER IV	**DESIGN**	
	4.1 Introduction	35
	4.2 High-Level Design	35
	4.2.1 System Architecture	36
	4.2.2 User Interface Design	37
	4.2.2.1 Navigation Design	43
	4.2.2.2 Input Design	44
	4.2.2.3 Output Design	45
	4.2.3 Database Design	47
	4.2.3.1 Conceptual and Logical Database Design	47
	4.3 Detailed Design	50
	4.3.1 Software Design	50

	4.3.1.1 Pseudo Code	50
	4.3.2 Physical Database Design	55
	4.3.2.1 Data Definition Language	55
	4.4 Conclusion	59
CHAPTER V	**IMPLEMENTATION**	
	5.1 Introduction	60
	5.2 Software Development Setup	61
	5.3 Software Configuration Management	62
	5.3.1 Configuration Environment Setup	62
	5.3.2 Version Control Procedure	66
	5.4 Implementation Status	67
	5.5 Conclusion	68
CHAPTER VI	**TESTING**	
	6.1 Introduction	69
	6.2 Test Plan	70
	6.2.1 Test Organization	70
	6.2.1.1 System tester	70
	6.2.1.2 Hand phone tester	72
	6.2.2 Test Environment	73
	6.2.2.1 Location/environment	73
	6.2.2.2 Hardware	73
	6.2.2.3 Software	74
	6.2.2.4 Firmware configurations and preparations	74
	6.2.3 Test Schedule	74
	6.3 Test Strategy	76
	6.3.1 Classes of Tests	76
	6.4 Test Design	78
	6.4.1 Test Description	78

	6.4.2 Test Data	84
	6.5 Test Result and Analysis	85
	6.6 Conclusion	95
CHAPTER VII	**PROJECT CONCLUSION**	
	7.1 Observation on Weaknesses and Strengths	96
	7.1.1 System Strengths	96
	7.1.1.1 Save time	96
	7.1.1.2 The system can be used no matter where the users are	97
	7.1.1.3 System security	97
	7.1.1.4 Functionality and user-friendly	97
	7.1.2 System Weaknesses	98
	7.1.2.1 Not commercial in the market	98
	7.1.2.2 Delay	98
	7.1.2.3 Not applicable when GSM network has a Problem	98
	7.1.2.4 Must have enough credit when send SMS	99
	7.2 Propositions for Improvement	99
	7.2.1 System will check the availability status of the renewal books	99
	7.3 Contribution	99
	7.4 Conclusion	100
REFERENCES		**101**
BIBLIOGRPHY		**103**
APPENDICES		**104**

LIST OF TABLES

TABLE	TITLE	PAGE
2.1	Service provides by Otaniemi Campus Library's mobile services	15
2.2	Comparison between previous researches	16
2.3	Duration of each activity	21
3.1	Data Requirement for Book Renewal Reminder via SMS System	27
3.2	Software Requirement for the System	32
3.3	Hardware Requirement for the System	33
4.1	Input Design of the System	44
4.2	Output Design of the System	45
4.3	Data Dictionary	49
4.4	Admin Login Function Description	51
4.5	Student Registration Function Description	51
4.6	Add Books Function Description	52
4.7	Borrow Function Description	53
4.8	Send Reminder Function Description	53
4.9	Renewal Function Description	54
5.1	Version Control Procedure for the system	66
5.2	Implementation Status for the Book Renewal Reminder via SMS Systems	67

6.1	List of System Tester	71
6.2	List of Hand Phone Tester	72
6.3	Hardware Requirement	73
6.4	Test module of Book Renewal Reminder via SMS System	75
6.5	Classes of Tests	77
6.6	Login Test Case	78
6.7	Connection to Server Test Case	79
6.8	Register Student Test Case	80
6.9	Add New Record Test Case	81
6.10	Borrow Book Test Case	81
6.11	Send Reminder Test Case	82
6.12	Renewal of the books Test Case	83
6.13	Test data of Book Renewal Reminder via SMS System	84
6.14	Test Result and Analysis for Login Module	86
6.15	Test Result and Analysis for Connection to Server	87
6.16	Test Result and Analysis of Register Student	88
6.17	Test Result and Analysis of Add New Record of Books	89
6.18	Test Result and Analysis of Borrow module	91
6.19	Test Result and Analysis of SMS Reminder module	92
6.20	Test Result and Analysis of Automatic Renewal module	93
6.21	Test Result and Analysis of Feedback Module	94

LIST OF FIGURES

FIGURE	TITLE	PAGE
2.1	SMS Notification from Library SMS service	11
2.2	Architecture of the Library SMS Service	11
2.3	Screen shot of the SMS notification System version 1	12
2.4	Screen shot of the SMS notification system version 1.1	13
2.5	Rapid Application Development (RAD) Model	19
3.1	Data Flow Diagram for the Current System	25
3.2	Data Flow Diagram of Main Function for Book Renewal Reminder via SMS System	29
3.3	Use case diagram for Book Renewal Reminder via SMS System	30
4.1	System Architecture of Book Renewal Reminder via SMS System	36
4.2	Login Interface	37
4.3	Register Interface	38
4.4	New Record Interface	39
4.5	Borrow Interface	40
4.6	Reminder Interface	41
4.7	Renewal Interface	42
4.8	Feedback Interface	42
4.9	Navigation Design of Book Renewal Reminder	43

4.10	Entity Relationship Diagram (ERD) for the system	48
4.11	SQL statement of login into the system	55
4.12	SQL statement of Student Registration	56
4.13	SQL statement of Borrow Books	57
4.14	SQL statement of Add New Book	57
4.15	SQL statement of Send Reminder	58
4.16	SQL statement of Renewal of the Books	58
5.1	Environment Architecture of Book Renewal Reminder via SMS	61
5.2	Microsoft Visual Basic.Net 2005	63
5.3	MobitekSMSAPIv5 in References Window	63
5.4	Segment of codes to declare the SMSAPI5	64
5.5	Segment of codes to connect GSM modem to the application	64
5.6	Codes to connect the application to the database	65
5.7	Codes to receive SMS from students	65
5.8	Code to send SMS	66
6.1	Login Interface	86
6.2	Error message when login failed	87
6.3	Successful Register	88
6.4	Error message when not complete fill the data	89
6.5	Successful save new record	90
6.6	Error message when data do not complete	90
6.7	Successful borrow books	91
6.8	SMS Reminder Interface	92
6.9	Successful send SMS Reminder	93
6.10	Automatic Renewal Interface	94
6.11	Feedback Interface	95

LIST OF ATTACHMENTS

ATTACHMENTS	TITLE	PAGE
A	Gantt Chart	104
B	User Manual	106

CHAPTER I

INTRODUCTION

1.1 Project Background

This application is intended be developed for enhancing the current UTeM's library system. Currently, UTeM's library does not provide any alert or notification to the students about the renewal of the books. They only have online renewing book system which means students can renew books through the Internet or as manually where they should come directly to the library's book renewal counter. So, to improve the application, this project is proposed where students not only can renew the books via mobile phone but also received the notification or reminder about when they should return the books and make a choice whether they want to renew or not. This application will become the preferable alternative for the students to renew books. It is not only because it use mobile phone but it also acted as reminder to the students if they forgot to renew the books. The SMS notification will send to the student's mobile phone the day before the student need to return the books. So, the probability students to return the books exceed the due date will be decreased. As we all know, by the application over the phone, it can speed up and simplify the process without requiring a long queue of students at the counter. Besides that, this system also facilitates the students to renew books through mobile phone. This project will build an SMS delivery mechanism for the UTeM's library. During this project, the knowledge of network technologies can be applied besides learning new and valuable knowledge.

1.2 Problem Statements

Previously, UTeM students have two choices when they want to renew books.. First, they go directly to the library counter and alternatively, they can access to the online application. Unfortunately, UTeM's library do not provide renewal reminder before the due date through online. UTeM's library also does not provide any notification letter to the students about the renewal of the books. Therefore, there is a tendency of students to forget renewing. UTeM's students can go directly to the library counter to renew the books. However, this manual renewal process has a problem in term of time consuming where the renewal time at the counter is limited. It is because the library counter is not open for 24 hours daily.

1.3 Objectives

There are four main objective of the project. They are:

- To develop system that will allow students receive renewal reminder through mobile phone.
- To ensure system send successful renewed notification automatically to the student after they had renewed the books.
- To allow students renew books by responding the received notification message.
- To provide ease of use and flexibility to the student through mobile phone application.

1.4 Scope

- **System User**

This system will be used by authorized administrator and students. The administrator will be managed the system while the students will be used the system to renew books through SMS.

- **System Functionality**

This system will send notification to the selected list of UTeM's students via SMS. UTeM's students can also make the renewal of the books through mobile phone. The system will also updates the renewal of the books automatically and send the new due date notification to the students.

- **Methodology**

This system is built based on Rapid Application Development (RAD).

1.5 Project Significance

As we all know, most of the applications nowadays are using mobile application and SMS-based applications such as SMS Banking System because of their effective, fast and simple application. Here, Book Renewal Reminder System via SMS will facilitate the students and furthermore will become an enhancement to the current UTeM's Library Management System.

1.6 Expected Output

After completion of this project, Book Renewal Reminder System via SMS expected to help and facilitate UTeM students especially in renewal the books. This system also could give a lot of benefits to the UTeM's Library Management System.

1.7 Conclusion

This chapter is about the summary of the background of the project. Basically, this chapter describes the problem statements arise in the project and the proposed solution to solve the problems. This chapter also elaborates the objectives and scope involves in the system. Furthermore, the project significant and the expected output also have been described. Project significant has elaborates the benefits of the project. Overall, this chapter reviews on the background of the system and will be as guideline to all the works in the next chapters. The next activities to be developed are to investigate the project methodologies and discuss the previous research together with the proposed solution.

CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

This chapter will discuss details about the literature review and project methodology. The purpose of this chapter is to conduct the research about the other systems or applications that are similar to the system that will be developed. All aspect are studied in order to develop a system that is more effective. Furthermore, the discussion is also including the methodologies, techniques, hardware and software that being used in other research. The comparison between them is analyzed to highlight the differences thus determine the better solutions for this project.

2.2 Literature Review

Literature review is about the investigating and analyzing the current systems that are similar and applied same technology with the system that will be developed. Moreover, a literature review is a body of text that aims to review the critical points of current knowledge and methodological approaches on a particular topic. Literature reviews are secondary sources, and as such it does not report any new or original experimental work.

There is a lot options on how to gain all related information during the literature review process such as review the books, online journal, magazine, online books, legal websites and valid internet resource.

2.2.1 Domain

The domain for the project is the ICT in Advanced Manufacturing Technology based on the Computer System Technology. This is because this project is adapted with the GSM technology. According to Harte et.al (1999), GSM technology involves communications between a mobile phone, using a radio interface, to the various part of GSM network. GSM technology allow for a wide range of services that are similar and compatible with differences types of fixed networks including the public analog and digital telephone networks.

Book Renewal Reminder via SMS System is based on the mobile applications technology which is a part of computer system technology. The reminder from the system that will send via mobile phone to the students is the example of SMS technology that is wider use nowadays. Short Message System (SMS), which worked on a stored-and-forward basis, is primarily used to short text messages from one cell phone to another.

According the article from Goldstuck (2006), the used of SMS technology is increased from 2006 to 2007. For example, media entertainment nowadays uses mobile technology in voting their arties in reality show. For the next 10 years, he predicts that there is high impact of using mobile application especially in business. From the article, we know that the use of mobile technology such as mobile phone gives a lot of advantages to the people.