

**KOLEJ UNIVERSITI TEKNIKAL KEBANGSAAN MALAYSIA**

**STUDENTS CLINICAL MANAGEMENT SYSTEM**

raf

QA76.9.D26 .M44 2005



0000037727

Kolej Universiti Teknikal Kebangsaan Malaysia students  
clinical management system / Mohamad Hizar Abd Hamid.

**MOHAMAD HIZAR BIN ABD HAMID**

**KOLEJ UNIVERSITI TEKNIKAL KEBANGSAAN MALAYSIA**

**KOLEJ UNIVERSITI TEKNIKAL KEBANGSAAN MALAYSIA  
STUDENTS CLINICAL MANAGEMENT SYSTEM**

**MOHAMAD HIZAR BIN ABD HAMID**

**This report submitted in partial fulfillment of the requirement for the  
Bachelor of Computer Science  
(Software Development)**

**FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY  
KOLEJ UNIVERSITI TEKNIKAL KEBANGSAAN MALAYSIA  
2005**

## TESIS^ APPROVAL STATUS FORM

JUDUL: KUTKM STUDENTS CLINICAL MANAGEMENT SYSTEM

SESI PENGAJIAN: 2005/2006

Saya :

MOHAMAD HIZAR BIN ABD HAMID

(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 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)

Alamat tetap : F 20 B, Kg Baru2, Kedah.

\_\_\_\_\_  
(TANDATANGAN PENYELIA)

Nama Penyelia: PN.AZLIANOR  
BT. ABDUL AZIZ

Tarikh : 24 - 11 - 2005

Tarikh : \_\_\_\_\_

CATATAN: \*\* Jika tesis ini SULIT atau TERHAD, sila lampirkan surat daripada pihak berkuasa.


^ Tesis dimaksudkan sebagai Laporan Projek Sarjana Muda (PSM)

**DECLARATION**

I admitted that this project title name is

**KOLEJ UNIVERSITI TEKNIKAL KEBANGSAAN MALAYSIA STUDENTS  
CLINICAL MANAGEMENT SYSTEM**

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

**STUDENT** :  \_\_\_\_\_ **Date:** 24-11-2005  
**(MOHAMAD HIZAR BIN ABD HAMID)**

**SUPERVISOR** : \_\_\_\_\_ **Date:** \_\_\_\_\_  
**(PN. AZLIANOR BINTI ABDUL AZIZ)**

## ACKNOWLEDGEMENT

*Firstly, I would like to thank the Almighty God; Allah for blessing me through these seven months duration of Project Sarjana Muda.*

*I would like to take chances to express thousand thanks and also appreciation toward my supervisor (Mrs. Azlianor Binti Abdul Aziz), she has given me the opportunity in order to achieve the Project Sarjana Muda goal in this unit. Without her support and encouragement, all of my work would be useless.*

*And also I would like to thank my lecturers from Faculty of Information Technology and Communication (Software Development) and PSM committee for giving me the guideline in completing Project Sarjana Muda.*

*Finally limitless thanks to my family and all of my friends from BITS, BITM and BITC course for all their supports and encouragements toward completing this project. Thank you again to those involved in my Projek Sarjana Muda.*

## **ABSTRACT**

This project is carried out to develop KUTKM Students Clinical Management System for KUTKM Students Clinic. The purpose of this project is to add new features to the clinical management system. Features added are the patient's registration based on the online system by student. Otherwise, student also can make an appointment. Student should fill up the appointment form in the system. This system is developing based on the web page. After that, student and staff or doctor can access this system wherever they are through the Internet. Beside that, this system also provides a facility to staff or doctor to manage the clinic which they will update the medicine stocks, insert and delete record of medicine stocks, student health record and others. The automated shared information and simplified registration and appointment process allow the student to manage their time to be more efficient and systematic.

## ABSTRAK

Projek ini dijalankan untuk membangun satu sistem pengurusan klinik pelajar untuk Klinik Pelajar KUTKM. Tujuan projek ini adalah untuk menambah fungsi baru di dalam sistem manual yang digunakan oleh staf atau doktor di klinik tersebut. Fungsi yang ditambah ialah pendaftaran pesakit secara online yang dibuat sendiri oleh pelajar. Selain itu, pelajar juga boleh membuat temujanji dengan mengisi borang yang disediakan di dalam sistem tersebut. Sistem yang dibangunkan ini adalah berdasarkan kepada laman web. Pelajar dan juga staf atau doktor boleh mengakses sistem ini di mana-mana sahaja mereka berada melalui Internet. Selain itu, sistem ini memberi kemudahan kepada staf atau doctor untuk menguruskan klinik dari segi pengurusan ubat yang berada di dalam stok mereka. Selain itu, mereka juga boleh mengemaskini maklumat ubat, menambah dan membuang rekod ubat, rekod kesihatan pelajar dan lain-lain. Perkongsian maklumat dan cara pendaftaran yang lebih mudah serta proses temujanji yang sistematik membolehkan pelajar menguruskan masa mereka dengan lebih berkesan dan teratur.

## TABLE OF CONTENTS

CHAPTER	SUBJECT	PAGE
	DECLARATION	ii
	ACKNOWLEDGEMENT	iii
	ABSTRACT	iv
	ABSTRAK	v
	TABLE OF CONTENTS	vi
	LIST OF TABLES	x
	LIST OF FIGURES	xii
	APPENDIX	xiv
CHAPTER 1	INTRODUCTION	
	1.1 Project Background	1
	1.2 Problem Statement(s)	2
	1.3 Objective	4
	1.4 Scopes	4
	1.5 Project Significance	5
	1.6 Expected Output	6
	1.7 Conclusion	7
CHAPTER 2	LITERATURE REVIEW AND PROJECT METHODOLOGY	
	2.1 Introduction	9
	2.2 Fact and Finding	10
	2.2.1 Current System Scenario	10
	2.2.2 Comparison	11
	2.3 Project Methodology	12



<b>2.4</b>	<b>Project Requirements</b>	<b>14</b>
	2.4.1 Software Requirements	14
	2.4.2 Hardware Requirements	15
	2.4.3 Other Requirements	15
<b>2.5</b>	<b>Project Schedule and Milestones</b>	<b>16</b>
<b>2.6</b>	<b>Conclusion</b>	<b>18</b>

**CHAPTER 3****ANALYSIS**

<b>3.1</b>	<b>Problem analysis</b>	<b>19</b>
	3.1.1 Background of Current System	19
	3.1.2 Problem Statement	22
<b>3.2</b>	<b>Requirement Analysis</b>	<b>23</b>
	3.2.1 Functional Requirement	23
	3.2.1.1 Scope	23
	3.2.1.2 Authentication	24
	3.2.1.3 Have Two User	24
	3.2.1.4 Patient Register	24
	3.2.1.5 View The Information	24
	3.2.1.6 Update The System	24
	3.2.2 Business Flow	26
	3.2.3 Use-Case View	27
	3.2.4 Actors	27
	3.2.5 Use Case Description	28
	3.2.6 Interaction Diagram	44
	3.2.6.1 Authenticate User for Staff	44
	3.2.6.2 Authenticate User for Student	45
	3.2.6.3 Patient's Registration	46
	3.2.6.4 Make an Appointment	47
	3.2.6.5 View Result of Appointment	48
	3.2.6.6 Update Medicine Stocks	49
	3.2.3.7 Update Appointment Record	50

3.2.3.8 View patient's Information Record	51
3.2.3.9 Update Student Health Record	52

3.3 User Requirements	53
3.4 Software Requirements	54
3.5 Hardware Requirements	55
3.6 Conclusion	56

## CHAPTER 4 DESIGN

4.1 Introduction	57
4.2 High level Design	58
4.2.1 Raw/Input Data	58
4.2.2 System Architecture	62
4.2.2.1 Static Organization	63
4.2.2.2 High level Class Diagram	65
4.2.3 User Interface Design	69
4.2.4 Database Design	74
4.2.5 Deployment view	75
4.3 Detail design	76
4.4 Data dictionary	80
4.5 Conclusion	83

## CHAPTER 5

### IMPLEMENTATION

5.1 Introduction	84
5.2 Software Development Environment	
Setup	85
5.2.1 System Planning	86
5.2.2 System Analysis	86
5.2.3 Process Designing	86
5.2.4 Coding	86

5.2.5	Testing	86
5.3	Software Configuration Management	87
5.3.1	Configuration Environment Setup	87
5.3.2	Version Control Procedure	87
5.4	Implementation Status	87
5.5	Conclusion	88

## CHAPTER 6 TESTING

6.1	Introduction	89
6.2	Test Plan	90
6.2.1	Test Organization	90
6.2.2	Test Environment	90
6.2.3	Test Schedule	91
6.3	Test Strategy	92
6.4	Test Design	93
6.4.1	Test Description	100
6.4.2	Test Data	103
6.5	Test Result and Analysis	105
6.6	Conclusion	107

## CHAPTER 7 PROJECT CONCLUSION

7.1	Observation on Weaknesses and Strengths	108
7.2	Propositions for Improvement	109
7.3	Conclusion	110

	BIBLIOGRAPHY	111
--	--------------	-----

## LIST OF TABLES

<b>TABLE</b>	<b>TITLE</b>	<b>PAGE</b>
<b>Table 1</b>	<b>Project Schedule and Milestones</b>	<b>16</b>
<b>Table 2</b>	<b>Student Login Status Data Source</b>	<b>59</b>
<b>Table 3</b>	<b>Student Registration Data</b>	<b>59</b>
<b>Table 4</b>	<b>Student-Retrieve Forgotten Password Data Source</b>	<b>60</b>
<b>Table 5</b>	<b>Student-Change Password Data Source</b>	<b>60</b>
<b>Table 6</b>	<b>Student Appeal Data Source</b>	<b>61</b>
<b>Table 7</b>	<b>Medicine Stocks</b>	<b>80</b>
<b>Table 8</b>	<b>Patients Registration</b>	<b>80</b>
<b>Table 9</b>	<b>Appointment</b>	<b>81</b>
<b>Table 10</b>	<b>Health Record</b>	<b>81</b>
<b>Table 11</b>	<b>Student</b>	<b>82</b>
<b>Table 12</b>	<b>Staff</b>	<b>82</b>
<b>Table 13</b>	<b>Implementation Status</b>	<b>88</b>
<b>Table 14</b>	<b>Hardware and Network Environment Specification</b>	<b>90</b>
<b>Table 15</b>	<b>Test Cycles and Duration</b>	<b>91</b>
<b>Table 16</b>	<b>Unit Test for Login Staff and Admin</b>	<b>93</b>
<b>Table 17</b>	<b>Unit Test for Login Students</b>	<b>94</b>
<b>Table 18</b>	<b>Unit Test for Result Appointment</b>	<b>95</b>
<b>Table 19</b>	<b>Unit Test for Health Record</b>	<b>96</b>
<b>Table 20</b>	<b>Unit Test for Change Password</b>	<b>97</b>
<b>Table 21</b>	<b>Unit Test for Patients Registration</b>	<b>98</b>

<b>Table 22</b>	<b>Unit Test for Appointment Information</b>	<b>99</b>
<b>Table 23</b>	<b>Login Test Summary</b>	<b>103</b>
<b>Table 24</b>	<b>Patients Registration Test Summary</b>	<b>104</b>
<b>Table 25</b>	<b>Appointment Information Test Summary</b>	<b>104</b>
<b>Table 26</b>	<b>Login Test Result</b>	<b>105</b>
<b>Table 27</b>	<b>Patients Registration Test Result</b>	<b>105</b>
<b>Table 28</b>	<b>Appointment Information Test Result</b>	<b>106</b>

## LIST OF FIGURES

FIGURE	TITLE	PAGE
1	Activity Diagram Of Current System	21
2	Overview Of Kolej Universiti Teknikal Kebangsaan Malaysia Student Clinical Management System	25
3	Activity Diagram System Proposed	26
4	Global View of Use Case Model	27
5	Student Login Interface	29
6	Patients Registration	31
7	Make an Appointment	33
8	View Student Information Records	35
9	Make an Appointment	37
10	Update an Appointment Record	39
11	Student Health Record	41
12	View Result of an Appointment	43
13	Interaction Diagram for Authenticate User for Staff	44
14	Interaction Diagram for Authenticate User for Student	45
15	Interaction Diagram for Patient's Registration	46
16	Interaction Diagram for Make an Appointment	47
17	Interaction Diagram for View Result of Appointment	48
18	Interaction Diagram for Update Medicine Stocks	49
19	Interaction Diagram for Update Appointment Record	50
20	Interaction Diagram for View Patient Information Record	51
21	Interaction Diagram for Update Student Health Record	52
22	High Level Logical View/Architecture	62
23	Static Organization	63
24	Class Diagram for Registration	65

<b>25</b>	<b>Class Diagram for Make Appointment</b>	<b>66</b>
<b>26</b>	<b>Class Diagram for Send Report</b>	<b>67</b>
<b>27</b>	<b>Class Diagram for Searching Result</b>	<b>68</b>
<b>28</b>	<b>Student Login Interface</b>	<b>69</b>
<b>29</b>	<b>Patients Registration</b>	<b>70</b>
<b>30</b>	<b>Make an Appointment</b>	<b>71</b>
<b>31</b>	<b>View Student Information Records</b>	<b>71</b>
<b>32</b>	<b>Make an Appointment</b>	<b>72</b>
<b>33</b>	<b>Update an Appointment Report</b>	<b>72</b>
<b>34</b>	<b>Student Health Record</b>	<b>73</b>
<b>35</b>	<b>View Result of an Appointment</b>	<b>73</b>
<b>36</b>	<b>Entity Relationship Diagram</b>	<b>74</b>
<b>37</b>	<b>Deployment View of Kolej Universiti Teknikal Kebangsaan Malaysia Students Clinical Management System</b>	<b>75</b>
<b>38</b>	<b>The Linear Sequential Model</b>	<b>85</b>

**LIST OF APPENDIX**

<b>APPENDIX</b>	<b>PAGE</b>
<b>User Manual</b>	<b>112</b>



## CHAPTER 1

### INTRODUCTION

#### 1.1 Project Background

The system that will be developed for the clinic is to manage all the management of the clinical. The management of the clinic include patient's registration process, updating the patient's information, maintaining the system, arranging the appointment scheduling and so on. This system is developed based on the online system.

This system will be divided in to two users. The first user is staff or administrator at the clinic and the second user is student or patient. The task of the staff is to manage the patient's registration, update the database of patients, medicine and clinical record. The staff or administrator also arranges the appointment scheduling for the patients and maintain the system. The student or patients may access the Kolej Universiti Teknikal Kebangsaan Malaysia Student's Clinical Management website to get information about the Kolej Universiti Teknikal Kebangsaan Malaysia Student's Clinic and to make and view the appointment with the doctor. They can register for health check up.

The proposed of the system is likely to ease the management of the Kolej Universiti Teknikal Kebangsaan Malaysia Student's Clinic in terms of time used to handle the patients, such as registration and inspection. Besides, this system

also allows the user to access the information of the clinic whenever they are connected to the Internet. In addition, it save money and time as the clinic might need only a low maintenance cost to maintain the system. This system is also backup by secured system to prevent an unauthorized user.

With this system that we are going to develop, the management of the Kolej Universiti Teknikal Kebangsaan Malaysia Student's Clinic will be more systematic than the manual system. Therefore, by using this system, it will save time for users, thus resulting higher profit to the clinic and better services to its patients.

## **1.2 Problem Statement**

In conjunction with the globalization, many business organizations will have to depend on information technology to get its daily routine and business function done efficiently, this requires specialized applications to fulfil their business requirements and solving daily problems. In the health aspect, the most clinics are also use the information technology to manage their management of the clinical.

Kolej Universiti Teknikal Kebangsaan Malaysia Student's Clinic has their own clinical management system. However, the Kolej Universiti Teknikal Kebangsaan Malaysia Student's Clinic current system does have some cons. From the observation and the questionnaire, we found a lot of problem. For example, the staff could not find the data when the students come to make an appointment. This is because the Kolej Universiti Teknikal Kebangsaan Malaysia Student's Clinic staff still using the manual system to save the data and it will make the data lost or damaged. The problem still exists in the current system which is:-

- **Manual System**

Kolej Universiti Teknikal Kebangsaan Malaysia Student's Clinic still using manual system for storing patients. This paper based system has the possibility of damaged and lost of data besides require a lot of paper to store data. To solve this problem we decide to minimize problem by develop it system to store the patients.

- **The Capital Problem To Develop The System**

Kolej Universiti Teknikal Kebangsaan Malaysia Student's Clinic is the new facility for the students. To develop the system need budget and the capital, serve as students try to help to develop a system for Kolej Universiti Teknikal Kebangsaan Malaysia Student's Clinic and give the facility for all students and staff.

- **Low Memory And Hard Disk**

Kolej Universiti Teknikal Kebangsaan Malaysia Student's Clinic still using lowest memory and hard disk for computer operating system, to solve this problem the staff should change the applicable capacity for the memory and hard disk. The higher capacity will easy to manage the system.

- **No Experience To Handle The Computer**

Not all staff of the Kolej Universiti Teknikal Kebangsaan Malaysia Student's Clinic has knowledge to handle the system or computer. It will give a high risk and problem to other person. To solve this problem we develop the system with

GUI (Graphic User Interface) and button to make the easy way for the novice user to classify what is the system need.

### 1.3 Objective

- To make this system accepted by the students and the management of Kolej Universiti Teknikal Kebangsaan Malaysia Clinic.
- To make the process of registration become quicker.
- To save students time and money.
- To disclose students to make a registration based on the online concept.
- To help students learn more about the environment of clinic

### 1.4 Scopes

In this project, we will develop an online clinical management system. The user will use the online registration facility for student or patients. A scope illustrate the limitation and spaces of the overall project which in the process of developing and distributing every task in the system. Kolej Universiti Teknikal Kebangsaan Malaysia Students Clinical Management System have two user. That is staff or administrator of Kolej Universiti Teknikal Kebangsaan Malaysia Student's Clinic and students or patients.

The scope of the project effect much on the size of the system that are being developed. The scope of the project of Kolej Universiti Teknikal Kebangsaan Malaysia Students Clinical Management System includes:-

- This system has a patient's registration interfaces. Student can make an online registration and fill the form for appointment to meet doctor with this system. All patients' information will be added in Patient's Information database.
- This system can display the medicine stocks record, patient's information, student health record and etc.
- The staff or administrator of this system can update, delete and add information about patients and maintain the system.
- This system also have a security system. Which mean this system has a User Authentication or Login interfaces. The user must enter their username and password to access this system.

## 1.5 Project Significance

The project significance of this system is to develop an online system. This system is similar with the web based system. The user will get more benefit from this system. Among the benefit are the students will have a better service from the clinic. This system more than is benefit important because it can help the management of Kolej Universiti Teknikal Kebangsaan Malaysia Students Clinical Management System to manage their clinic more systematic. This system minimizing or name error reading of patient's info.

The student just enters their information in Patient's Registration interfaces to register their name in Patient's Information database. Then when the

student go to the clinic, just type the student id to check the registration record. The students no need to wait in a long queue to make a registration. Preciously, the students who are sick must go to the clinic themselves to register, but after this system is developed it will make the registration process easier. The management of Kolej Universiti Teknikal Kebangsaan Malaysia Students Clinical Management System will arrange the appointment between student and doctor. This is more important because student can prepare manage their time when to meet the doctor.

This system can help the staff to find the information about patients that have been registered in database. So, student need no to fulfil again about their information for registration. This system can give more benefit not only for the Kolej Universiti Teknikal Kebangsaan Malaysia Students Clinical Management System, but it also can give more benefit for students and staff.

## **1.6 Expected Output**

For our target clinic, first, it is hoped that the proposed system will offer a better business solution to help clinic in capitalize on ICT opportunities. The solution is likely re-engineering of clinic structures such as centralizing all the data and maintaining all the information in one system to achieve lower costs, faster time-to-inspection as well as improving the service quality.

Second, the proposed system will provide a persistent and stable storage of data. Equipped with a well designed database, it will help the clinic to manage the constantly changing data, which including the support for an efficient data maintenance.

Third, the system is expected to reduce significantly the clinic operation and resources cost in long term basis. Access to an online system gives the clinic staff and patients or student an inexpensive way to share information of the clinic.

Finally, we expect the system will be used by staff and student to facilitate them to access the system using the website. This system can give staff and student convenience to make a registration for student as patients and to maintain the system for staff.

For the potential user, the proposed system will provide an easy access to the clinic information by using the World Wide Web. The user will be able access to all the information of clinic such as appointment scheduling, medicine stocks, patients' information and etc through the clinic website. It is expected to satisfy different group of users' needs. Last but not least, it is also hoped that the system will facilitate user to access and update the system whenever they are connected to Internet.

## **1.7 Conclusion**

The Kolej Universiti Teknikal Kebangsaan Malaysia Students Clinical Management System is a fully computerized system to manage online registration and appointment process, develop for Kolej Universiti Teknikal Kebangsaan Malaysia Students Clinical Management System. This system can be use by any students or staff even for the user with low computer literacy, Due to the reason, this system is easy to learn and understand by the users and it is also user friendly.

Besides that, this new proposed system can also help the clinic to solve the main power shortage and reduce student's time. Regarding of the requirement of the developed system, students is allowed to register and make an appointment whenever they are on-line, while the clinic management can manage the process of appointment, view the students information, update medicine stocks and students health record easily.

However Kolej Universiti Teknikal Kebangsaan Malaysia Students Clinical Management System has some constraints. The constraints can be solved in the enhance system in future.