

**ELECTRONIC PATIENT RECORD MANAGEMENT SYSTEM
(E-PRMS)**

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**This report is submitted in partial fulfillment of the requirements for the award of
Bachelor of Electronic Engineering (Computer Engineering) With Honours**

**Faculty of Electronic and Computer Engineering
Universiti Teknikal Malaysia Melaka**

April 2010



UNIVERSITI TEKNIKAL MALAYSIA MELAKA
FAKULTI KEJURUTERAAN ELEKTRONIK DAN KEJURUTERAAN KOMPUTER

BORANG PENGESAHAN STATUS LAPORAN
PROJEK SARJANA MUDA II

Tajuk Projek : ELECTRONIC PATIENT RECORD MANAGEMENT SYSTEM

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Specially dedicated to my parent, siblings and beloved friends for gives me support and advice until I had finished my final year project. Not forgotten my supervisor, Puan Noor Mazlina Binti Mahmud who helps me to achieve this project until successful. Thank you very much for all the guidance given

ACKNOWLEDGEMENT

Praise to Allah SWT for giving me the strength in order to finish my final year project (PSM I and PSM II). I would like to take this opportunity to thank my supervisor, Puan Noor Mazlina Binti Mahmud who gave me a lot of guidance and advices in order to complete my project without any doubt. My highest gratitude to her would never comes to an end and always be remembered. May Allah reward all courtesy good.

I also want to thank to my family for giving me such a good courage and guidance to complete my final year project. Without encouragement from them, I could not finish the project properly.

Finally, I would like to thank to my dear friend who are directly or indirectly giving me full support and their helps during the project development until my project and thesis complete. Thank you very much and may Allah bless all of you always.

ABSTRACT

Electronic Patient Record Management is developed to help doctors and staff in clinic to manage patient records by systematically. The system will record all information about patient who registered under the clinic. This electronic patient record will eliminate the constraint that happen in current system. This system is built to reduce the problems and to improve patient flow, documentation and reporting, new computer software is needed to replace paper files and records with all-digital technology. This system also include by 3 main modules, which are patient registration, information by using barcode tags, and consultation session schedule, health and medical information. Once the patient registers their record, the administrator will use barcode reader to read the barcode and the information of the patient will appear on the system. The system was using Microsoft Visual Basic.Net 2005 to design the graphical user interface and SQL programming language as the database design.

ABSTRAK

Sistem Pengurusan Rekod Pesakit (E-PRMS) dibangunkan untuk membantu doktor dan kakitangan klinik untuk menguruskan rekod pesakit secara sistematik. Sistem akan merekodkan semua maklumat tentang pesakit yang berdaftar di bawah klinik tertentu. Rekod pesakit ini akan mengurangkan masalah yang sering berlaku dalam sistem pengurusan rekod yang sedia ada. Sistem ini dibina untuk mengurangkan masalah dan untuk meningkatkan aliran pesakit, rekod dan dokumen. Oleh itu, satu perisian komputer baru diperlukan untuk menukar sistem rekod menggunakan fail-fail kertas dan nota kepada teknologi digital. Sistem ini juga mempunyai 3 modul utama iaitu pendaftaran pesakit, pencarian maklumat dengan menggunakan kod bar, jadual sesi konsultasi, serta maklumat perubatan dan kesihatan. Selepas rekod pesakit didaftarkan, pentadbir akan menggunakan pengimbas kod bar untuk membaca kod bar dan maklumat daripada pesakit akan muncul di sistem. Sistem ini menggunakan Microsoft Visual Basic.Net 2005 sebagai antara muka pengguna grafik dan SQL sebagai bahasa pengaturcaraan untuk pangkalan data.

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CHAPTER I

INTRODUCTION

Chapter 1 gives an overview of Electronic Patient Record Management. The objectives of the project are stated clearly. There is few problem statement which is lead to this project development. The scope of project which consists of hardware and software development is being discussed in this chapter.

1.1 Introduction of Project

With monthly and yearly increasing number of patients who register in clinics and hospitals, the volume of patient's records continues to climb and the possibility of losing the manual records can also happen. So, this project is built to reduce the problems and to improve patient flow, documentation and reporting, new computer software is needed to replace paper files and records with all-digital technology. This system also include by 3 main modules, which are patient registration and information by using barcode tags, consultation session schedule, health and medical information. Once the patient registers their record, the administrator will use barcode reader to read the barcode and the information of the patient will appear on the system.

This project will be developed by using Microsoft Visual Basic .Net as the interface design while the database to store the data will be using SQL programming language. Barcode reader will be connected by using serial port and the connection is activated by using Microsoft Communication Control in the VB.Net. For the registration module, only staff and admin can use it. Doctor only can use the consultation schedule module and also the health and medical information module.

1.2 Objectives of Project

The objectives of this project are:

- 1) To build a system that is used to store patient's information and registration, the medical information and also the schedule of consultation session.
- 2) To build a system that is fully protected and only the administrator can accessed the system. Besides that, the software is also match with barcode tag so that the administrator only need to scan the barcode cards on barcode reader then the patient's information will appear on the computer screen.
- 3) To develop systematic system to manage patient's record and information.
- 4) To provide a manageable database for easier data and information retrieval.
- 5) To replace old documentation system.
- 6) To save time and increase the service efficiency.

1.3 Problem Statement

Nowadays, the volume of patients has increased in clinics and hospital. Generally, the total number of patient in hospital is higher than volume of patient in clinics. Usually, most of clinics in Malaysia and hospital use the old documentation records by using paper files. In this situation, the problems that could occur are the possibility of losing the paper files records and hard to manage the patients records. The records could be missing if there is occurrence of negligence staff. Other than that, patients have limited paper files records and they have to renew the paper record if the old paper files are already full with records. Furthermore, the paper records are not fully protected and it's easy to intrude. With this system, the time for tracking and recording patient's data can be minimize as the normal system takes time to record the patient's data. This system helps the doctor to handle and record the patient's data more easily. Doctor can check the medical history of their patient through this system. Doctor can easily print out the medical certificate (MC) from the system rather than need to writes on the MC paper.

1.4 Scope of Work

The scope of this project will be divided into two parts which are scope of user and scope of the system. The scopes is describes as below.

a) User.

- The user of this system is for staff or admin and doctor. Each of the user will provided with their own password. This will prevent from the intruders.
- The user will use registration and search patient form and also

b) System functionalities.

- This system consists of three main modules which are registration and patient information using barcode, consultation schedule and also medical and health information.
 - i. Registration and patient information using barcode module.
 - This module will use by staff or admin only. When the new patient register, staff or admin will do the registration and all the information will be entered and save in the barcode. To search the information of the patient, staff only need to scan the barcode and the information will appear in the computer screen. The barcode reader will be connected to the computer via serial port or USB.
 - ii. Consultation schedule module.
 - The function of this module is managing and conducting the patient consultation schedule with doctor. Only doctor can use this module. This module will list the schedule of the patient meeting the doctor. It also contains the history of the previous consultation session. Doctor also can check the availability of the date to make sure there is no overlapping date.
 - iii. Health and medical information module.
 - The function of this module is to record patient's health and medical information. This module also can use by the doctor only. To search the patient's information, doctor need to search by enter patient ID in the space provided. All the medical history will be shown.

c) Development.

- This system will be designed by using Microsoft Visual Basic.Net as the interface (GUI). In this system, VB.Net is the main host to save the patient information and to verify the correct or incorrect patient. It is also

used as the interface for serial connection for barcode reader. From VB.Net, the barcode tag number will appear and it can be matched to the valid patient information. VB.Net also will show the patient identification that has already registered.

- For the database, this system will use SQL programming language. SQL, or structured query language, is a programming language used to store, manage, and retrieve data housed in relational databases.

d) Scope of hardware.

- The hardware that will be use in this system is the barcode reader. Barcode reader will be connected to computer via serial port. The connection between VB.Net and serial port can be established by activating the Microsoft Comm. Control 6.0 in the VB. Microsoft Comm. Control 6.0 will allow VB.Net to communicate with external hardware via serial port.

There is a limitation of this project which are:

- i. Each of the users need login ID and password to enter the system. This is because to keep the system and data safety avoiding from intruders.
- ii. The system is limited to staff or admin and doctors.
- iii. The system will be designed to be independent and standalone system.
- iv. The system is suitable for clinics because this system helps to handle and record the patient's data more easily.
- v. The system functionalities will cover from patient records including their personal data, health and medical history information, consultation schedule with doctor, treatment done and current health condition.
- vi. The system will use barcode reader to scan the barcode tags.

CHAPTER II

LITERATURE REVIEW

This chapter will cover the research and findings that had been done to develop the electronic patient records management. There are studies about related systems, the differentiation among the systems, the information about barcode technology and operation and also information about Visual Basic.Net and SQL programming language.

2.1 Barcode Technology

A bar code is a graphic representation of data (alpha, numeric, or both) that is machine-readable. Bar codes are a way of encoding numbers and letters by using a combination of bars and spaces of varying widths. Both the lines and spaces are read. They may be thought of as another way of writing, because they replace key data entry as a method of gathering data. In business, correct usage of bar codes can reduce inefficiencies and improve a company's productivity, thereby growing its bottom line. Simply put, bar codes are a fast, easy, and accurate way of entering data. A bar code typically does not contain descriptive data. A bar code is a reference number that a

computer uses to look up an associated record that contains descriptive data and other important information.



Figure 2.1: Example of Barcode.

Bar codes come in many varieties. Most of us are familiar with those seen in grocery or retail stores, but there are many others that are used in various industries. In fact, there is more use of bar coding in manufacturing than in any other industry sector. Each industry has symbologies that are unique: They are not interchangeable. In some cases, companies have developed their own proprietary bar code symbologies. Why are there so many different types of bar codes? It's simply because different symbologies have evolved to solve specific problems.

2.1.1 Barcode Operation

Bar codes are read by sweeping a small spot of light across the printed bar code symbol. There's only a thin red line emitted from the laser scanner; what is happening is that the scanner's light source is being absorbed by the dark bars and reflected by the light spaces. A device in the scanner takes the reflected light and converts it into an electrical signal. The scanner's laser (light source) starts to read the bar code at a white space (the quiet zone) before the first bar and continues passing by the last bar, ending in the white space that follows it. Because a bar code cannot be read if the sweep wanders outside the symbol area, bar heights are chosen to make it easy to keep the sweep within the bar code area. The longer the information to be coded, the longer the bar code

needed. As the length increases, so does the height of the bars and spaces to be read. The photodiode interprets this information and sends it to the database via the bidirectional link. The link "talks" with the database and determines information about this object. It can request information and it can update information (e.g., quantity remaining, changes in price or addition to a registry). The requested information is sent to the bar code reader and registered either directly on the device, such as with a hand-held reader, or the data is sent to a device.

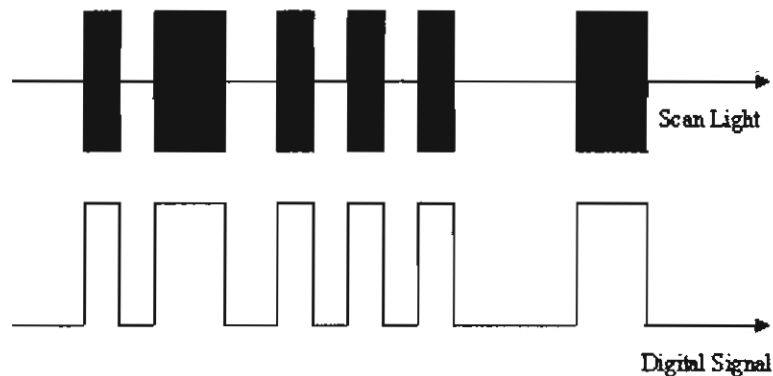


Figure 2.2: Operation of Barcode Reader

A barcode reader contains two parts. The first part is the scanner that scans the image and converts into digital representation (01111000). The second part is the decoder which combines the binary digital signals into a series of characters. The decoded information is sent to the computer via keyboard or serial interface.



Figure 2.3: Barcode Scanner.

2.1.2 Barcode Structure

A bar code is a self-contained, encrypted message with information encoded within the bars and spaces of a specific pattern. Color is not relevant and no characterizing information exists in the height of the bars and spaces. Think of it as similar to the dots and dashes in Morse Code.

Each bar code symbology contains a set of specifications that assigns the specific widths of the bars and spaces and their allowable tolerances. Depending on the symbology used, individual bar code symbologies can use five, seven, eight, and nine elements to code a single character.

Symbologies can encode either numbers (numeric) or alphanumeric (alphabetic and numeric) information, while others support the Full ASCII character set. There are many ways data can be encoded and formatted within the pattern. Most bar codes have a unique start/stop character combination; however, some allow multiple start/stop codes that are used for a variety of purposes.

Bar codes are either discrete or continuous. As shown in, discrete bar codes start with a bar, end with a bar, and have a space between characters (intercharacter gap, which contains no information). Each character can stand-alone and decoded independently from the adjacent characters.

Continuous bar codes always start with a bar, end with a space, and have no intercharacter gap. Since there are no intercharacter gaps, a continuous bar code requires less length to encode a given amount of data. In this example, 1234 is encoded as an Interleaved 2 of 5 bar code. There are variety types of barcode as shown below in table 2.1.