CLINIC MANAGEMENT SYSTEM

MOHD ARIFF BIN ANUAR

Projek ini merupakan salah satu keperluan untuk
Ijazah Sarjana Muda Sains Komputer dengan Kepujian
(Sistem Maklumat)

Fakulti Sains Komputer dan Teknologi Maklumat
UNIVERSITI MALAYSIA SARAWAK
2006

Acknowledgement

First of all Alhamdulillah. The final year project is able to be completed within the time frame given.

Secondly thanks to all the lecturers Faculty of Science Computer and Information Technology for be a good lecturer helps me to finish my final year project. Special thanks to the supervisor En Mohamad Nazri Khairuddin for the advices and time that he spends to help improve my final year project.

Thank you to Hj Bidrihisam B. Hj Mohd Zaidi the operational manager and Dr Hjh. Noram B. Hj Mohd Zin from Poliklinik Keluarga for the cooperation during the evaluation and usability testing.

For all the participant that involve in evaluation and system testing, thank you very much. I really appreciate your cooperation and time spend during that session

For my family, thanks for the full support that they gave to me.

To all my friends thanks for the ideas and all the comments that has been given. I really appreciate.

Finally thanks to all the people that helps me in completing the final year project.

Table of Contents

Chapter 3: Requirement Analysis and Design

4.0 Implementation and testing

List of Figures

List of table

List of table

Abstract

Clinic Management System is developed to support the clinic daily operation before this is done manually. This system will involve all the clinic operation starting from patient registration until billing the patient. The important thing is it will become easier for the data record and retrieval. This system will be able to generate report regarding the clinic operation. For example, the number of patient per day and total collection per day. This system is able to check the inventory for the medicine in the clinic. The target user for this system is staff of the clinic, doctor and also the management. Prototyping approach is applied while developing this system. This will involve an iterative process to make this system is usable and easy to use by the user. The design for the system is using the System Development Life Cycle (SDLC) approach. The design will involve entity relationship diagram (ERD) and Data Flow Diagram (DFD) to show the logical flow for the system. For the implementation, Apache is used as a web server, MySql as a database, PHP as a scripting language and internet explorer as a browser. The main important while developing any system is to make the system usable. Evaluation is conduct with the Poliklinik Keluarga in Kota Tinggi, Johor. The doctor and staff give their evaluation and also opinion to make the system more usable for the clinic daily operation. Overall this system is able to support the daily clinic operation based on evaluation from real user and the system is able to perform the task correctly.

Abstrak

Sistem Pengurusan Klinik dibuat untuk membantu dalam operasi harian pengurusan klinik yang dilakukan secara manual sebelum ini. Sistem ini akan melibatkan semua aktiviti harian klinik bermula dari pendaftaran pesakit sehinggalah bil kepada pesakit. Perkara yang paling penting dalam sistem ini ialah merekod data-data dan mengambil semula data-data yang telah direkodkan sebelum ini. Sistem ini mampu menghasilkan laporan berkaitan dengan operasi harian klinik. Sebagai contoh jumlah pesakit dalam sehari dan juga jumlah kutipan bagi kilinik dalam sehari. Sistem ini juga mampu untul memeriksa inventori ubat untuk klinik. Sistem ini disasarkan kepada staf klinik , doktor dan juga pihak pengurusan klinik. Kaedah prototype digunakan untuk menghasilkan sistem ini. Ini akan melibatkan proses yang berterusan memperbaiki sistem yang dihasilkan untuk membolehkannya beroperasi dengan baik dan mudah digunakan. Sistem ini direka menggunakan kaedah *System Development Life Cycle* (SDLC). Bagi implementasi, Apache digunakan sebagai pelayan web, MySql sebagai pangkalan data dan PHP sebagai scripting language. Perkara yang penting ialah membolehkan sistem ini berfungsi dengan baik. Penilaian telah dilakukan dengan pihak Poliklinik Keluarga di Kota Tinggi,Johor. Doktor dan staf memberikan penilaian mereka dan juga pendapat untuk menambaik sistem yang dihasilkan. Secara keseluruhan sistem ini mampu membantu dalam pengurusan harian bagi operasi klinik.

Chapter 1: Introduction

1.1 Introduction

Nowadays many systems have been developed to make life easier. The system will include database that will record all the data. For the private hospital, usually they are using digital system to record the patient information and other information that related to the hospital. There are many systems for clinic management system, but it does not meet the local user requirement that is still new in the electronic system. Here, it will be more explanation of the system.

1.2 Project description

Clinic Registration System is developed to improve the clinic management and automates the workflow that happens in the clinic. This system is considering all the activities in the clinic.

Patient will make registration first. If the patient never registered before, patient information collected and stored in the database. However, if it is an existing patient the patient data is search-using IC (identification card) no. This will improve the record of the patient and save the time during the registration. At this time, patient is assign to the doctor

Once the patient gets the treatment, the doctor will send the report including the medicine name. The staff will view the report and complete the patient record. After that, the staff will prepare the bills for the patient. The patient can choose mode to pay cash or maybe the clinic is panel doctor for the patient. Then the staff will update the medicine stock and the patient record will be kept in database.

The clinic management system is very beneficial for a clinic/doctor. It will stores complete patient record. The most important thing is it will make it easier for the retrieval of history information of the patient. In case, if patient is allergic for certain medicine, the doctor may detect what type of medicine.

For the security, before the user enters the system they have to input their username and password before log in to the system. The system has different access for the difference user.

For the management of the clinic, they may view the daily report of clinic.

1.3 Problems Statement

Before this, the management of the clinic is done manually. There are some problem arise especially for the data retrieval. Clinic has a problem of loss of patient data. There is also redundant patient data if the patient not sure whether they have come to the clinic before. So the clerk consider the patient as a new patient and add new data. Currently, the inventory for the medicine is done manually. The management of the clinic also have to takes times to check for the medicine inventory.

1.4 Objectives

When developing the system, some objective has been outlined. First, to fulfill the requirement for the final year project (TMP 3012).From the technical view, the system will help to make it easier to maintain the record of patient, doctor and medicine. It will help to reduce the number of lost record for the patient. At the same time, it will improve the data retrieval. It will be easier for the staff of the clinic to retrieve back the record of existing patient and doctor may view the patient history. For the doctor, it will record all the profile of doctor if the clinic has more than one doctor. Furthermore, the inventory modules for the medicine will help in check the balance medicine and the information of

the medicine such as medicine manufacture and price. The system will display if the medicine is running out of stock. The most important thing is the management can view the payment record for the clinic.

At the same time, the system may generate report for the operation of the clinic. For example, report about the number of patient per day and total income for the clinic per day.

1.5 Scope

This scope is convergent to the one of private clinic in Kota Tinggi, Johor. The scope for the system will involve staff, doctor and management of the clinic. The staff will register the patient. The doctor will diagnose the patients and give the medication while the management will view the daily report of clinic operation. The communication between the staff is done using the local clinic network.

1.6 Methodologies

During the development of the system, System Development Life Cycle (SDLC) procedures will be followed.

In the System Development Life Cycle (SDLC), Structured Systems Analysis and Design Methodology (SSADM) will be applied. SSADM phased includes Planning, Analysis, Design and Implementation and Testing.

1.6.1 Planning

During this phase, the objectives and goals of the system were defined clearly include the project scoped. In this case, the objectives and goals of the system are to improve the management process in clinic and at the same way to improve process of recording data and data retrieval. After this, the risks of the system are been identified and evaluated. Identify the tools that going to use in the development process

1.6.2 Analysis

This phase includes identifying the data, the functions of the system, and the requirements for the system. This phase is divided into for sub-phases, which is content analysis, interaction analysis, functional analysis, and configuration analysis. The content analysis will identify the content that will be provided for the user. For the clinic management system, it will record data for patient, medicine inventory and so on. As for the interaction analysis, interaction between the user and the system is very important. Therefore, there will be an interfaces for the clerk to register patient, doctor to view the patient and billing to customer. The functional analysis consists of interaction analysis that defines operations that will be manipulated to the content. The configuration analysis describes the environment and infrastructure in which the system will reside. It also includes the review of the existing web base applications system used for government and private organizations and the comparison between them.

1.6.3 Design

In this phase, development of the system is based on the information during planning and analysis phases. The design will include data storage, interface design, architecture design and program design the development. The Entity relation diagram will be used to show the relationship between the entities in the overall system. Meanwhile data flow diagram is design here to show the process that will take place in the system.

1.6.4 Implementation

At this phase, all the design is transfer into the programming language. Prototyping approach will be used in the implementation phased. It means that the system

will be keep on building and testing until the system meet the requirement during the design phased.

1.6.5 Testing

After the implementation is complete, testing will be done to find any error and bugs. Black box testing and white box testing will be applied. Later, the user will do testing.

1.7 Expected Outcome

The system will be able to improve the workflow of the clinic starting from registration until billing to the patient. At the same time, it will maintain all the data that can be accessed anytime.

The report generated will help the owner of the clinic to view the summary daily operation of the clinic.

1.8 Significance of Project

The clinic management system will improve clinic operation for both staff and the patient

For the staff, it will make it easy during registration process. If the patient is an existing patient, they can easily retrieve back the record of the patient.

For the doctor they can view history record of patient. In case, if the patient allergy with the certain medicine, the doctor will give an alternative medicine for the patient.

For the management, it will help them view the report operation of the clinic. The other thing is it will maintain the account for the clinic.

1.9 Conclusion

Project introduction is the first step in building a system. Basically it will tell what is the application or a system that we are intended to build, what it will look like, brief describe on the proposed project, setting up the project scope, defining project objective, problem statements of the project and also the expected outcome. This stage will be used as a reference to ensure system meet the project scope and project objective.

Chapter 2: Background

2.1 Introduction

Currently the oversea company has developed most of the clinic management system. However, the features and functions for the system are advanced for the local user because clinic in Malaysia is still using manual system. Besides that, the system that was developed is very expensive. This system developed to meet the local requirement in Malaysia. The clinic in Malaysia is doing a registration manually. This chapter will elaborate more on how the existing works and the tools and terms that makes the service works.

2.1.2 Client/server

Client/server describes the relationship between two computer programs in which one program, the client, makes a service request from another program, the server, which fulfills the request. In a network, the client/server model provides a convenient way to interconnect programs that are distributed efficiently across different locations. Computer transactions using the client/server model are very common. In the usual client/server model, one server, sometimes called a daemon, is activated and awaits client requests.

2.2 Tools

2.2.1 Web Server

A Web server is a program that, using the client/server model and the World Wide Web's Hypertext Transfer Protocol (HTTP), serves the files that form Web pages to Web users (whose computers contain HTTP clients that forward their requests). Every computer on the Internet that contains a Web site must have a Web server program. Considerations in choosing a Web server include how well it works with the operating

system and other servers, its ability to handle server-side programming, security characteristics, and publishing, search engine, and site building tools that may come with it.

2.2.1.1 Apache Web Server

Apache is a freely available Web server that is distributed under an "open source" license. Version 2.0 runs on most Unix-based operating systems (such as Linux, Solaris, Digital UNIX, and AIX), on other UNIX/POSIX-derived systems (such as Rhapsody, BeOS, and BS2000/OSD), on AmigaOS, and on Windows 2000.

Apache has been shown to be substantially faster, more stable, and more feature-full than many web server.

The most important thing is apache is able to incorporate with PHP/MySQL .[6]

2.2.1.2 Java Web Server 2.0

Java Web Server is using Servlets technology to enable server-side Java applications that are easily available to users, employees and suppliers over the web. It is specially design for e-commerce activity and developed by Sun Microsystem Inc. Java web server is written in Java programming language

Java Web Server enables developers to create interactive and extensible web sites. The best thing is it provides GUI based tools for easy installation , management and maintenanace

Java web server 2.0 installation is fast and GUI based. Java web server has a built-in function that combines the strength of SSL-compliant encryption and authentication technology.

2.2.2 Database

Database is a place where all the data that obtain from the system is stored here. Data from the database stored in database can be manipulate using Add, Delete, Drop, Insert and Update command

2.2.2.1 MySQL

MySQL is an open source relational database management system. It is based on the structure query language (SQL), which is used for adding, removing, and modifying information in the database. Standard SQL commands, such as ADD, DROP, INSERT, and UPDATE used in MySQL.

MySQL used for a variety of applications but it usually used on Web servers. A website that uses MySQL may include Web pages that access information from a database.

Many database-driven websites that use MySQL use a Web scripting language like PHP to access information from the database. MySQL commands can be incorporated into the PHP code, allowing part or all of a Web page to be generated from database information.

Because both MySQL and PHP are both open source (meaning they are free to download and use), the PHP/MySQL combination has become a popular choice for database-driven websites.

2.2.2.2 PostgreSQL

PostgreSQL is an open source Object Relational Database Management System (ORDBMS). PostgreSQL was use as a testbed of various technique and technologies for university. PostgreSQL look similar to PostgreSQL MySQL project. Both offer a capable relational database accessible through various APIs and access method, including SQL. PostgreSQL offer stored procedures, triggers and foreign key support. PostgreSQL is highly extensible offering user defined operators and types. PostgreSQL is usually best for projects where high concurrency or complicated features needed.

2.2.3 Scripting Language

In computer programming, a script is a program or sequence of instructions that is interpreted or carried out by another program rather than by the computer processor (as a compiled program). [2]

In the context of the web-based, script languages are written to handle forms input or other services for a system and are processed on the Web server.

2.2.3.1 PHP

PHP (recursive acronym for "PHP: Hypertext Preprocessor") is an Open Source general-purpose scripting language that suited for Web development and can be embedded into HTML. PHP code is executed on the server different from the other side.

PHP is focused on server-side scripting. It can collect form data, generate dynamic page content, or send and receive cookies. The interesting features about PHP, it has search engine functions called mnoGoSearch.

PHP can be used on all major operating systems. The most important things is PHP is able to run in Microsoft Windows. PHP has also support for most of the web servers today. Since the system using Apache as web server, so it is suitable to choose PHP as scripting language. PHP also able to connect to any major database and mySQL is database for the clinic management system. PHP and MySQL is able to operate in any operating system.The communication can be done using common Structured Query Language (SQL).

PHP's abilities include output images, PDF files and even Flash movies (using libswf and Ming) generated on the fly. PHP can auto generate these files, and save them in the file system.

2.2.3.2 ASP

Microsoft produces Active Server Page (ASP). ASP is server side dynamic web page generator focus on database connectivity which allows developers to use simplified scripting texts to create web pages to access information and function from server. ASP supports VB script, Java code for Jscript and HTML to the server application and database.

The disadvantage of ASP is it platform and server dependent means that it only runs on Microsoft Operating System.

2.2.4 Web Browser

2.2.4.1 Internet Explorer

Internet explorer is browser that integrate well with the Microsoft. It will be the browser to using the Clinic Management System. Internet Explorer will support table includes alignment attributes that allow text to be flowered around the table.

2.2.5 Similar Comparable System

2.2.5.1 Hospital Management System

HMS runs on all standard hardware. The system is developed using Oracle 9i and Developer Forms 6i Release 2 as database. HMS has the portability and connectivity to run on all standard hardware platforms, with data security and easy recovery in case of a system failure.

HMS provides the benefits of streamlined operations, enhanced administration and control, improved response to patient care, cost control, and improved profitability. HMS contains 23 modules such as registration, billing, pharmacy, management information system (MIS), financial accounting and appointment scheduling.

During registration, the reception module handles in-patient and out-patient registration and admission, as well as online bed allocation. The billing module facilitates cashier and billing operations for different categories of patients, and automatic posting of charges for different services such as lab tests. The pharmacy module deals with all

medical items. Its activities include generating indents, issues to patients, returns, updating daily stock positions and stock adjustments.

MIS module helps generate valuable and timely Management Information Reports that facilitate better control of the Hospital affairs and enhance the efficiency of day-to-day operations. [3]

2.2.5.2 Traditional Chinese Medication Clinic Management System

Final year student at University of Hong Kong developed this system. This system only need basic requirement from the user to interact with the system. The system is network based computer system. The system is web-based three-tier client-server architecture. The system was developed to computerize the management of the clinic.
The system will be able to record systematically the information of patients including the case history to give the better treatment for patient. Besides that, the system will be able to store information of herbs and generate standard form. The function of the system is login pages for the staff, registration for patient and diagnosis.[4]

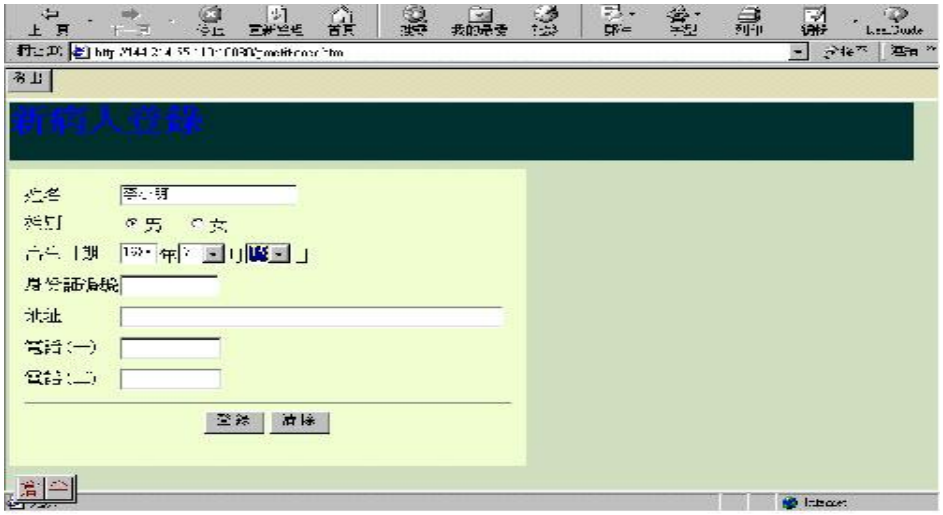

Figure 2.1 Registration Patient

2.2.5.3 Hospice Patient Management System

Hospice Patient Management System allows user to enter referral information and track accordingly. This includes assessments, a history of the patient's care planning, the next-of-kin and primary caregivers, medication administration records, hospice resources, insurances, and durable medical equipment.

HPMS offers report writer tools to help generate report. The report writer gives easy access to HPMS' relational database including Patient Data, Services, Billing, Accounts Receivable, Resources and Supplies.

HPMS provides function that calls Patient Careplans that will automate the process of identifying patient problems and producing a Careplan. It can be modified depends on patient treatment progresses. The Careplan includes care needs, goals, and interventions.

HPMS automates the billing process. Charges are calculated based on the patient's level of care or the services provided. [5]