

## **DENTAL INFORMATION SYSTEM**

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fulfillment of the requirements for the degree  
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by

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## ABSTRAK

Kajian ini dibuat bagi menghasilkan satu prototaip Sistem Maklumat Pergigian (Dental Information System) bagi kegunaan sebuah klinik pergigian. DIS terdiri dari dua bahagian; sebuah sistem berdasarkan web dan sebuah sistem klien server.

Sistem berdasarkan web menyediakan maklumat tentang klinik, kemudahan pendaftaran pesakit baru dan temujanji bagi pesakit. Ia juga dapat memaparkan rekod peribadi, kesihatan dan pergigian pesakit. Sistem berdasarkan web ini memfokus pendidikan kesihatan pergigian. selain menyediakan petua penjagaan gigi, permainan teka-teki, FAQ (soalan yang seringkali ditanya), dan teknologi terkini dalam bidang pergigian.

\*

Sistem klien server telah direkabentuk bagi kegunaan di klinik. Ia terdiri dari modul pesakit, doktor, bekalan, akaun dan utiliti. Dengan modul ini, doktor boleh mengakses maklumat kesihatan dan pergigian pesakit dengan segera. Sistem juga membolehkan kemaskini rekod di buat. Ia mampu mengeluarkan bil pesakit, laporan kewangan harian, bulanan dan tahunan bagi klinik. Ia juga menyediakan laporan bekalan perubatan, peralatan klinik dan perbandingan harga bekalan.

## **ABSTRACT**

Dental Information System (DIS) is designed for the use of dental clinic. DIS consists of two parts; a Web Based System and a Client Server System.

The web-based system provides information about the clinic; it allows new patient registration and appointment booking. It also gives access to clinic patient to view their personal, medical and dental record. Web based system mainly focused on educating public about dental health. It provides tips on dental care, puzzle games, FAQ, New Tech release in dentistry.

The Client Server System is designed for the use of clinic staff. Its module consists of patient information, doctor information, supplier, account and utility. With this module doctors can retrieve any information regarding patients medical or dental health easily. The system also allows updates on records. It also provides account reports of the clinic. It generates patient bills, daily, monthly and yearly income report. It also supplies medical and utensil supply report and supplier stock pricing.

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# **CHAPTER 1**

## **INTRODUCTION**

### **1.0      Introduction**

Database has fueled the information technology. It is now an integral part of our daily life. Information can be accessed and viewed at finger tips. Web based application is now the trend. Mankind would like to access information at the other side of the world. With the wireless technology, man can view what he wish without a wire limiting his distance.

Universities and colleges have database system containing information about students, courses, staff, and enrolment for each course. Student information system contains all particulars about the student including all courses attended, credit hours taken, results and students status.

A library uses database containing details of books in the library, details of users, reservation and so on. Users are able to find a book based on its title, author or subject area. Database system also allows a user to know if a certain book is available, locate a book on the shelf and reserve a book. The system also sends out reminder to borrowers who have failed to returns books on the due date. A bar code reader is used to keep track of books coming in and going out of the library.

Database is also used in our local supermarket. The cashier runs a bar code reader over each purchase. This is linked to a database application program, which uses the bar code to find out the price of the item from the product database. The program also reduces the number of that item in stock. The system is also able to place an order to obtain more stocks if the reorder level falls below a threshold.

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the thesis is for  
internal user  
only

## REFERENCES

Alvarado, R.C , (2000). Welcome to MED. Retrieved July 30<sup>th</sup>, 2002 from the World Wide Web:<http://www2.enegritiy.com/customers/stories/dce/andersen.shtml>

Andersen Consulting (1997). Retrieved July 30<sup>th</sup>, 2002 from the World Wide Web:  
<http://www2.enegritiy.com/customers/stories/dce/andersen.shtml>

Connolly, B. & Begg, C. (1999). Database System, A Practical Approach to Design, Implementation, and Management. (rev. ed.). Singapore: Addison-Wesley.

Gottfried, B.S. (2001). Visual Basic. Schaum's Outlines. New York: McGraw Hill.

Greenspan, J. (1999). Your First Database. Retrieved July 30<sup>th</sup>, 2002 from the World WideWeb:  
<http://hotwired.lycos.com/webmonkey/backend/databases/tutorials/tutorial3.html>

Hatfield, B. (1999). Active Server Pages For Dummies. (2<sup>nd</sup>. ed.). New York: IDG Books Worldwide.

Hoffer, J.A., George, J.F. & Valacich J.S. (1996). Modern System Analysis And Design. New York:Benjamin/Cummings Publishing Company.

London, S. (2000). FrontPage 2000. California:McGraw-Hill.

Lozano, F. (1998). Introduction to Relational Database Design. Retrieved July 13<sup>th</sup>, 2002 from the World Wide Web: <http://www.edm2.com/0612/msql7.html>

Owades, M.. (2001). Relational Database Projects. Retrieved July 13<sup>th</sup>, 2002 from the World Wide Web: <http://www.mtoassoc.com/index.html>

Wikipedia. (2002). Database Management System. Retrieved July 30<sup>th</sup>, 2002 from the World Wide Web:  
[http://www.wikipedia.com/wiki/Database\\_management\\_system](http://www.wikipedia.com/wiki/Database_management_system)

Whitten, J.L., Bentley, L.D. & Dittman, K.C. (2001). System Analysis And Design Methods. Singapore: McGraw-Hill Irwin.

Ying, L. G. (2000). Database Projects. Retrieved July 30<sup>th</sup>, 2002 from the World Wide Web: <http://www.cs.unm.edu/~ylguo/resume/resume.html>

Ziemer, J. (2002). Resume: Jurgen Ziemer. Retrieved July 30<sup>th</sup>, 2002 from the World Wide Web: <http://www.jayzed.com/projects.htm>