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WEB BASED PROFESSIONAL DEVELOPMENT TOOL

FOR LECTURERS

ABSTRACT

Malaysia is now moving heavily towards the era of Information Technology (IT) and the Internet technology is really an industry that is growing larger day by day. However, not many people appreciate these technologies and use them to simplify their work in life. We, who are a student and a citizen of the IT society should know and use these technologies to help us in real life situations.

web based professional development tool for lecturers is a system that will help lecturers of Faculty of Computer Science and Information Technology (FCSIT), to build a personal websites without any programming knowledge barrier. Currently, many lecturers having their websites with limited function and unprofessional layout.

The main objective of this system is to facilitate lecturers to build a website without using any web developing software and without any web programming knowledge. The system is developed to support four types of process, the layout manages process, data input process, download process and upload process. Each process has few functions with user friendly environment to make ease the web development process. Moreover some optional also given to lecturers to develop their website with advanced web function such as forum and search with just a single click. Therefore, I believe that this system will benefit all lecturers from FSCIT when it's implemented later.

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Next, I would like to thank my course mates who gladly shared their knowledge and experiences. The discussions held allowed us to realize the weaknesses and strength of each other's system. With that, we are able to improve the weakness and improve the quality of our system.

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CHAPTER 1: INTRODUCTION

Lecturers personal website is a common in the Faculty of Computer Science and Information Technology (FCSIT), University of Malaya. It is a communication tool used by lecturers to make the students be informed with the latest news about their subjects and used to upload the notes and tutorials or any related material regarding the course.

The system which I am working on is about building a web-based system or in others words, an online system which used by lecturers to build a custom personal webpage which to improve accessibility and storage of information for their personal webpage. This system will consist with four (4) types of processes, which are the layout process, data input process, forum setup process and forum management process.

The purpose of the system is to simplify the web development process, helps to standardise the web layout with the content, make ease to lecturers to edit modify and update their web pages and facilitate lecturers to build their website with advanced web functions such as forum, upload function, download function and search function.

Generally, the system will enable the lecturers to choose there layout, input relevant information and manage the forum (manage course details, manage upload files URL and moderate the forum discussion).

1.1 Project Overview

This project is concerned with the development of a web-based system that will allow lecturers of the faculty (FCSIT) to do build their website more effective and efficiently.

This project will establish a better communication method between students and lecturers and without using any third party web development software used, thus provide faster and more reliable information management system.

1.2 Project Objectives

The main objective for developing this system to facilitate lecturers to build a website, faster and efficiently. Other objectives are:-

a. To demonstrate how the internet and Information Technology (IT) can be used as a tool to manage information.

b. Simplify the web development process.

c. To simplify the communication process between student and lecturers.

d. Helps students to upload files in the lecturers site itself without using any other system.

e. Helps lecturers build a web site without any web programming knowledge.

1.3 Project Scopes

The system cover a full web development process without using any web developing software or programs and protected by a user name and password.

a. The need to have server in order to use the system.

b. The internet connection speed might affect the effectiveness of the system.

c. Internet low bandwidth can cause the slower download time process.

d. The need to have reliable platform and database.

e. The need to have extra hardware or software.

1.4 Project Limitations

The most obvious limitation of this system is that it only covers the FSCIT lecturers.

Other expected limitations are:-

   a. The need to have server in order to use the system.

   b. The internet connection speed might affect the effectiveness of the system.

   c. Server's low bandwidth can cause the slower developing process.

   d. The need to have reliable platform and database.

   e. The need to have extra hardware or software.

1.5 Expected Outcome

Currently, the software available to develop website are too general. The knowledge on web programming is very important to develop a website and knowledge on using graphical software also equally important to build a better layout. This system will overcome this problem and facilitate the lecturer to build a website faster, easier, and economical and the important part is without any web programming knowledge.

Here are some of the advantages of using the system:-

a. *Automate all tasks*

The entire task to build a website is automated and the lecturers can build a website without any barrier.

b. *Provide better communication between student and lecturers*

Currently there is many lecturers website with limited web function. This system will enable the lecturers to a website with a forum function to provide a better communication among student and lecturers.

1.6 Research Conducted

To build a system that will support and facilitate all the needs of all the parties involved, search is conducted in the following areas:-

a. Professional web and client-server application development strategies are studied.

b. Latest technologies, platforms and programming languages are studied and compared in order to build a robust, flexible, reliable and powerful system.

c. Past year senior's thesis are reviewed.

d. Related books about the internet, networking and software developments are reviewed.

e. Search for a similar system online is conducted.

1.7 Hardware and Software Requirements

Hardware and software are two (2) dominant or important criteria for a system to perform perfectly. In order for the system to work, all these requirements must be fulfilled.

a. Microsoft Windows 98 (and later versions) or Linux RedHat v7.2.

b. Apache or IIS(*Internet Information server*) server.

c. Minimum Pentium 2 processor or a 300 MHz processor.

d. 32 Mb ram or higher.

e. Modem.

f. A web browser (Example: Internet Explorer).

g. Other standard computer peripherals.

1.8 Expected Project Schedule

To complete the project successfully on time, a project schedule was planned as a guideline to manage the progress and task that need to be accomplished according to priority. The whole project is divided into six (6) different stages:-

a. System planning.

b. Methodology and system analysis.

c. System design.

d. Coding and testing.

e. Testing and implementation.

f. Evaluation and maintenance.

CHAPTER 2: LITERATURE REVIEW

Literature review is an account of what has been published on a topic by researchers or scholar. It's a careful examination of the body of literature printing towards the answers of the questions directly or indirectly imposed by the project title.

In this project, literature review is to serve the purpose of gathering information related to the Web-based Professional Development tool for Lecturers. The review will focus on the latest technology and scripting languages on web-based applications as well as the most famous and popular servers and database structures available. The literature review scope includes:-

a. Revision resource.

b. The steps in doing literature review.

c. The Lecturers personal web pages.

d. The World Wide Web.

e. Web-enabled applications architecture.

f. System development tools and environment.

2.1 Revision Resource

Revision resource is vital in order to build a proficient and reliable system. The main objective of Revision resource is to find out more supporting facts in architecture designing to develop an integrated environment to facilities users in the creation of web development tool. Some of the common methods used to find this essential process are:-

a. Consult lecturers and academic advisors from time to time to gather information and advices in developing the system.

b. Interviews with some lecturers, students and academic personnel whom have there own personal web page.

c. Using the facilities provided by the internet such as search engine, online journal and electronic encyclopedia.

d. Some revision of the past year thesis are done.

e. Current and available similar systems are analyzed.

2.2 Steps in Literature Review

Here are the steps taken in doing the literature review:-

a. Introduction to the lecturers personal web pages.

b. Introduction to the Web from the World Wide Web (WWW) view.

c. The web-enabled application architecture.

d. Indicating and selecting the system development tools and environment.

2.3 Introduction to lecturers personal web sites.

The objectives

- To be an online communication tool between lecturers and students. Facilitate lecturers to publish their notice, announcement, results and current course updates without any barrier such as time and place. It does be the fastest and easiest way to communicate with students.

- Let the students to be updated with the current happening of the course or keep on informed with the latest information of the course.

- Lecturers can upload their notes, tutorials and assignment topics, immediately and without involving any costs. It also Give students chance to download notes tutorials and assignments for free.

- Lecturers personal information published on their sites, to ensure that their students manage to know them closer about their personal particulars such as their academic qualification and the area of research.

- Some of the lecturers sites have forum application to enable students to share their course information among them and to seek help between each other.

Current web pages review

Lectures web pages basically used to communicate with their students, to share the course information and make public announcement. Moreover, it also used to upload notes, tutorials and assignment topics.

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It clearly seemed that almost all the lectures having their own personal web pages. In term of architecture each lectures having their own style in creating their web pages, but basically all the web pages have many similarities in term of contents. It clearly shows that the main purposes of the lectures are the same.

2.4 Introduction to the Web

A technical definition of the World Wide Web: all the resources and users on Internet that are using the Hypertext Transfer Protocol (HTTP).

The WWW is a collection of data found in the computers from the whole world, which connects among each other in the form of hypertext. These hypertext files contain multimedia documents which are called as hypermedia.

To browse the WWW, user will need a web browser. Web browser translates Hypertext Markup Language (HTML), which is send by the web browser to the graphical user interface in the browser. Web contains 3 important elements:

a. Hypertext Transfer Protocol (HTTP)

b. Unified Resource Locator (URL)

c. Hypertext Markup Language (HTML)

2.4.1 Hypertext Transfer Protocol (HTTP)

The Hypertext Transfer Protocol (HTTP) is the set of rules for exchanging files (text, graphic images, sound, video and other multimedia files) on the World Wide Web. Relative to the TCP/IP suite of protocols (which are the basis for information exchange on the Internet), HTTP is an application protocol.

Essential concepts that are part of the HTTP include (as its name implies) the idea that files can contain references to other files whose selection will elicit additional transfer requests. Any Web server machine contains, in addition to the HTML and other files it can serve, an HTTP daemon, a program that is designed to wait for

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HTTP requests and handle them when they arrive. The Web browser is an HTTP client, sending requests to server machines. When the browser user enters file requests by either opening a Web file (typing in a Uniform Resource Locator) or clicking on a hypertext link, the browser builds an HTTP request and sends it to the Internet Protocol address indicated by the URL. The HTTP daemon in the destination server machine receives the request and, after any necessary processing, the requested file is returned.

2.4.2 Unified Resource Locator (URL)

URL represents the Internet address that used by the web browser. A URL can be thought of as the "address" of a web page. URLs are used to write links linking one page to another; for an example, see the HTML entry.

A URL is made up of several parts. The first part is the **protocol**, which tells the web browser what sort of server it will be talking to in order to fetch the URL. In this example, the protocol is **http.** The remaining parts vary depending on the protocol, but the vast majority of URLs you will encounter use the **http** protocol; exceptions include **file** URLs, which link to local files on your own hard drive, **ftp** URLs, which work just like **http** URLs but link to things on FTP servers rather than web servers, and **mailto** URLs, which can be used to invite a user to write an email message to a particular email address.

The second part of the example URL above is the **fully qualified domain name** of the web site to connect to. For example, the fully qualified domain name is www.fsktm.um.edu.my. This name identifies the web site containing the page. The term "fully qualified domain name" refers to a complete web site or other computer's

name on the Internet. The term "domain name" usually refers only to the last part of the name, in this case boutell.com, which has been registered for that particular company's exclusive use.

The third part of the example URL is the **path** at which this particular web page is located on the web server. For example, the path is /notispelajar/Attach04/Aug/05.asp. Similar to a filename, a path usually indicates where the web page is located within the web space of the web site; in this case it is located in the basic sub-folder of the new folder, which is located in the top-level web page directory of our web site.

2.4.3 Hypertext Markup Language (HTML)

HTML (Hypertext Markup Language) is the set of markup symbols or codes inserted in a file intended for display on a World Wide Web browser page. The markup tells the Web browser how to display a Web page's words and images for the user. Each individual markup code is referred to as an element (but many people also refer to it as a tag). Some elements come in pairs that indicate when some display effect is to begin and when it is to end.

HTML is a formal recommendation by the World Wide Web Consortium (W3C) and is generally adhered to by the major browsers, Microsoft's Internet Explorer Netscape's Navigator, which also provides some additional non-standard codes. The current version of HTML is HTML 4.0. However, both Internet Explorer and Netscape Navigator implement some features differently and provide non-standard extensions. Significant features in HTML 4 are sometimes described in general as dynamic HTML.

2.5 The web-enabled application architecture
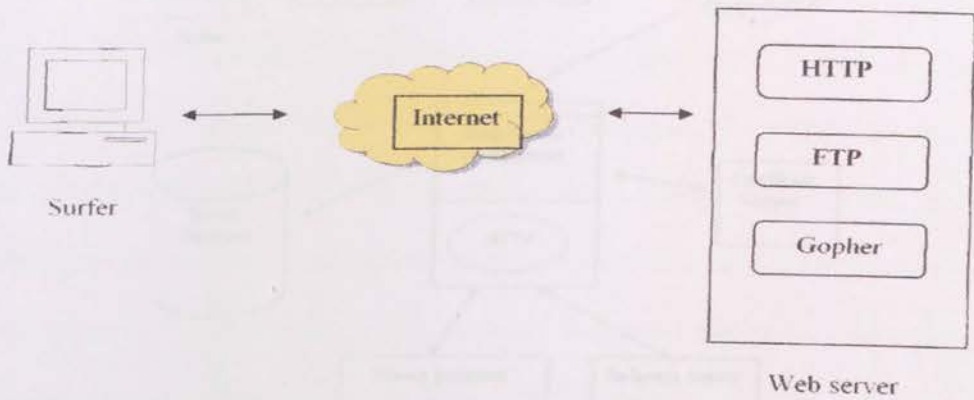
Diagram 2.1: The simple data-sharing architecture that changes premises on the World Wide Web

Developing web based applications depend on many networks and application components that works together to send information to clients that needed it. Web browsers deploy data from web servers, as shown in chart 2.1. There is some services and protocols that are used together with the World Wide Web, such as:-

a. TCP/IP (Transmission Control Protocol/Internet Protocol)

b. Gopher

c. FTP (File Transfer Protocol)

There are many factors that contributes to how the functions and operations of the internet. These factors help global network and private through many challenges. To change a global network to a robust application platform, the original web architecture must be able to fulfill all needs, which usually are not important when developing traditional application. The revolutionized is shown below at chart 2.2.
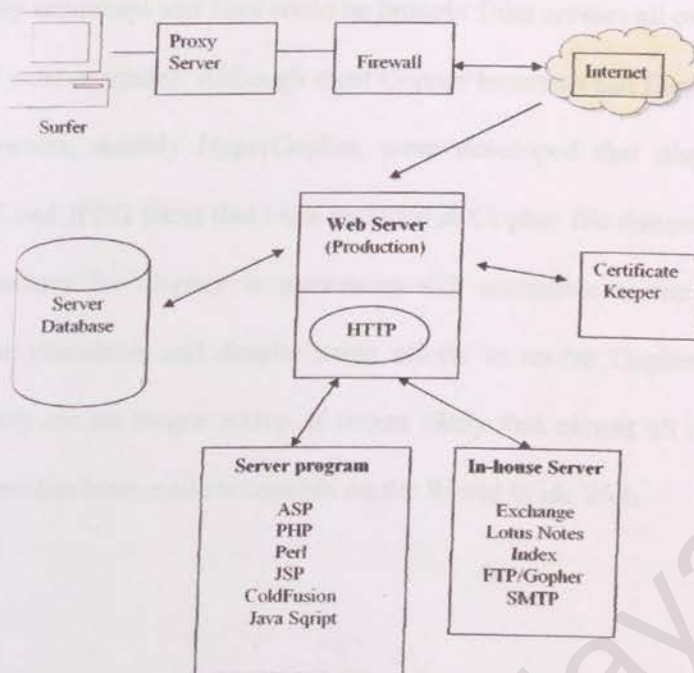
Diagram 2.2: The web architecture evolution to support the web-enabled applications

2.5.1 Transmission Control Protocol/Internet Protocol (TCP/IP)

TCP/IP (Transmission Control Protocol/Internet Protocol) is the basic communication language or protocol of the Internet. It can also be used as a communications protocol in a private network (either an intranet or an extranet). Many Internet users are familiar with the higher layer application protocols that use TCP/IP to get to the Internet. These include the World Wide Web's Hypertext Transfer Protocol (HTTP), the File Transfer Protocol (FTP), Telnet which lets user logon to remote computers, and the Simple Mail Transfer Protocol (SMTP). These and other protocols are often packaged together with TCP/IP.

2.5.2 Gopher

From about 1992 through 1996, Gopher was an Internet application in which

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hierarchically organized text files could be brought from servers all over the world to a viewer on your computer. Although most Gopher browsers and files are text-based, Gopher browsers, notably HyperGopher, were developed that displayed graphic images (GIF and JPEG files) that were included in Gopher file directories. Although the root directory for Gopher is sometimes still accessible at the University of Minnesota or elsewhere and despite some efforts to revive Gopher, virtually all Gopher servers are no longer active. It seems likely that almost all of the original Gopher content has been made accessible on the World Wide Web.

2.5.3 File Transfer Protocol (FTP)

File Transfer Protocol (FTP), a standard Internet protocol, is the simplest way to exchange files between computers on the Internet. Like the Hypertext Transfer Protocol (HTTP), which transfers displayable web pages and related files, and the Simple Mail Transfer Protocol (SMTP), which transfers e-mail, FTP is an application protocol that uses the Internet's TCP/IP protocols. FTP is commonly used to transfer Web page files from their creator to the computer that acts as their server for everyone on the Internet. It's also commonly used to download programs and other files to user's computer from other servers. Basic FTP support is usually provided as part of a suite of programs that come with TCP/IP. However, any FTP client program with a graphical user interface usually must be downloaded from the company that makes it.

2.5.4 The Internet

The Internet, sometimes simply known as "The Net," is a worldwide system of computer networks - a network of networks in which users at any one computer can, if they have permission, get information from any other computer (and sometimes talk directly to users at other computers). It was conceived by the Advanced Research Projects Agency (ARPA) of the U.S. government in 1969 and was first known as the ARPANET. The original aim was to create a network that would allow users of a research computer at one university to be able to "talk to" research computers at other universities. A side benefit of ARPANet's design was that, because messages could be routed or rerouted in more than one direction, the network could continue to function even if parts of it were destroyed in the event of a military attack or other disaster. Technically, what distinguishes the Internet is its use of a set of protocols called TCP/IP (for Transmission Control Protocol/Internet Protocol). Two recent adaptations of Internet technology, the intranet and the extranet, also make use of the TCP/IP protocol. The most widely used part of the Internet is the World Wide Web (often abbreviated "WWW" or called "The Web"). Its outstanding feature is hypertext, a method of instant cross-referencing.

2.5.5 Web Application

Any application that uses Web Technologies including web browsers, web servers and Internet protocols is called Web Application. A web application can be divided into three different layers. Presentation layer which forms the first tier of the

application consists of web server and the web browser, which is responsible for assembling the data into presentable format. Application layer constitutes the second tier of the application and is consisting of server side program and scripts. Finally the third tier provides the programmable access to the databases. In an e-commerce scenario when a user (first tier), send a request to the web server, web server process the request (second and third tier), formats the result and finally sends the formatted results (first tier) to the client.
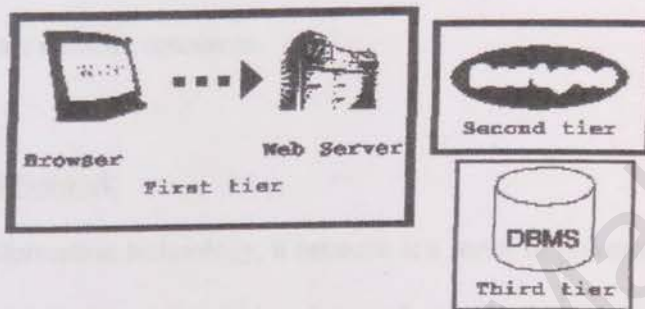
Diagram 2.3: The 3-tier diagram

In this process server side scripts play a very important role of processing the users request and in the generation of dynamic pages, based on user and its input.

2.5.6 Proxy servers

In an enterprise that uses the Internet, a proxy server is a server that acts as an intermediary between a workstation user and the Internet so that the enterprise can ensure security, administrative control, and caching service. A proxy server is associated with or part of a gateway server that separates the enterprise network from the outside network and a firewall server that protects the enterprise network from outside intrusion.

2.5.7 Firewall

A firewall is a set of related programs, located at a network gateway server that protects the resources of a private network from users from other networks. Basically, a firewall, working closely with a router program, examines each network packet to determine whether to forward it toward its destination. A firewall also includes or works with a proxy server that makes network requests on behalf of workstation users. A firewall is often installed in a specially designated computer separate from the rest of the network so that no incoming request can get directly at private network resources.

2.5.8 Network

In information technology, a network is a series of points or nodes interconnected by communication paths. Networks can interconnect with other networks and contain sub networks. The most common topology or general configurations of networks include the bus, star, and token ring topologies. Networks can also be characterized in terms of spatial distance as local area networks (LAN), metropolitan area networks (MAN), and wide area networks (WAN). A given network can also be characterized by the type of data transmission technology in use on it (for example, a TCP/IP or Systems Network Architecture network); by whether it carries voice, data, or both kinds of signals; by who can use the network (public or private); by the usual nature of its connections (dial-up or switched, dedicated or non-switched, or virtual connections); and by the types of physical links (for example, optical fiber, coaxial cable, and Unshielded Twisted Pair).

2.5.9 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. Two leading Web servers are Apache, the most widely installed Web server, and Microsoft's Internet Information Server (IIS). Other Web servers include Novell's Web Server for users of its NetWare operating system and IBM's family of Lotus Domino servers, primarily for IBM's OS/390 and AS/400 customers. Web servers often come as part of a larger package of Internet- and intranet-related programs for serving e-mail, downloading requests for File Transfer Protocol (FTP) files, and building and publishing Web pages. 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.

2.5.10 Browser

A browser is an application program that provides a way to look at and interact with all the information on the World Wide Web. The word "browser" seems to have originated prior to the Web as a generic term for user interfaces that let you browse (navigate through and read) text files online. Technically, a Web browser is a client program that uses the Hypertext Transfer Protocol (HTTP) to make requests of Web servers throughout the Internet on behalf of the browser user. While some browsers also support e-mail (indirectly through e-mail Web sites) and the File Transfer Protocol (FTP), a Web browser is not required for those Internet protocols and more specialized client programs are more popular.

2.6 System development tools and its environment

This section will cover several topics:

a. Web development method.

b. Programming language.

c. Web browser.

d. Web interface design.

e. Operating system.

f. Web server.

g. Server-side scripting language.

h. System database.

2.6.1 <u>Web development method</u>

World Wide Web has developed from non-image support webs to global network that can support large and heavy applications. This happens because of changes from static to dynamic information, database driven applications on web servers. The `dynamic' word explains that the process of building the HTML depends on the information send to the web server. Web server will process information and changes output to HTML. Making it simple, bases will process information, for example getting user information. This information can be saved in text file and changes it to e-mail messages. Smaller modules are more flexible in presenting calculations, reading and writing to database web based application appears.

2.6.2 <u>Programming language</u>

There are several programming languages that will play vital roles in developing this system. These programming languages will cover the development of web page's interface, database and client, server side programming/processing. Among the programming languages that will be used are:-

I) HTML

HTML (Hypertext Markup Language) is the set of markup symbols or codes inserted in a file intended for display on a World Wide Web browser page. The markup tells the Web browser how to display a Web page's words and images for the user. Each individual markup code is referred to as an element (but many people also refer to it as a tag). Some elements come in pairs that indicate when some display effect is to begin and when it is to end. HTML is a formal Recommendation by the World Wide Web Consortium (W3C) and is generally adhered to by the major browsers, Microsoft's Internet Explorer and Netscape's Navigator, which also provide some additional non-standard codes. The current version of HTML is HTML 4.0.

II) JavaScript

A lightweight script translator language that translates user triggered events in the Internet Explorer browser. It is a product of Netscape Communication Corporation and Sun Microsystems Incorporated.

III) DHTML

Dynamic HTML is an evolution of the traditional HTML. It's a group of technology with the goal to build interactive websites. It allows developer to write script which manipulates HTML elements on web where scripting is done using technologies like Cascading Style Sheets (CSS) and client-side scripting.

IV) SQL

SQL is the abbreviation for Structured Query Language. It's a language to coordinate, organize, control and get data that is kept in the computer database.

V) ASP.NET

ASP.net is the next generation of Microsoft's Active Server Page (ASP), a feature of their Internet Information Server (IIS). ASP.net is different from ASP in two major ways: it supports code written in compiled languages like C++, Visual Basic, and Perl, and, it features server controls that can separate the code from the content, allowing WYSIWYG editing of pages. A set of .NET classes used to create Web-based, client-side (Web Form) and server-side (Web Service) applications. ASP.NET was derived from the Microsoft Active Server Pages (ASP) Web technology and adapted for use in the .NET Framework. Also called *managed ASP* and formerly known as *ASP+*.

2.6.3 Web browser

A browser is the software that allows user to locate, display and use web documents. In consideration to the web browser to be used in the system, two of the most popular web browsers are compared.

I) Internet Explorer 6.0 (IE6)

Microsoft's Internet Explorer is a graphical World Wide Web "browser" or "client". Internet Explorer, like other browsers, uses a system called HTML. This stands for Hyper Text Markup Language. Hypertext implies some portions of a document contain links to other areas, either in that document or to documents in other locations. Colored and underlined text usually represents a link or new location. Hyperlinks can be text, pictures or graphics. User uses computer mouse to choose highlighted "links" on the screen. Internet Explorer 6.0 from Microsoft continues to follow the standard for DHTML which is approved by the World Wide Web Consortium (W3C).

II) Netscape Navigator 6.1

For this system, Internet Explorer 6.0 will be used as the web browser. Among the reason IE6 was selected is because it is an extremely quick browser, has excellent mail client, second-generation Dynamic HTML and XML support, completely free, its dynamic behaviors, intelliSense technology, "AutoTools" and Internet Radio toolbar.

2.6.4 Webpage interface design

I) Microsoft Frontpage 2000

Microsoft Frontpage helps user to build and control web pages with its consoling and development tools. Some of the reasons of using Microsoft Frontpage are:-

a. Enables user to build attractive web pages efficiently.

b. Allows user to update web pages easily and quickly.

c. Can be used together with the widely used Microsoft Office.

d. Give developer authorization power to specify how they want the code to be formatted back.

II) Macromedia Dreamweaver

Macromedia Dreamweaver is a professional HTML editor for designing, coding and developing websites, web pages and web applications. Dreamweaver provides helpful tools to enhance web creation experience. The visual editing features in Dreamweaver quickly create pages without writing a line of code. Dreamweaver also includes many coding-related tools and features, including code editing tools. In the Code view (such as code coloring and tag completion), reference material on HTML, CSS, JavaScript, CFML, ASP and JSP and a JavaScript Debugger. Macromedia Roundtrip HTML technology imports hand-coded HTML documents without reformatting the code. Dreamweaver now incorporates and expands on all of the capabilities from Macromedia UltraDev, helping to build dynamic database-backed web applications using server languages such as ASP, ASP.NET, ColdFusion Markup Language (CFML), JSP and PHP. Dreamweaver is fully customizable.

III).NET Framework

A programming infrastructure created by Microsoft for building, deploying, and running applications and services that use .NET technologies, such as desktop applications and Web services. The .NET Framework contains three major parts: the Common Language Runtime (CLR), the Framework Class Library, and ASP.NET..*NET Framework Class Library* (FCL) is The foundation of classes, interfaces, value types, services and providers that are used to construct .NET Framework desktop and Web-based (i.e., ASP.NET) applications. The fundamental elements of the FCL are defined as classes located in the System namespace. All of the most primitive aspects of .NET are stored in System, including built-in value types, the Object type, and support for exception handling and garbage collection. Thousands of more classes are located in second- and third-level namespaces that include support for network and file I/O, graphics, security, configuration management, and Web services. All CLS-compliant compilers can use the FCL..*NET Framework Configuration Tool* is A .NET programming tool (*Mscorcfg.msc*) used to adjust code access security policy at the machine, user, and enterprise security policy levels. This tool can also be used to configure remoting services, and add, configure, and delete assemblies in the Global Assembly Cache. See *Global Assembly Cache Utility..NET Services Installation Tool* is A .NET programming tool (*Regsvcs.exe*) used to add managed classes to Windows 2000 Component Services. This tool loads and registers an assembly, generates, registers, and installs a type library into a specified COM+ 1.0 application.

2.6.5 Operating System

Windows 2000 Server will be used as the system's operating system. Windows 2000 Server is chosen because of the stability, security, network capabilities, future extensibility and quality support it could offer.

I) Stability

Unlike Windows 95/98, Windows 2000 Server is a true multithreaded, multitasking operating system where applications run in protected memory space. In layperson's terms, this means that if an application "crashes", it will not bring down the entire system. Other applications will be protected by the operating system. Although Windows XP/ME offers a degree of protection from unruly applications, this protection is not as extensive as that provided by Windows 2000 Server. With Windows 2000 Server, user can work with multiple applications without the fear that a problem with one application will ruin user's work in others.

II) Security

Windows 2000 Server workstations allow users a high degree of control over access to files and other resources on their machines. Users can take advantage of various features of the logon process to control the users who can access their computers and set file permissions so that their valuable data is protected from intruders even if the hard drive is physically removed.

III) Network capabilities

Windows 2000 Server is designed for use in a networked environment. 2000 Server Workstations have robust support for internet protocols such as TCP/IP, as well as other methods of network communication.

IV) Future extensibility

In any case, further development of Microsoft's technology will certainly be applied to the NT operating system family.

V) Quality support

There are many technical supports which is available on the books and in the internet.

2.6.6 Web server

For the system's web server, comparisons are made between Apache server and Microsoft's Internet Information Server (IIS). Apache is an open source project and is still developed actively, while IIS is a product under Microsoft. The following table summarizes the standards support implemented by Apache and IIS.

Table 2.1: Standard support differences between Apache and IIS

Features	Apache	IIS	Comments
HTTP 1.1	Yes	Yes	
SNMP	No	Yes	A commercial plug-in SNMP module is available for Apache from Covalent that provides real-time management

			information for server access statistics, activity, load and utilization as well as on-the-fly configuration changes. Additional information is available at http://www.covalent.net/products/snip/
W3C's extended log format	Yes	Yes	
ISAPI	Yes	Yes	ISAPI extension modules are written by third parties and available as part of the Apache distribution. Apache supports ISAPI extensions but does not support ISAPI filters.
SSL 2.0/3.0	Restricted	Yes	A module is available for Apache that provides strong cryptography for the Apache 1.3 Web server SSL 2.0/3.0 and TLS 1 (Transport Layer Security 1) protocols. However, this module can be used only outside the United States for free. In the United States, you can use it for noncommercial purposes for free if you use RSAREF (because of various patents held by RSA).
WebDAV	Yes	Yes	Part of Apache 2.0 functionality.

			WebDAV, which stands for Web Distributed Authoring and Versioning, is a standard under development by W3C, for Web-based collaborative document development.

A major difference between Apache and IIS is their prerequisites. While Apache is available for many Unix versions, Linux, Windows and OS/2, IIS can run only in the Windows environment. What's more, the latest version of IIS will run only on Windows 2000 server.

Table 2.2: Server differences, courtesy from

Features	Apache	IIS
Operating System (OS) dependency	Unix, Linux, Windows and OS/2.	Windows
Hardware platform	Wide range of hardware supported by the different operating systems, including Intel and SPARC.	Those supported by Windows.

http://www.networkcomputing.com/unixworld/ 1124/1124uw.html

In conclusion, IIS server is selected as the system's web server .The factors that draw to this decision are:-

a. Large installed base.

b. Support is available from worldwide developer and user communities.

c. Flexible and powerful URL rewriting.

d. Rich feature set.

e. Extensible (can link new modules into the core server).

2.6.7 Server-side scripting language

"Server-side" means that the control of the script is handled by the server rather than running a script on each user's personal computer. Example of server side script is PHP, PERL and ASP.NET. JavaScript is a popular "client-side" scripting language. To develop this system, several server-side scripting languages are reviewed, such as PHP 4.0, Microsoft's ASP.NET and ColdFusion.

I) PHP (Hypertext Preprocessor)

PHP, a recursive acronym for "Hypertext Preprocessor", is an open-source server-side scripting language designed for creating robust and reliable dynamic web pages for e-commerce and other mission critical web applications. PHP has gained much popularity these days. The reason for this is it has several advantages that other server-side scripting language has to offer. Among the advantages of PHP are:-

- Speed - not only the speed of execution which is important, but also that it does not slow down the rest of the machine. So it should not demand a lot of system resources. PHP integrates well with other software, especially under UNIX's, has a small footprint and when run as an Apache module is already loaded for use. Plus, PHP is a thin wrapper around many operating system calls so can be very fast.

- Stability - it's no good being fast if the system crashes every few thousand pages. No application is bug free, but having a community of PHP developers and users makes it much harder for bugs to survive for long. Under the hood, PHP uses its own resource management system, and has a sophisticated method for handling variables, making it intrinsically a robust system.

- Security - the system should be protected from malicious attacks from users, both as programmers and as surfers. PHP provides many levels of security which can be set in the .ini file to the desired level.

- Simplicity - programmers should be able to start being productive as soon as possible. With PHP, even HTML coders can start integrating PHP into their pages straight away. Programmers with previous experience of C or even with JavaScript can get up to speed very quickly.

- PHP will run on any platform. Using the same code base, PHP can be compiled and built on about 25 platforms, including most UNIXs, Windows (95/98INT/2000) and Macs. As this uses the same code base, all scripts will run identically, whatever the platform.

- PHP is similar to C. So anyone who has experience with a C-style language will soon understand PHP. In C-style languages users can also include JavaScript and Java. In fact, much of PHP's functionality is provided by wrappers around the underlying system calls (such as fread() and strlen()), so C programmers will immediately feel at home.

- PHP is Open Source. There's thousands of user creating, fixing, updating and adding the features of PHP. There is world wide community of people who can share their knowledge's and discuss their problems, plus good scripts or function user can get from the open source community like freshmeat.net

However, PHP does have its disadvantages, which is the error handling in PHP is not as sophisticated as Cold Fusion or ASP. There is no IDE or debugger. An IDE is probably not important for most people. Most people continue using the same environment they use for HTML development.

II) ASP.NET

ASP.NET is Microsoft's technology for deploying active content on the web. This technology was designed to work on a Windows operating system that is running Microsoft's Internet Information Server (for NT Server) or Microsoft Peer Web Services (for NT Workstation or Win9x). It depends very heavily on Microsoft's COM/DCOM technology at least in a Windows operating environment. Among the advantages of using ASP are:-

- It is free if a user already has a Windows-based computer.

- It has got lots of support for common tasks such as database connectivity.

- Because of its large install base - there are lots of free and relatively cheap components that can be plugged in.

The disadvantages of ASP.NET are:-

- Operates only on Windows NT/IIS workstation.

- It is quite slow. PHP have a far advantage by comprising processing speed.

- ASP.NET requires high processing power computer to run fast and smoothly.

III) ColdFusion

Allaire's Cold Fusion is a development and web server environment specifically designed for the web. As a result, most of the dynamic content generated by it is accomplished using XML type tags. Because Cold Fusion uses Cold Fusion Markup Language (CFML) tags to generate active web content, it is in general not mangled by HTML editors. Among the advantages using ColdFusion are:-

- ColdFusion applications can be developed rapidly because no coding other than the use of simple HTML style tags is required.

- ColdFusion applications are easy to test and roll out.

- The ColdFusion language contains all the processing capability which will be ever needed.

- ColdFusion provides tools for troubleshooting and debugging.

- ColdFusion comes with all the hooks needed to link to almost any database.

- ColdFusion is fast due to its scalable, multithreaded, service-based architecture.

ASP.NET is chosen as the system's server side scripting language; although it has some disadvantages but since all the lecturers PC running in windows platform and faster PC, ASP.NET will be the best choice. Moreover it is best to use ASP.NET together with MySQL and IIS server for optimize performance.

2.6.8 System database

For the system's database, comparisons are made between MySQL, SQL server and Access. The results are shown in the table below:-

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Table 2.3: Database differences

Database	Advantages	Disadvantages
MySQL	- Very fast, efficient and fairly well featured. - Can handle large amounts of data. - Inexpensive. - It's easy to learn and quick to implement.	- Cannot handle complex relational issues such as subselects (subqueries). - Transactions and commit/rollback not directly supported. Commercial sites with online ordering capabilities will find this lack of transaction support disappointing. - Weak support for foreign keys and referential integrity. - No stored procedures and triggers.
SQL Server	- Expensive. - Significant learning curve.	- Supports very large databases. - Support for triggers, stored procedures

		and other database analysis tools.
Access	• Very inexpensive. • Easy to learn. • Quick to implement.	• Limited in what it can do with respect to real database manipulations, those contained in SQL. • Does not handle large amounts of data well. • Less reliable.

2.7 Website Analysis

Since the there is no current system on this application, some lecturers web pages were analysed. The objective of this analysis is to be acquainted with the lectures needing for their personal web pagers.

2.7.1 Amirrudins Homepage (*Mr. Amirrudin Hj Kamsin*)

(http://fsktm.um.edu.my/~amir)
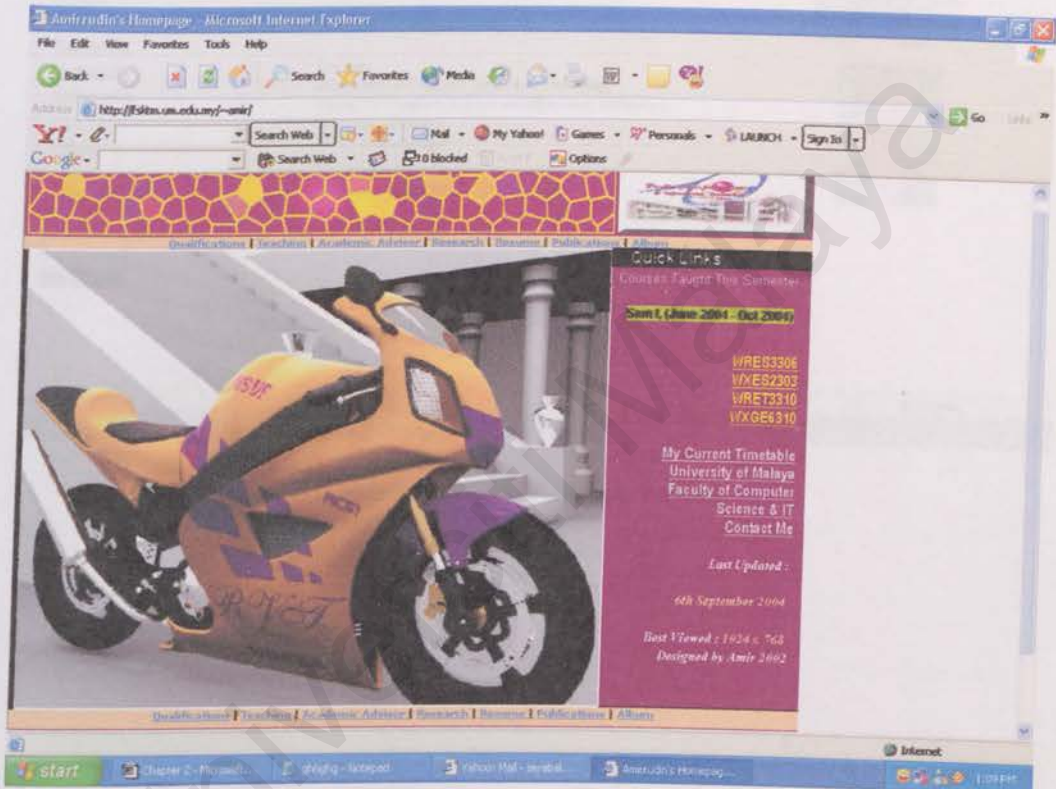
Diagram 2.4: Mr Amirs main Page

2.7.2 Mr Ang Tan Fong , A.M.P

(http://ip158.fsktm.um.edu.my/angtf/)
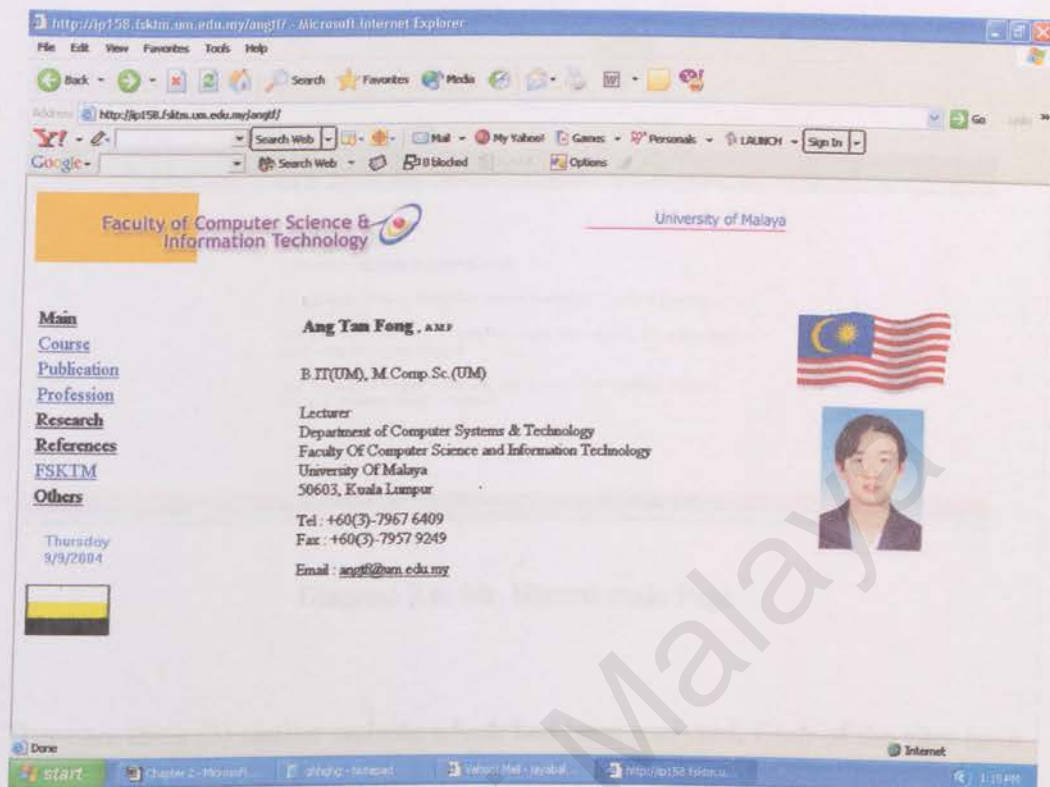
Diagram 2.5: Mr Ang's main page

2.7.3 We are the champion (Mr. Mohamad Nizam Hj. Ayub)

(http://perdana.fsktm.um.edu.my/~nizam/)
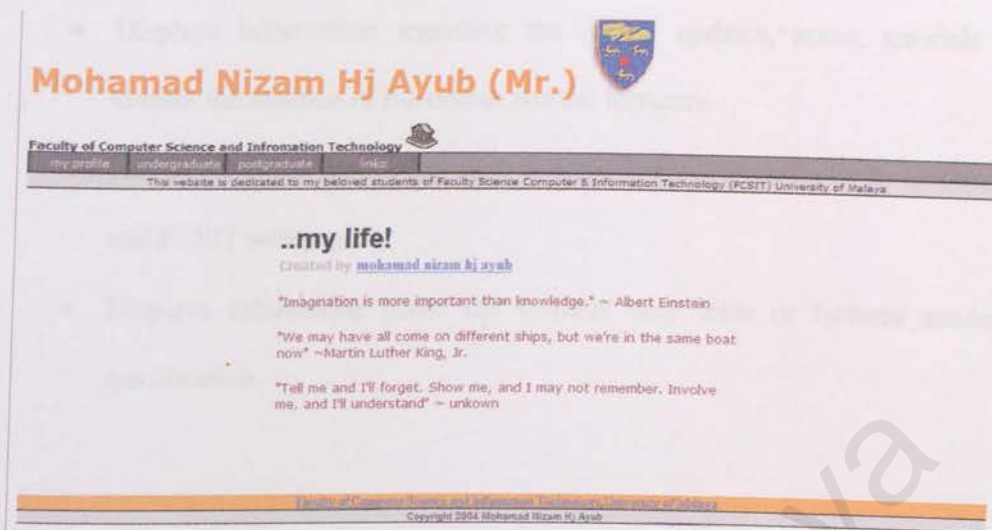
Diagram 2.6: Mr. Nizams main Page

There are three (3) similar website which had been analyzed. Each of the sites have its own advantage. Mr amirs sites and mr Nizam's site are almost same in architecture and only different in term of design. Mr Amir focuses more on main page design with some graphics and animation. Mr Nizams site are more on static page. We can't conclude that the with more graphics design are the best, because it's all depend on the individuals. It may or may not necessary to have some to some extra graphics such ad Mr. Amirs page. Among these three, only the Mr. Ang site has more features than the others. Because I don't know the login ID and password, therefore I can't see the whole system and its function. But, from my view, the difference between the Mr. Angs site and the others is that it has a login page and a register page. The login page will be used by the system's to allow the student top view their notes and so on and the register page will allows students to register for the forum discussion. In general all three websites has the same function. All website

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has functions such as:-

- Displays information regarding the course updates, notes, tutorials and current information of the course and the lecturers.

- Has a link to the some other such as pages regarding course or to university's and FCSIT web page.

- Displays information about the lectures time table or lectures academic qualification.

study system without methodology and analysis is very important in developing a reliable and perfect system. Besides that, it can also determine the most involved in the system and employ a systematic development at the management phase.

After considering the research phase, information analysis is carried out to change obtained information to an understandable form (formula, schedule or graph). The next process is to study the system that constructed. The estimation involved in the web developing process will be easier to be implemented if the collected information is appropriate and does fulfill the requirements for the construction of the system. Indirectly, it can help to minimize time and cost of the project. At the same time, mistakes and errors can be reduced and this process also gives helps in understanding process developing the system.

Chapter 3
Methodology

CHAPTER 3: METHODOLOGY

Study towards systems methodology and analysis is very important in developing a reliable and perfect system. Besides that, it can also determine the users involved in the system and display a systematic development of the management phase.

After conducting the research phase, information analysis is carried out to change obtained information to an understandable form (Example: schedule or graph). The next process is to study the system true requirements. The activities involved in the web developing process will be easier to be implemented if the gathered information is appropriate and does fulfill the requirements for the development of the system. Indirectly, it can help to economize time and cost of development. At the same time, mistakes and errors can be reduced and there would be a great raise in understanding towards developing the system.

3.1 System Development Methodology

Process is defined as a series of steps that involves activity, constraint and resources that will produce the desired output. Methodology is methods that are used in the system development phase to reflect the true objective of system. Methodology consists of processes, where it is also includes several criteria such as:-

a. The explanations about the primary processes and activities.

b. Processes to use resources which are related to the system constraints.

c. The explanations about the related sub-processes.

d. Activities for processes (input and output).

e. Activities are carried out according to the level or sequence.

f. Have sets of principles that explain the objective of each activity.

g. Constraint or control can be imposed towards activity, resource or product.

Methodology and analysis is used to create the same understanding towards activity, resource and also constraint. Besides that, it also seeks inconsistency and redundancy in the system. In conclusion, the use of methodology and analysis are more to guide the development of a system. It is also known as the system life cycle where a set of methods begins with a set of the users' requirements and produces a system that fills all requirements that is predicted and needed. Among the methodologies of system development are:-

3.1.1 Waterfall Model

This model involves several processes of development being portrayed as flowing water, from one process to the following process. This model is shown in the diagram below:-
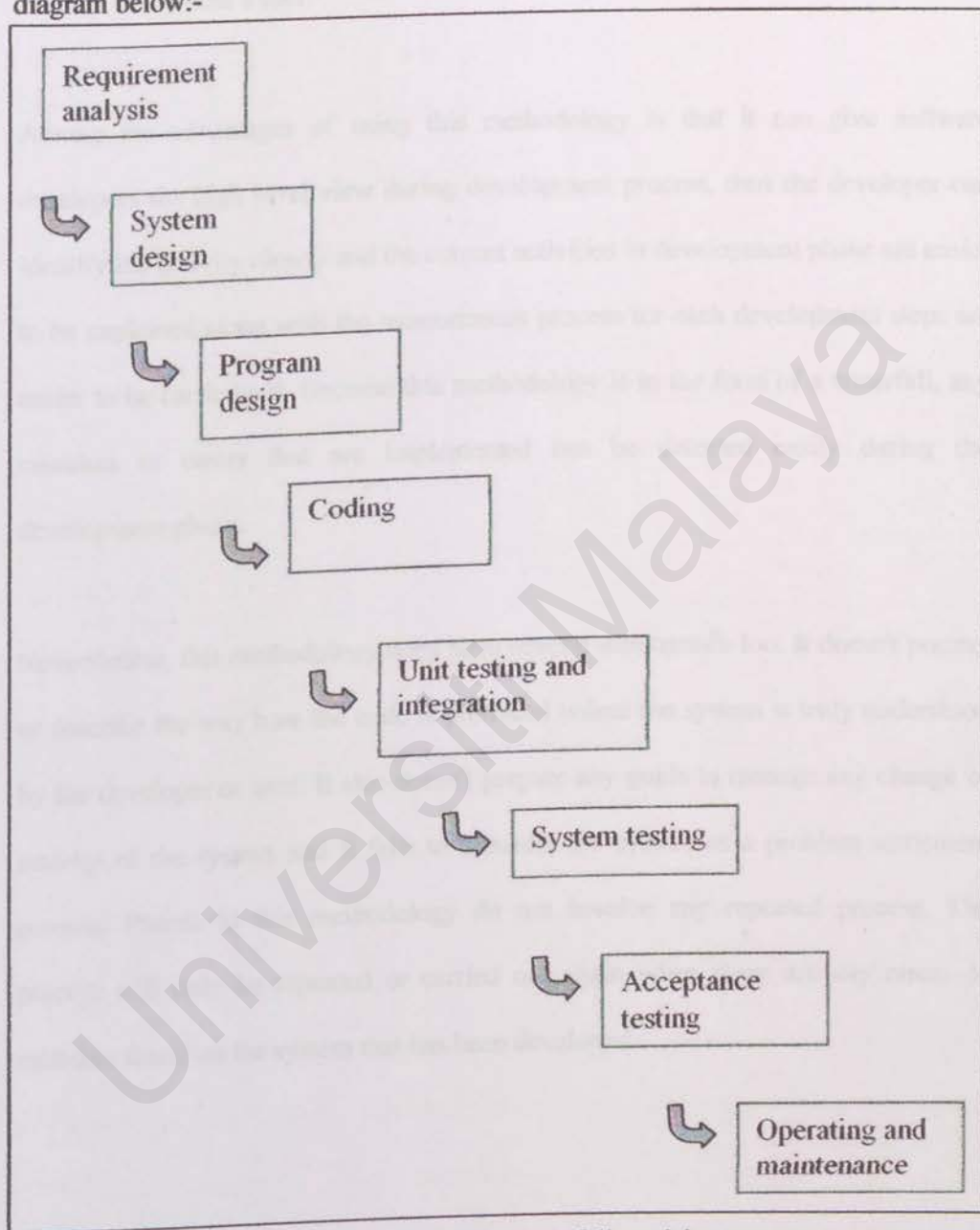
Diagram 3.1: The waterfall model

This model is developed to help developer in explaining information to client that isn't regular with system development. Based on the diagram above, a step in the

process of development must be completed before the next step begins. For example, when all requirements accumulated and documented, system design activity will start. This methodology is used to develop system that is not complex and doesn't involve the system's user.

Among the advantages of using this methodology is that it can give software developers the high level view during development process, thus the developer can identify the activity clearly and the current activities in development phase are easier to be explained along with the measurement process for each development steps are easier to be carried out. Because this methodology is in the form of a waterfall, any mistakes or errors that are implemented can be detected easily during the development phase.

Nevertheless, this methodology does have several weaknesses too. It doesn't portray or describe the way how the code is produced unless the system is truly understood by the developer or user. It also doesn't prepare any guide to manage any change of activity of the system and it fails to consider the system as a problem settlement process. Phases in this methodology do not involve any repeated process. The process will only be repeated or carried out again when there are any errors or mistakes found on the system that has been developed.

3.1.2 Prototype Model

Prototype model is shown in the diagram below:-
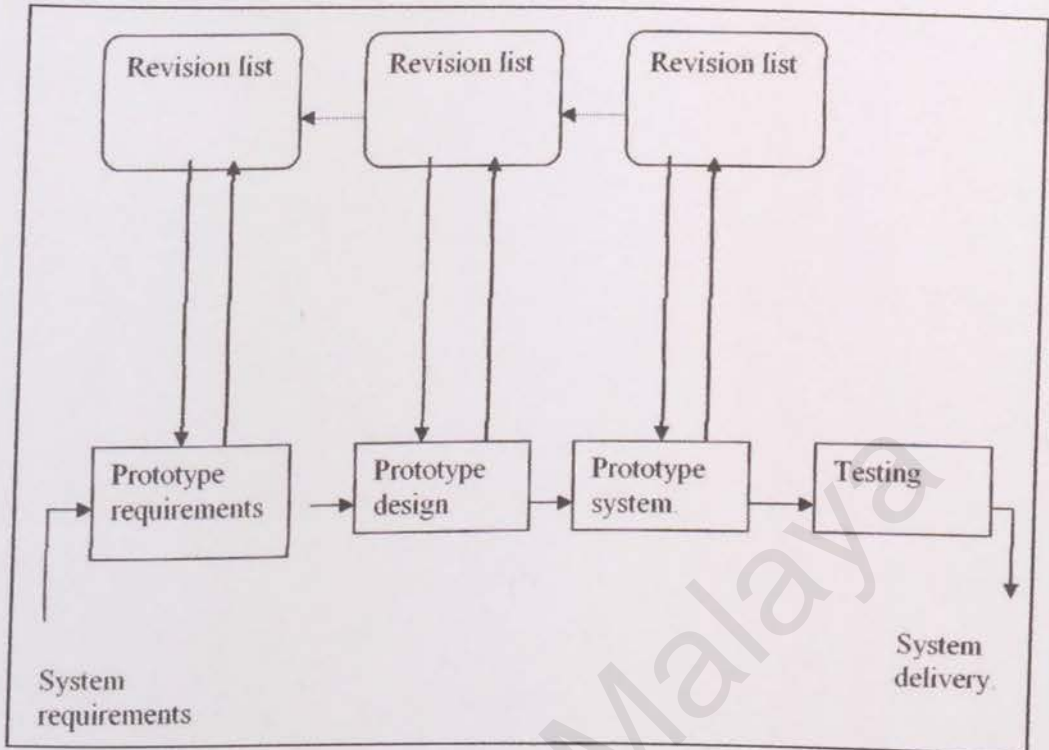
Diagram 3.2: The prototype model

This prototype model has several advantages. It allows all or part of the system to be built quickly to understand issues that arises from the viewpoint of the development phase. It also allows the adding of functions and alteration to be carried out throughout the development phase and it emphasizes the concepts that the developer and client must have same understanding because developed system can be seen although it is not complete. All misunderstanding between user and developer can be settled earlier because the system's function can be identified earlier.

But, the prototype model has several weaknesses. Among its weakness is that the system is normally prepared in rush, and due to that, the long-term system quality

and maintenance could be an issue. In getting a fast result or the final prototype, the system's operating systems and devices might be inappropriate.

Figure 3.3: The waterfall with prototype model

3.2 Model Selection (Waterfall with Prototype Model)
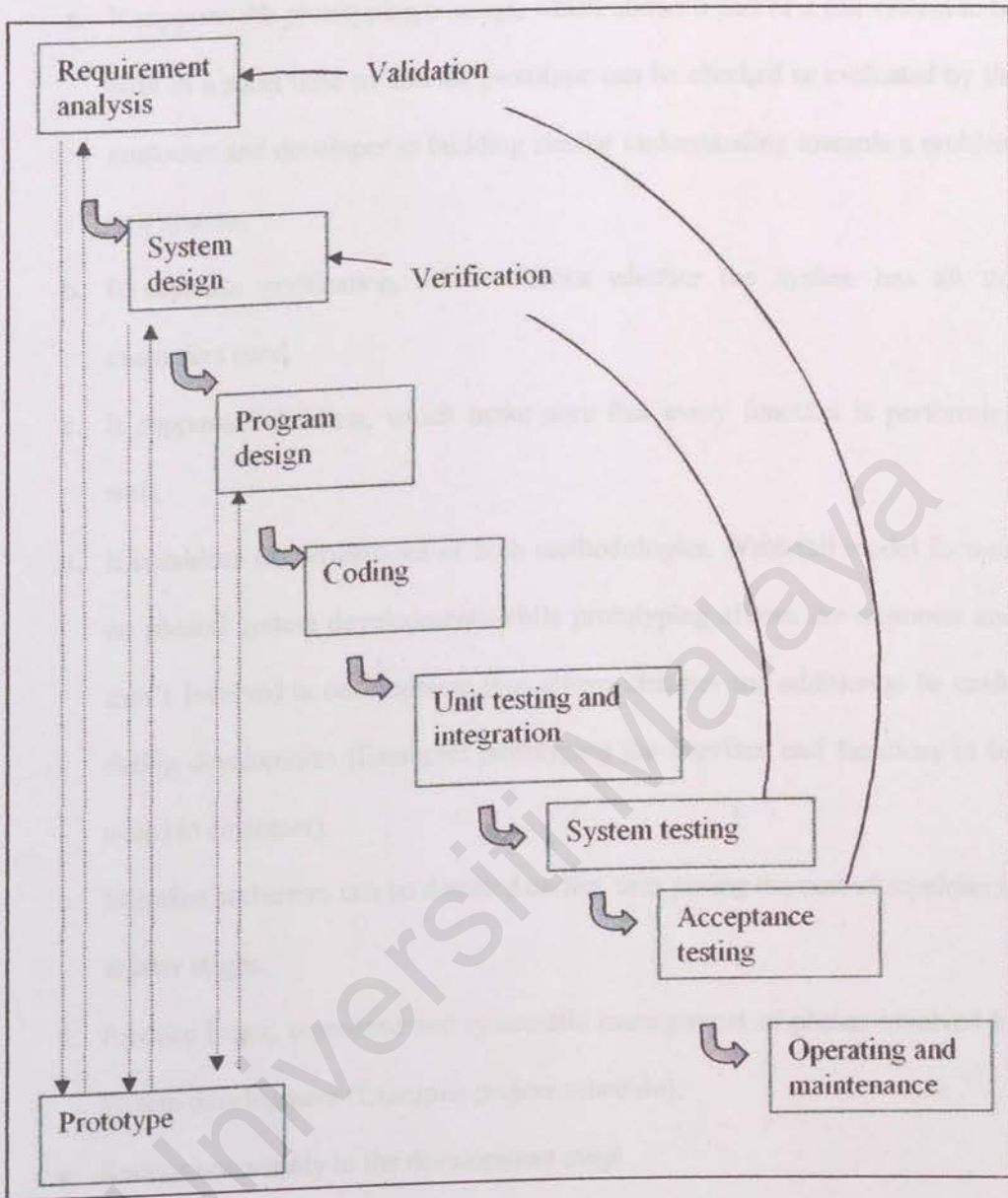
Diagram 3.3: The waterfall with prototype model

After analyzing and considering the advantages and weakness of both waterfall and

prototype model, the selected model to develop the system for this system is the

waterfall model with prototyping. This methodology is selected for the development

of this System because of several reasons. Among the reasons are:-

a. It supports the prototyping concept, which allows a part or a full system to be built in a short time so that the prototype can be checked or evaluated by the customer and developer in building similar understanding towards a problem or a system.

b. It supports verification, which checks whether the system has all the customers need.

c. It supports validation, which make sure that every function is performing well.

d. It combines the advantages of both methodologies. Waterfall model focuses on phased system development, while prototyping allows the customer and user's involved in development thus allows changes and addition to be made during development (Example: prototyping the interface and functions to be tested to customer).

e. Mistakes and errors can be detected earlier, thus saving the cost of repairing it at later stages.

f. Produce better, organized and systematic management of phases involved in system development (Example: project schedule).

g. Reduce uncertainty in the development stage.

Although the waterfall with prototype model is considered efficient, it still has flaws in it. Among the weaknesses of the model are:-

a. The current development phase must be finished to proceed to the next phase. In other words, phases in the system development can't be done concurrently.

b. Changes in design and programming will occur more often because of

prototyping, where changes will be made if an error or problem is detected during prototyping.

c. It doesn't state or picture how the codes will be developed in the implementation phase.

3.3 Phases in the Selected Methodology

Waterfall model with prototyping involves eight (8) phases which are as stated below:-

    a. Requirements analysis phase

    b. System and program design phase

    c. System coding phase

    d. Unit testing and integration phase

    e. System testing phase

    f. Acceptance testing phase

    g. Operational and maintenance phase

3.3.1 Requirements Analysis Phase

Analysis towards requirements is the first step taken in developing in this system. This includes defining system's purpose, objective and project scope as guidelines in finding the information and clear picture of the system that will be developed. At this phase hardware and also software requirement is determined. Among methods that are used to obtain information at this phase is through discussion, formal and informal interview session, surfing the internet, reading materials and studies are conducted on related system project or thesis that already exists.

3.3.2 System and Program Design Phase

At this phase, the system's logical design is made. This logical design will be the guideline of the system's development phase. Among the system's logical designs are:-

a. Design of system structure

b. Interface design

c. Database design

3.3.3 System Coding Phase

The next phase is the system's coding phase, where in this phase, the program codes are developed based on the studies done and also guidelines that were gathered. Users of the system are not involved in this phase.

3.3.4 Unit Testing and Integration Phase

The purpose of the unit testing phase is to monitor and detect errors. Objective of the testing phase is achieved when failures/mistakes or errors are detected in the system. When mistakes or errors are found, then the system will focus on ways to prevent the mistakes/errors. Steps in unit testing phase are:-

a. Code checking

b. Prove that the code is correct

c. Test program component

d. Compare techniques

Integration phase can be made via several approaches. Among the approaches are:-

    a. Top - down integration

    b. Bottom - up integration

    c. Big - bang integration

    d. Sandwich integration

Units that are ready will have its usability to be examined. Then, the usability verified units would be integrated with other verified units.

3.3.5 System Testing Phase

At this phase of the system development process, the developed system is checked to ensure that it has filled all the expected requirements of the customer/client and user.

User will be involved in the process of system's testing. User will comment and criticize the developed system. The system will be added, fixed, changed and repaired until it satisfies and has achieved all the users' requirements.

3.3.6 Acceptance Testing Phase

In this phase, the acceptance testing is carried out to the users to determine if the system fulfills the users' needs, which could be different than the developers understanding and view of the developed system. Sometimes, this test will be conducted in the real working environment, where the system will be used or applied after the system is fully developed.

System that has fulfilled the entire client's required specification is handed over to the client. In the case of a system that is not tested in the real working environment, device/tools and network installation will be done first before the system is installed.

3.3.7 Operating and Maintenance Phase

The final phase involved in this methodology is the operating and maintenance phase, where system performance is monitored to ensure that the system is working well. This phase involves detection of errors and bugs on the system so that it will be fixed and upgraded from time to time.

In the process of developing a reliable system, supporting and accurate information are needed. One of the ways used in collecting information is known as the system analysis method. System analysis can be defined as ways to get information and data in fulfill system requirement and specification phase. In the process of system development, information about the end user's behavior need to be understood properly by the system developer before all the information is incorporated. This will also contribute to an effective planning for the developing and implementation process. Phases to adopt in system analysis are as stated below:

Chapter 4

System Analysis

a. Define system constraints.

b. Fact and information finding methods.

c. Analyzing system requirements.

d. Analyzing software and hardware requirements.

e. Research on system specification and constraint.

CHAPTER 4: SYSTEM ANALYSIS

In the process of developing a reliable system, supporting and accurate information are needed. One of the ways used in collecting information is known as the system analysis method. System analysis can be defined as ways to get information and data to fulfill system requirement and specification phase in the process of system development. Information about the end user's behavior need to be understood properly by the system developer before all the information is computerized. This will also contribute to an effective planning for the developing and implementation process. Phases involved in systems analysis are as stated below:-

    a. Define system constraint.

    b. Fact and information finding methods.

    c. Analyzing system requirements.

    d. Analyzing software and hardware requirements

    e. Research on system specification requirements.

4.1 Web-based Professional Development for Lecturers Constraints

In systems' context, constraint can be defined as restriction or problems that must be considered in building a perfect system. These constraints might change and be fixed during the system's design phase. For this system, there are several constraints that must be considered. Among the constraints are:-

a. The system can only be accessed by someone who has a computer with a web server IIS/Apachie)

b. The layout and banner are specially designed for FCSIT lecturers.

c. An internet account is needed, including necessary hardware (modems, LAN cable) for upload process.

d. Interface of language and the directive that is sophisticated is not enough until enabling the processing of natural ways language for order and user's question.

4.2 Collecting Information

In this phase, it is very important to gather all the data and information about the system which will be developed. This phase is considered very important because any misunderstanding in this phase will lead to serious problems during system implementation phase. Therefore, it's vital for the developer to really understand all the information that is analyzed during this phase. Several available techniques in collecting information will be used in this phase. Among the techniques used in gathering information are:-

a. Interview

b. Research

c. Surfing the Internet

d. Discussion

4.2.1 Interview

Interview is a technique used for collecting information where information is collected by confronting another person or group personally (face-to-face interaction). In the process of gathering information, formal and informal interviews are conducted. During the interview sessions, both structured and unstructured (spontaneous) questions are directed to the interviewee.

The parties who are involved in the interviews are the parties directly involved with the system's scope, like students and lecturers. There are many parties involved in the interview sessions because the system covers a large scope. Therefore, in developing a system that satisfies all parties, all information regarding each parties involved must be captured. By doing interviews, detailed information regarding the system

can be captured and all questions can be made spontaneously. Any information which is unclear can be cleared on the spot.

4.2.2 Research

Research involves reading and checking towards reading materials like revision books, past year's thesis, journals and others that contain information about the system. Many of these materials do not contain direct information about the system, but it contains indirect information or information that helps in system development which includes systems components like software and tools. Among the reading materials that are included during research are:-

a. *Revision books*

Many of the revision books are about software development, building web pages, databases, software development methodologies, networking, web applications development and security. Among the books are regarding PHP, ASP.NET, MySQL, Dreamweaver, Microsoft's Access and FrontPage, JavaScript and software engineering.

b. *Articles*

Articles that are relevant to the system development are also studied. Most of these articles are from the Internet and some of it is from magazines like Malaysia's Chip Magazine . These articles contain information about the issues related to software development, web server, scripting languages, databases and interface development software selections. This information will help in selecting the appropriate tools to be used during system development phase which will reduce uncertainty and error in the future.

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4.2.3 Surfing the Internet

In the development era of science and technology, lots of useful information can be gathered from the Internet. There is information about almost everything available on the Internet for free. Therefore, I use the Internet for several reasons which will benefit the system. Among the reasons are:-

a. Searching for information related to the development of this system such as information and articles about the useful software and system tools selection, design issues and much more.

b. Search for websites, which providing information on web development process. These websites will help in providing ideas on what services the system should provide.

c. Looking for ideas in designing the system. For Example, systems interface design.

4.2.4 Discussion

Discussions are conducted regularly especially with the appointed supervisor, Mr. Mohd. Nizam Bin Ayub. Discussion is needed when problems occurs in the system development phase and guidance is needed from a more experienced and knowledgeable person. Informal discussions with friends are also done to gain more understanding and knowledge towards the system development.

4.3 System Requirement Analysis

System requirements are an official description about what are needed to the system developer in order to develop a reliable system. It should specify what the system should do without specifying how the system does it. System requirements are divided to two section, functional requirements and non-functional requirements.

4.4.1 Functional Requirements

Functional requirements can be defined as all the activities or functions that must be done by the system to fulfill all clients' needs. Functional requirements explain the interaction between the system and its environment. It also explains how the system should react/behave to certain stimulation. In laymen words, it explains the functions and services of the system.

For this system, the functional requirements are based on the user's access level. The system's functional requirements are:-

a. *The log-in function/page*

   This function will only allow a the user to with log in user name and password to access the system

b. *Change password function*

   This function is used to change the current user password to a new password for safety reasons. This function contains three (3) fields:-

   - The "new user name" field - to enter the new username.

   - The "old username" field - to enter the current username.

   - The "new password" field - to enter the new password.

- The "old password" field - to enter the current password
- The "new password confirmation" field - again enter the current password for confirmation.

There will be a "change" button which functions similar to the submit button. Only matching "old password" with "old username" and "new password" with "and password confirmation" will be accepted before the username and password is changed to a new username and password.

c. *Choose template function*

This function used to store the template which used by the user to develop the webpage

d. *Setup forum function*

Here the place to choose the button and banners for the forum and input the main categories for the forum

e. *Data input function*

This function will enable the user to input all the data that going to in their webpage.

f. *Forum function*

To manage moderate and administrate the forum.

4.4.2 Non-functional Requirements

Non-functional requirements or constraint explains the control that limits the choice of getting/building a solution to a problem. Non-functional requirements of this system are:-

a. *Portability*

Portability refers to the capability of the system to operate on various platforms regardless of the manufacturer or the operating systems. Since ASP.NET is the selected server side language, portability isn't an issue because ASP.NET are cross platforms and can operate on any operating systems. Secondly, the ASP.NET output follows the international standards, which means that all kinds of browser won't have a problem in accessing the System.

b. *Security*

Security refers to the ability of the system's immunity and avoidance to any attacks like hacking and malicious codes. The system will implement the Secure Socket Layer (SSL) as the TCP/IP's security layer. Encryption technique will be used to support every authentication process.

c. *Scalability*

Scalability refers to the ability of the system to migrate to a machine with greater or lesser performance ability, without changing much of the underlying components. This system is a web-based and modular-based system, therefore the system can be implemented on almost any machine as long as the most minimum requirements are fulfilled.

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d. *Flexibility*

Flexibility refers to the system's ability to adopt new technologies, resources and implementation in changing environments. This system is a web-based system, therefore the future web technologies should be able to comply with the existing web technologies.

e. *Usability*

Usability refers to the user-friendliness of the system. The system is quite a large system and covers lot of input process; therefore the user's interface will be very user-friendly and similar to the existing available websites.

f. *Reliability*

Reliability refers to the ability to rate the failure occurrence of the system. This system is using Windows NT as its operating systems and Apache server as the systems server, which now regarded as the best server available. Thus, the system should be reliable enough as long there is no hardware error on the server or unstable internet connection.

g. *Efficiency*

Efficiency refers to the ability of the system to process high number of user requests with short and acceptable response time. The system is using the combination of IIS server, ASP.NET scripting language and MySQL database, which is regarded as one of the best combinations that can process large number of requests with minimum time.

4.4 Analysis of technical requirements

Technical requirements can be defined as a description for implementation environment that includes hardware and software.

4.5.1 Technical software requirements

a. *Programming language*

- Sequence Query Language (SQL)
- PHP
- Dynamic HTML (DHTML)
- JavaScript
- Flash Action Script (Lingo)

b. *Database*

- MySQL

c. *Scripting processing language*

- PHP

d. *Interface development tools*

- Macromedia Dreamweaver UltraDev
- Microsoft Visual InterDev 6.0
- Microsoft Frontpage

e. *Operating system*

- Windows XP

f. *Web server*

- Apache Web Server (Apache 2.0)

4.5.2 Technical hardware requirements

a. *For clients using the system*

- Computers with at least 166 MHz processing power.

- Memory of minimum 32 MB SDRAM.

- Keyboard and mouse.

- Modem with minimum speed of 14.4 kbps and an internet connection.

b. *For the server computer*

- Computer with at least 1 GHz processing power.

- Primary memory of 256 SDRAM or 128 RDRAM.

- 10 GB of secondary memory.

- Keyboard and mouse.

- Modem with minimum speed of 56 kbps and an internet connection

  (higher bandwidth connection will assure smoother performance)

CHAPTER 5: SYSTEM DESIGN

System design is a creative process that changes a problem to a solution. The design phase will use the information gained from analysis phase and proposes a new system that will fulfill the user's/client's requirements.

This chapter will explain the system's architecture design, system's design approach, the system's database design and system's interface. The objective of this phase is to document the systems (*web based professional development tool for lecturers*) conceptual design based on the information gained in the analysis phase.

5.1 System Architecture Design

The client-server architecture will be used in developing the system. In this architecture, the client will have to request to the server and the server will provide the client's request. The client is normally a normal desktop computer and the server is normally a server computer or a workstation.

The advantage of using the client-server architecture is that the user will get information only when the clients request for the information. There are three parts of the 3-tier application which will be located at different places in the network, which are:-

a. *The front end*

   It is the workstation or desktops. This part will prepare the Graphical User Interface (GUI) and specific applications like registration form and interactive windows.

b. *The middle end*

   This is where the application server resides. It is normally located at the Local Area Network (LAN)'s server. It acts like a server of the client's request from the workstations. But, it acts as a client in the interaction with the back-end programs, which is normally placed in the mainframe. In other words, application servers are the middle-man between the browsers based on the front end and the back-end databases.

c. *The back end*

   This part includes the database and the program that manages, reads and writes to the database.

The 3-tier application uses the client-server architecture. The advantages of using the 3-tier application is different programmers with different programming languages can develop the system separately. Therefore, the program of each tier can be changed without interrupting any other tiers. The diagram below shows the 3-tier application in the system.
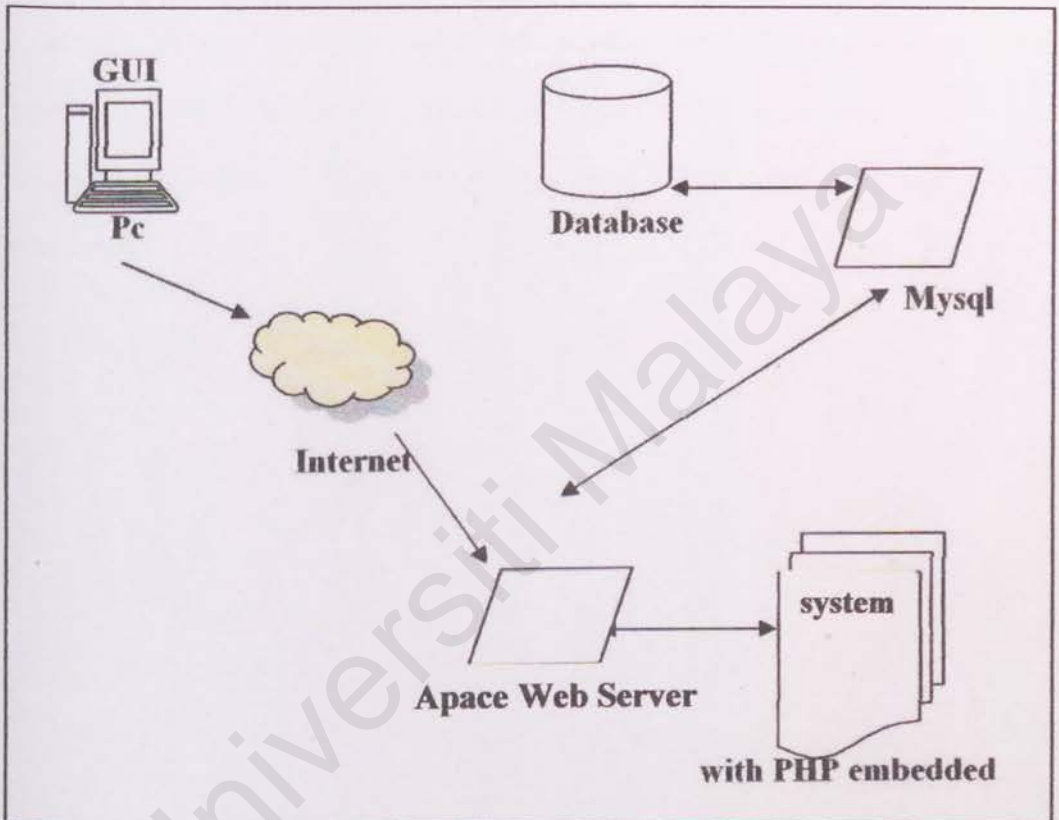
Diagram 5.1: 3-tier architecture

5.2 System Design Approach

The system will be using function based approach or decomposition approach. It is a structured system approach or a top down approach that decompose a system to hierarchies. The higher-level modules explain the system in general while lower level module explains the system in more specific form.

5.3 Structure Chart for Professional Development for Lecturers

Before looking at the design of the function, it would be better to view the structure chart of this system. By looking at the structure chart, understanding of the system can be increased. The general structure chart will be divided into two main parts. There are admin part and users part. The users parts consist of two structure charts, which represent the user access level. Users in this users structure are divided into two types; the registered user and the unregistered user. The unregistered user will only be allowed to access the general user section, while registered user can access and use all functions in the system. Below are the general structure charts for the Users Part.

Diagram 5.2: Users general structure chart for the system
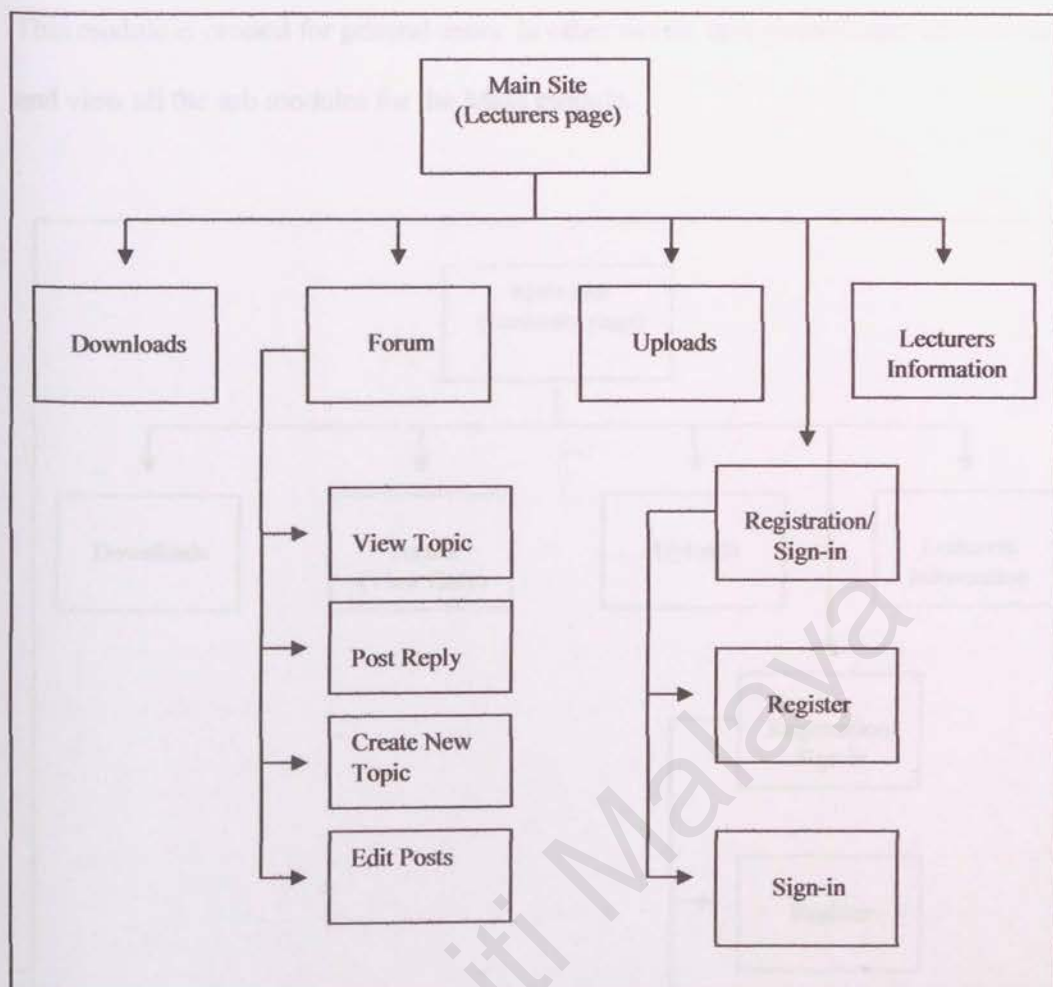
Diagram 5.3: The Main's sub modules for registered users

This module is created for general users. In other words, unregistered user can access

and view all the sub modules for the Main module.
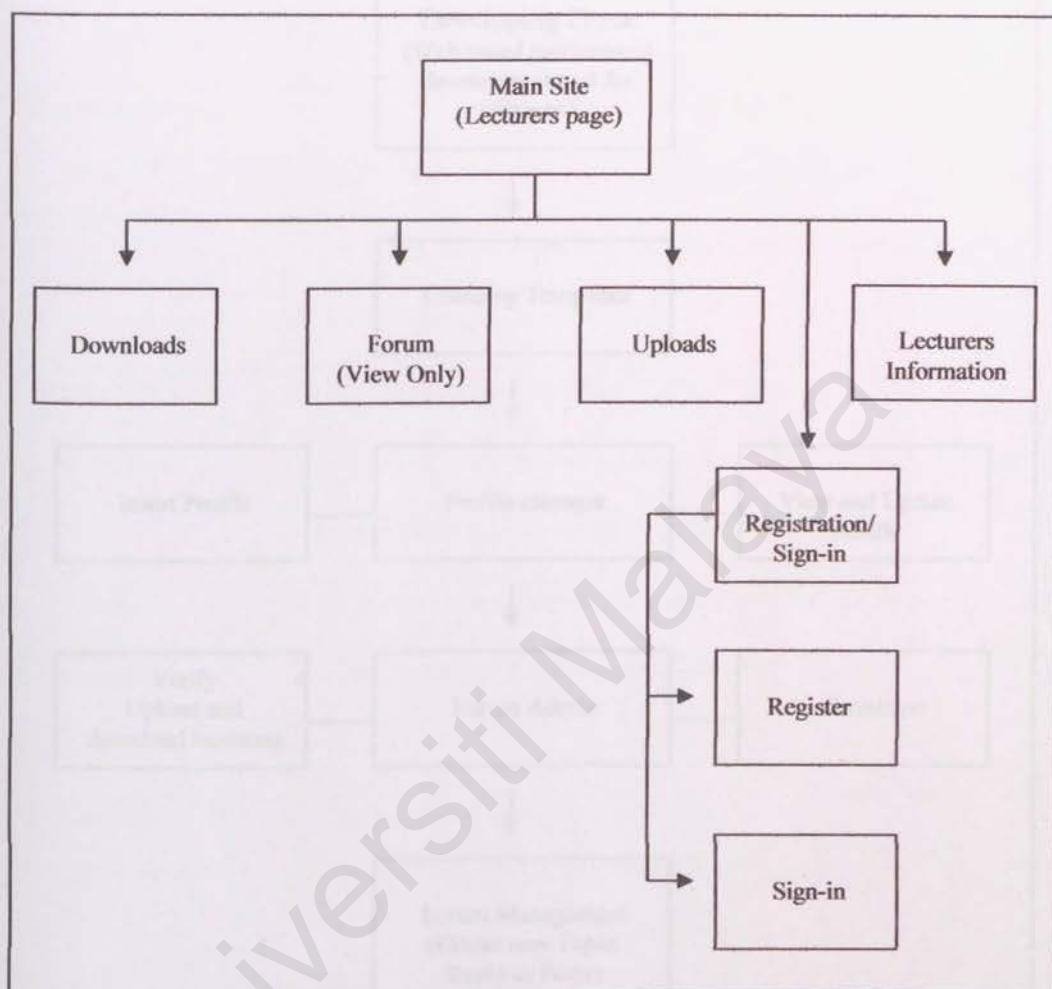
Diagram 5.4: The authentication sub module for general (*non- registered*) users

However, for this section, only registered users are allowed to enter. A username and

a password are required to enter this section. After the user accessed this area by

submitting the valid username and password, the system will identify the user's access

level and then will send the pages and functions that are appropriate with the users'

access level.

Below are the structure charts for the admin part of the system

```
                    ┌─────────────────────────┐
                    │    Developing Phase     │
                    │ (Web based professional │
                    │    development tool for │
                    │        lecturers)       │
                    └────────────┬────────────┘
                                 │
                                 ▼
                    ┌─────────────────────────┐
                    │   Choosing Templates    │
                    └────────────┬────────────┘
                                 │
                                 ▼
┌──────────────┐    ┌─────────────────────────┐    ┌──────────────────┐
│Insert Profile│────│     Profile manager     │────│ View and Update  │
│              │    │                         │    │     Profile      │
└──────────────┘    └────────────┬────────────┘    └──────────────────┘
                                 │
                                 ▼
┌──────────────┐    ┌─────────────────────────┐    ┌──────────────────┐
│    Verify    │    │                         │    │                  │
│  Upload and  │────│       Forum Admin       │────│   Information    │
│download      │    │                         │    │                  │
│locations     │    └────────────┬────────────┘    └──────────────────┘
└──────────────┘                 │
                                 ▼
                    ┌─────────────────────────┐
                    │    Forum Management     │
                    │   (Create new Topic,    │
                    │     Reply to Posts)     │
                    └────────────┬────────────┘
                                 │
                                 ▼
                    ┌─────────────────────────┐
                    │         Finish          │
                    └─────────────────────────┘
```
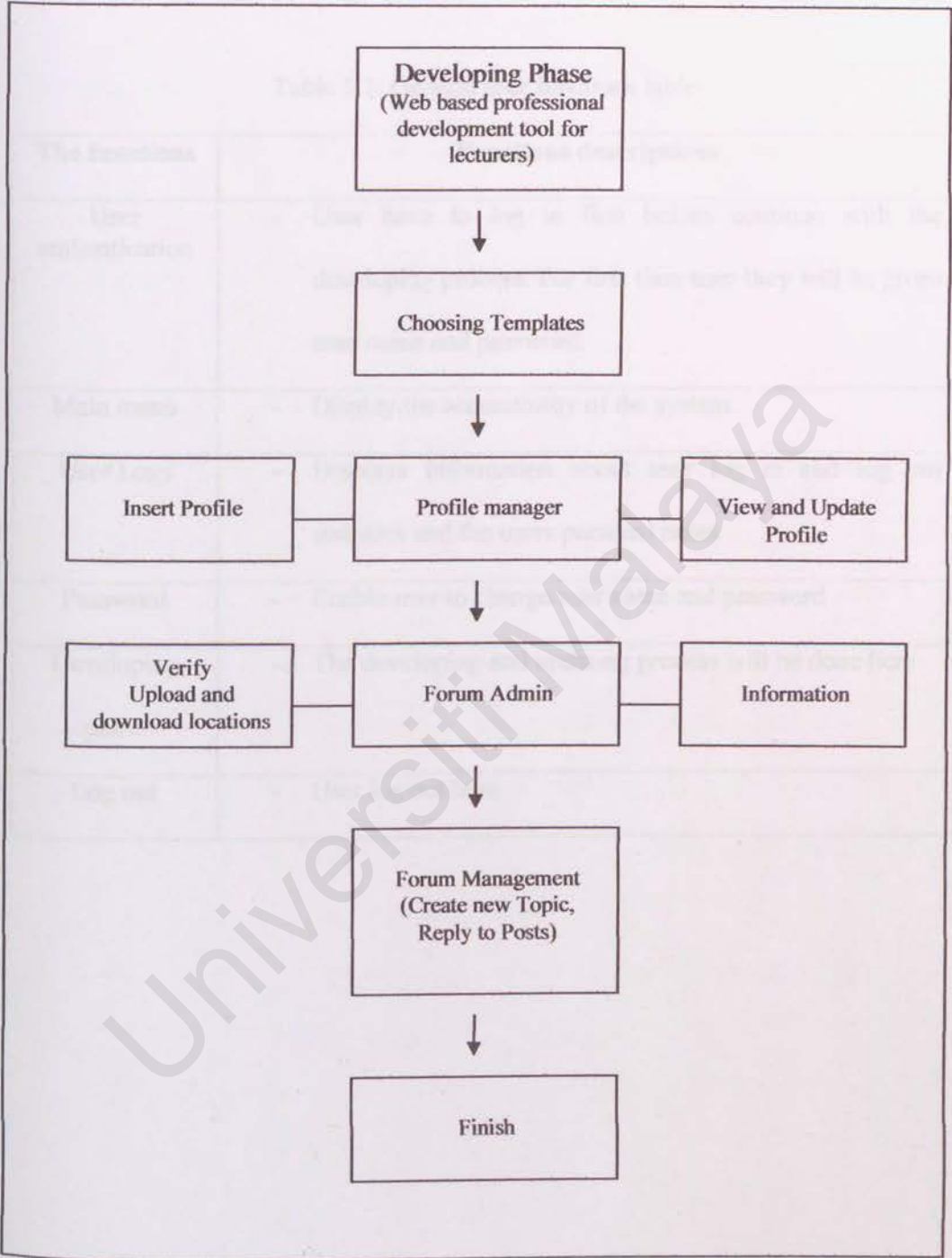
Diagram 5.5: The Admin part models

5.4 Functions Design

5.4.1 The General User Module

Table 5.1: General user functions table

The functions	Functions descriptions
User authentication	- User have to log in first before continue with the developing process. For first time user they will be given user name and password.
Main menu	- Display the accessibility of the system
User Logs	- Displays information about user log in and log out statistics and the users personal notes
Password	- Enable user to change user name and password
Developing phase	- The developing and updating process will be done here
Log out	- User log out here

5.4.2 The Admin Phase Module

Table 5.2:Admin Phase Module table

The functions	Functions descriptions
Template Admin	- User have to choose their favorite layout. There will be 15 layout to be chosen
Profile Admin	- Enable Admin To Input , view and update Personal Profile.
Forum Admin	- Add Course Information - Upload Course Files such as Notes, Labs and Tutorials - Reply To users question - Submit additional Information regarding in course - Create and post New Topics
Change password	- It allows the admin to change his password. - User will need to enter an old password and a new password (twice) in order to change its old password to a new password. - All entered data in this function will be encrypted.
Finish	- The page ready to publish.

5.5 Data Flow Diagram (DFD)

The data flow diagram is a graphical character for data flow and data processing for a system. It shows all the system's input, output, process and data flows.

The data flow diagram for this system will only covers the context and level-zero diagrams, since this is just the development phase. The entire diagram for level-one will be explained later during the implementation phase.

For this system, there will be only one level-zero diagrams. Since there is only one user, below is the context diagram for the system.
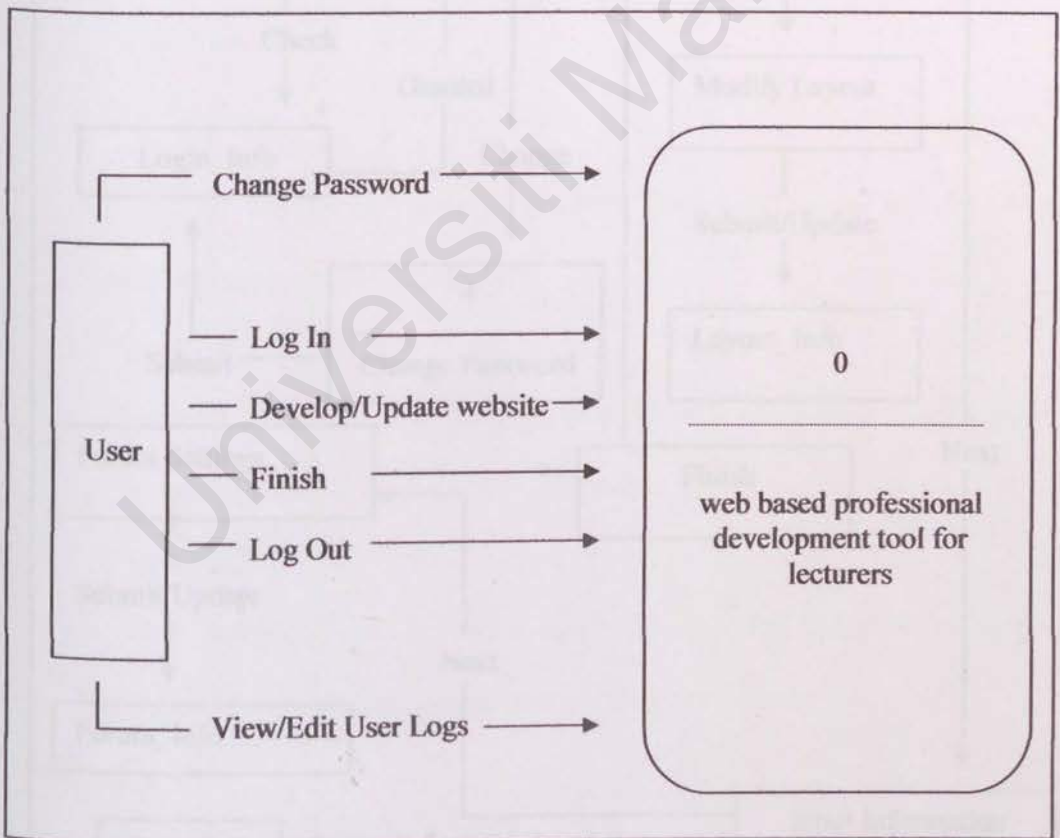
Diagram 5.6: The context diagram
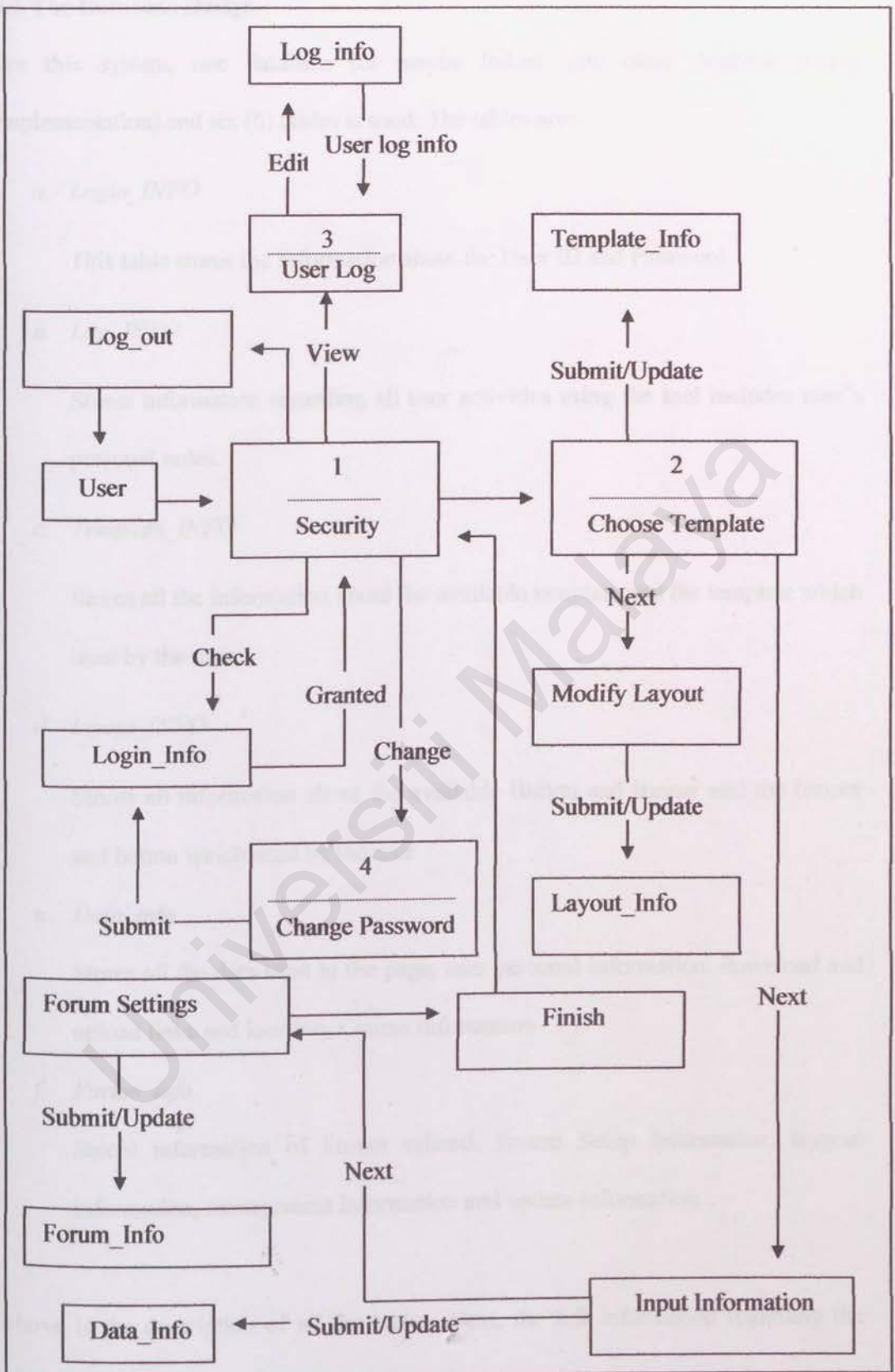
Diagram 5.7: The level-zero diagram

5.6 The Database Design

For this system, one database (or maybe linked with other database during implementation) and six (6) tables is used. The tables are:-

    a. *Login_INFO*

    This table stores the information about the User ID and Password

    b. *Log_INFO*

    Stores information regarding all user activities using the tool includes user's personal notes.

    c. *Template_INFO*

    Stores all the information about the available template and the template which used by the user.

    d. *layout_INFO*

    Stores all information about the available Button and banner and the banner and button which used by the user

    e. *Data_info*

    Stores all the data used in the page, user personal information, download and upload links and location, Course Information

    f. *Forum_info*

    Stores information of Forum related. Forum Setup information, layaout information, management information and update information.

Above is the description of all the tables. Next, the full information regarding the tables is described below:-

5.6.1 Login_INFO Table

Table 5.3: Login_Info table

Field Name	Data Type	Size	Explanations
User ID	Varchar	10	The user personal ID
Password	Varchar	10	Users Password

5.6.2 Log_Info Table

Table 5.4: Log_Info table

Field Name	Data Type	Size	Explanations
Last_Modify	Varchar	10	When Last time update the website
Duration	Varchar	10	How Long the development/update process took
Activities	Varchar	500	What are changes made
UserNotes	Varchar	500	Users personal notes regarding the updates or development

5.6.3 Tempale Table

Table 5.5: Template_Info table

Field Name	Data Type	Size	Explanations
TemplateID	Varchar	10	List of available Template
TemplateDetails	Varchar	100	Brief detail of each Template
UserTemplate	Varchar	10	Information On the template used by user

5.6.4 Layout_Info Table

Table 5.6: Layout_Info table

Field Name	Data Type	Size	Explanations
ColorID	Varchar	10	List of available banners
ButtonID	Varchar	10	List of available Button

5.6.5 Data_Info Table

Table 5.7: Data_Info table

Field Name	Data Type	Size	Explanations
PageTitite	Integer	5	The title of page to be display
CourseNumber	Integer	2	The number of course(s)
CouserTitle	Varchar	10	The title of the course

CourseCode	Varchar	10	The code of the course
NotesNumber	Integer	2	How many notes can download
TotorialNumber	Integer	2	How many tutorials can be download
AssigmentNumber	Integer	2	How many assignments can be download
Notes	Varchar	50	The title of each notes
Tutorials	Varchar	50	The title of each Tutorial
Assignments	Varchar	50	The title of each assignment
LinkNotes	Varchar	50	The location where the notes stored
LinkTutorials	Varchar	50	The location where the tutorials stored
LinkAssignment	Varchar	50	The location where the assignment stored
UserName	Varchar	100	User full name and qualification
UserTel	Varchar	10	Room telephone number
UserHP	Varchar	10	Hand phone number
UserRoom	Varchar	5	Room number
UserInfo	Varchar	5000	Extra info input bye user include their personal picture
Studentinfo	Varchar	5000	The location of student list

			from Microsoft Excel file
Announcement	Varchar	1000	Announcement to students
Links	Varchar	5000	Links to other sites

5.6.6 Advanced_Info

Table 5.8: Advanced_Info table

Field Name	Data Type	Size	Explanations
Form	Varchar	3	Yes/No to forum
Search	Varchar	3	Yes/No to search
LogIn	Varchar	3	Yes /No to log in

5.7 Database design for forum

5.7.1 fsktm_auth_access

Field	Type	Null	Default
group_id	mediumint(8)	No	0
forum_id	smallint(5)	No	0
auth_view	tinyint(1)	No	0
auth_read	tinyint(1)	No	0
auth_post	tinyint(1)	No	0
auth_reply	tinyint(1)	No	0
auth_edit	tinyint(1)	No	0
auth_delete	tinyint(1)	No	0
auth_sticky	tinyint(1)	No	0
auth_announce	tinyint(1)	No	0
auth_vote	tinyint(1)	No	0
auth_pollcreate	tinyint(1)	No	0
auth_attachments	tinyint(1)	No	0
auth_mod	tinyint(1)	No	0

Indexes:

Keyname	Type	Cardinality	Field
group_id	INDEX	None	group_id
forum_id	INDEX	None	forum_id

Space usage:

Type	Usage
Data	0 Bytes
Index	1,024 Bytes
Total	1,024 Bytes

Row Statistic:

Statements	Value
Format	fixed
Rows	0
Creation	Mar 01, 2005 at 10:44 PM
Last update	Mar 01, 2005 at 10:44 PM

5.7.2 fsktm_banlist

Field	Type	Null	Default
ban_id	mediumint(8)	No	
ban_userid	mediumint(8)	No	0
ban_ip	varchar(8)	No	
ban_email	varchar(255)	Yes	NULL

Indexes:

Keyname	Type	Cardinality	Field
PRIMARY	PRIMARY	0	ban_id
ban_ip_user_id	INDEX	None	ban_ip
			ban_userid

Space usage:

Type	Usage		
Data	0 Bytes		
Index	1,024 Bytes		
Total	1,024 Bytes		

Row Statistic:

Statements	Value
Format	dynamic
Rows	0
Next Autoindex	1
Creation	Mar 01, 2005 at 10:44 PM
Last update	Mar 01, 2005 at 10:44 PM

5.7.3 *fsktm_categories*

Field	Type	Null	Default
cat_id	mediumint(8)	No	
cat_title	varchar(100)	Yes	*NULL*
cat_order	mediumint(8)	No	0

Indexes:

Keyname	Type	Cardinality	Field
PRIMARY	PRIMARY	3	cat_id
cat_order	INDEX	None	cat_order

Space usage:

Type	Usage		
Data	84 Bytes		
Index	3,072 Bytes		
Total	3,156 Bytes		

Row Statistic:

Statements	Value
Format	dynamic
Rows	3
Row length ø	28
Row size ø	1,052 Bytes
Next Autoindex	6
Creation	Mar 01, 2005 at 10:44 PM
Last update	Mar 01, 2005 at 10:44 PM

5.7.4 fsktm_config

Field	Type	Null	Default
config_name	varchar(255)	No	
config_value	varchar(255)	No	

Indexes:

Keyname	Type	Cardinality	Field
PRIMARY	PRIMARY	61	config_name

Space usage:

Type	Usage
Data	1,616 Bytes
Index	3,072 Bytes
Total	4,688 Bytes

Row Statistic:

Statements		Value
Format	dynamic	
Rows		61
Row length ø	26	
Row size ø		77 Bytes
Creation	Mar 01, 2005 at 10:44 PM	
Last update	Mar 02, 2005 at 01:38 AM	

5.7.5 fsktm_confirm

Field	Type	Null	Default
confirm_id	char(32)	No	
session_id	char(32)	No	
code	char(6)	No	

Indexes:

Keyname	Type	Cardinality	Field
PRIMARY	PRIMARY	0	session_id confirm_id

Space usage:

Type	Usage
Data	0 Bytes
Index	1,024 Bytes
Total	1,024 Bytes

Row Statistic:

Statements		Value
Format	fixed	
Rows		0
Creation	Mar 01, 2005 at 10:44 PM	
Last update	Mar 01, 2005 at 10:44 PM	

5.7.6 fsktm_disallow

Field	Type	Null	Default
disallow_id	mediumint(8)	No	
disallow_username	varchar(25)	No	

Indexes:

Keyname	Type	Cardinality	Field
PRIMARY	PRIMARY	0	disallow_id

Space usage:

Type	Usage
Data	0 Bytes
Index	1,024 Bytes
Total	1,024 Bytes

Row Statistic:

Statements	Value
Format	dynamic
Rows	0
Next Autoindex	1
Creation	Mar 01, 2005 at 10:44 PM
Last update	Mar 01, 2005 at 10:44 PM

5.7.7 fsktm_forum_prune

Field	Type	Null	Default
prune_id	mediumint(8)	No	
forum_id	smallint(5)	No	0
prune_days	smallint(5)	No	0
prune_freq	smallint(5)	No	0

Indexes:

Keyname	Type	Cardinality	Field
PRIMARY	PRIMARY	0	prune_id
forum_id	INDEX	None	forum_id

Space usage:

Type	Usage
Data	0 Bytes
Index	1,024 Bytes
Total	1,024 Bytes

Row Statistic:

Statements	Value
Format	fixed
Rows	0
Next Autoindex	1
Creation	Mar 01, 2005 at 10:44 PM
Last update	Mar 01, 2005 at 10:44 PM

5.7.8 fsktm_forums

Field	Type	Null	Default
forum_id	smallint(5)	No	0
cat_id	mediumint(8)	No	0
forum_name	varchar(150)	Yes	*NULL*
forum_desc	text	Yes	*NULL*
forum_status	tinyint(4)	No	0
forum_order	mediumint(8)	No	1
forum_posts	mediumint(8)	No	0
forum_topics	mediumint(8)	No	0
forum_last_post_id	mediumint(8)	No	0
prune_next	int(11)	Yes	*NULL*
prune_enable	tinyint(1)	No	0
auth_view	tinyint(2)	No	0
auth_read	tinyint(2)	No	0
auth_post	tinyint(2)	No	0
auth_reply	tinyint(2)	No	0
auth_edit	tinyint(2)	No	0
auth_delete	tinyint(2)	No	0
auth_sticky	tinyint(2)	No	0
auth_announce	tinyint(2)	No	0
auth_vote	tinyint(2)	No	0
auth_pollcreate	tinyint(2)	No	0
auth_attachments	tinyint(2)	No	0

Indexes:

Keyname	Type	Cardinality	Field
PRIMARY	PRIMARY	9	forum_id
forums_order	INDEX	None	forum_order
cat_id	INDEX	None	cat_id
forum_last_post_id	INDEX	None	forum_last_post_id

Space usage:

Type	Usage
Data	284 Bytes
Index	5,120 Bytes
Total	5,404 Bytes

Row Statistic:

Statements	Value
Format	dynamic
Rows	9
Row length ø	31
Row size ø	600 Bytes
Creation	Mar 01, 2005 at 10:44 PM
Last update	Mar 01, 2005 at 10:44 PM

5.7.9 fsktm_groups

	Field	Type	Null	Default
	group_id	mediumint(8)	No	
	group_type	tinyint(4)	No	1
	group_name	varchar(40)	No	
	group_description	varchar(255)	No	
	group_moderator	mediumint(8)	No	0
	group_single_user	tinyint(1)	No	1

Indexes:

Keyname	Type	Cardinality	Field
PRIMARY	PRIMARY	2	group_id
group_single_user	INDEX	None	group_single_user

Space usage:

Type	Usage
Data	68 Bytes
Index	3,072 Bytes
Total	3,140 Bytes

Row Statistic:

Statements	Value
Format	dynamic
Rows	2
Row length ø	34
Row size ø	1,570 Bytes
Next Autoindex	3
Creation	Mar 01, 2005 at 10:44 PM
Last update	Mar 01, 2005 at 10:44 PM

5.7.10 fsktm_posts

Field	Type	Null	Default
post_id	mediumint(8)	No	
topic_id	mediumint(8)	No	0
forum_id	smallint(5)	No	0
poster_id	mediumint(8)	No	0
post_time	int(11)	No	0
poster_ip	varchar(8)	No	
post_username	varchar(25)	Yes	NULL
enable_bbcode	tinyint(1)	No	1
enable_html	tinyint(1)	No	0
enable_smilies	tinyint(1)	No	1
enable_sig	tinyint(1)	No	1
post_edit_time	int(11)	Yes	NULL
post_edit_count	smallint(5)	No	0

Indexes:

Keyname	Type	Cardinality	Field
PRIMARY	PRIMARY	0	post_id
forum_id	INDEX	None	forum_id
topic_id	INDEX	None	topic_id
poster_id	INDEX	None	poster_id
post_time	INDEX	None	post_time

Space usage:

Type	Usage
Data	0 Bytes
Index	1,024 Bytes
Total	1,024 Bytes

Row Statistic:

Statements	Value
Format	dynamic
Rows	0
Next Autoindex	2
Creation	Mar 01, 2005 at 10:44 PM
Last update	Mar 01, 2005 at 10:44 PM

5.7.11 fsktm_posts_text

Field	Type	Null	Default
post_id	mediumint(8)	No	0
bbcode_uid	varchar(10)	No	
post_subject	varchar(60)	Yes	NULL
post_text	text	Yes	NULL

Indexes:

Keyname	Type	Cardinality	Field
PRIMARY	PRIMARY	0	post_id

Space usage:

Type	Usage
Data	0 Bytes
Index	1,024 Bytes
Total	1,024 Bytes

Row Statistic:

Statements	Value
Format	dynamic
Rows	0
Creation	Mar 01, 2005 at 10:44 PM
Last update	Mar 01, 2005 at 10:44 PM

5.7.12 fsktm_privmsgs

Field	Type	Null	Default
privmsgs_id	mediumint(8)	No	
privmsgs_type	tinyint(4)	No	0
privmsgs_subject	varchar(255)	No	0
privmsgs_from_userid	mediumint(8)	No	0
privmsgs_to_userid	mediumint(8)	No	0
privmsgs_date	int(11)	No	0
privmsgs_ip	varchar(8)	No	
privmsgs_enable_bbcode	tinyint(1)	No	1
privmsgs_enable_html	tinyint(1)	No	0
privmsgs_enable_smilies	tinyint(1)	No	1
privmsgs_attach_sig	tinyint(1)	No	1

Indexes:

Keyname	Type	Cardinality	Field
PRIMARY	PRIMARY	0	privmsgs_id
privmsgs_from_userid	INDEX	None	privmsgs_from_userid
privmsgs_to_userid	INDEX	None	privmsgs_to_userid

Space usage:		Row Statistic:	
Type	Usage	Statements	Value
Data	0 Bytes	Format	dynamic
Index	1,024 Bytes	Rows	0
Total	1,024 Bytes	Next Autoindex	1
		Creation	Mar 01, 2005 at 10:44 PM
		Last update	Mar 01, 2005 at 10:44 PM

5.7.13 fsktm_privmsgs_text

Field	Type	Null	Default
privmsgs_text_id	mediumint(8)	No	0
privmsgs_bbcode_uid	varchar(10)	No	0
privmsgs_text	text	Yes	NULL

Indexes:

Keyname	Type	Cardinality	Field
PRIMARY	PRIMARY	0	privmsgs_text_id

Space usage: Row Statistic:

Type	Usage	Statements	Value
Data	0 Bytes	Format	dynamic	
Index	1,024 Bytes	Rows		0
Total	1,024 Bytes	Creation	Mar 01, 2005 at 10:44 PM	
		Last update	Mar 01, 2005 at 10:44 PM	

5.7.14 fsktm_ranks

Field	Type	Null	Default
rank_id	smallint(5)	No	
rank_title	varchar(50)	No	
rank_min	mediumint(8)	No	0
rank_special	tinyint(1)	Yes	0
rank_image	varchar(255)	Yes	*NULL*

Indexes:

Keyname	Type	Cardinality	Field
PRIMARY	PRIMARY	1	rank_id

Space usage: Row Statistic:

Type	Usage	Statements	Value
Data	24 Bytes	Format	dynamic	
Index	2,048 Bytes	Rows		1
Total	2,072 Bytes	Row length ø	24	
		Row size ø		2,072 Bytes
		Next Autoindex		2
		Creation	Mar 01, 2005 at 10:44 PM	
		Last update	Mar 01, 2005 at 10:44 PM	

5.7.15 fsktm_search_results

Field	Type	Null	Default
search_id	int(11)	No	0
session_id	varchar(32)	No	
search_array	text	No	

Indexes:

Keyname	Type	Cardinality	Field
PRIMARY	PRIMARY	0	search_id
session_id	INDEX	None	session_id

Space usage:

Type	Usage	Row Statistic:		
		Statements	Value	
Data	0 Bytes	Format	dynamic	
Index	1,024 Bytes	Rows		0
Total	1,024 Bytes	Creation	Mar 01, 2005 at 10:44 PM	
		Last update	Mar 01, 2005 at 10:44 PM	

5.7.16 fsktm_search_wordlist

Field	Type	Null	Default
word_text	varchar(50)	No	
word_id	mediumint(8)	No	
word_common	tinyint(1)	No	0

Indexes:

Keyname	Type	Cardinality	Field
PRIMARY	PRIMARY	1	word_text
word_id	INDEX	None	word_id

Space usage:

Type	Usage	Row Statistic:		
		Statements	Value	
Data	20 Bytes	Format	dynamic	
Index	3,072 Bytes	Rows		1
Total	3,092 Bytes	Row length ø	20	
		Row size ø	3,092 Bytes	
		Next Autoindex	13	
		Creation	Mar 01, 2005 at 10:44 PM	
		Last update	Mar 01, 2005 at 10:44 PM	

5.7.17 fsktm_search_wordmatch

Field	Type	Null	Default
post_id	mediumint(8)	No	0
word_id	mediumint(8)	No	0
title_match	tinyint(1)	No	0

Indexes:

Keyname	Type	Cardinality	Field
post_id	INDEX	None	post_id
word_id	INDEX	None	word_id

Space usage:

Type	Usage
Data	0 Bytes
Index	1,024 Bytes
Total	1,024 Bytes

Row Statistic:

Statements	Value
Format	fixed
Rows	0
Creation	Mar 01, 2005 at 10:44 PM
Last update	Mar 01, 2005 at 10:44 PM

5.7.18 fsktm_sessions

Field	Type	Null	Default
session_id	char(32)	No	
session_user_id	mediumint(8)	No	0
session_start	int(11)	No	0
session_time	int(11)	No	0
session_ip	char(8)	No	0
session_page	int(11)	No	0
session_logged_in	tinyint(1)	No	0

Indexes:

Keyname	Type	Cardinality	Field
PRIMARY	PRIMARY	1	session_id
session_user_id	INDEX	None	session_user_id
			session_id
session_id_ip_user_id	INDEX	None	session_ip
			session_user_id

Space usage:

Type	Usage

Row Statistic:

Statements	Value

		Format	fixed	
Data	285 Bytes	Format	fixed	
Index	4,096 Bytes	Rows		1
Overhead	228 Bytes	Row length ø 57		
Effective	4,153 Bytes	Row size ø		4,381 Bytes
Total	4,381 Bytes	Creation	Mar 01, 2005 at 10:44 PM	
		Last update	Mar 03, 2005 at 03:24 PM	

5.7.19 fsktm_smilies

Field	Type	Null	Default
smilies_id	smallint(5)	No	
code	varchar(50)	Yes	NULL
smile_url	varchar(100)	Yes	NULL
emoticon	varchar(75)	Yes	NULL

Indexes:

Keyname	Type	Cardinality	Field
PRIMARY	PRIMARY	42	smilies_id

Space usage: Row Statistic:

Type	Usage	Statements	Value
Data	1,564 Bytes	Format	dynamic
Index	2,048 Bytes	Rows	42
Total	3,612 Bytes	Row length ø	37
		Row size ø	86 Bytes
		Next Autoindex	43
		Creation	Mar 01, 2005 at 10:44 PM
		Last update	Mar 01, 2005 at 10:44 PM

5.7.20 fsktm_themes

Field	Type	Null	Default
themes_id	mediumint(8)	No	
template_name	varchar(30)	No	
style_name	varchar(30)	No	
head_stylesheet	varchar(100)	Yes	NULL
body_background	varchar(100)	Yes	NULL
body_bgcolor	varchar(6)	Yes	NULL
body_text	varchar(6)	Yes	NULL

body_link	varchar(6)	Yes	NULL
body_vlink	varchar(6)	Yes	NULL
body_alink	varchar(6)	Yes	NULL
body_hlink	varchar(6)	Yes	NULL
tr_color1	varchar(6)	Yes	NULL
tr_color2	varchar(6)	Yes	NULL
tr_color3	varchar(6)	Yes	NULL
tr_class1	varchar(25)	Yes	NULL
tr_class2	varchar(25)	Yes	NULL
tr_class3	varchar(25)	Yes	NULL
th_color1	varchar(6)	Yes	NULL
th_color2	varchar(6)	Yes	NULL
th_color3	varchar(6)	Yes	NULL
th_class1	varchar(25)	Yes	NULL
th_class2	varchar(25)	Yes	NULL
th_class3	varchar(25)	Yes	NULL
td_color1	varchar(6)	Yes	NULL
td_color2	varchar(6)	Yes	NULL
td_color3	varchar(6)	Yes	NULL
td_class1	varchar(25)	Yes	NULL
td_class2	varchar(25)	Yes	NULL
td_class3	varchar(25)	Yes	NULL
fontface1	varchar(50)	Yes	NULL
fontface2	varchar(50)	Yes	NULL
fontface3	varchar(50)	Yes	NULL
fontsize1	tinyint(4)	Yes	NULL
fontsize2	tinyint(4)	Yes	NULL
fontsize3	tinyint(4)	Yes	NULL
fontcolor1	varchar(6)	Yes	NULL
fontcolor2	varchar(6)	Yes	NULL
fontcolor3	varchar(6)	Yes	NULL
span_class1	varchar(25)	Yes	NULL
span_class2	varchar(25)	Yes	NULL
span_class3	varchar(25)	Yes	NULL
img_size_poll	smallint(5)	Yes	NULL
img_size_privmsg	smallint(5)	Yes	NULL

Indexes:

Keyname	Type	Cardinality	Field
PRIMARY	PRIMARY	2	themes_id

Space usage:

Type	Usage
Data	600 Bytes

Row Statistic:

Statements	Value
Format	dynamic

Index	2,048 Bytes	Rows		2
Total	2,648 Bytes	Row length ø	300	
		Row size ø		1,324 Bytes
		Next Autoindex		3
		Creation	Mar 01, 2005 at 10:44 PM	
		Last update	Mar 01, 2005 at 10:44 PM	

5.7.21 fsktm_themes_name

Field	Type	Null	Default
themes_id	smallint(5)	No	0
tr_color1_name	char(50)	Yes	NULL
tr_color2_name	char(50)	Yes	NULL
tr_color3_name	char(50)	Yes	NULL
tr_class1_name	char(50)	Yes	NULL
tr_class2_name	char(50)	Yes	NULL
tr_class3_name	char(50)	Yes	NULL
th_color1_name	char(50)	Yes	NULL
th_color2_name	char(50)	Yes	NULL
th_color3_name	char(50)	Yes	NULL
th_class1_name	char(50)	Yes	NULL
th_class2_name	char(50)	Yes	NULL
th_class3_name	char(50)	Yes	NULL
td_color1_name	char(50)	Yes	NULL
td_color2_name	char(50)	Yes	NULL
td_color3_name	char(50)	Yes	NULL
td_class1_name	char(50)	Yes	NULL
td_class2_name	char(50)	Yes	NULL
td_class3_name	char(50)	Yes	NULL
fontface1_name	char(50)	Yes	NULL
fontface2_name	char(50)	Yes	NULL
fontface3_name	char(50)	Yes	NULL
fontsize1_name	char(50)	Yes	NULL
fontsize2_name	char(50)	Yes	NULL
fontsize3_name	char(50)	Yes	NULL
fontcolor1_name	char(50)	Yes	NULL
fontcolor2_name	char(50)	Yes	NULL
fontcolor3_name	char(50)	Yes	NULL
span_class1_name	char(50)	Yes	NULL
span_class2_name	char(50)	Yes	NULL
span_class3_name	char(50)	Yes	NULL

Indexes:

Keyname	Type	Cardinality	Field
PRIMARY	PRIMARY	1	themes_id

Space usage:		Row Statistic:		
Type	Usage	Statements		Value
Data	1,506 Bytes	Format	fixed	
Index	2,048 Bytes	Rows		1
Total	3,554 Bytes	Row length ø	1,506	
		Row size ø	3,554 Bytes	
		Creation	Mar 01, 2005 at 10:44 PM	
		Last update	Mar 01, 2005 at 11:01 PM	

5.7.22 fsktm_topics

Field	Type	Null	Default
topic_id	mediumint(8)	No	
forum_id	smallint(8)	No	0
topic_title	char(60)	No	
topic_poster	mediumint(8)	No	0
topic_time	int(11)	No	0
topic_views	mediumint(8)	No	0
topic_replies	mediumint(8)	No	0
topic_status	tinyint(3)	No	0
topic_vote	tinyint(1)	No	0
topic_type	tinyint(3)	No	0
topic_first_post_id	mediumint(8)	No	0
topic_last_post_id	mediumint(8)	No	0
topic_moved_id	mediumint(8)	No	0

Indexes:

Keyname	Type	Cardinality	Field
PRIMARY	PRIMARY	0	topic_id
forum_id	INDEX	None	forum_id
topic_moved_id	INDEX	None	topic_moved_id
topic_status	INDEX	None	topic_status
topic_type	INDEX	None	topic_type

Space usage:		Row Statistic:		
Type	Usage	Statements		Value
Data	0 Bytes	Format	fixed	

Index	1,024 Bytes	Rows			0
Total	1,024 Bytes	Next Autoindex			2
		Creation	Mar 01, 2005 at 10:44 PM		
		Last update	Mar 01, 2005 at 10:44 PM		

5.7.23 fsktm_topics_watch

Field	Type	Null	Default
topic_id	mediumint(8)	No	0
user_id	mediumint(8)	No	0
notify_status	tinyint(1)	No	0

Indexes:

Keyname	Type	Cardinality	Field
topic_id	INDEX	None	topic_id
user_id	INDEX	None	user_id
notify_status	INDEX	None	notify_status

Space usage:

Type	Usage
Data	0 Bytes
Index	1,024 Bytes
Total	1,024 Bytes

Row Statistic:

Statements	Value
Format	fixed
Rows	0
Creation	Mar 01, 2005 at 10:44 PM
Last update	Mar 01, 2005 at 10:44 PM

5.7.24 fsktm_user_group

Field	Type	Null	Default
group_id	mediumint(8)	No	0
user_id	mediumint(8)	No	0
user_pending	tinyint(1)	Yes	*NULL*

Indexes:

Keyname	Type	Cardinality	Field
group_id	INDEX	None	group_id
user_id	INDEX	None	user_id

Space usage: Row Statistic:

Type	Usage	Statements		Value
Data	16 Bytes	Format	fixed	
Index	3,072 Bytes	Rows		2
Total	3,088 Bytes	Row length ø 8		
		Row size ø		1,544 Bytes
		Creation	Mar 01, 2005 at 10:44 PM	
		Last update	Mar 01, 2005 at 10:44 PM	

5.7.25 fsktm_users

Field	Type	Null	Default
user_id	mediumint(8)	No	0
user_active	tinyint(1)	Yes	1
username	varchar(25)	No	
user_password	varchar(32)	No	
user_session_time	int(11)	No	0
user_session_page	smallint(5)	No	0
user_lastvisit	int(11)	No	0
user_regdate	int(11)	No	0
user_level	tinyint(4)	Yes	0
user_posts	mediumint(8)	No	0
user_timezone	decimal(5,2)	No	0.00
user_style	tinyint(4)	Yes	NULL
user_lang	varchar(255)	Yes	NULL
user_dateformat	varchar(14)	No	d M Y H:i
user_new_privmsg	smallint(5)	No	0
user_unread_privmsg	smallint(5)	No	0
user_last_privmsg	int(11)	No	0
user_emailtime	int(11)	Yes	NULL
user_viewemail	tinyint(1)	Yes	NULL
user_attachsig	tinyint(1)	Yes	NULL
user_allowhtml	tinyint(1)	Yes	1
user_allowbbcode	tinyint(1)	Yes	1
user_allowsmile	tinyint(1)	Yes	1
user_allowavatar	tinyint(1)	No	1
user_allow_pm	tinyint(1)	No	1
user_allow_viewonline	tinyint(1)	No	1
user_notify	tinyint(1)	No	1
user_notify_pm	tinyint(1)	No	0
user_popup_pm	tinyint(1)	No	0
user_rank	int(11)	Yes	0
user_avatar	varchar(100)	Yes	NULL
user_avatar_type	tinyint(4)	No	0

Field	Type	Null	Default
user_email	varchar(255)	Yes	*NULL*
user_icq	varchar(15)	Yes	*NULL*
user_website	varchar(100)	Yes	*NULL*
user_from	varchar(100)	Yes	*NULL*
user_sig	text	Yes	*NULL*
user_sig_bbcode_uid	varchar(10)	Yes	*NULL*
user_aim	varchar(255)	Yes	*NULL*
user_yim	varchar(255)	Yes	*NULL*
user_msnm	varchar(255)	Yes	*NULL*
user_occ	varchar(100)	Yes	*NULL*
user_interests	varchar(255)	Yes	*NULL*
user_actkey	varchar(32)	Yes	*NULL*
user_newpasswd	varchar(32)	Yes	*NULL*

Indexes:

Keyname	Type	Cardinality	Field
PRIMARY	PRIMARY	2	user_id
user_session_time	INDEX	None	user_session_time

Space usage:

Type	Usage
Data	196 Bytes
Index	3,072 Bytes
Total	3,268 Bytes

Row Statistic:

Statements	Value
Format	dynamic
Rows	2
Row length ø	98
Row size ø	1,634 Bytes
Creation	Mar 01, 2005 at 10:44 PM
Last update	Mar 02, 2005 at 05:31 AM

5.7.26 fsktm_vote_desc

Field	Type	Null	Default
vote_id	mediumint(8)	No	
topic_id	mediumint(8)	No	0
vote_text	text	No	
vote_start	int(11)	No	0
vote_length	int(11)	No	0

Indexes:

Keyname	Type	Cardinality	Field
PRIMARY	PRIMARY	0	vote_id
topic_id	INDEX	None	topic_id

The top section has space usage and row statistics.Space usage:

Type	Usage	Statements		Value
Data	0 Bytes	Format	dynamic	
Index	1,024 Bytes	Rows		0
Total	1,024 Bytes	Next Autoindex		1
		Creation	Mar 01, 2005 at 10:44 PM	
		Last update	Mar 01, 2005 at 10:44 PM	

5.7.27 fsktm_vote_results

Field	Type	Null	Default
vote_id	mediumint(8)	No	0
vote_option_id	tinyint(4)	No	0
vote_option_text	varchar(255)	No	
vote_result	int(11)	No	0

Indexes:

Keyname	Type	Cardinality	Field
vote_option_id	INDEX	None	vote_option_id
vote_id	INDEX	None	vote_id

Space usage:

Type	Usage	Statements		Value
Data	0 Bytes	Format	dynamic	
Index	1,024 Bytes	Rows		0
Total	1,024 Bytes	Creation	Mar 01, 2005 at 10:44 PM	
		Last update	Mar 01, 2005 at 10:44 PM	

5.7.28 fsktm_vote_voters

Field	Type	Null	Default
vote_id	mediumint(8)	No	0
vote_user_id	mediumint(8)	No	0
vote_user_ip	char(8)	No	

Indexes:

Keyname	Type	Cardinality	Field

vote_id	INDEX	None	vote_id
vote_user_id	INDEX	None	vote_user_id
vote_user_ip	INDEX	None	vote_user_ip

Space usage:		Row Statistic:		
Type	**Usage**	**Statements**	**Value**	
Data	0 Bytes	Format	fixed	
Index	1,024 Bytes	Rows		0
Total	1,024 Bytes	Creation	Mar 01, 2005 at 10:44 PM	
		Last update	Mar 01, 2005 at 10:44 PM	

5.7.29 fsktm_words

Field	**Type**	**Null**	**Default**
word_id	mediumint(8)	No	
word	char(100)	No	
replacement	char(100)	No	

Indexes:

Keyname	**Type**	**Cardinality**	**Field**
PRIMARY	PRIMARY	0	word_id

Space usage:		Row Statistic:		
Type	**Usage**	**Statements**	**Value**	
Data	0 Bytes	Format	fixed	
Index	1,024 Bytes	Rows		0
Total	1,024 Bytes	Next Autoindex		1
		Creation	Mar 01, 2005 at 10:44 PM	
		Last update	Mar 01, 2005 at 10:44 PM	

5.8 Interface Design

The interface design is an important aspect of the system, because it will determine the quality of the system. A well-designed interface should be effective, easy to use, simple and attractive. To make the interface attractive, several techniques will be used like:-

a. *Scan–ability*

   The layout of this system should include headers, sub headers, bullets and all key words should be highlighted.

b. *Use of simple language*

   System should use simple language that only concise to the point, no waffling, correct spelling and grammar. All text messages should not use jargons and are limited to maximum three lines.

c. *Page navigation*

   Navigation refers to the structure of the system and patterns the user will use to traverse the system. Links are the mechanism that will be used to navigate through the system. System must be neat, consistent and intuitive navigational interface that can attracts visitors. Some of the key factors that leads to the success of a navigational portal/website are:-

   - Use clear and consistent navigational aids page names, logos, banners, icons, and background colors as virtual clue to the users.

   - Consistent icon or motif to tell people that it will take them to next or another page.

d. *Overall appearance*

Interface controls like the capitalization, alignment and highlighting should be consistently labeled. Attractive media such as animation, sound and graphics can make contents come alive by avoiding mood and emotion.

e. *Animation*

Moving text must be short and is used only to indicate the major title of the page to attract visitors and alert people about updated information or data.

f. *Graphics/images*

Web pages should avoid the use of many and heavy graphics to ensure that the web pages do not loads slowly. All text colors, backgrounds and object sizes should be appropriate.

The implementation of the this system is the next phase after the analysis, design and design process. System implementation in software development is a process to convert system requirements into program codes. The initial stage of system implementation involves setting up the development environment. This includes setting up development tools to facilitate the system implementation. Then, application tools and programming languages that are suitable for the development of the proposed system are chosen carefully. Generally, the development of the system is varied according to different development phases, which can be categorized into system design, system implementation and system verification.

Chapter 6

System Implementation/Development

CHAPTER 6: SYSTEM IMPLEMENTATION/DEVELOPMENT

The implementation of the this system is the next phase after its system's analysis and design process. System implementation in software development is a process to convert system requirements into program codes. The initial stage of system implementation involves setting up the development environment. This includes setting up development tools to facilitate the system implementation. Thus, application tools and programming languages that are suitable for the development of the proposed system are chosen carefully. Generally, the development environment is suited according to different development phases, which can be categorized into system design, system implementation and report writing process.

6.1.2 System Development

The basic tools used for the system development were:

- Microsoft's Apache HTTP Server (web server)
- MySQL (database management system)
- PHP development (server side programming language)
- JavaScript
- Microsoft Windows XP Professional Edition (operating system)
- Macromedia Dreamweaver MX (editor and interface creation tool)
- Adobe Photoshop CS (image editing tool)
- Microsoft Internet Explorer 6.0 (online browser)
- Macromedia Flash (Page Animation)

6.1 Development Environment

Specifies the environment on which the system will be implemented. The development environment on which the system is build on is important as it plays an important role in determining the implementation of the system.

6.1.1 <u>System Design</u>

Overview of the system was designed in the form of context diagram and data flow diagrams (DFD) in Chapter 5 before its actual implementation using Microsoft Visio. Although system design is clearly stated in Chapter 5, nevertheless, during the initial stage of system development, a number of considerations and adjustments were done to the initial system design in order to match actual needs and requirements.

6.1.2 <u>System Development</u>

The basic tools used for the system development were:-

- Microsoft's Apache web Server (web server)

- MySQL Server (database management system)

- PHP Server Pages (server side programming language)

- JavaScript

- Microsoft Windows XP Professional Edition (operating system)

- Macromedia Dreamweaver MX (editor and interface creation tool)

- Adobe Photoshop CS (image editing tool)

- Microsoft Internet Explorer 6.0 (testing browser)

- Macromedia Flash (Flash Animation)

6.1.3 <u>Report Writing</u>

Microsoft Word XP 2003 and Microsoft Visio were used for preparing this report. All the problems encountered, together with solutions found throughout the processes (starting from system implementation until system evaluation) were recorded as well as the results from system testing and system integration.

6.2 System Coding (Coding Approach, Style and Scripting Language)

6.2.1 Coding Approach

The selection for coding approach is essential for aiding in quality assurance of system projects. The top-down approach and the modular approach were selected for the coding purpose.

Top-down design means looking at the large picture of the system and then exploding it into smaller parts or subsystems. It allows the system analyst to ascertain overall system objectives first, as well as how they are best met in an overall system. Then the system analyst moves to divide the system into subsystems and the system requirements.

Once the top-down design approach is used, next, the modular approach can be very useful in programming. This approach involves breaking the programming into logical, manageable modules. It works well with top-down design because it emphasizes the interfaces between modules and does not neglect them in the system development phase. Each individual module should be functionally cohesive, so that it is changed with accomplishing only one function.

The top-down design is selected because it avoids the chaos of attempting to design system "all at once". Besides that, it also prevents the system analyst from getting so mired in detail that he lose sight of what the system is supposed to do.

The modular program design makes module easier to write and debug because they are virtually self-contained. Tracing an error in a module is less complicated, since a

problem in one module will not cause problems in others. Modules are also easier to

maintain since modification usually will be limited to a few modules and will not

spread over an entire program. Modules are also easier to grasp, since they are self-

contained subsystems. This means that a reader can pick up a code listing of a module
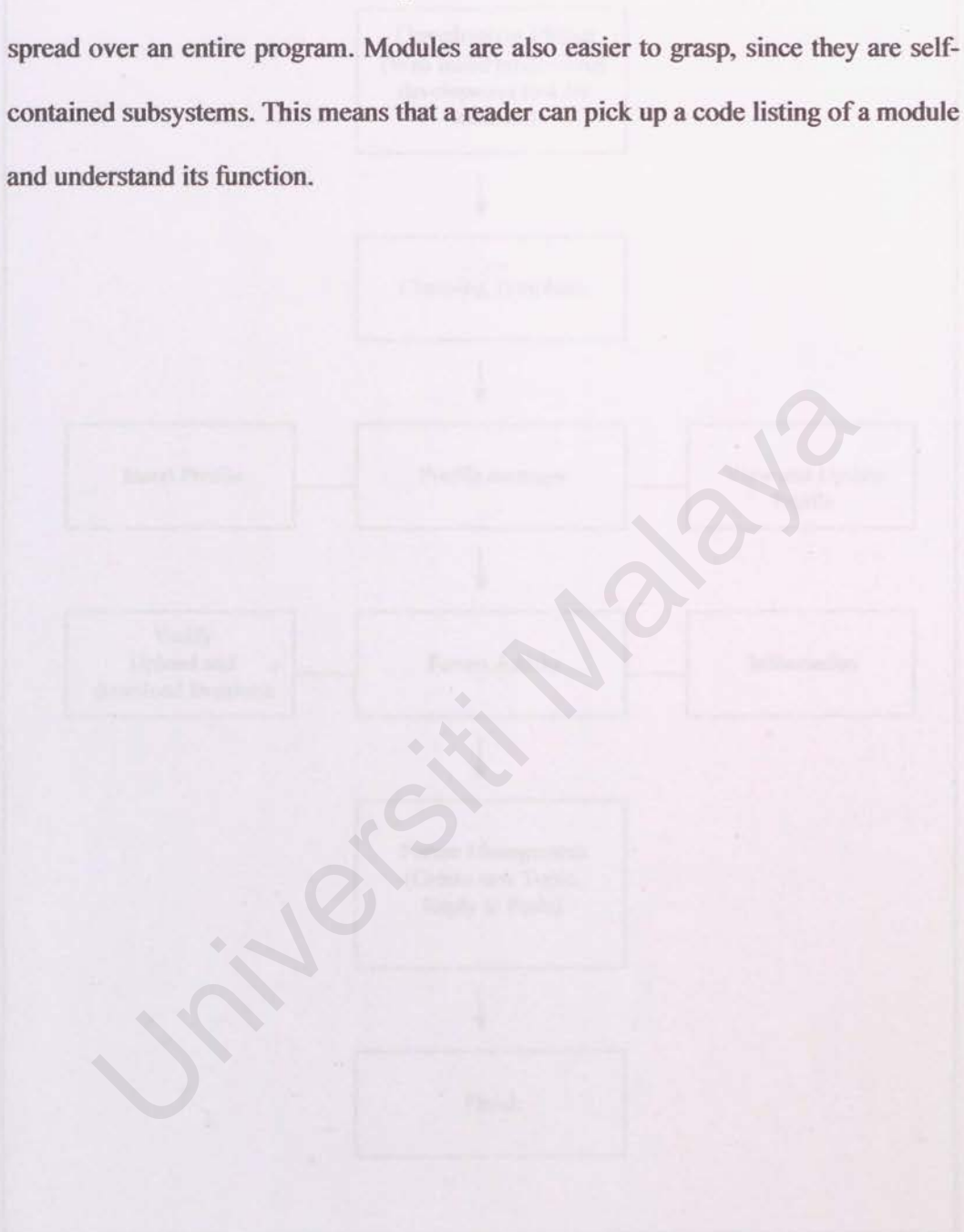
and understand its function.

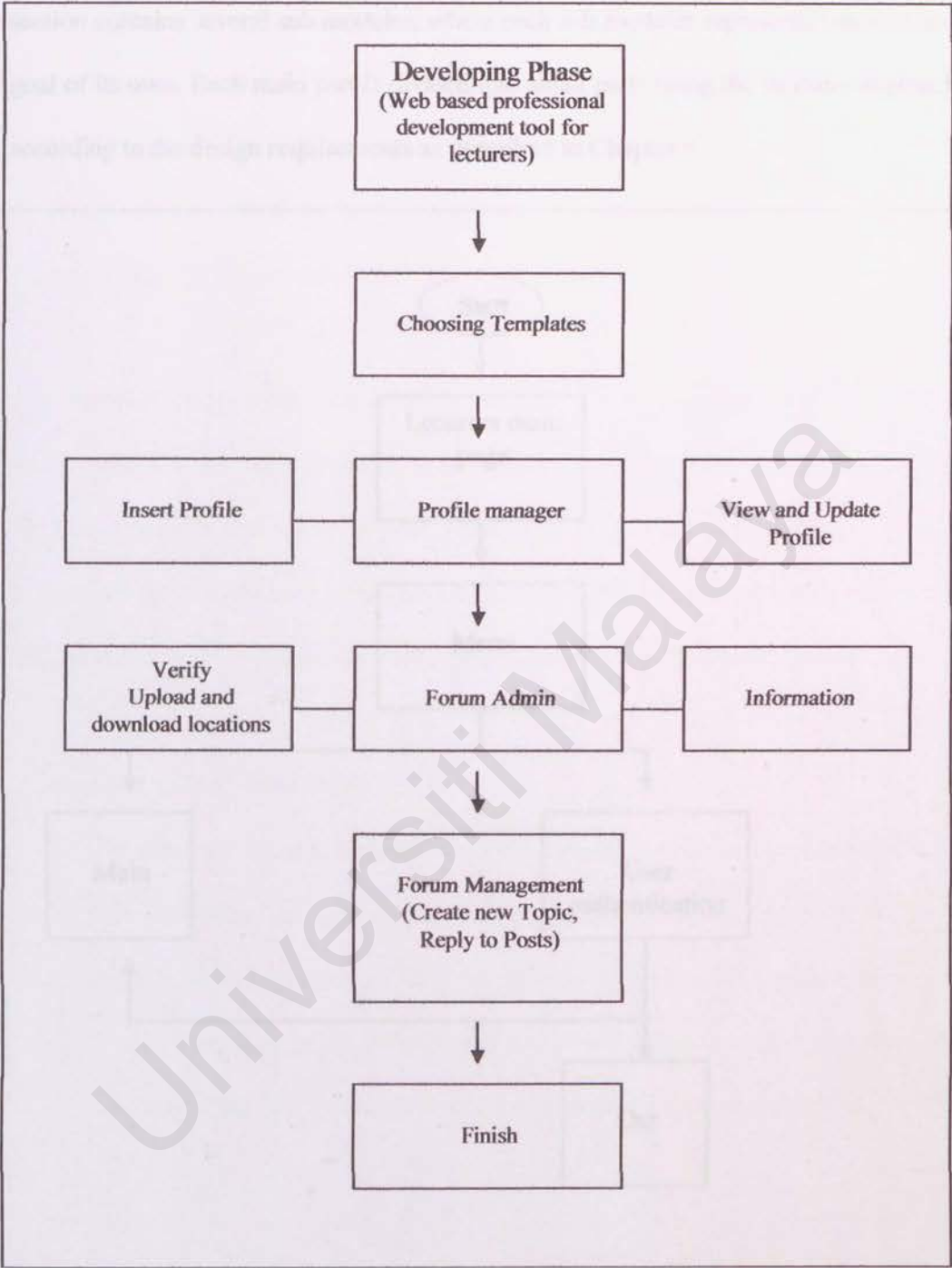As shown in Figure 6.1, the professional development for lecturers top-down design,


```
          ┌─────────────────────────┐
          │     Developing Phase    │
          │ (Web based professional │
          │   development tool for  │
          │        lecturers)       │
          └─────────────────────────┘
                      │
                      ▼
          ┌─────────────────────────┐
          │    Choosing Templates   │
          └─────────────────────────┘
                      │
                      ▼
┌──────────────┐  ┌─────────────────┐  ┌──────────────────┐
│Insert Profile│──│ Profile manager │──│ View and Update  │
│              │  │                 │  │     Profile      │
└──────────────┘  └─────────────────┘  └──────────────────┘
                          │
                          ▼
┌──────────────┐  ┌─────────────────┐  ┌──────────────────┐
│   Verify     │  │                 │  │                  │
│ Upload and   │──│   Forum Admin   │──│   Information    │
│download      │  │                 │  │                  │
│locations     │  │                 │  │                  │
└──────────────┘  └─────────────────┘  └──────────────────┘
                          │
                          ▼
                  ┌─────────────────┐
                  │Forum Management │
                  │(Create new Topic│
                  │ Reply to Posts) │
                  └─────────────────┘
                          │
                          ▼
                  ┌─────────────────┐
                  │     Finish      │
                  └─────────────────┘
```

Diagram 6.1: Admin Phase Module

This system is divided into 2 sections that is the administrator and the student. Each section contains several sub modules, where each sub modules represents function and goal of its own. Each main part is divided into small parts using the modular approach according to the design requirements as described in Chapter 5.

```
                        ┌─────────────┐
                        │    Start    │
                        └──────┬──────┘
                               │
                               ▼
                     ┌───────────────────┐
                     │  Lecurers main    │
                     │       page        │
                     └─────────┬─────────┘
                               │
                               ▼
                     ┌───────────────────┐
                     │       Menu        │
                     └─────────┬─────────┘
                               │
            ┌──────────────────┴──────────────────┐
            │                                      │
            ▼                                      ▼
     ┌─────────────┐                      ┌─────────────────┐
     │    Main     │                      │      User       │
     │             │                      │ authentication  │
     └─────────────┘                      └────────┬────────┘
            ▲                                      │
            └──────────────────────────────────────
                               │
                               ▼
                        ┌─────────────┐
                        │     Out     │
                        └─────────────┘
```
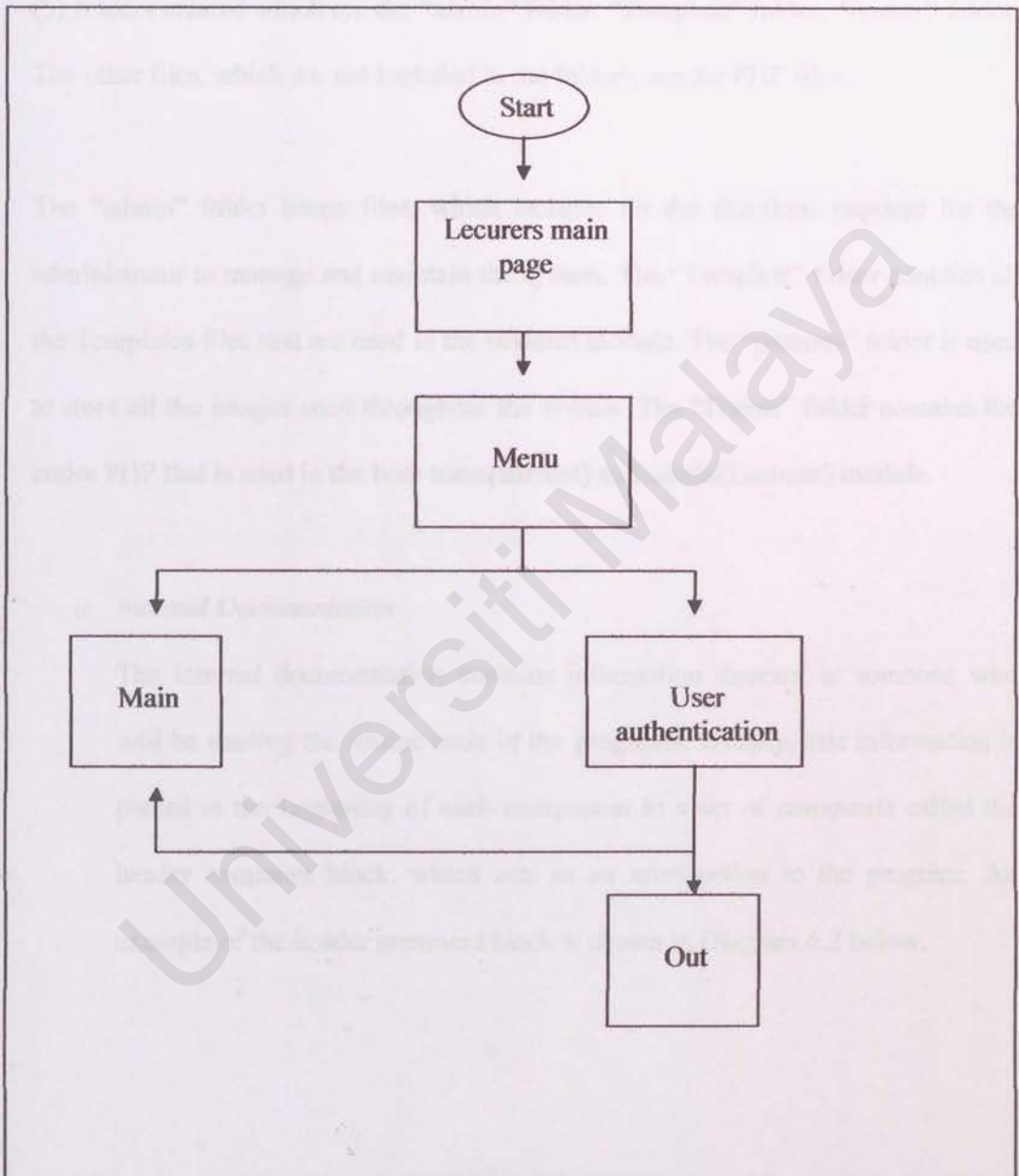
Diagram 6.2: User Phase Module

6.2.2 Coding Style

The coding styles are important to increase the code maintainability and readability. In the this system, the codes written in files are kept in different folders to make it a whole lot simpler for readers to identify the functions of each folder. There are five (3) folders created which are the "admin" folder, "Template" folder, "Forum" folder, The other files, which are not included in the folders, are the PHP files.

The "admin" folder keeps files, which includes all the functions required for the administrator to manage and maintain the system. The "Template" folder contains all the Templates files that are used in the students module. The "pictures" folder is used to store all the images used throughout the system. The "Forum" folder contains the entire PHP that is used in the both users(student) and admin(Lecturer) module.

a. *Internal Documentation*

The internal documentation contains information directed at someone who will be reading the source code of the programs. Usually, this information is placed at the beginning of each component in a set of comments called the header comment block, which acts as an introduction to the program. An example of the header comment block is shown in Diagram 6.2 below.

```
<!—
    Author       : Jayabalan sathiasulan
    Filename     : admin_profile.php
    Description  : This file displays the information about the
                   Lecturers profile
-->
```
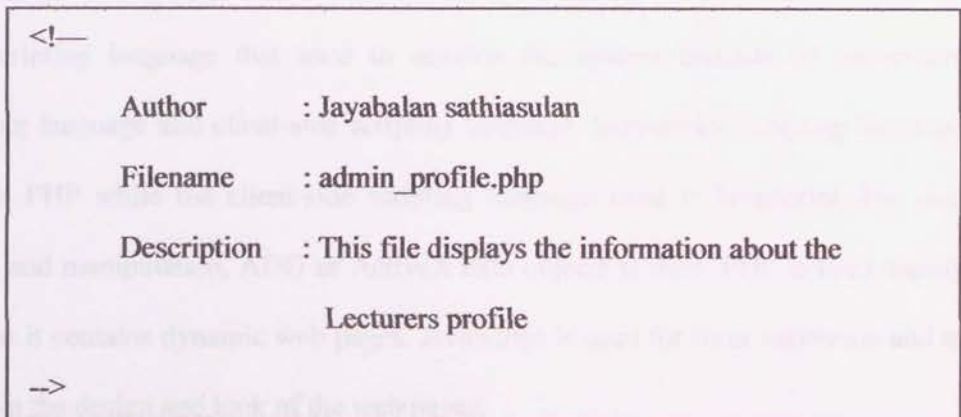
Diagram 6.3: Header comment block

b. *Layout*

The system has used tables to control the different parts of the web pages in the coding during the development of the system. It is easier to control and create dynamic content using this method. Layout structure of the system website is shown in Diagram 6.3 below.

Header

Menu

Content
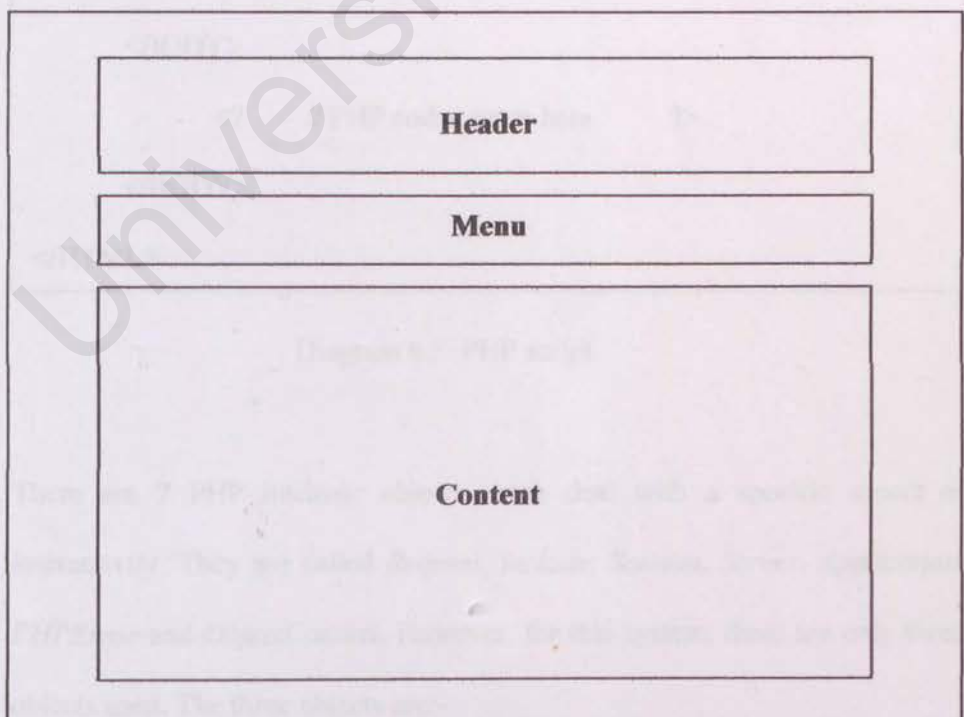
Diagram 6.4: layout structure

The scripting language that used to develop the system consists of server-side scripting language and client-side scripting language. Server-side scripting language used is PHP while the client-side scripting language used is JavaScript. For data access and manipulation, ADO or ActiveX data objects is used. PHP is used mainly because it contains dynamic web pages. JavaScript is used for form validation and to improve the design and look of the web pages.

a. *PHP*

PHP is a HTML embedded scripting language, which means it can be used together with HTML. In HTML, PHP script is enclosed with special PHP tags. It begins with "<?" and ends with "?>". An example of an PHP script is shown in Diagram 6.4 below.

```
<HTML>

    <BODY>

        <?    // PHP codes starts here      ?>

    </BODY>

</HTML>
```
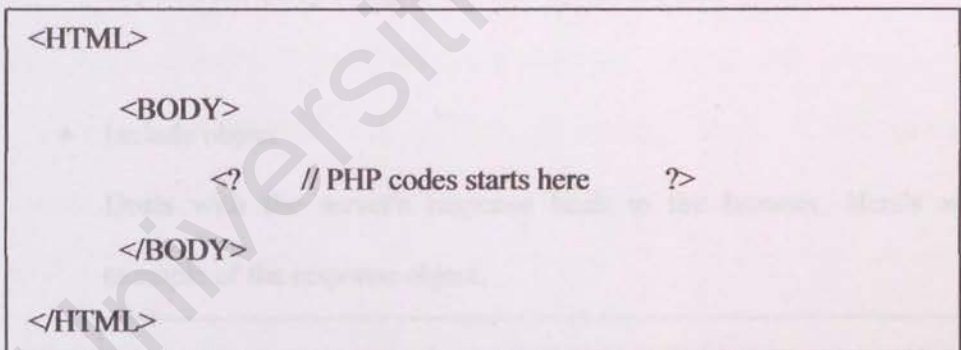
Diagram 6.5: PHP script

There are 7 PHP intrinsic objects, each deal with a specific aspect of interactivity. They are called *Request, include, Session, Server, Application, PHPError* and *ObjectContext*. However, for this system, there are only three objects used. The three objects are:-

- **Request object**

  Used to deal with a request that user makes. 'The request' might be made in the form of input from an HTML form, or just by typing in the URL. An example of the request object is shown in diagram 6.5.

  ```
  strName = Request.Form("Name")

  strMatric1 = Request.Form("Matric1")

  strMatric2 = Request.Form("Matric2")

  strUsername = strMatric1 & strMatric2
  ```

  Diagram 6.6: Example of the 'request' object

  As shown in figure 6.6, Request.Form("Name") means that the server requests the query string that is sent by the browser or user.

- **Include object**

  Deals with the server's response back to the browser. Here's an example of the response object.

  ```
  Set conn = Nothing

  Include("registered.php)"
  ```

  Diagram 6.7: Example of the 'include' object

  Include("registered.php)" means the web server is asked to redirect the page to the 'registered.php' webpage once the SQL queries are executed.

- Session object

  Used to represent the user's session and to store information about that session. Example of a session object is shown in diagram 6.8 below.

  ```
  session("Username") = request.form("Username")
  session("Password") = request.form("Password")
  ```

  Diagram 6.8: Example of the 'session' object

  In this example, a session variable named "Username" is received from the login form. This example is used when the user signs-in into the system.

b. JavaScript

  JavaScript is also a HTML embedded scripting language and can be used together with HTML and PHP. In HTML, JavaScript is enclosed with special JavaScript tags. An example of the JavaScript tags is shown in Diagram 6.8.

  ```
  <script language = "JavaScript">
          //       JavaScript statements
  </script>
  ```

  Diagram 6.9: JavaScript tag

JavaScript is used frequently in the system. An example of JavaScript used to validate a form is shown in Diagram 6.10.

```
function input_verify(thisform) {

        if(thisform.Name.value==""||thisform.Name.value==null) {

                alert("Please enter your Name")

                thisform.Name.focus();

                return false;

        }

        if(thisform.Matric2.value==""||thisform.Matric2.value==null) {

                alert("Please complete your Username")

                thisform.Matric2.focus();

                return false;

        }

        if((thisform.Matric2.value.length)<6) {

                alert("The second column of the Username field must

                contain 6 characters");

                thisform.Matric2.focus();

                return false;

        }

        if(isNaN(thisform.Matric2.value)) {

                alert("The second column of the Username field must

                contain only digits");

                thisform.Matric2.focus();

                return false;

        }return true;

}
```

Diagram 6.10: An example of JavaScript validation function

c. ADO (ActiveX Data Object)

ADO enables data access, allows data to be viewed, manipulated and updated via web pages. The latest version is the ADO 2.6. ADO has five main objects. The sytem uses only two of it, which are:-

- Connection Object

  The link between the program (PHP files) and the data store.

  ```
  Set conn = Server.CreateObject("Adodb.Connection")
  conn.Open "Provider=MYSQLOLEDB.1;Password=jaya;;User
      ID=jaya;Initial Catalog=Thesis;Data
  ```

  Diagram 6.11: The connection object

  The 'conn.open' specifies the provider and the data source it needs to create a connection with the database. These codes will be in each PHP web pages that requires database usage.

- Recordset Object

  Contains all the data returned from specific action on the data store.

  ```
  rs2.Open "SELECT * FROM Profile_Form", conn
  sql03= "insert into ID_Form (Name,Username) values
      (""&strName&"","'&strUsername&"")"
  conn.execute sql03
  ```

  Diagram 6.12: The recordset object

In this example, the 'rs2' variable is a recordset object. There are two method associated with recordset object, which are insert and execute. insert is used when there are new records need to be entered into the database and execute is used to initiate the addition of data.

6.3 Summary

The system implementation/development of the system is presented in Chapter 6. This includes the coding approach, coding styles and scripting language used.

The coding approach assures the system's quality. The top-down approach and the modular approach were selected for the coding purpose. It is selected because it avoids the chaos of attempting to design system 'all at once' and prevents the system analyst from getting so mired in detail that he lose sight of what the system is supposed to do.

The coding style increases the system maintainability and readability. In this system, the codes written in files are kept in folders to make it a whole lot simpler for readers to identify.

Scripting languages that used to develop the system consists of server-side scripting language (PHP) and client-side scripting language (JavaScript).

Overall, the primary goal of this phase is to produce a simple, neat, useful and clear source code that will ease the processes of verification, debugging, testing, modification and further enhancement of the system.

The main function of system testing is to discover the existence of errors in a program and to judge whether the program is suitable to its task requirements. Nevertheless, testing can only detect the existence of errors; it cannot assure that there is no error in the program. Therefore, a more suitable approach must be chosen to reduce the possibility of errors in a program.

Bottom-up approach was adopted in system testing for system. Each module at the lowest level of the system hierarchy was tested individually, and then the tested modules would be integrated to the next testing module.

Chapter 7

System Testing

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CHAPTER 7: SYSTEM TESTING

The main function of system testing is to determine the presence of defects in a program and to judge whether the program is useable in real-life environment. Nevertheless, testing can only detect the presence of errors. It cannot assure that there is no error in the program. Therefore, a more suitable approach must be chosen to reduce the possibility of errors in a program.

Bottom-up approach was adopted in system testing for system. Each module at the lowest level of the system hierarchy was tested individually. Then, all the tested modules would be integrated to the next testing module.
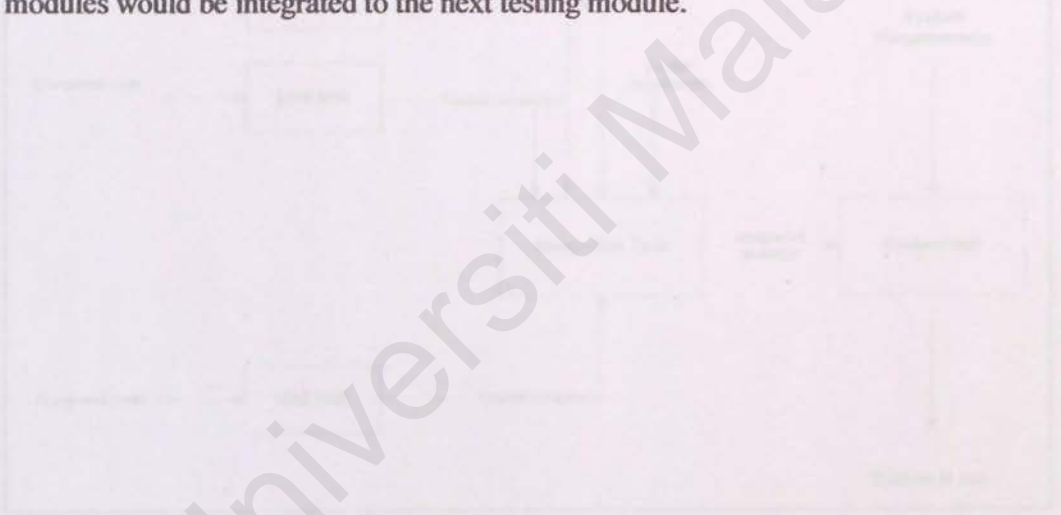
7.1 Testing Process

Testing takes place throughout the process of system implementation. Although testing is a tedious process, it is an essential series of steps that helps to assure the quality of the eventual system testing is done on many different levels at various intervals.

In developing a system, testing involves several stages as shown in Diagram 7.1.
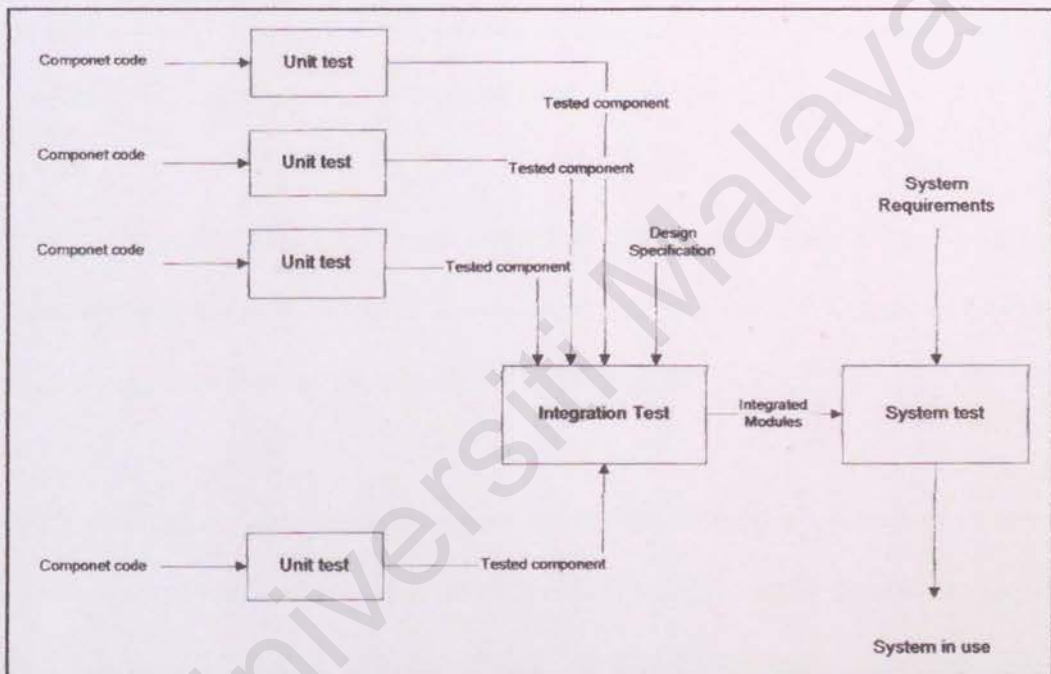
Diagram 7.1: Testing steps

First, unit testing/module testing was carried out in which each program component was tested on its own, isolated from the other components in the system.

When the collections of components have been unit tested, the next step was to ensure that the integration among the components were defined and handled properly.

Integration testing is the process of verifying that the system components work together as described in the system and program specifications.

Unit testing is the process to test the individual components to verify that they function properly. Each component was tested independently without the interaction from the other system components. Unit testing was performed concurrently with the development process.

Unit testing verifies that the components function properly with the types of input expected from studying the component's design. The internal data structures, logic and boundary conditions for the input and output data were tested.

To test a component, input data and conditions were fed in about the component to manipulate the data and the output is observed. The input is selected so that the output demonstrates something about the behavior of the code.

Both valid and invalid input were selected as test data. These data were then run to see if they returned satisfactory output results. Correct data can test the possible conditions and unexpected errors, such as variations in format and ranges. Therefore the program's response was checked for errors.

For example, the new patient registration form, the student's name, email address and password fields must not be left empty. Or else a pop up box will appear asking the student to enter the specific data that are left empty. This function was implemented using JavaScript. Testing using wrong date format was carried out to test whether the user can detect the valid date. Most of the form fields are left empty

7.2 Types of Testing

7.2.1 <u>Unit Testing</u>

Unit testing is the process to test the individual component to assure that they function properly. Each component was tested independently without the interference from the other system components. Unit testing was performed concurrently with the development process.

Unit testing verifies that the components functions properly with the types of input expected from studying the component's design. The internal data structures, logic and boundary conditions for the input and output data were tested.

To test a component, input data and conditions were chosen to allow the component to manipulate the data and the output is observed. The input is selected so that the output demonstrates something about the behavior of the code.

Both valid and invalid data were created to test data. These data were then run to see if base routines work and to catch errors. Created data also test the possible maximum and minimum values, as well as variations in formats and codes. Throughout the process, the output was checked for errors.

For example, the new forum registrations form. The student's name, email address and password fields must not be left empty. Or else, a pop up box will appear asking the student to enter the specific details that are left empty. This function was implemented using JavaScript. Testing using wrong data format was carried out to test whether the unit can detect the fault data. Some of the form fields are left empty

when submitting the form, and to check whether the system can detect the empty
fields.

Connection of unit to other pages/links is also tested here. When completing the new
student's registration form, the data is submitted and if the registration is successful, a
successful statement will appear. This is test by using a set of test data that is
correctly filled.

7.2.2 Module Testing

Module testing is performed without other system modules. A module consists of a
collection of dependent components to perform a particular task or function. Different
possible test cases are applied to the module and the test results would be verified.
Unusual results will be analyzed and they would help in debugging sub-modules in
order to produce the desired output.

For example, the administrator's profile module, which handles task regarding profile
like adding and editing announcements. Each task (add, edit) is tested to ensure it
works properly. For instance, when the administrator enter a the profile, the profile
should be seen in the main page. The same thing goes for the condition where the
profile edited.

7.2.3 Integration Testing

Integration testing is done to ensure that all components performed accurately without
problems when they are integrated. In this case, integration testing was done on all
the four (2) main modules, which are the Administrator, and Forum module as well as

all the sub-modules were integrated. Testing was done to ensure that when all the components are integrated, all functions worked smoothly and in this case, that each link and file could be called and opened successfully. Besides from that, integration testing here also ensured that all modules could access the same database for their respective usage.

7.2.4 System Testing

System testing is the phase where this system is uploaded and sub-systems are integrated to develop the entire system. This means that this testing is concerned with the fully functional operation of the system as proposed. The emphasis here is the interaction of various parts of the system when functions are uploaded into the server.

Testing in this phase is very wide, thus all modules and functionalities of each modules were tested. Among the main areas of concerned which was tested were the sign-in identification and verification for the users of the system, capability to access the database and display results, capability of the administrator to view and update important tables in the database via Graphical User Interface (GUI), ensuring there were no broken links, ensuring the resources and information were displayed efficiently and a correct GUI behavior.

7.2.5 Security Testing

Security testing is to verify the protection mechanism in the system against improper penetration. The system security is tested as three (3) different ways as described below:-

    a. "No caching"

        The browser will not cache every page of PHP files, in other words, the pages

will not be stored temporarily in the user's memory. This will prevent the user from accessing the system illegally or unauthorized, especially from the usage of 'back' or 'forward' button from the browser.

b. Using session

Every user will be given a session ID every time they sign-in with a valid sign-in username and password. Without this session ID, the user will not be able to access pages, since all session ID will be validated and verified at the beginning of every file, thus preventing unauthorized usage or system abuse.

c. Authorized access (Authentication process)

This is to ensure that the valid user using the functions provided by the system. Every time a user signs-in, the system will check whether the user exists and the password entered matches with the password in the database. In addition, every user is given a static access level to determine whether the user is a student or lecturer.

7.2.6 User Acceptance Testing

This is the final phase in the testing process. After this phase is completed, the would be ready for operational use. The were tested with the data supplied by the end-users, rather than using simulated test-data. This method is more efficient, as the users would be able to view and use the system and judge whether or not it's appropriate for their use. Acceptance testing also highlights the problems located in the requirements phased, where the systems features do not really meet the end-user's needs. The user

acceptance test is done to several users who are:-

    a.   **Student**

    b.   **Lecturer**

7.3 Results from Testing

Faculty of Computer Science and Information Technology lecturers and students were invited to preliminarily use the system. Their views were taken into consideration for changing certain functionalities in the system. The views that needed more time to implement will be considered for future enhancement and improvement.

The outcome of the testing phases uncovered minor drawbacks and defects of the system, which were later analyzed and fixed. Opinions and comments from students were also obtained in designing the user interface so that its user friendly. As a result, user friendly interfaces with useful and adequate functions were built. Certain errors, which were found in the interface and the system structure, which were not seen earlier, were identified after testing was done. After it was identified, the errors/defects occurred were fixed. Testing phase was performed carefully to ensure that the system developed met the objectives and requirements proposed.

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7.4 Changes made to the system

There are several changes made to the system after testing had been conducted. The changes includes:-

a. Some of the tables of the database (mainly for the forum), which is mentioned in Chapter 5 (System design). Changes had been made according to the functionality and how the system works. General table were added/deleted while some of the field name in the tables were added/changed.

b. Changes of system development tools and the database. At first, ASP server-side scripting language, IIS server and MS SQL database was suggested for the system but then it was changed to comply with current industrial standard, which is using PHP, Apache and MySQL Server and it provided for free. Therefore, the system now uses PHP, Apache server and MySQL server as database.

c. Changes had also been made to the interface design. Interface design has changed to be more of a user friendly and interactive and with flash animation website after testing was done.

7.5 Summary

Generally, the objectives of the project defined had been achieved. The system is able to handle the student's recruitments from a lecturers website.. Besides that, it can handle and maintain the database for the administrator. This system also provides safeguard to prevent the unauthorized users from accessing or modifying the system or the database.

The evaluation of this system is done partially taken from the system developers, and also collected from views of Faculty of Computer Science and Information Technology (FCSIT) lecturers, staffs and students. From these evaluations, the system strengths and weaknesses had been identified. From the current outlooks of the system, future enhancements are proposed to further enhance this system in the near future.

Chapter 8

Discussions and Conclusions

CHAPTER 8: DISCUSSIONS AND CONCLUSIONS

The evaluation of this system is concluded by views from the system developer, and also collected from views of Faculty of Computer Science and Information Technology (FCSIT) lecturers, staffs and students. From these evaluations, the systems strengths and weaknesses had been identified. From the current setbacks of the system, future enhancements are proposed to further improve this system in the near future.

8.1 Problems encountered and solution

8.1.1 Difficulties in choosing a programming language

In the market, there are several popular programming language used for web development. Choosing a suitable programming language was a critical process as all tools have their strengths and weaknesses.

In order to solve this problem, I've searched information from the internet and reference books to study on the strengths and weaknesses of each programming language. I have chosen PHP programming language that support all the requirements defined in my system. The information from the internet did help me in making up the decision. The main reason I choose PHP is because it is free and wide used as server pages.

8.1.2 Lack of knowledge

The real problem is to master PHP programming language in less than five (5) months and then build a system using it. Moreover lack of knowledge in Flash Action Script make the developing process late.

The solution for this problem is to get some reference books on PHP programming language and learn the codes that are coded by other programmers from the internet. Besides that, I have also joined some forum on the web to increase my knowledge on PHP and action Script. This problem had eventually decreased after I improved my knowledge and experience on writing PHP programs. Sometimes, I referred to the Internet to find some solutions to the problems I faced during the system development phase.

8.1.3 Linking to the database

During the system development, one of the problems which I encountered was trying to link the system to the database after the tables/databases were created. Using HTML codes and features from Macromedia Dreamweaver MX, I tried to link directly the pages to the databases which is created using MySQL server. Though not impossible, at the beginning, the task proved to be very tedious.

However, after learning from the PHP books that I have bought and understand the usage of codes that were done by other programmers from the Internet, I managed to link the pages to the database and allow the users to view their details, without much hassle. It was not an easy task getting PHP programming language to link to the database and presenting the data in the way preferred. It took some time, but the effort put in doing it did payoff eventually.

8.2 Evaluation by end users

Evaluations by end users were collected based on users comments and feedback after they have tested the system. Evaluation can be positive and negative. After the evaluation process was carried out, a better idea was gained on how the system can satisfy the users' needs, which part of the system was the most attractive part and which part of the system, which needs to be improved.

End users responses are important because the end users are the people who will interact with the system in the future. The end users can provide comments and suggestions that are useful to enhance and improve the functions provided by the system.

From the responses given by end users, modifications and improvement had been made to the system.

8.3 The strengths of the System

The system have certain strengths, which both users and code readers would find appealing. They are:-

a. Easy to use application

    Ease-of-use is a very important aspect in developing this system. The system provides easy-to-use application to students and Lecturers. With this system, lecturer create a website more efficient

b. Custom password validation

    A custom password authentication system using sessions was created to prevent unauthorized users from accessing the page if they do not have any permission to view. More importantly, the authorized users are prohibited from accessing the functionality, which is out of their privilege.

c. User-friendly Interface

    The interface were designed in a way where it is simple to use and understand, suits and attracts targeted user group which are the students and lecturers of FCSIT . It is designed with a blend of soft colors, easy to understand language and grammar/instructions. Even when filling in the user's detail, drop-down menus was created so that users do not need to do a lot of typing and achieve consistency.

d. Fast response time

The response time for applications is arguably fast. This is due to the pages not using "heavy" graphics, such as flash buttons.

8.4 The weakness of System

The system has several weaknesses. They are as described below:-

    a. When the student submit files, there is no direct response to lecturers.

    b. The Administrator's module could have included reports about the system.

    c. Lecturers have to create file links manually.

8.5 Future Enhancements

In the future, this can be enhanced in several perspectives as described below:-

a. The user interface could be more interactive and friendly. However, this would affect the system's performance, especially its response time.

b. The administrator section should include reports, charts and graphs in order to convert the data into more useful information.

8.6 Knowledge and experience gained

Upon completion of this project, a lot of knowledge and experiences were gained. The learning process took place from the beginning towards the end of this project.

I had learned a lot about the process of analyzing, designing, implementing, testing and evaluating a web-based system. These experiences are indeed very helpful and useful in future. Furthermore, during the development and implementation of this system, I have personally gained knowledge and experiences in using tools such as the programming language, which is PHP, the scripting language, flash action script the database (MySQL Server) and the designing tools such as Macromedia Dreamweaver MX, Flash and Adobe Photoshop CS.

I also understand how a bookmark functions and learned how to build it. Besides that, I have also learned the technology and skills in developing a project, the right manner of documenting the system and the right way to implement codes in a system.

8.7 Summary

The evaluation towards the system includes the problems triggered and the solutions, the system evaluation by end users, the system strengths, the system weaknesses, future enhancements and the knowledge and experiences gained throughout the development process.

The system strengths indicate the positive values of the system while the system's weaknesses indicate the limitations of the system. However, the system constraints can be improved in the future with enhancements to the system.

Structure of the system

text html css

screenshot.htm

Reg	inc	url	link	builder	doc	sep	tools	video	setup

css

xml

Appendix

The system contains a folder consisting some (many) PHP files. The folders are:-

a. *admin folder*

Admin is an abbreviation (short form) for Administrator. This folder contains all the files used by the administrator module.

b. *Template folder*

This folder contains all the PHP files for the template module.

c. *images folder*

This folder stores all the images which are used throughout the system.

d. *photos folder*

Directory of the system

The system contains 4 folder and a common (main) PHP files. The folders are:-

a. *admin folder*

   Admin is the abbreviation (short form) for Administrator. This folder contains all the PHP files for the administrator module.

b. *Template folder*

   This folder contains all the PHP files for the tempalte module.

c. *pictures folder*

   This folder stores all the images which are used throughout the system.

d. *forum folder*

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This folder contains all the PHP files for the forum module.

As stated previously, there are two (2) types of users of the system. They are:-

a. Student

b. Lecturers

Therefore, the user manual will be explained thoroughly according to the type of users.

Setting up system on local personal computer (PC)

1. First, make sure that your PC has Microsoft's Apache Installed and enabled. If Apache is not installed, you can download at Apache site (www.apache.org).

2. This system uses MySQL Server as its database. So, you will have to make sure that the database has been started. If database is not installed, please install the database (www.mysql.org) and set the username as 'jaya' and password as 'jaya'. The connection of the database is shown in the diagram below:-

```
<?
$conn = mysql_connect("localhost", "jaya", "jaya");
mysql_select_db("Thesis",$conn);

?>
```

3. Copy the Thesis folder from the CD provided and paste the folder into your IIS file directory. By default, the directory is:-

C:\Program Files\Apache Group\Apache\htdocs\Thesis

4. Finally, open your web browser (Eg: Internet Explorer) and type:-

   http://localhost/Thesis/admin/index.php (admin site)

   http://localhost/Thesis/main.php (users site)

5. Your browser should be displaying the main page of the system.

User Manual
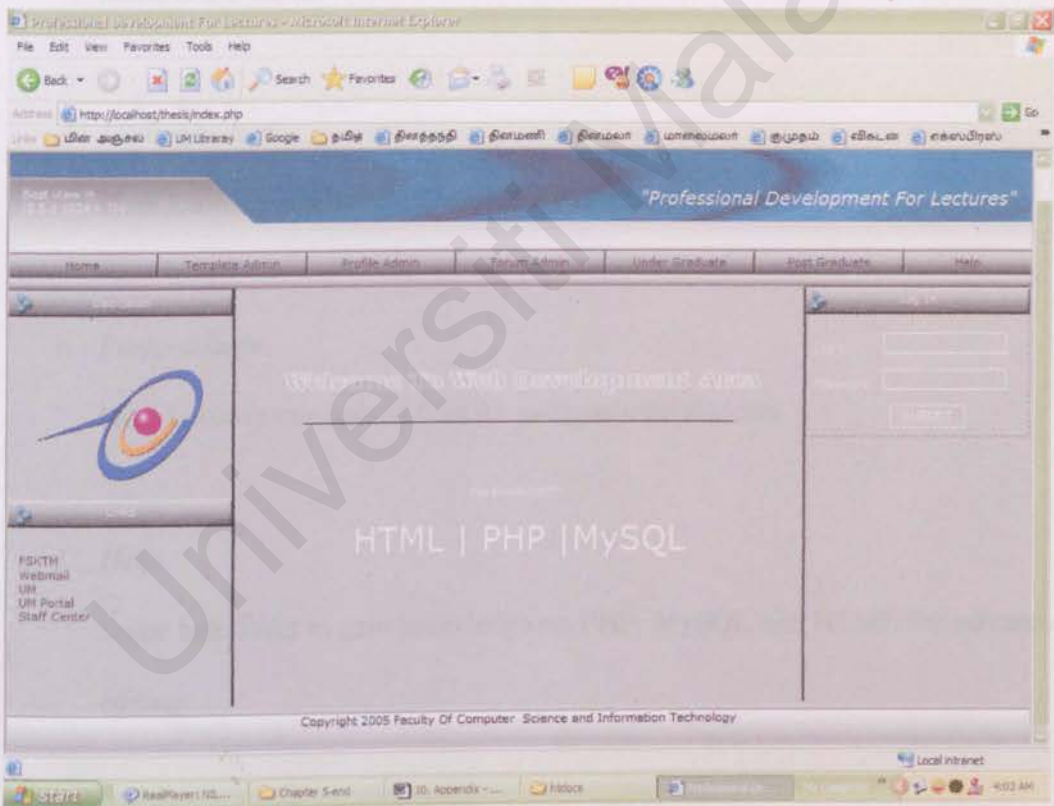
The home page (index.php)

This is the first page you will see once the admin open the system. This page provides

the module for signing in into your account and also gives the entire user the ability to

view and edit the profile. There are six (6) links provided in the main page. They are:-

a. *Home*

Brings back the user to the main page.

b. *Template admin*

Here the lecturer (administrator) view insert, update the template

c. *Forum Admin*

A click on the 'Forum' button on the main page will allow the user to get to the forum page. The layout management occur here to change the forum interface and change button and colors. The lecturers have to enter the course name and code here

d. *Undergraduate*

Here Lecturer can upload files for Undergraduate students

e. *Postgraduate*

Here Lecturer can upload files for postgraduate students

f. *Help*

Some help links to gain knowledge on PHP, MySQL and HTML foe advance editing.

Lectuere will also be able to change their password by clicking the *Change Password* link which is located beside the 'Sign In' button. A pop-up window will appear and the user needs to follow the simple instructions in order to change their password.

The register page (register.php)

The forum main page
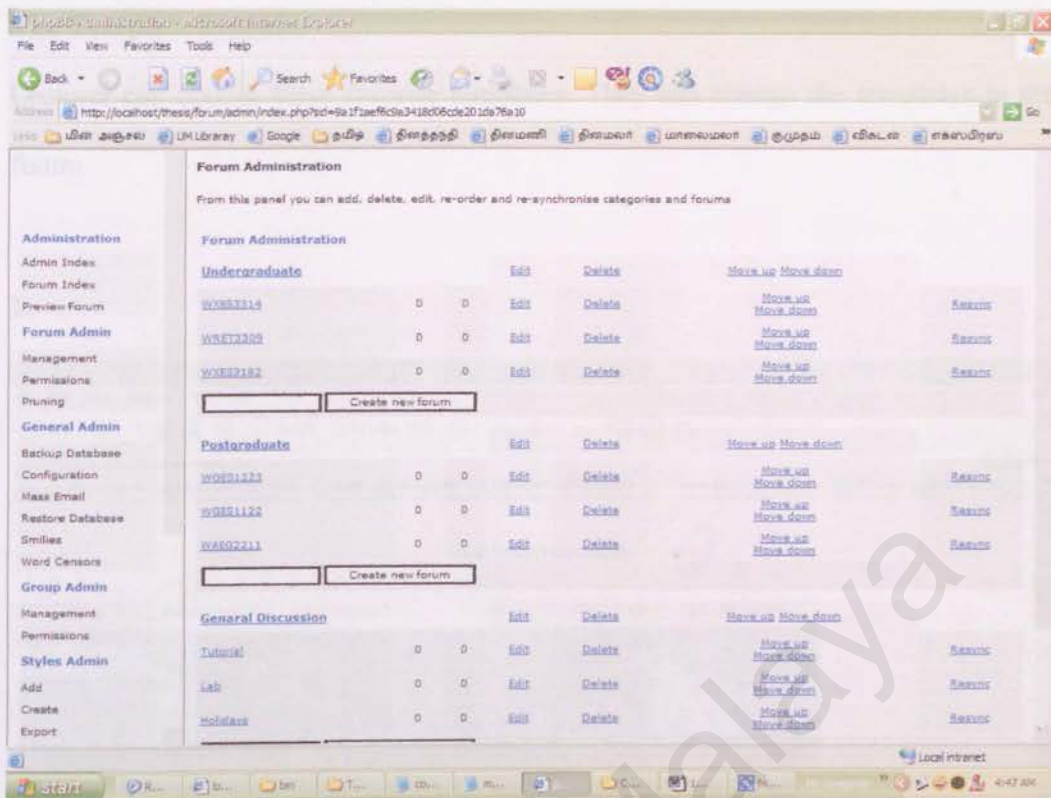
Forum Admin Main Page

The Template Modules

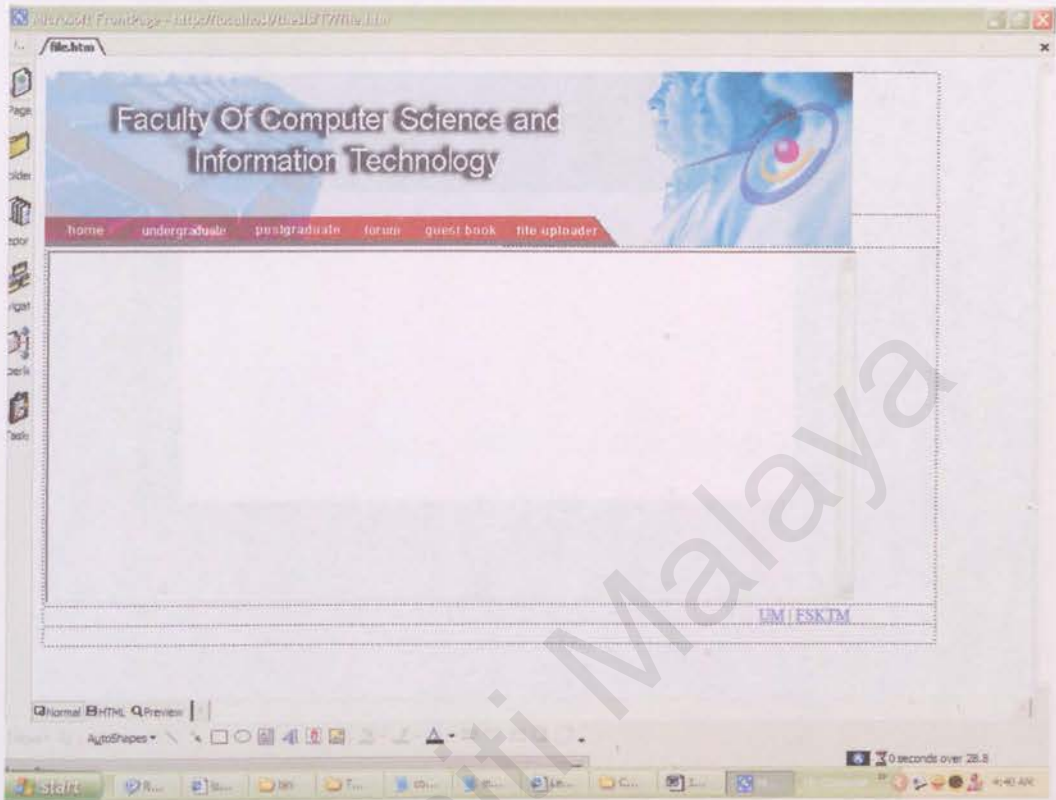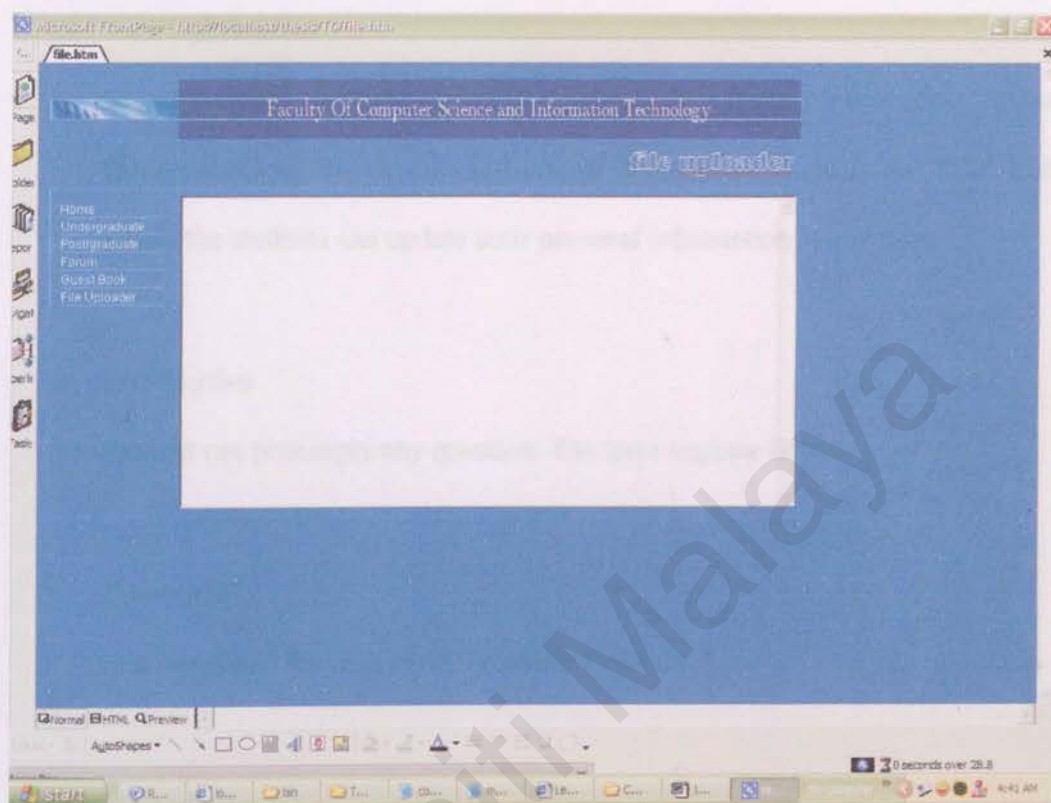Lecturer can choose there favorite templates. They can change the templates in the future

1.

2.

3.

5.

6.

7. the student module has 4 main functions. They are:

Student also can submit files
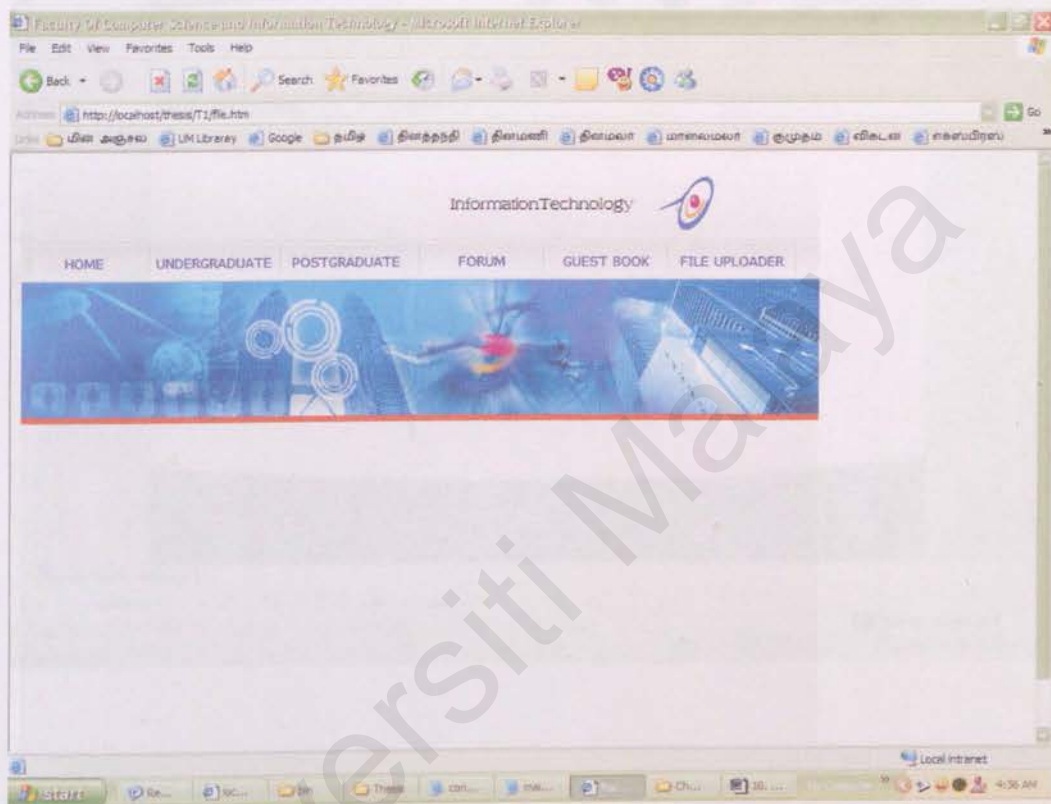
Student Module

The student module has 4 main functions. They are:-

a. *View Information*

The students will be able to view the latest information about themselves.,lecturers profile and course iformation. There is an 'Edit' link where the students can update their personal information at any time.

b. *Post Replies*

Student can post reply any question. The have register first.

c. *Download*

Can download the files which lecturers Uploads

d. *Upload Files*

Student also can upload files.

Faculty Of Computer Science & InformationTechnology

| HOME | UNDERGRADUATE | POSTGRADUATE | FORUM | GUEST BOOK | FILE UPLOADER |

>HOME

UM|FSKTM

ere.*erere*
Room ere
Faculty of Computer Science &
Information Technology,
Universiti Malaya,
50603, Kuala Lumpur,
Malaysia
erer
erre

ormal ⊟HTML Q Preview
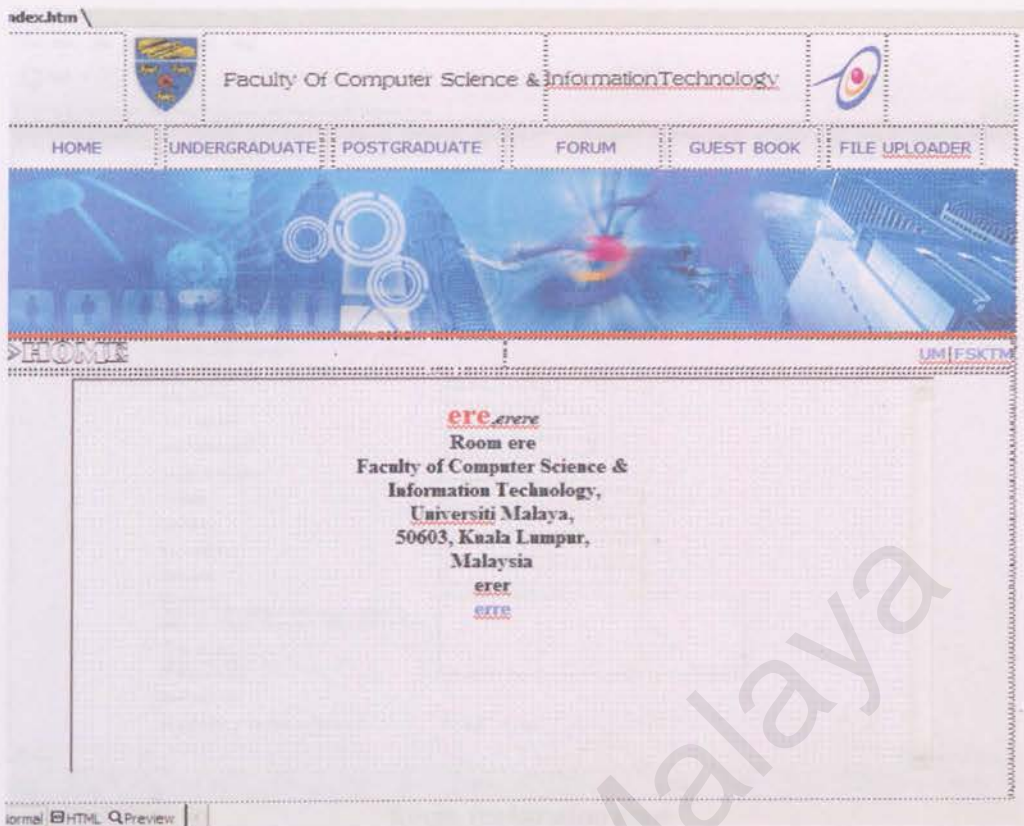
The students main page (index.html)

forum registration page

post topic page

Guest Book module

Forum module is an additional module created to viewers post comments and feedback about the page

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