



University Of Malaya

FSKTM
Landscape Committee Homepage

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A Final Year Project Report
WXES3182

Submitted to the
Faculty Computer Science and Information Technology
University of Malaya

In Partial Fulfillment of the Requirement For
The Degree of
Bachelor of Computer Science
Session 2001/2002

Submission Date (21 January 2002)



Abstract

FSKTM Landscape Committee Homepage is a web-based application. It aims at providing web application to assist the operation and management of FSKTM Landscape Committee. It also acts as a communication channel between the faculty students and the landscape committee members. This project is aims to overcome that no such web site for FSKTM Landscape Committee to provide up-to-date information.

FSKTM Landscape Committee Homepage is a stand-alone system. It will be developed on the Microsoft Windows 2000 platform. Internet Information Server will be used as web server while Macromedia Dreamweaver Ultradev 4.0 will be used as a tool for designing dynamic web application for this project.

This project is handle by one undergraduate student only. An introductory description about this thesis project consists of project definition, objectives and scope has been discussed in this report.

Beside that, some survey and literatures related to this thesis project has been analyzed and carried out. Justification on the methodology using for this project and the requirement analysis of this project has been discussed briefly in this report too. In addition, this report also discussed briefly about the system design, system implementation, system testing and system evaluation. User manual also attach at the back of this report.



Acknowledgement

First and foremost, I would like to express my greatest gratitude to my supervisor, Puan Salimah Mokhtar for giving me an opportunity to join this project. Her generous guidance and supervision throughout the project is deeply appreciated.

I also wish to express my greatest gratitude to my moderator, Mr. Teh Ying Wah for his assistance and tolerance. His suggestion and ideas to further enhance this project is deeply appreciated.

I must not forget to thanks my course mates, for their generous sharing of knowledge and support. Thanks to my senior, Miss Chang Pick Yin for her comments and advice throughout this project.

Last but not least, I would like to say thanks to my parents and brothers who have gave me constant support and guidance throughout my life.



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Chapter 1

Introduction

Chapter 1 Introduction

This chapter gives an introductory description about this thesis project. Statement of problem, study objectives, its rationale and constraints are addressed. Significance of this thesis project and its potential contributions are described:

1.1 Project Definition

FSKTM Landscape Committee Homepage is a web-based application, which contains a server site (including database server), web server and client server. It uses the Internet/Intranet and browser to present data and retrieve input. FSKTM Landscape Committee Homepage enables users to access the application from any location at any time, as long as the users have access to the internet/intranet.

FSKTM Landscape Committee Homepage is aimed at developing a web application for FSKTM Landscape Committee and students. It is also acts as a communication channel between faculty students and the Landscape Committee members.

Major sections of the homepage are Introduction, Link, Notice Board, Hit counter, Guest book, Forum Discussion and Suggestion Board.

1.2 Project Objectives

In order to develop this thesis project, the objectives of the system must be well understood to ensure that the outcome of the project meet its objective. In general, this



web site is aimed to develop an integrated and well-organized web site for FSKTM Landscape Committee besides to shorten the logical distance of global communication, interaction and information exchange through the use of Internet. With this objective, information can be obtained at any time and from anywhere to save users' time. It is also aimed at providing an effective and efficient communication facility to assist the operation and management of the Landscape Committee.

This thesis project also aims to provide a dynamic web site by providing online-content update function for Landscape Committee members. As a result, up-to-date and adequate information could be disseminated to all the users. As a faculty that produces computer professional, a more innovative and creative approach has been created to introduce FSKTM Landscape Committee Homepage.

Specifically, the objectives of the project can be divided into sections:

- i. To provide the basic knowledge and guideline of the landscape architecture to all users of this system.
- ii. To establish a homepage that can use for multi-purpose.
- iii. Enable the lecturer and student to share their knowledge and experience in the field of landscape designing.
- iv. FSKTM Landscape Committee can inform all activities to be carrying out to the lecturer and student in an easier and faster way.
- v. Transmit the information in an interactive, efficiency, user-friendly form.

1.3 Motivation

This project is entitled, its objectives is develop a integrated and dynamic web site for FSKTM Landscape Committee as there are not any established web site yet for Landscape Committee. Many function have been provided such as notice board, discussion forum, landscape photo, web bulletin board, hit counter, guest book, linking and so on for this web site.

1.4 Project Expectation

FSKTM Landscape Committee Homepage is aimed at providing an effective and efficient communication facility to assist the operation and management of the Landscape Committee of the faculty. With the establishment of FSKTM Landscape Committee Homepage, well-organized and integrated system will be provided. Up-to-date information could be disseminated to all faculty students and landscape committee members.

Features such as web bulletin board, notice board, discussion forum are included in FSKTM Landscape Committee Homepage. With the establishment of this project, a creative and innovative web site will be provided.

1.5 Project Scope

The overall scope of this project is to focus on developing an web application which containing server sites (including database server), web server and client site that provide

information about landscape design, notice board, guest book system, faculty landscape photo and linking for FSKTM Landscape Committee members and students.

1.6 Project Development Life Cycle

A development life cycle is used in order to produce a system that satisfies the needs of the end users. The development life cycle of FSKTM Landscape Committee web site consists of 5 phases, which are Requirement Analysis, Design, Build/Coding, Testing and Documentation as depicted in figure 1.1.

The development life cycle of FSKTM Landscape Committee web site begins at the phase of requirement analysis. The requirement of the entire system are analyzed and specified to fulfill the end users' requirement specifications.

Design is the second phase of Development Life Cycle. This phase is including software design and system design. Design is the first step in the process of transforming the requirement into close representation of the eventual functional software. It also includes lower level work such as detailed specification of data structure and algorithms with the identified components. Software design is a process of devising and documenting the overall architecture for a software system. It includes identifying the major components of the system, specifying what they are to accomplish and establishing the interfaces among the components. The system developers design the interfaces of the system and databases design to accomplish the System Design.



The next phase will be the coding phase where the design specifications will be translated into source codes that the computer can process.

After the coding phase has been completed, a software system is put through the testing phase before it can be put into operation. Software testing embraces a wide range of activities that not only support the assessment of quality but also help to achieve and preserve software quality.

At the last phase, various forms of documents are created. It aims to prepare guidance for user to understand the concept and functionality of each feature in the application. Before moving into the next phase, it is necessary to go through a review process. This will help you to detect the errors that may occur in each phase.

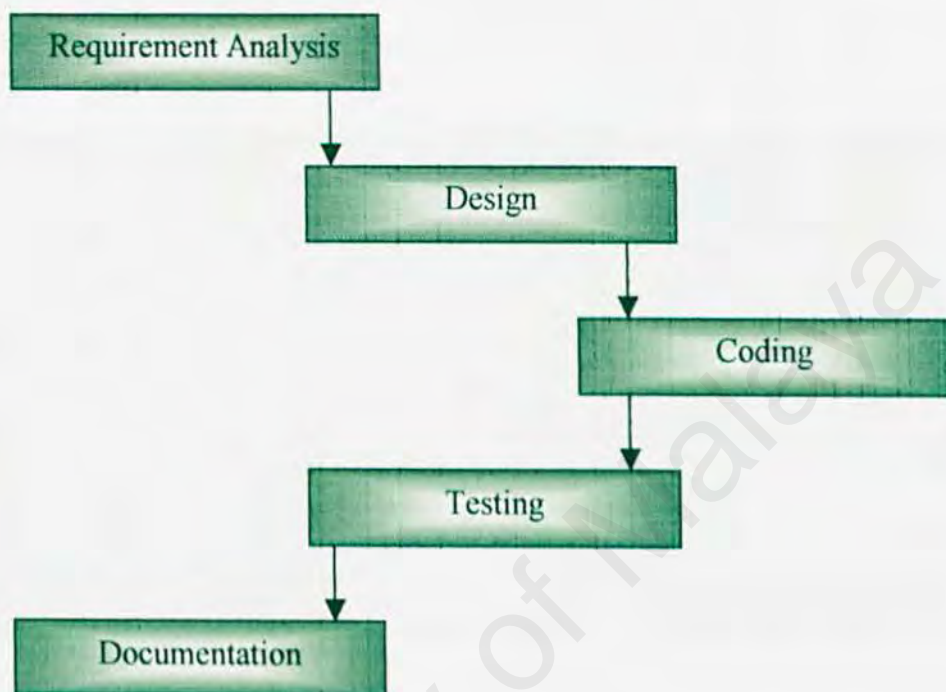


Figure 1.1 Project Development Life Cycle

1.7 Project Schedule

In order to achieve the project objectives, a project schedule was determined to manage the time and tasks that must be accomplished with the development phases. Figure 1.2 shows the project schedule. With the proper project schedule planning, it will ensure that the project development process works out smoothly and leads to success.

ID	Task Name	Start	Finish	Duration	Q3 01			Q4 01			Q1 02
					Jul	Aug	Sep	Oct	Nov	Dec	Jan
1	Literature Review	6/18/01	6/30/01	13d	■						
2	System Analysis	7/1/01	7/18/01	18d	■						
3	System Design	7/19/01	8/17/01	30d		■					
4	Coding	11/1/01	11/30/01	30d					■		
5	Unit Testing	12/1/01	1/4/02	35d						■	
6	Integration Testing	1/5/02	1/15/02	11d							■
7	System Testing	1/16/02	1/28/02	13d							■
8	Documentation	6/18/01	1/30/02	227d	■	■	■	■	■	■	■

Figure 1.2 Project Schedule

* September 2001- Final examination for first semester 2001/2002

* October 2001- Holiday: Studying ASP, SQL Server, VBScript and so on.

1.8 Summary

After the project objectives and the scope are well understood, some researches have to be carried out to ensure the system run smoothly. Next chapter considers some literatures related to this thesis project.

Chapter 2

Literature Review

Chapter 2 Literature Review

This chapter will discuss briefly about the literature and that have been done. These literatures have been done through some finding such as article available from Internet, senior's thesis and etc. Analysis on these materials also has been done.

2.1 Landscape Design and Landscape Architecture

Landscape design is the conscious process of managing, planning, and physically changing the landscape. It involves the physical management of the landscape and the design places. Places are the mental constructs that occur in the viewer's mind, through the synergism of specific settings, previous experience, and the individual's mental state.

Landscape Architecture is a profession whose primary societal role is the synergism of art and science for the management, planning, and design of the entire physical and cultural landscape, including its vestal wilderness and its growing urbaneness. This text recognizes that the profession is changing, and develops the case for a redefined societal role for landscape architecture as promoting human as well as ecological health and well being. In so doing, it develops the case landscape to be sustainability, that is, the ability of a landscape to be sustained without resource depletion or degradation. It also speaks for place-making, the design of strong positive placeness, which is the ability of a place to evoke strong desirable mental images and to be remembered over extended periods of time [1].

2.2 Internet

The Internet is a public network of computers that communicate using a communications protocol called Terminal Control Program / Internet Protocol (TCP/IP). This network was created by the Advanced Research Projects Agency (ARPA) of the U.S. armed services in the 1960s. Initially, it was called ARPANET, and it connected major computing centers at military, university, and research institutions. Over time, more and more organizations joined the network, and it became desirable for nonresearch, commercially oriented organizations to join as well. In 1984, the military split its organizations off from ARPANET to form MILNET. ARPANET continued to grow in popularity with universities, research, and commercial organizations. Today it is referred to as the Internet. MILNET and the Internet are still connected, however.

A number of standard services are provided on the Internet. Any Internet user has access to Internet mail services for E-mail. Services for public news-groups are provided by NetNews, an Internet facility that allows users with common interests to conduct public discussions with one another. Other services include Telnet, which allows an Internet user to sign on to a remote computer, and FTP, which allows users to send or retrieve files from remote computers [5].

2.2.1 The World Wide Web (WWW)

In 1989, Tim Berners-Lee of the European Particle Physics Laboratory (CERN) began work on a project that would enable researchers to share their work over the Internet. This project led to the development of the hypertext transfer protocol (HTTP), which is a

TCP/IP-based protocol that enables the sharing of documents with embedded links to other documents over a TCP/IP network [5].

Berners-Lee and others proposed using a standard set of codes to mark text in documents both to indicate heading, emphasis, italics, and the like and also to indicate links to other documents. This language, called hypertext markup language (HTML), was a subset of an already accepted publishing industry markup language called the standard generalized markup language (SGML).

In 1993, the National Center for Supercomputing Applications (NCSA) developed Mosaic, which has a client application for reading HTML (and other) documents. Later that year, Marc Andresen of NCSA proposed extending HTML to add the capability to add images and other types of media to HTML documents. Later Andresen and others left NCSA to form Netscape Communicator, where they developed the Netscape Navigator. Today Mosaic, Netscape Navigator, and Microsoft's Internet Explorer are the most widely used Internet browsers.

Internet servers are programs that provide services in response to HTML commands. While many Internet server programs exist. The most popular are Apache, Netscape Server, and Microsoft's IIS.

The result of these products and technologies was the creation of a dynamic network of hypertext documents distributed across thousands of computers. This network of documents is called the **World Wide Web**.

2.3 Client / Server Software Architecture

The client/server software architecture is a versatile, message-based and modular infrastructure that is intended to improve usability, flexibility, interoperability, and scalability as compared to centralized, mainframe, time sharing computing.

A client is defined as a requester of services and a server is defined as the provider of services. A single machine can be both a client and a server depending on the software configuration [6]. There are a few client / server software architecture that are available currently, which are mainframe architecture, file-sharing architecture and client/server architecture. However, the main point of this project will focus on the client/server architecture.

2.3.1 Web Client / Server Architectures

Client / Server Architecture may be used on LANs, WANs, and on the web. The main characteristic that these three somewhat diverse uses share is a division of the workload between the server and the client. In each case, the client computer typically request services, including printing, information retrieval and database access. The partner in these activities is the server, which is responsible of processing the client's requests. Nearly always, the client does very little work.

While the client's workload is light, the server's workload is not. Beside receiving and interpreting requests from the client, the server must locate information, reprocess it, and request initialization of resources supplied by other applications running on dedicated computers under the server's control. That workload sharing arrangement is why servers generally must be beefy, expensive computers with lots of disk capacity, fault-tolerant processors, and ample memory.

In contrast to the server, clients require no more capability than is found on any ordinary personal computer. The term thin client is a popular description of a client's relatively low workload, compared with that of a server. Thin clients, which are disk-less, are usually found on local area networks connected to the Internet [3].

2.3.2 Web Client / Server Communication

The division of labor between Web clients and Web servers is quite distinct. The Web Client - computer at the office or home – requests information from a particular Web server on a distant computer. Using the Internet as the transportation medium, the request is formulated into an HTTP request and sent to the target computer - the server. A moment later, when the target server receives the request, it retrieves the pages or other information that the server requested, formulates it as an HTML-formatted page, and sends it back to the requester client via the Internet. When the requested information, an HTML page in this instance, arrives at the client computer, the Web browser software determines that the information is an HTML page. It displays then page on the client machine according to the directions laid out in the page's HTML code. Repeatedly, this

same general scenario is carried out as the client requests, the server obliges and responds, and the client display the result. Sometimes, a simple client request results in dozens or even hundreds of separate server responses to locate and deliver information.

A web page containing many graphics and other objects can be slow to display, because each element requires a separate request and response. This division of labor between client and server is fixed and well established. Neither the client nor the server can deviate from its assigned responsibilities. However, the exact way a server or client carried out its respective duties can vary as discussed in the following section [3].

2.3.2.1 Two-Tier Client / Server

Two tier software architectures were developed in the 1980s from the file server software architecture design. The two-tier architecture is intended to improve usability by supporting a forms-based, user-friendly interface. The two-tier architecture improves scalability by accommodating up to 100 users (file server architectures only accommodate a dozen users), and improves flexibility by allowing data to be shared, usually within a homogeneous environment. The two-tier architecture requires minimal operator intervention, and is frequently used in non-complex, non-time critical information processing systems. Two tier architectures consist of three components distributed in two layers: client (requester of services) and server (provider of services) [8]. The three components are

1. User System Interface (such as session, text input, dialog, and display management services)
2. Processing Management (such as process development, process enactment, process monitoring, and process resource services)
3. Database Management (such as data and file services)

The two-tier design allocates the user system interface exclusively to the client. It places database management on the server and splits the processing management between client and server, creating two layers. Figure 2.1 depicts the two-tier software architecture [7].

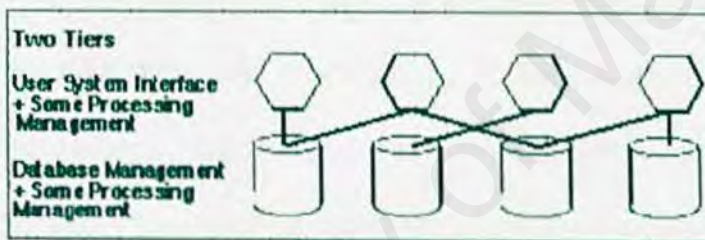


Figure 2.1: Two-Tier Client Server Architecture Design

In general, the user system interface client invokes services from the database management server. In many two-tier designs, most of the application portion of processing is in the client environment. The database management server usually provides the portion of the processing related to accessing data (often implemented in store procedures). Clients commonly communicate with the server through SQL statements or a call-level interface. It should be noted that connectivity between tiers could be dynamically changed depending upon the user's request for data and services.

As compared to the file server software architecture (that also supports distributed systems), the two-tier architecture improves flexibility and scalability by allocating the two tiers over the computer network. The two-tier improves usability (compared to the file sever software architecture) because it makes it easier to provide a customized user system interface. It is possible for a server to function as a client to a different server- in hierarchical client/server architecture. This is known as a chained two-tier architecture design.

Two tier software architectures are used extensively in non-time critical information processing where management and operations of the system are not complex. This design is used frequently in decision support systems where the transaction load is light. Two tier software architectures require minimal operator intervention. The two tier architecture works well in relatively homogeneous environments with processing rules (business rules) that do not change very often and when workgroup size is expected to be fewer than 100 users, such as in small businesses [7]. A more detail of two-tier architecture function is shown at the figure below.

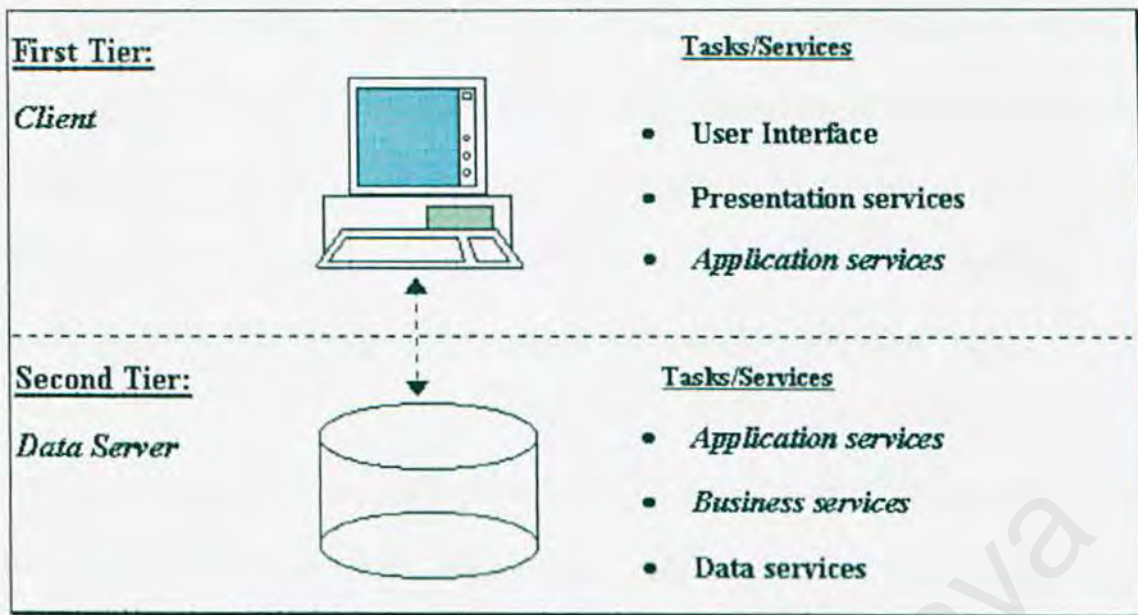


Figure 2.2 Two-Tier Client / Server

2.3.2.2 Three-Tier Client/Server

The three-tier software architecture emerged in the 1990s to overcome the limitations of the two-tier architecture. The third tier (middle tier server) is between the user interface (client) and the data management (server) components. This middle tier provides process management where business logic and rules are executed and can accommodate hundreds of users (as compared to only 100 users with the two tier architecture) by providing functions such as queuing, application execution, and database staging. The three tier architecture is used when an effective distributed client/server design is needed that provides (when compared to the two tier) increased performance, flexibility, maintainability, reusability, scalability, while hiding the complexity of distributed processing from the user [9].

The three tier architecture is used when an effective distributed client/server design is needed that provides (when compared to the two tier) increased performance, flexibility, maintainability, reusability, and scalability, while hiding the complexity of distributed processing from the user. These characteristics have made three layer architectures a popular choice for Internet applications and net-centric information systems.

A three tier distributed client/server architecture (as shown in Figure 2.2) includes a user system interface top tier where user services (such as session, text input, dialog, and display management) reside.

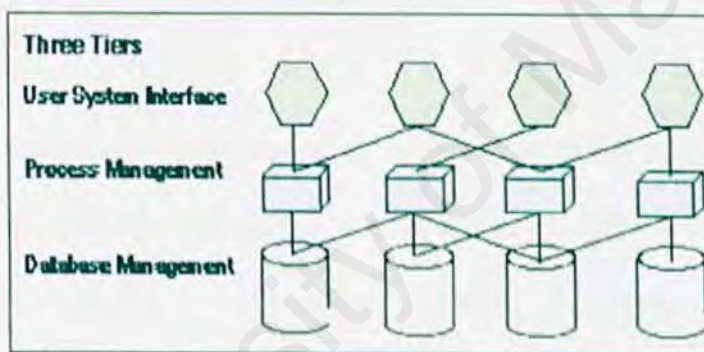


Figure 2.3 Three tier distributed client/server architecture depiction

The third tier provides database management functionality and is dedicated to data and file services that can be optimized without using any proprietary database management system languages. The data management component ensures that the data is consistent throughout the distributed environment through the use of features such as data locking, consistency, and replication. It should be noted that connectivity between tiers could be dynamically changed depending upon the user's request for data and services [9].

The middle tier provides process management services (such as process development, process enactment, process monitoring, and process resourcing) that are shared by multiple applications.

The middle tier server (also referred to as the application server) improves performance, flexibility, maintainability, reusability, and scalability by centralizing process logic. Centralized process logic makes administration and change management easier by localizing system functionality so that changes must only be written once and placed on the middle tier server to be available throughout the systems. With other architectural designs, a change to a function (service) would need to be written into every application.

In addition, the middle process management tier controls transactions and asynchronous queuing to ensure reliable completion of transactions. The middle tier manages distributed database integrity by the two-phase commit. It provides access to resources based on names instead of locations, and thereby improves scalability and flexibility as system components are added or moved.

Sometimes, the middle tier is divided in two or more unit with different functions, in these cases the architecture is often referred as multi layer. This is the case, for example, of some Internet applications. These applications typically have light clients written in HTML and application servers written in C++ or Java, the gap between these two layers is too big to link them together. Instead, there is an intermediate layer (web server) implemented in a scripting language. This layer receives requests from the Internet

clients and generates html using the services provided by the business layer. This additional layer provides further isolation between the application layout and the application logic.

It should be noted that recently, mainframes have been combined as servers in distributed architectures to provide massive storage and improve security.

Three tier architectures are used in commercial and military distributed client/server environments in which shared resources, such as heterogeneous databases and processing rules, are required. The three-tier architecture will support hundreds of users, making it more scalable than the two-tier architecture.

Three tier architectures facilitate software development because each tier can be built and executed on a separate platform, thus making it easier to organize the implementation. Also, three tier architectures readily allow different tiers to be developed in different languages, such as a graphical user interface language or light internet clients (HTML, applets) for the top tier; C, C++, SmallTalk, Basic, Ada 83, or Ada 95 for the middle tier; and SQL for much of the database tier.

Migrating a legacy system to a three-tier architecture can be done in a manner that is low-risk and cost-effective. This is done by maintaining the old database and process management rules so that the old and new systems will run side by side until each application and data element or object is moved to the new design. This migration might

require rebuilding legacy applications with new sets of tools and purchasing additional server platforms and service tools, such as transaction monitors and Message-Oriented Middleware. The benefit is that three tier architectures hide the complexity of deploying and supporting underlying services and network communications [9]. A more detail of two-tier architecture function is shown at the figure below.

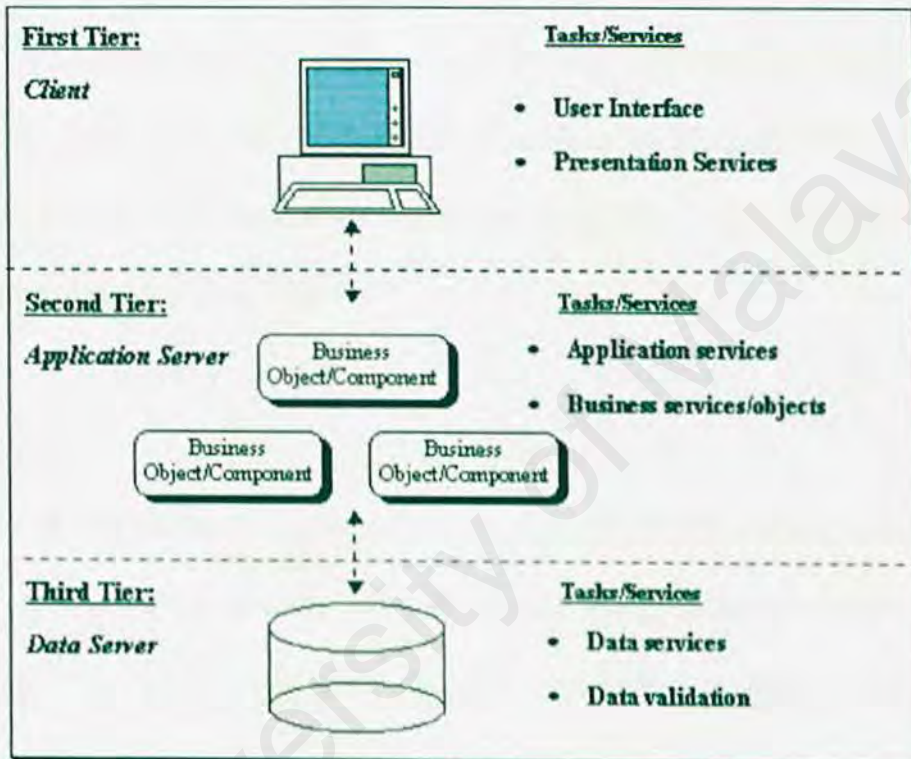


Figure 2.4 Three-Tier Client / Server

2.4 Application Platform

Currently, Unix, Windows NT and Linux are three of the most famous platforms for developing web client, server application. Each of them has own advantages and weaknesses. Different kinds of application will run in different platform. However, most of the application available in the market is only support one kind of platform.

2.4.1 Unix

Unix is an operating system developed at AT&T Bell Laboratories. It is an increasingly popular operating system [13]. Unix is currently available on PCs instead of used on mini computers and workstations in the academic community traditionally. More over, the business community has started to choose UNIX for its openness. Unix, like other operating systems, is a layer between the hardware and the application that run on the computer. It has functions that manage the hardware and functions that manage the execution of applications. Unix includes the traditional operating system components. In addition, a standard UNIX system includes a set of libraries. The following are some of the benefits and weakness of Unix:

Benefits of Unix

- Unix is consistent in treating files. It is very easy for the users to work with files because users don't need to learn special commands for every new task.
- Unix is not known only for its longevity and versatility as an operating system, but also for the variety and number of utility programs that called tool.
- It is powerful and mature operating system and network-based platform.

Weaknesses of Unix

- It need very powerful workstations and therefore not cost effective.
- It is very expensive.

2.4.2 Windows 2000 Professional Edition

Microsoft Windows 2000 is a true multipurpose server operating system. With the new features introduced with the Windows 2000 option pack, Windows 2000 Server is a complete platform available for building and hosting web-based applications, and is an easy server operating system available [13].

Benefits of Windows 2000

- Improved Windows 2000 Diagnostics Tool allows for easy examination of the system. Includes information on device driver information, network usage and system resource's such as IRQ, DMA, and IO address', all presented in a easy-to-view graphical tool.
- System Policy Editor and User Profiles of Windows 2000 allow system administrators to manage and maintain users' desktops in a consistent manor. System policies are used for the standardization of desktop configurations and control the user work environment and actions.
- The task manager of Windows 2000 is an integrated tool for monitoring applications and tasks, and report key performance metric of the Windows 2000 system. It provides information on each application and process that are running on the workstation, as well as memory and CPU usage.
- Point-to-Point Tunneling Protocol (PPTP) of Windows 2000 provides a way to use public date networks, such as the Internet, to create a virtual private network-connecting client PCs with servers. PPTP offers protocol encapsulation to support multiple protocols via TCP/IP connections and data encryption.

- New application programming interfaces for server application developers and better server performance deliver improved throughput and scalability for server applications such as Microsoft SQL Server 7.0
- Windows 2000 allows Object Linking and Embedding (OLE). It can combine the information from several applications into one compound document using the special OLE capabilities of window-based application.
- Network monitor of Windows 2000 is a powerful network diagnostic tool allows examining network traffic to and from the server at the packet-level. It allows capturing network traffic for later analysis, which makes troubleshooting network problems easier.

Weaknesses of Windows

- Insignificant changes to a Windows 2000 configuration require or request a shutdown and reboot in order to make the changes take effect. Change the IP address of the default gateway also to reboot.
- With Windows 2000, users will have to buy a separate software package in order to set up an email server.
- The ongoing maintenance and support requirements of Windows 2000 can make them much more costly to run.

2.4.3 Linux

Linux is another version of Unix based operating system. It is built from the long, varied tradition of Unix command-line culture. Linux has become quite popular worldwide as a

vast number of software programmers have taken Linux's source code and adapted it to meet their individual needs [10]. At this time, there are dozens of ongoing projects for porting Linux to various hardware configuration and purposes.

Benefits of Linux

- It is as stable as Unix.
- Highly cost-effective ability to scale the size of the site as traffic grows.
- It is developed under the GNU General Public License and its source code is freely available to everyone [12].

Weaknesses of Linux

- It is developed worldwide, therefore lack of proper organized support. It is more difficult to find staff talented in any particular arbitrary combination of Linux/Apache/Jrun/mod-Perl/PHP/Locomotive/whatever than it is to find staff talented in NT/IIS/COM [11].
- Linux is inherently unsafe because every malicious cracker in the universe has the source code to the site [11].
- It is missing many pieces required to build a real application. Those pieces are problematic.

2.5 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 from web pages to web users (whose computers contain HTTP clients that forward their request). Every computer on the Internet that contains a web site must have a web server program (or else the site files must be sent to a computer that has a web server program). Web servers often come as part of a larger package of Internet- and intranet-related programs for serving e-mail, downloading requests for FTP files, and building and publishing web pages [13].

2.5.1 IIS

Internet Information Server (IIS) is a group of Internet servers (including a Web or Hypertext Transfer Protocol server and a File Transfer Protocol server) with additional capabilities for Microsoft's Windows NT and Windows 2000 Server operating systems. IIS is Microsoft's entry to compete in the Internet server market that is also addressed by Apache, Sun Microsystems, O'Reilly, and others. With IIS, Microsoft includes a set of programs for building and administering Web sites, a search engine, and support for writing Web-based applications that access databases. Microsoft points out that IIS is tightly integrated with the Windows NT and 2000 Servers in a number of ways, resulting in faster Web page serving.

A typical company that buys IIS can create pages for Web sites using Microsoft's Front Page product (with its WYSIWYG user interface). Web developers can use Microsoft's Active Server Page (ASP) technology, which means that applications - including ActiveX

controls - can be imbedded in Web pages that modify the content sent back to users. Developers can also write programs that filter requests and get the correct Web pages for different users by using Microsoft's Internet Server Application Program Interface (ISAPI) interface. ASPs and ISAPI programs run more efficiently than common gateway interface (CGI) and server-side include (SSI) programs, two current technologies. (However, there are comparable interfaces on other platforms.)

Microsoft includes special capabilities for server administrators designed to appeal to Internet service providers (ISPs). It includes a single window (or "console") from which all services and users can be administered. It's designed to be easy to add components as snap-ins that you didn't initially install. The administrative windows can be customized for access by individual customers.

IIS includes security features and promises that it is easy to install. It works closely with the Microsoft Transaction Server to access databases and provide control at the transaction level. It also works with Microsoft's Netshow in the delivery of streaming audio and video, delayed or live [13].

2.5.2 Chili!Soft ASP

Chili!Soft ASP is a web application server based on the ASP architecture, the de facto standard for web applications. It is a complete platform for the rapid development of sophisticated web-based applications. Chili!Soft ASP includes scripting language, built-in state and session management and database access. Chili!Soft is a high performance



engine with features such as Just-in-Time Page Compilation, automatic process fail-over and restart, multi-threaded or multi-process configuration, and page caching. With version for both NT and Unix, users can build and host web applications across multiple platforms. Chili!Soft ASP is available for Netscape, Apache, and Lotus web servers on Windows NT, Solaris, and soon HP_UX and OS/390 [15].

2.5.3 Instant ASP

Instant ASP is a 100% Microsoft ASP-compatible server engine. It enables web/enterprise developers to deploy ASP applications. Develop data-driven, web-enabled, enterprise-class applications that can be deployed across multiple web server and operating system platforms. Written entirely in Java, Instant ASP runs on Linux, Novell, Sun, MacOS, HPUX, SGI, SCO, DEC Alpha, IBM OS/2, RS/6000, AS/400, S/390 and Windows. It support Apache, FastTrack5/Enterprise Servers, Sun WebServer, Java WebServer, IIS, WebSphere, Lotus Domino, and most web servers [15].

2.5.4 Personal Web Server (PWS)

PWS is Microsoft's slimmed-down web server, which provides a basis of which to develop corporate networked applications. PWS for Windows 95/98 turns any Windows 95/98 computer into a web server and enables easy publication of personal web pages. Easy to install and administer, PWS simplifies sharing information on their corporate Intranets or Internet for all users. PWS is ideal for developing, testing and staging web applications, as well as peer-to-peer publishing with its support for sharing files over HTTP and FTP protocols. Just like Microsoft IIS, PWS support all ISAPI extensions and

CGI scripts. PWS has been optimized for interactive workstation use, and does not have the system requirement of a full web server such as IIS [13].

2.6 Web Database Management

Database technology is used in a variety of applications. Some serve only a single user on a single compute while others are for multi user. There are variety types of database such as Microsoft Access, Microsoft SQL Server 7.0, Oracle 8i, Informix.

2.6.1 Ms Access

Microsoft Access is the most simplest database development tool [20]. The advantage of using Microsoft Access as below:

- Access is very easy to use for those who've never worked with database before.
- It is inexpensive to purchase
- Because it is created by Microsoft, it works very well with ASP and IIS.
- Regardless of the databases used, the methods for accessing it in ASP are very similar. However, if one working on a site that will require lots of database access and have a high volume of hits, then one probably want to consider a more powerful client/server database. Client/Server databases are designed to perform well, even with heavy use, and to provide the security measures needed to keep sensitive corporate data. They also cost a lot of money.

2.6.2 Ms SQL Server 7.0

Microsoft SQL Server is a significant tool in many regards. From data warehousing to applications that require not only a large amount of information, but also many different simultaneous users, SQL Server is a key component in answering data management requirement. It is a powerful and comprehensive database [16].

Microsoft SQL Server is an example of n-tier system. The user can manipulate the data directly from the client-side. Most of the time, the data is validated before it is updated into the database in server-side. It is tightly integrated with the Microsoft BackOffice family product to enable organization to improve decision-making and streamline the business process. It is the best database for Windows NT Server.

Microsoft SQL Server maintains referential integrity and security and ensures that operation can be recovered in the event of numerous types of failure. SQL Server can control the access for the type of information that can be retrieved by the user.

SQL Server supports Internet database integration. It allows the user to automate the publishing of database information in HTML documents. It allows users to build active web sites and conduct processors on the Internet. It gives user the complete Internet database publishing capabilities when combining with IIS and the SQL Server Internet connector.

2.6.3 Oracle 8i

Oracle is the world's leading vendor of database software. Oracle's ability to have all data and documents stored in a small number of high-performance databases benefits customers by centralizing all their data, making information management and access easier, more reliable, and less expensive [17].

The ground breaking capabilities of Oracle 8i's Internet File System (IFS) provides a single, easy to user data management interface for all data types, this minimizing customers' reliance on a proprietary operating system. Oracle is an open solution and it supports all kind of platform.

Oracle's advanced security features allow for enforced granular privileges, advanced auditing, enhanced access control, secure distributed processing and replication, and the ability to use additional authentication mechanisms.

Oracle uses a Java-enabled utility that provides everything needed to get a pre-tuned and pre-configured Oracle 8i database up and running. Oracle Enterprise Manager provides a single integrated management console for central administration of multiple servers. It also contains some advance functionality for tuning and diagnosing the database, and managing complex change in the database environment.

2.6.4 Comparison between SQL 7.0 and Oracle 8i

- SQL Server can run only on Windows but for Oracle 8i will essentially become irrelevant. Oracle supports all kind of platform [17].
- SQL Server is more ease to use system compared to the Oracle database. It provides more user-friendly graphical tools for installation, configuration and administration.
- With integrated management of text, images, audio and video, Oracle 8i's inter-media enables customers to take advantage of the multimedia nature of the web. For SQL, it advocates a strategy of storing non-traditional data in flat files in separate servers and linking them together using OLE-DB.
- Microsoft SQL Server tightly integrated with other Microsoft Products
 - Integration with Microsoft Exchange server provides reliable and scalable Internet and Intranet collaboration and messaging-supporting SQL Server initiated trigger and store procedure-based messaging and replication of Exchange public folders
 - Seamless integration with Windows NT provides security, a web application environment and Microsoft Transaction server support.

2.7 Web Security

2.7.1 Secure Socket Layer (SSL)

SSL is a protocol developed by Netscape for transmitting private documents via the Internet. SSL works by using a private key to encrypt data that's transferred over the SSL connection. The idea of SSL is that the programming for keeping data confidential has to

be contained in a program layer between an application such as web browser or HTTP and the Internet's TCP/IP layers. Netscape using sockets method of passing data back and forth between a client and a server program in a network or between program layers in the same computer.

SSL is an integral part of each Netscape browser. If a web site is on a Netscape server, SSL can be enabled and specific. Web pages can be identified as requiring SSL access. Other servers enabled by using Netscape's SSL Ref program library, which can be downloaded for noncommercial use or licensed for commercial use.

Netscape has offered SSL as a proposed standard protocol to the World Wide Web Consortium (W3C) and the Internet Engineering Task Force (IETF) as a standard security approach for web browsers and servers. Verisign is the leading certificate authority (CA), providing over 125,000 web sites with SSL server certificates, mainly for use in e-commerce [18].

2.8 Web Application Programming Language and Technologies

2.8.1 HTML

In order to publish information for global distribution, a universal understood language is needed, a kind of publishing mother tongue that all computers may potentially understand. The publishing used by the World Wide Web is HTML.

HTML gives the following abilities to authors:

- Publish online documents with headings, text, tables, lists, photos, etc.
- Retrieve online information via hypertext links, at the click of a button.
- Design forms for conducting transactions with remote services, for use in searching for information, making reservations, ordering products, etc.
- Include spreadsheets, video clips, sound clips, and other application directly in their documents.

HTML was originally developed by Tim Berners-Lee while at CERN, and popularized by the Mosaic browser developed at NCSA [5]. During the course of the 1990s it has blossomed with the explosive growth of the Web. During this time, HTML has been extended in a number of ways. Since the Web depends on Web page authors and vendors sharing the same conventions for HTML, this has motivated joint work on specifications for HTML.

In late 1994, HTML 2.0 was developed under the aegis of the Internet Engineering Task Force (IETF) to codify common practice. HTML+ (1993) and HTML 3.0 (1995) proposed much richer versions of HTML. Despite never receiving consensus in standards discussions, these drafts led to the adoption of a range of new features. The efforts of the World Wide Web Consortium' HTML Working Group to codify common practice in 1996 resulted in HTML 3.2 (January 1997).

Most people agree that HTML documents should work well across different browser and platforms. By achieving interoperability, cost is lowered since content providers need to only develop one version of a document. If the effort is not made, there is much greater risk that the Web will devolve into a proprietary world of incompatible formats, ultimately reducing the Web's commercial potential for all participants.

Each version of HTML has attempted to reflect greater consensus among industry players so that the investment made by content providers will not be wasted and that their documents will not become unreadable in a short period of time. HTML has been developed with the version that all manner of devices should be able to use information on the Web. PCs with graphics displays of varying resolution and color depths, cellular telephones, hand held devices, devices for speech for output and input, computer with high or low bandwidth, and so on.

2.8.2 Client-side scripting language

Client-side scripting involves the execution of the scripting language by the browser that interprets the web page. The client-side scripting is browser specific that is dependent on the type of browsers that executes the script without contacting a server. Client-side scripting is not very secure because the code is visible to the user [20].

2.8.2.1 VBScript

Microsoft Visual Basic Scripting Edition (VBScript) is a subset of the Microsoft Visual Basic Language. It is implemented as a fast, portable, lightweight interpreter for use in

World Wide Web browsers and other applications that use Microsoft ActiveX controls, Automation servers, and Java applets. VBScript is currently available as part of Microsoft Internet Explorer and Microsoft Internet Information Server.

When used in Microsoft Internet Explorer, VBScript is directly comparable to Microsoft JavaScript (not Java). Like JavaScript, VBScript is a pure interpreter that process source code embedded directly in the HTML. VBScript code, like JavaScript, does not produce standalone applets but is used to add intelligence and interactivity to HTML documents. For programmers who already know Microsoft Visual Basic, VBScript is a valuable alternative to JavaScript in activating web pages.

There are three separate classes of objects available within VBScript:

- Objects provided by the VBScript engine.
- Objects provided by the Internet Explorer.
- Objects provided by the web page author.

The VBScript engine provides the core run-time functionality – a subset of the full Microsoft Visual Basic language – including a minimal set of basic objects. Microsoft Internet Explorer provides the vast majority of objects used in scripting. In general, anything that is specific to the Internet is provided by Internet Explorer and anything that is generally useful is provided directly in VBScript. The web author can insert additional Objects through the <OBJECT> HTML tag [15].

2.8.2.2 JavaScript

JavaScript is a scripting language that allows truly interactive Internet applications to be constructed. The biggest advantage of JavaScript is that it can be written directly within a HTML file. It is meant to complement, and not necessarily replaces the current standard for World Wide Web interactivity, CGI. JavaScript is most popularly used to check variables in input boxes. It verifies that all of the input boxes on a given form are filled and contain valid data range. JavaScript can also capture incoming e-mail addressed form web site visitors.

Although easier than Perl and CGI scripting, JavaScript also has its limitations. The most important of which is that JavaScript cannot write a file to the web server's hard disk. Thus, CGI must still be used to create interactive forms that append data to a file. Another disadvantage of JavaScript is that there is not any compliant database. Data are stored in arrays as a replacement to database file.

To create an HTML file, no special kind of software is required. Any kind of text editor can be used. JavaScript can be written into an HTML file using the same method. HTML forms the basic design of a homepage, whereas JavaScript adds interactivity and performs validation on inputs keyed in by Internet users [15].

2.8.3 Server-side scripting language

A server-side script is a script that is interpreted by the web server. It is an instruction set that is processed by the server and the resulting data is sent to a client. When an HTTP

request is made for the server-side script, the filename suffix informs the web server that then contents of the file are to be processed on the server before being returned to the client. The server interprets the server-side script instructions and translates them into appropriate HTML code. The server then returns the whole file as pure HTML, which is then interpreted by the browser [20].

2.8.3.1 ASP (Active Server Page)

Active Server Page (ASP) is one for the latest server-based technologies from the Microsoft for building dynamic and interactive WebPages. The basic of ASP is the Microsoft's Internet Information Server (IIS) software.

Basically, ASP is a VBScript and JScript interpreter that is integrated with IIS, together with an interface for other custom components. It is also able to include other web page components like ActiveX controls and Java Applets. Therefore, since ASP binds together other various server-based systems to help build interactive web pages, it is considered as a glue technology [20].

Active Server Pages is also being considered for the e-commerce project because of its mains features especially in web server technology. These reasons are as follows:

- It is suitable for publishing and collecting data on the web.
- Provides a way for building secure transactions, server-based applications and web sites.
- Is suitable for building multi-tier Internet and Intranet applications.

- Provides Active Database Object, one of the Active Server Components allows easy but powerful connections to be made to almost any database system for which an Open Database Connectivity (ODBC) driver is available.
- Works together with Windows NT and IIS to provide a comprehensive set of key software technologies, which enables secure exchange of information over public networks, access control to server resources and confident identification of server and client.
- Has pre-built Active Server Components, which provide plug-in objects that will perform specific tasks.
- Can interact with almost any existing dynamic web page technology such as CGI (Common Gateway Interface), ISAPI (Internet Server Application Programming Interface) and scripts written in PERL, Python and Awk.
- Support client-server programming. Furthermore, the combination of ASP, client-site scripting and objects can be used to create client/server applications.
- Is able to create client side code dynamically on the server.

2.8.3.2 CGI (Common Gateway Interface)

Before Java, the standard of developing an interactive homepage was by using Common Gateway Interface (CGI) [20]. CGI is a standard for interfacing external applications with information servers, such as HTTP or web servers. Without CGI, a plain HTML document that web daemon retrieves is static. A CGI program on the other hand, is executed in real-time, so that it can output dynamic information. The program executed by web daemon will transmit information to the database engine, and retrieve the results

back again, and display them to the client. A CGI program can be written in any language that allows it to be executed on the system, such as C/C++, FORTRAN, PERL, Visual Basic, Apple Script, etc.

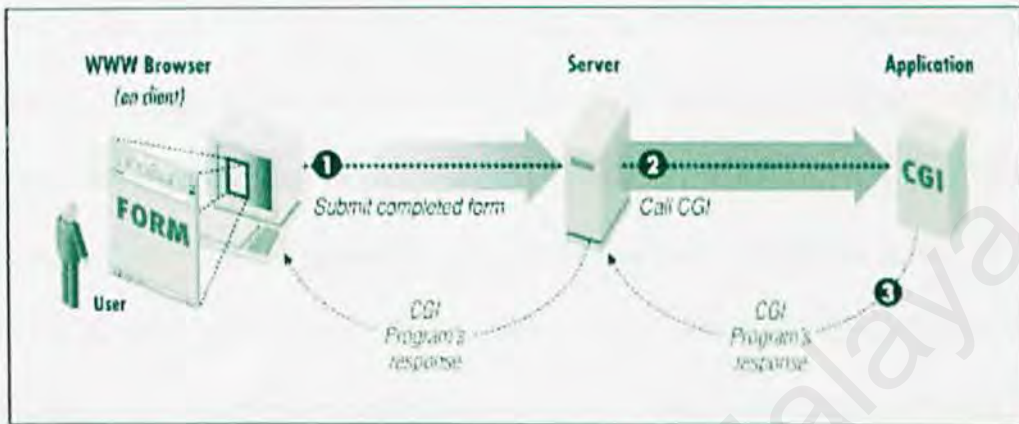


Figure 2.5 Simple Diagram of CGI

2.8.3.3 Cold Fusion

ColdFusion is a popular and sophisticated set of products for building web sites and serving pages to users. With ColdFusion, web developers can build a content database using input templates and combine these with application programs

To create a web site in which pages are developed dynamically as they are served. ColdFusion consists of ColdFusion Studio, which is used to build a site. ColdFusion Studio is described as “ a complete integrated development environment (IDE) ”. The most valuable feature for many companies that use ColdFusion is the ability to build web site as “piece parts” that can be stored in a database and then reassembled for web pages,

e-mail newsletter, and other uses. ColdFusion provides a visual interface for building web pages directly or for building the “piece parts”. ColdFusion is also a popular tool for building e-commerce sites.

ColdFusion has its own page markup language, called ColdFusion Markup Language (CFML). CFML encompasses the web’s Hypertext Markup Language HTML and Extensible Markup Language (XML). A just-in-time (JIT) compiler turns the CFML into the pages that get served. Applications can access databases using Microsoft’s OLE-DB, ODBC or drivers that access Oracle and Sybase databases. ColdFusion can be coordinated with distributed applications that use CORBA or Microsoft’s DCOM to interact with other network applications [13].

2.9 Microsoft Data Access Technology

In order to access, retrieve and share information efficiently throughout a web site, data access technologies gave to be considered. Among the most complete set of Data Access Technologies are provided by Microsoft. Microsoft’s set of Data Access Technologies includes VB SQL, Open Database Connectivity (ODBC), Data Access Object (DAO), Remote Data Object (RDO), Active-X Data Object (ADO) and OLE-DB.

2.9.1 VB SQL

Every machine using Microsoft Visual Basic has access to DB Library. This interface provides efficient point-to-point access to MS SQL Server for programmers. However, the

use of this technology is declining, as less programmer-intensive solutions are available [22].

2.9.2 Open Database Connectivity (ODBC)

ODBC is an open standard API that is fully aligned with XOPEN & ISO standards. It allows applications to access different SQL data sources at run time without recompiling the application for each target database. ODBC is based on a concept of database drivers that perform conversion between the ODBC API and the version of SQL employed by relational database. During run time, the ODBC driver will communicate with other drivers, doing so through a standard interface called the Service Provider Interface (SPI). ODBC is a network independent technology because it employs replaceable network libraries. The figure 2.3 below had shown the ODBC interface [21].

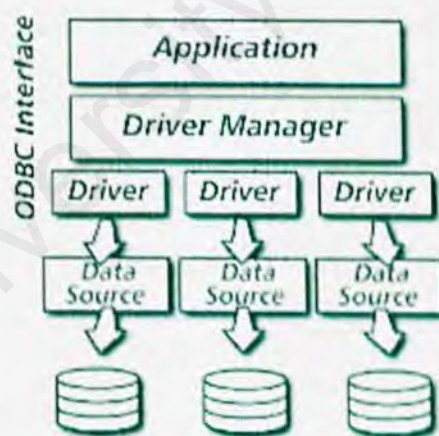


Figure 2.6 ODBC Interface

2.9.3 Data Access Object (DAO)

The Data Access Object (DAO) concept was released in 1992 as part of Microsoft Access desktop database. It focuses on efficient management of desktop data and decision support level access to remote RDBMS data. It is based on Microsoft Jet database engine. Jet is a combination of a full function query processor data store, and functions as a local cursor engine that provides robust functionality for use with data sources. It includes distributed database's query, update local data management and access to a variety of data including all popular Index Sequential Access Methods (ISAMs) and to all ODBC-based data. DAO's access to remote data involves the use of Jet engine's entire set of extended functionality [22].

2.9.4 Remote Data Object (RDO)

Because of considerations to optimize speed and control, developers ignored JET when creating transaction centric application to a RDBMS. Therefore, Remote Data Objects (RDO) was created to overcome this problem. It is an object interface that directly calls ODBC for optimal speed, control and ease of programming. RDO provides access to server side cursor as to minimize network traffic [22].

2.9.5 Active-X Data Object (ADO)

ADO is a new technology for data access based on existing technologies and endowed with increased flexibility. The concept of ADO is based on the ability to be used in an environment whose base set of object interfaces is standardized and easily extensible as new application requirements. Therefore, multiple implementations of ADO are allowed

– each with specific usage such as desktop, client-server and distributed transactions. The ADO is an evolution of both DAO and RDO into a single and simplified and extensible interface that will supersede all DB-Library, DAO & RDO functionality. It includes implementation with full data manipulation capability and a downloadable, lightweight implementation available to Internet clients at runtime [22].

2.9.6 OLE-DB

OLE-DB is a C/C++ language component architecture that was designed primarily for used by third party software developers. The purpose of the OLE SQL is to extend the reach of application capability beyond the limitations of ODBC. It is a COM-based API with features that provide access to both SQL and non-SQL data sources and to provide an environment where database components can be replaceable [22].

2.10 Web Application Development Tool

There are a number Web application development tools for building Web application.

2.10.1 Microsoft Visual Interdev 6.0

Visual Interdev (VI) comes as part of Microsoft's suite of professional programming tools, known as Visual Studio. VI is a tool for designing dynamic web applications. It is, in effect, just a development environment and a collection of useful tool and utilities.

VI 6.0 is the tool that Microsoft is promoting as their favored ASP editing tool. One simple but very useful feature of VI 6.0 is that it highlights ASP `<%` and `%>` tags in

yellow, and the ASP script itself is highlighted using blue of legal keywords – so they stand out from the HTML.

In addition, Visual Interdev boasts strong links with SQL Server, which makes it very easy to setup databases combining ASP and SQL Server. It also provides several useful web-based tools for doing things like checking links, highlighting the broken ones on your site, and allowing to drag-and-drop pages from one location to another.

Visual Interdev does have a couple of drawbacks – it's the most difficult to master of the editors discussed here, and also the most expensive. But having said that, it's undoubtedly the most powerful of these editors as it offers many more tools and features to the developer. The following are some benefits of Visual Interdev 6.0 [23]

Benefits of Microsoft Visual Interdev 6.0

- It is a rapid end-to-end web application development. It allows professional developers to design, build, debug, and deploy cross-platform HTML plus script based web applications faster than ever before.
- Powerful, integrated database tools. It includes a complete set of database programming and design tools, allowing developers to build enterprise-class, data-driven web applications within a single, integrated IDE.
- Full-featured, standard-based team development. Specifically designed to meet the unique challenges of team based web development.

2.10.2 Microsoft Front Page

FrontPage 2000 comes as part of Microsoft's Office 2000 suite – it's another tool for creating and designing web pages, but it doesn't offer all the functionality of Visual Interdev. It is ultimately a weaker but easier application to use, and it costs a lot less than Visual Interdev. If you don't mind the fact that there are fewer features, then it's a simpler, cheaper alternative for the novice [20].

Another quirk of FrontPage is that it likes to 'improve' your HTML and ASP code. Be careful to check the true HTML after saving your page, to ensure that it hasn't been changed in this way.

2.10.3 Notepad

Notepad is a time-honored text editor. No matter how much Microsoft promotes Visual Interdev, there will always be people who will use Notepad as their editor of choice. The fact that it's been free with every incarnation of Windows certainly helps sustain its popularity.

Of course, it doesn't highlight the ASP in any way, but also it doesn't generate any extra code. It doesn't feature many additional functions; but because it's so simple that it's still a very popular choice. In Windows 2000, Notepad offers a GoTo feature (under the Edit Menu), which allows you to move around your documents using line numbers [20].

2.10.4 Allaire's Homesite

One of the best non-Microsoft web page editors is Allaire's Homesite. It has special features that allow editing and previews ASP scripts on a web server. It also features an easy-to-use interface, which allows keeping track of files and folders at the same time as your file contents.

Homesite, like both Visual Interdev and FrontPage 2000, color-codes ASP script to make it easy to identify. In short, Homesite is a very powerful editor, and well worth a look [24].

2.10.5 Macromedia Dreamweaver UltraDev 4.0

Macromedia Dreamweaver UltraDev is a professional environment for building Web application. A web application is a collection of pages that interact with each other and with various resources on a Web server, including database.

UltraDev is also a professional editor for creating and managing Web sites and pages. Because it incorporates all of the Dreamweaver page design and site management tools, UltraDev makes it easy to create, manage, and edit cross-platform, cross-browser web page. UltraDev is fully customizable, the user can create his own objects, commands, and server behaviors, modify menu and keyboard shortcuts, and even write script to extend UltraDev with new actions, behaviors, and property inspectors [2].

2.10.6 HotMetal

HotMetal is a long-popular text-based HTML editor. It sports a new Wysiwyg interface, opening its power to less technical web builders. SoftQuad also adds new site management capabilities. They're not as fancy as those in Fusion or FrontPage, but they are helpful in organize the site and manage links. HotMetal benefits from its history as a tag-based text editor. Compared to the other editors, HotMetal produced the tightest and most logical HTML and it supports a dazzling array of the latest web technologies, including Java, Active X, and dynamic HTML. But the way HotMetal handles cascading style sheet (CSS) sets it apart from others editors [24].

The CSS Editor dialog box steps users through the style elements users want to apply. Then the online help shows users how to implement inline or linked style sheet. Unfortunately, what the users see is not always the users get. Differences between how a page looks in HotMetal's Wysiwyg development environment and how the same page looks in a browser vary from minor to extreme. And for all of its technical wizardry, HotMetal doesn't let users preview such features as CSS or DHTML; users have to launch an external browser to see their work.

Compared to the rest of the program, HotMetal's Wysiwyg interface feels tacked on. However, novices could use it to learn HTML as they work, since HotMetal writes strong, clean HTML code.

2.10.7 NetObjects Fusion

Fusion took the Wysiwyg world by storm when it arrived in 1996. It is powerful due to its ability to create web pages visually. But like FrontPage and Cyberstudio, Fusion's primary function isn't HTML editing, it's site management. When users start a new project, they construct the layout of their site using one of the built-in templates or by creating a new template of their own. As users add pages, Fusion automatically manages all the links within their site. While most other Wysiwyg tools boast interfaces that take their cues from word processors, Fusion more closely resembles popular desktop publishing packages such as QuarkxPress or Adobe PageMaker than it does Microsoft work [24].

Users place their text and media with pixel-level precision on Fusion's grid-covered layout space. Fusion gives users excellent control over fonts; they can even embed text in a graphical element, and Fusion will generate the image automatically. The resulting pages looked identical when users viewed them in the Fusion editor and in either Internet Explorer or Netscape Navigator.

Fusion's enviable level of control takes its toll in large file sizes. Fusion uses complex table structures and `<SPACE>` tags to place elements on a page. The HTML files are abnormally large, containing complex code that is essentially impossible to tweak manually. Users can do some rudimentary manual HTML editing in the Fusion editor, such as adding tags or inserting script, but any serious hand editing should be left to advanced users, as an errant tweak can result in jumbled HTML.

Fusion also does not yet support cascading style sheets (CSS) or other implementations of dynamic HTML. That's a shame, since using css to tie out elements instead of Fusion's convoluted table structures would greatly diminish the size and complexity of the files the product creates. Still, the impressive amount of control the users get means that, with Fusion, what the users see really is what they get.

2.10.8 Symantec Visual Page

Visual Page is the basic Wysiwyg web editor more akin to PageMill than Fusion. It offers all the basic tools expected from these programs, including an FTP client and drag-and-drop editing. More importantly, it outperforms its competitors in both power and ease of use. Visual Page handles tables and frames in a remarkably simple and intuitive manner. Visual Page rearranges the content instantly as users manipulate the page, making it easy to see how the users' changes will affect the overall look [24]. It encountered only minor problems, such as a flaw in the display of borderless tables. Java users will appreciate Visual Page's applet preview feature, which lets the users view Java applets in the preview mode without launching an external browser. Visual Page offers similar direct previews of QuickTime movies.

Overall, Visual Page is everything a Wysiwyg HTML editor should be. It's easy to use and lets the users create fairly complex pages quickly without writing any HTML code. Most importantly, the web pages will look just as expect them to.

2.10.9 Others

There are other editors, such as Sausage Software's HotDog and Adobe's PageMill.

2.11 Summary

After doing some literatures related to this thesis and analyzed them, the discussion will be moved on the topic of justification on the proposed methodology and requirement analysis in chapter 3.

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Chapter 3

System Analysis

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Chapter 3 System Analysis

In order to understand the nature of a program when developing a system, establishing the services that the system should provide and the constraints under which it must operate are very important. This chapter will discuss the methodology used for this thesis project and the requirements analysis.

3.1 Methodology

A hybrid model consists of Waterfall model and prototyping has been chosen as FSKTM Landscape Committee Homepage process model. After refining the Waterfall model and prototyping model to suit this project, justification has been done, which a few phases have been combined. It has shown in Figure 3.1.

Requirement Analysis is the first phase of this methodology. In this phase, all the information about this project is gathered. Information will be gathered through Internet and reading material such as books, magazines, journals and newspaper. The system's functionality and constraint are established. The software and hardware requirement for this project also has been determined during this phase.

Section Design is the next phase for this methodology. It involves designing system sections and determining the functionality and the feasibility of the system sections.

Section Design established an overall system architecture. It is also involves drafting out data flow diagrams that resembles the functionality of the system and its subsystem. Prototyping is used in this phase together with the Waterfall model to reduce the uncertainty about what the system should do. Prototyping is therefore a means of requirements validation that lets the developers discover requirements errors or omissions early in the process.

The following phase of this methodology is the section coding where all programs will be coded and using selected programming languages and application development tools based on the design determined in the Section Design. Unit testing involves verifying that each section meets its specification. Prototyping is also used in this phase to ensure that the output of the coding meets the design that determined in the Section Design phase.

Integration and System Testing is the next phase of this methodology. The sections of the project are integrated and tested as a complete system to ensure that the system requirements have been meet.

The last phase of this methodology is the operation and maintenance. The system is installed and put into use. Maintenance involves fixing errors, which are not discovered in the earlier stages of the life cycle, improving the implementation of the system units and enhancing the system's functionality as new requirement are discovered.

The purposes on choosing the Waterfall model with prototyping are:

- It helps the developers to follow the sequence of events they expect to encounter.
- Useful in helping developers lay out what they need to do.
- It can help to reduce the uncertainty about what the system should do and therefore enhance the understanding.
- Associated with each process activity are milestones and deliverables so that developers could use the model to gauge how close the project was to completion to a given point in time.
- Prototyping is useful for verification and validation, where verification ensures that the system function properly and validation ensures that the system has implemented the entire requirement in the specification.

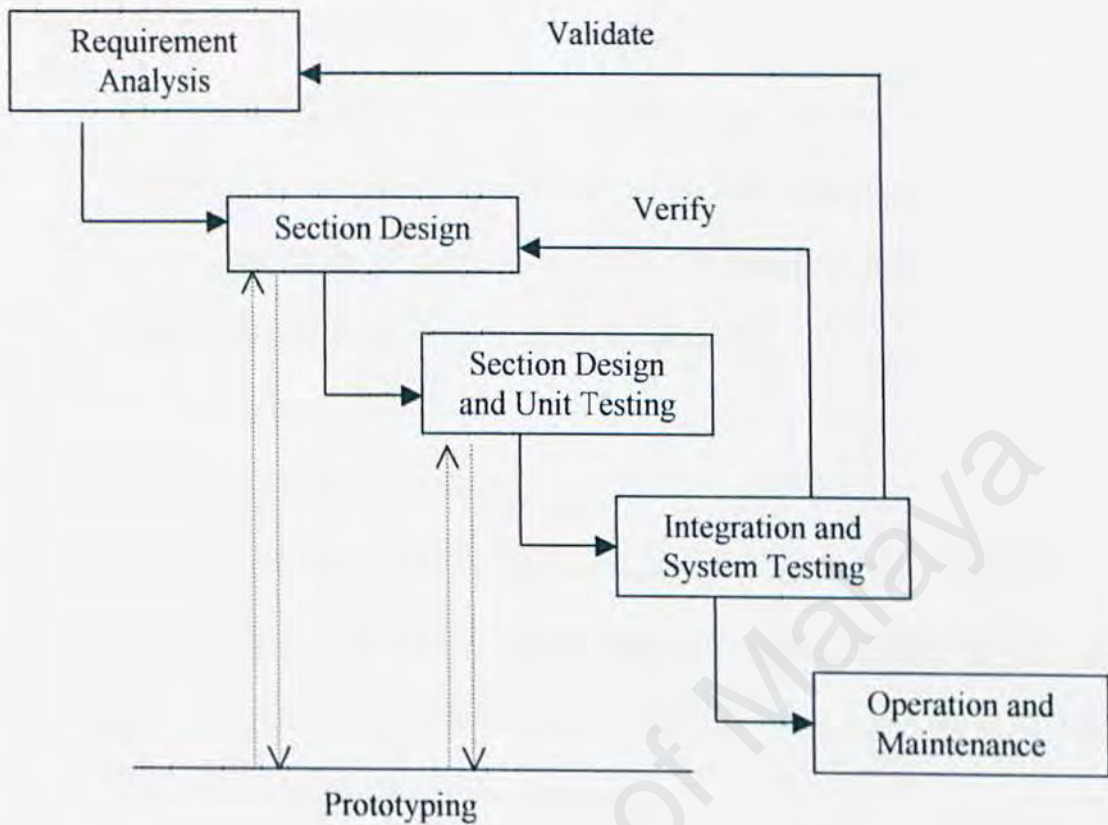


Figure 3.1 Waterfall model with Prototyping

3.2 System Analysis

After doing some survey on development tools that has been discussed in Chapter 2, a most suitable tool for the system has been decided. These tools include the entire platform, servers, web application programming language and technology. The following are the tools used in the system after considering their advantages.

3.2.1 Development Tools Analysis

- Windows 2000 Professional Edition

- Windows 2000 Professional Edition has been chosen as main server operating server. It is chosen because of its user friendliness and stability feature. Besides, an NT authentication and files system that can be used in the system's data repository components also provided.

- IIS 5.0 (Internet Information Server 5.0)

- IIS 5.0 is chosen as the web server because it can be well supported by Windows 2000 Professional Edition operating system. Beside, IIS 5.0 can provide the basic web authentication for the web application that is used for FSKTM Landscape Committee Homepage.

- Microsoft Access 2000

- It was chosen as systems database platform because it is stable and work well with other Microsoft components. It supports multi-user environment, easy to configure and setup. Besides, the database can easily be mapped to the other processing server through (ODBC 32 bit).

- IE 4.0 and above (Internet Explorer)

- IE is the most suitable browser for the system compare to others. Internet Explorer is needed for this web application system because it supports most of the HTML scripts that are used in the project.

- Microsoft Visual Interdev 6.0

- Microsoft Visual Interdev is the editor for the ASP coding. It provides more features that are helpful for ASP coding. The graphical design can be drawn easily by using Microsoft Visual Interdev 6.0. It also provides the script outline as well as the toolbox and server object that minimizes the burden to build a web application.

3.2.2 Web Application Programming Language And Technologies

- ASP (Active Server Page)

- ASP has been chosen as server-side scripting for this project because of its simplicity and speed. ASP can minimize network traffic by limiting the need for the browser and server to talk each other. It also provides improved security measures since the code can never be viewed from the browser.

- HTML (Hypertext Markup Language)

- HTML is the basic language for the web pages. HTML is easy to implement and needed to generate layout and design for web page.

- VBScript (Visual Basic Script)

- VBScript is the basic server side scripting language for ASP. It is a subset of VB language. Its function is to make web pages more dynamic and it is better support than JavaScript when it is used in ASP environment.

-JavaScript

- JavaScript is the basic client side scripting language. It is used to generate information on the client side. It can be supported by two major browsers, which are IE and Netscape Navigator.

3.3 Requirement Analysis

Requirement analysis can be divided into functional requirements and non-functional requirements. The following will discuss in detail about the functional and non-functional requirements.

3.31 Functional Requirements

Functional Requirements are functions and features that the system should provide for the users. The system is considered incomplete if any of the necessary function is not included. The following are some of the functional requirement of the system:

- Information about landscape design

- This section provides the information about landscape design and landscape architecture skill to the users.



- Committee member profile

- This section provides all the committee members profile.

- Notice Board

- The notice board should able to display up-to-date notices for all faculty students and Landscape Committee members.
- An online content update function consists of add and delete record should be provided to update the notices.

- Links to other sites

- This section should able to provide links to some informative site, which are related to the field of landscape design.
- An on-line content update function consists of add and delete record to should be provided.

- Hit Counter

- This section should able to count the number of visitors that have visited to FSKTM Landscape Committee Homepage.

- GuestBook System

- This section should able to let the faculty students to give their ideal and comment about field of landscape design.



- Forum Discussion

- This section should be able to let the faculty students and Landscape Committee members to involve themselves in an on-line discussion.

- Faculty Landscape Photo

- This section should be able to let the faculty students to view the redesign faculty landscape photo. Besides, the student and committee member also can upload the landscape photo to this site.

- Suggestion Board

- This section should be able to provide a facility to display user's suggestion about FSKTM Landscape Committee Homepage. All the suggestions will be considered to improve the quality of the web site.

- Authentication

- This section should be able to provide the security to let the authorized person only to add new committee member and to sign on notice board and web bulletin board.

3.32 Non-Functional Requirements

In order to ensure the quality of system produced, certain quality factors must be conformed. Non-functional requirements are those constraints on the services or

functions offered by the system. The following non-functional requirements have been considered for FSKTM Landscape Committee Homepage.

- Flexibility

- The system should have the capability to take advantage of new technologies and resources. The system should be able to implement in the changing environment. Information about the faculty can be accessed from anywhere at anytime.

- Reliability

- Reliability is referred to the expectation of a system to perform its intended function accurately. Thus, the system should be reliable in performing its functions and operations. For example, whenever a button is clicked, the system should be able to execute that particular function or generate some message to inform the user what is happening.

- Usability

- The system should be developed in such a way that it is easy to use. It will enhance and support rather than limit or restrict the office process. Interfaces must be self-explanatory and consistent with other application in the environment.

- Portability

- Portability of FSKTM Landscape Committee Homepage will enable the application to work on various platform, hardware and operating system. Components in this system will be designed to ensure migration of component does not or only require minimum modification, recompiling, reconfiguration or redesign.

- Modularity

- Modularity is a necessary factor in order to produce a good program. The system is broken into sections or modules so that functions of objects could be distinct from one another. This characteristic eases the testing and maintenance. In the system design, modularity of program sections is applied from the very beginning because this will lead to easy modification and enhancements in the future.

- User Friendliness

- The system should be able to build a flow of navigation that helps users in navigating to related URL with little efforts through hyperlinks and procedure steps. User interface should be user friendly to enhance the interaction between the users and the system.



- Efficiency

- In order to meet this requirement, the system should be accessed in an unlimited number of time to produce expected overcomes or output as a creditable pace or speed.

-Manageability

- The sections within the system should be easy to handle to ensure the maintenance can be done regularly. Besides, evolutionary of the system will easy to be done.

3.4 Proposed Tools

3.4.1 Hardware Requirements

Hardware Requirements are divided into two types, design time requirement and run time requirement.

Design time requirement

It is requirements that are used to setup the server and server side system to run on.

Processor

Intel Pentium III 866 MHz or greater and other compatible processors like AMD and Cyrix are being used.



Random Access Memory (RAM)

Minimum 64 RAM is required (Recommended 128 RAM). Higher memory is being recommended when the database is to be put into production for running multiple services.

Hard Disk

Minimums of 4.5 GB are required. For installing Windows 2000 Professional Edition, it takes 125 MB. In addition, SQL Server Enterprise Edition needs 180 MB for full install. Another 200 MB is used for installing the developing tools such as Microsoft Visual Interdev 6.0, MSDN Library, Macromedia collection (Dreamweaver, Flash, Firework), and etc. An additional 100 MB is reserved for project's source code. About 3.9 GB hard disk space left will be used for storing and testing database data.

Run time requirements

It is for client side user to run the program

Processor

Intel Pentium 100MHz or greater and other compatible processors like AMD, Cyrix etc.

RAM (Random Access Memory)

A minimum of 32MB RAM is required.



Hard Disk

Minimum of 50 MB disk space is required to installing web browser like Netscape Communicator or Internet Explorer.

Other

Modem with 33.6 kbps or above, keyboard, mouse, and display card.

3.4.2 Software Requirement

As a conclusion of literature survey doing in chapter 2, I list out software requirement of our system.

Operating System

Microsoft Windows 2000 Professional Edition

Database Management System

Microsoft Access 2000

Web Server

Microsoft IIS 5.0

Web Browser

Internet Explorer 4.0 or above. Various web browsers are needed for the purpose of testing the web application.

Development tools

Microsoft Visual Interdev 6.0, Macromedia Collection (Dreamweaver, Flash, Firework).

Programming Language

Develop using ASP technology. Server site scripting using VBScript and client site with JavaScript.

3.5 Summary

After the methodology and the requirement of the system have been identified, the system design is the next phase that has be considered in this project. The next chapter will discuss the some of the system design.

Chapter 4

System Design

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Chapter 4 System Design

This chapter will basically cover on some of the system design including user interface design, data flow diagram and other design. The design is a basic idea for the development of the system.

4.1 System Architecture

After doing some survey on the client/server architecture, three-tier client/server architecture has been chosen for this project.

4.1.1 Three-Tier Architecture

Figure 4.1 shows the three-tier client/server architecture for FSKTM Landscape Committee Homepage. The frontier or the application tier of the system consists of all the necessary applications. In this layer, the main application component that appears to the user is the IE 4.0 browser. This layer will provide the user interface. HTML and VBScript are used to activate the application layer. All of them provide the most flexible and dynamic interface for the users. The application is always reside within the web server, which is the IIS 5.0 (Internet Information Server).

The middle tier is known as the functionality or service tier. The communications between this tier and the frontier depends on the Hypertext Transfer Protocol (HTTP) for the web pages transfer. The functionality tier consists of the components that are created to support the system such as searching for record and other configuration. All these

components require ASP and the ASP Server objects to perform the functions in the web servers. The IIS in this tier will process the request from the client and produces the result in web pages format. The IIS will also process any data request of the user by linking to the database server, which contain in the bottom tier. The IIS will do other extra additional activity during the data processing.

The bottom tier is the data repository for the system. The data repository is built by the SQL database. It functions as the main database for the system. The components in the middle tier are connected with the SQL database in the bottom tier through the combination of the Structured Query Language (SQL) and Open Database Connectivity (ODBC).

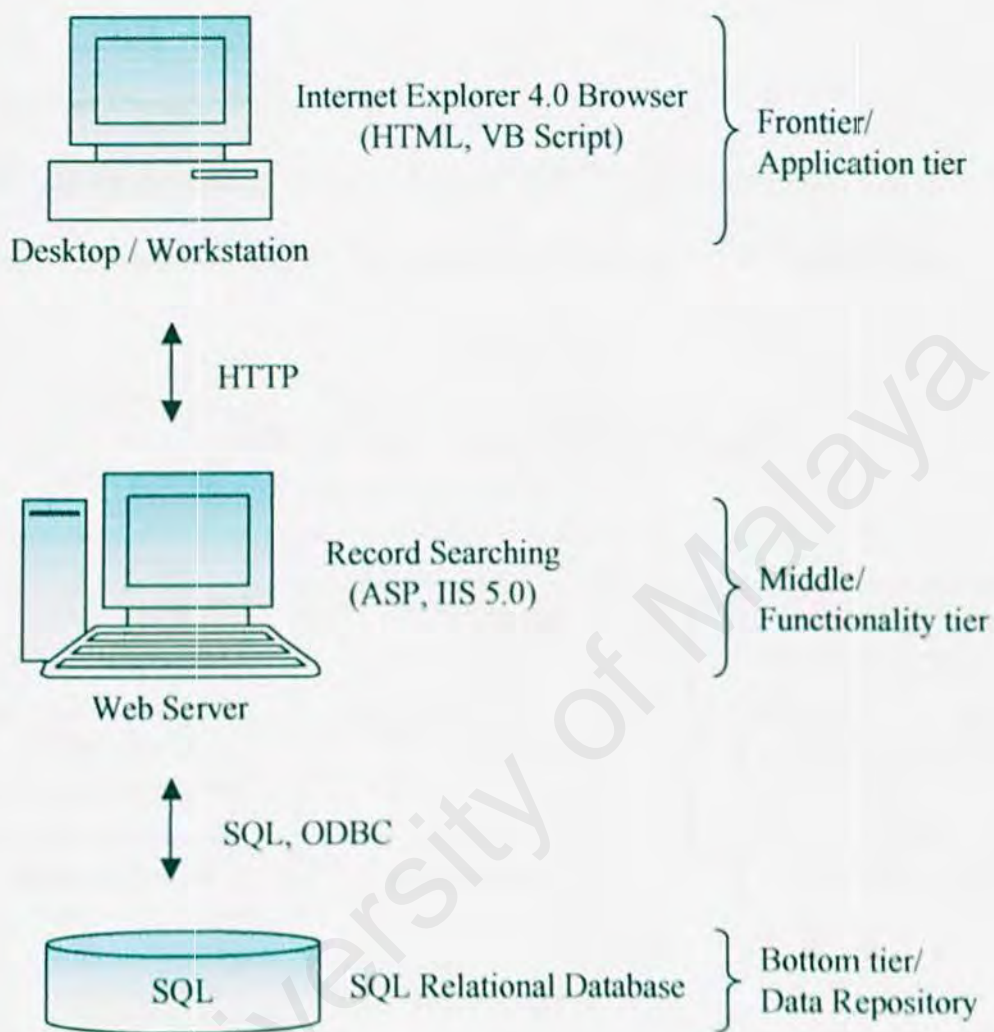


Figure 4.1 FSKTM Landscape Homepage Three-tier Client/Server Architecture

4.2 System Structure Chart

Under this section, system structure chart and data flow diagrams have been carried out.

4.2.1 System Structure Chart

Figure 4.2 shows the system structure chart of FSKTM Landscape Committee Homepage main page. This chart consists of 10 sections, which are shown as figure below.

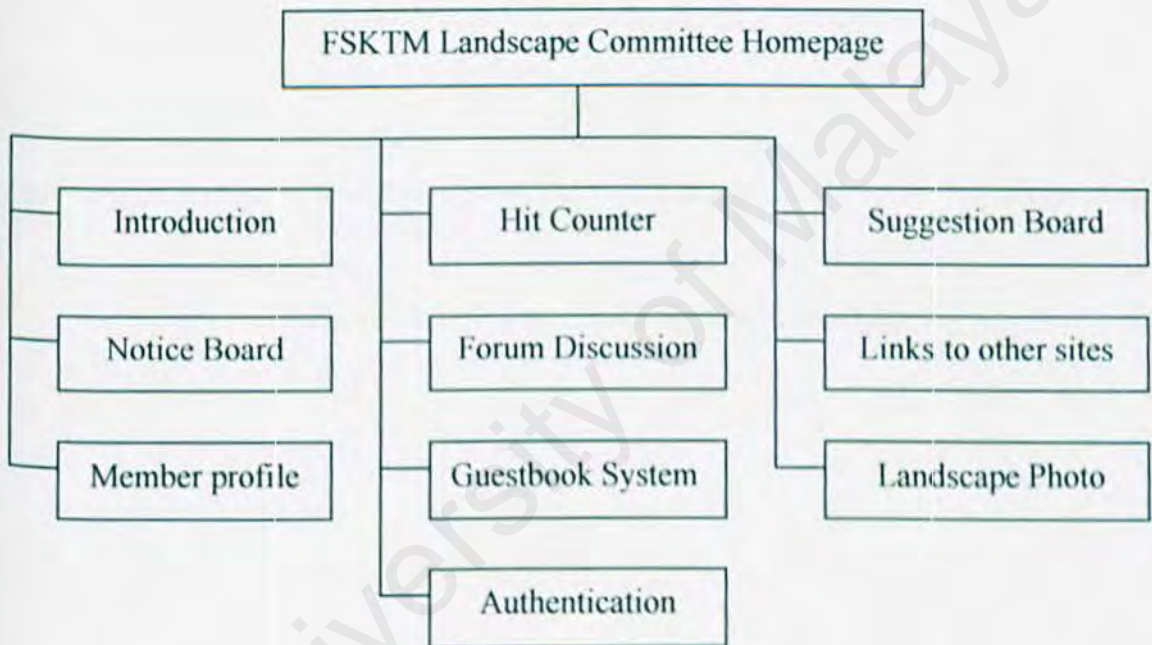


Figure 4.2 FSKTM Landscape Committee Homepage System Structure Chart

4.2.2 Data Flow Diagram (DFD)

DFD are used to graphically characterize data process and flows in a system. It let the developer to understand how data moves through the system, the process or transformation that the data undergoes, and what the output are. The DFD includes context diagram, diagram 0 and child program. Four basic symbols are used to chart data movement on DFD. They are shown as Figure 4.3



Figure 4.3 Four Basic Symbols for DFD

As shown in Figure 4.4 below, there are 8 modules in the system, which are notice board (1), member profile (2), suggestion board (3), linking (4), guest book system (5), forum discussion (6), introduction (7) and landscape photo (8).

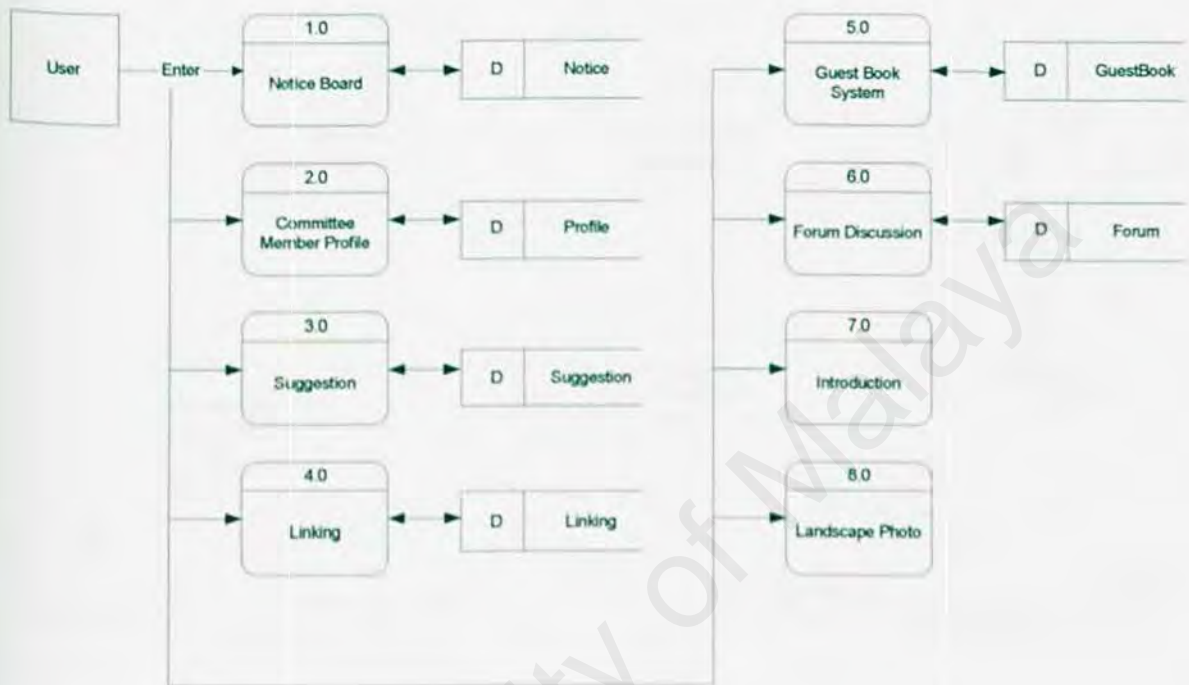


Figure 4.4 Data Flow Diagram 0 for the Landscape Committee Homepage

Notice Board Module

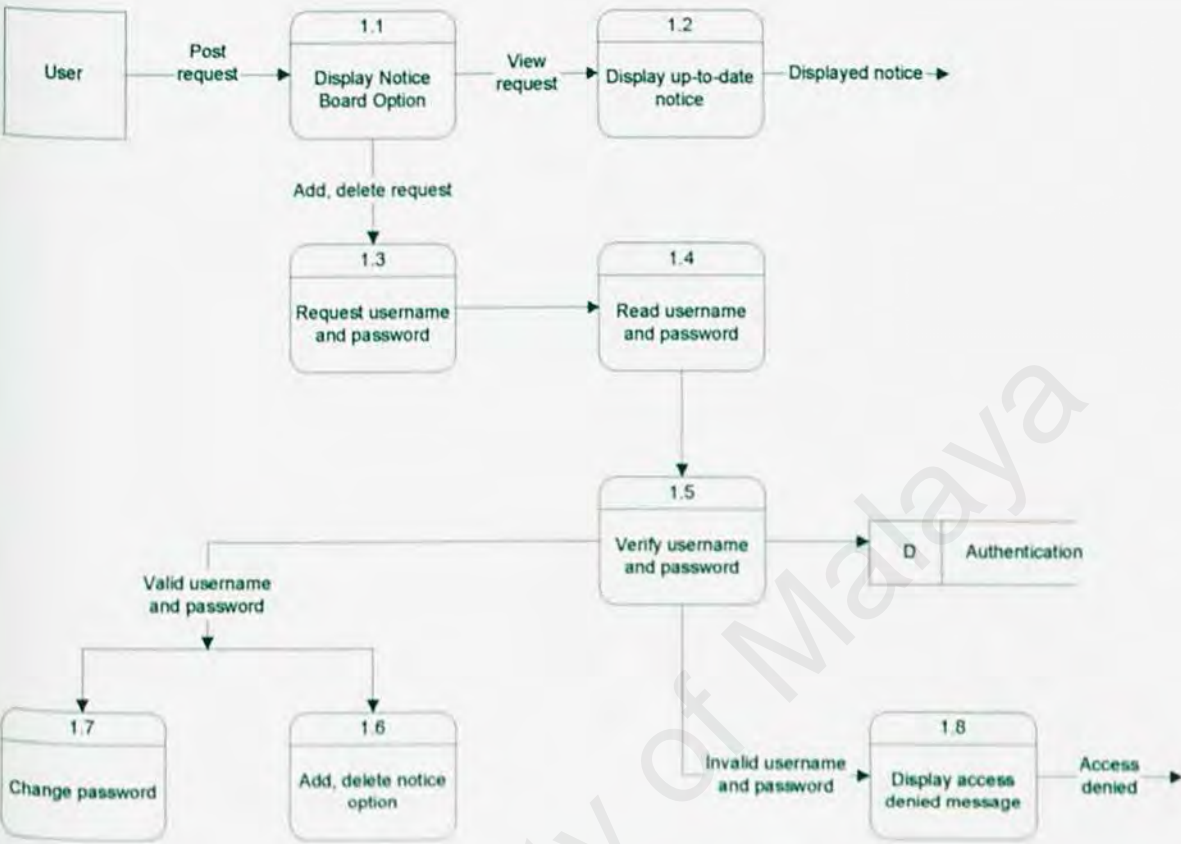


Figure 4.5 Data Flow Diagram 1 (Notice Board)

Committee Member Profile Module

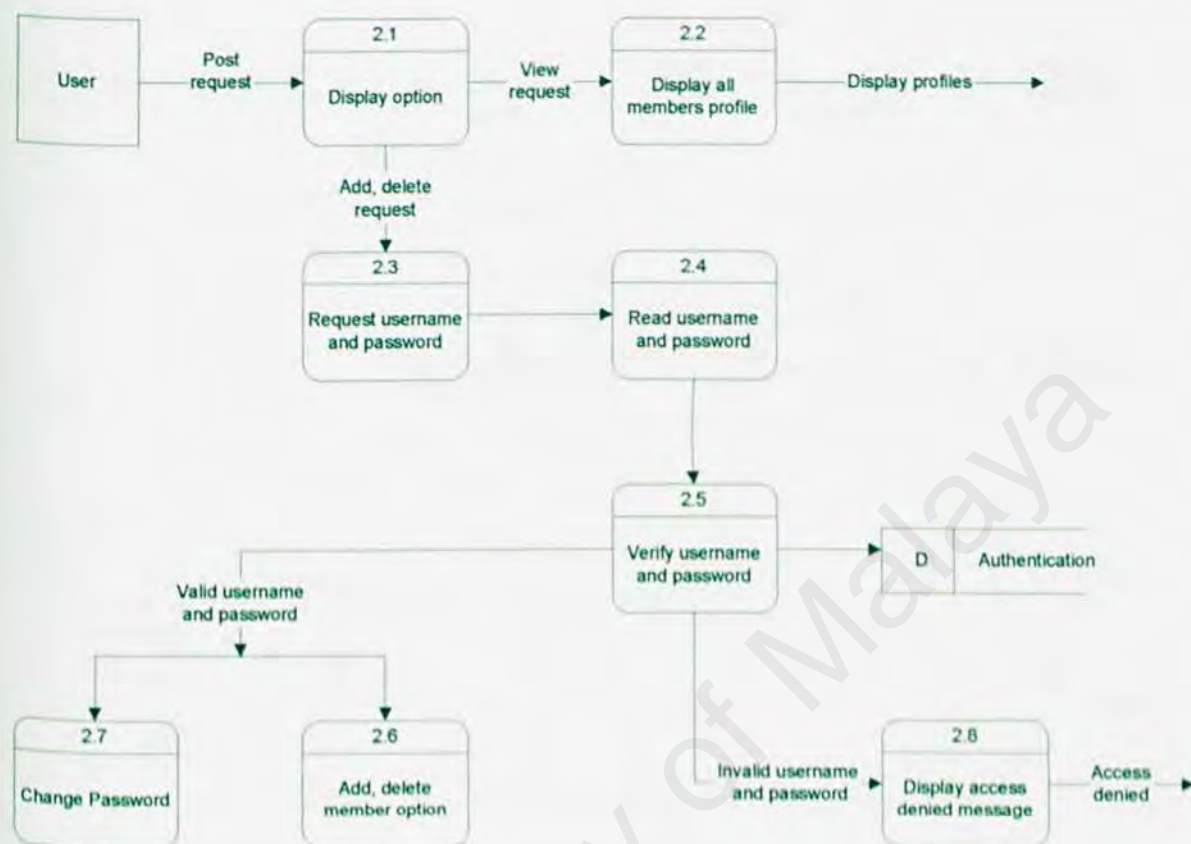


Figure 4.6 Data Flow Diagram 2 (Committee member profile)

Suggestion Board Module

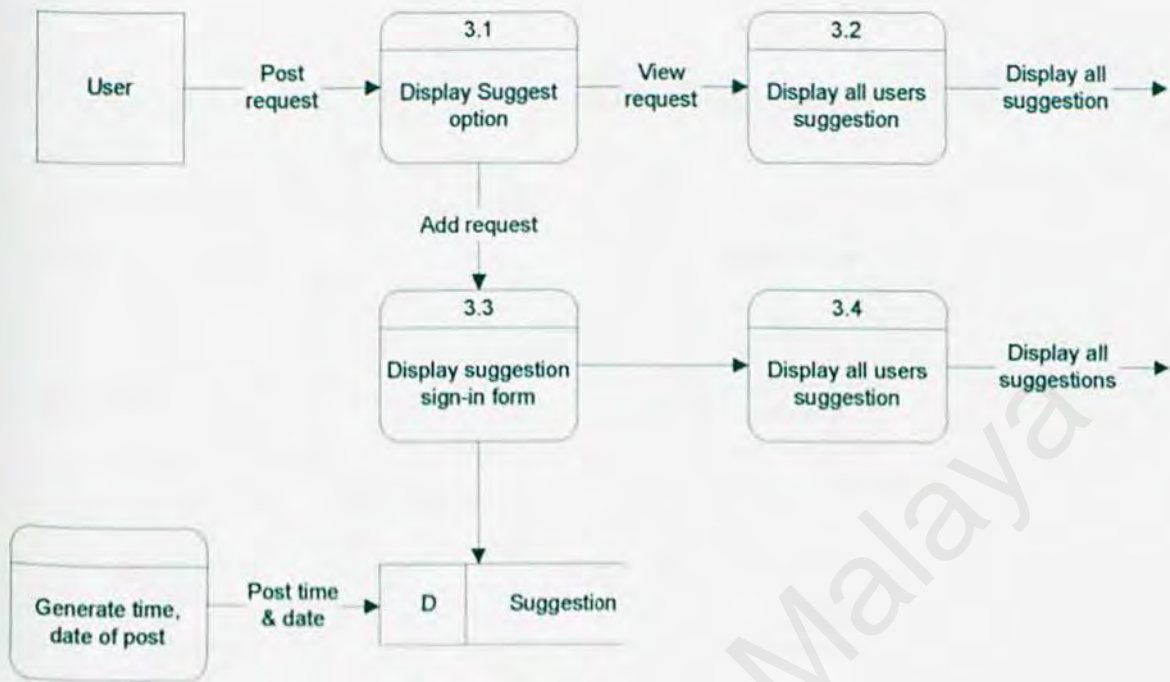


Figure 4.7 Data Flow Diagram 3 (Suggestion Board)

Linking Module

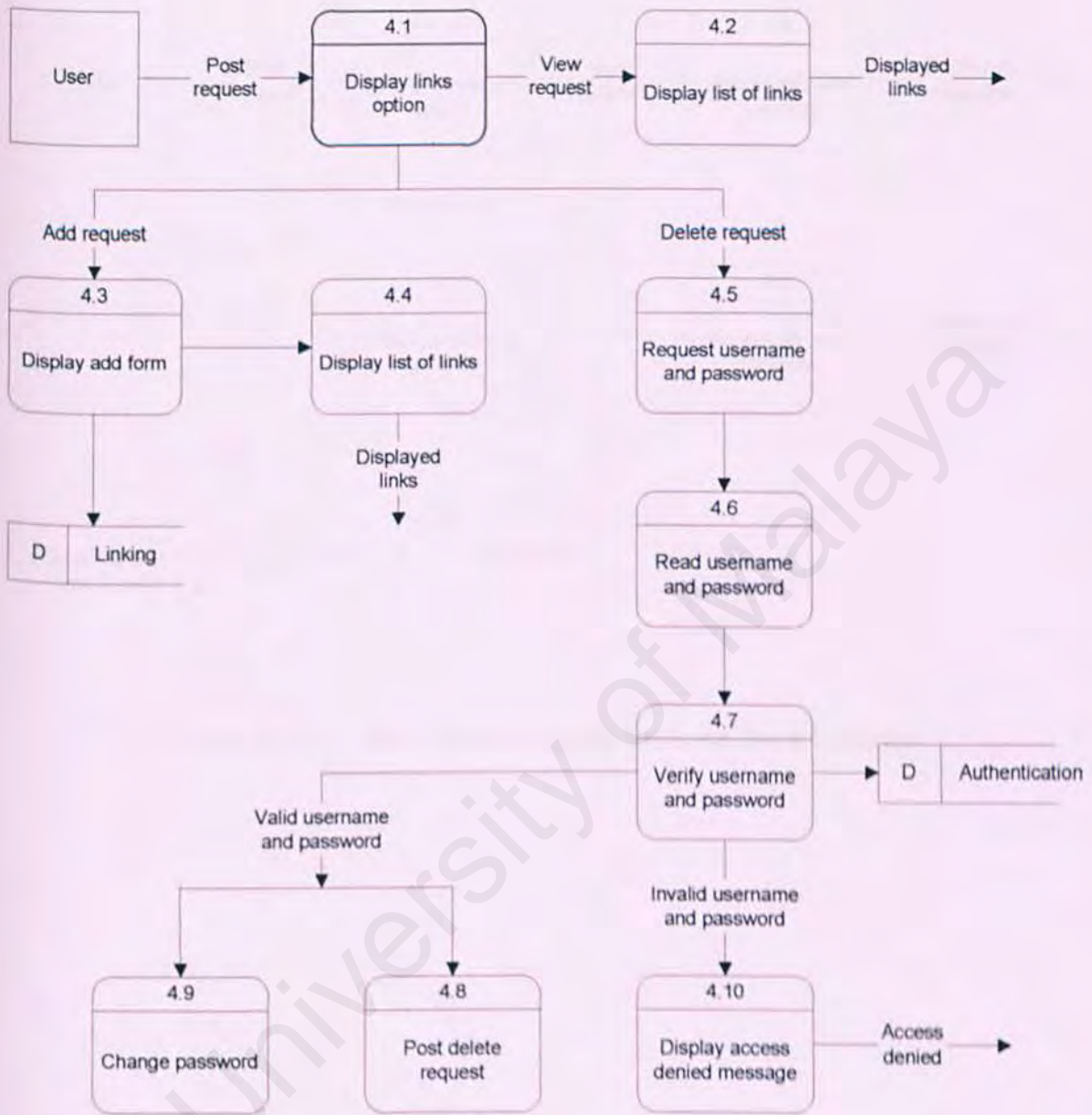


Figure 4.8 Data Flow Diagram 4 (Linking)

Guest Book System Module

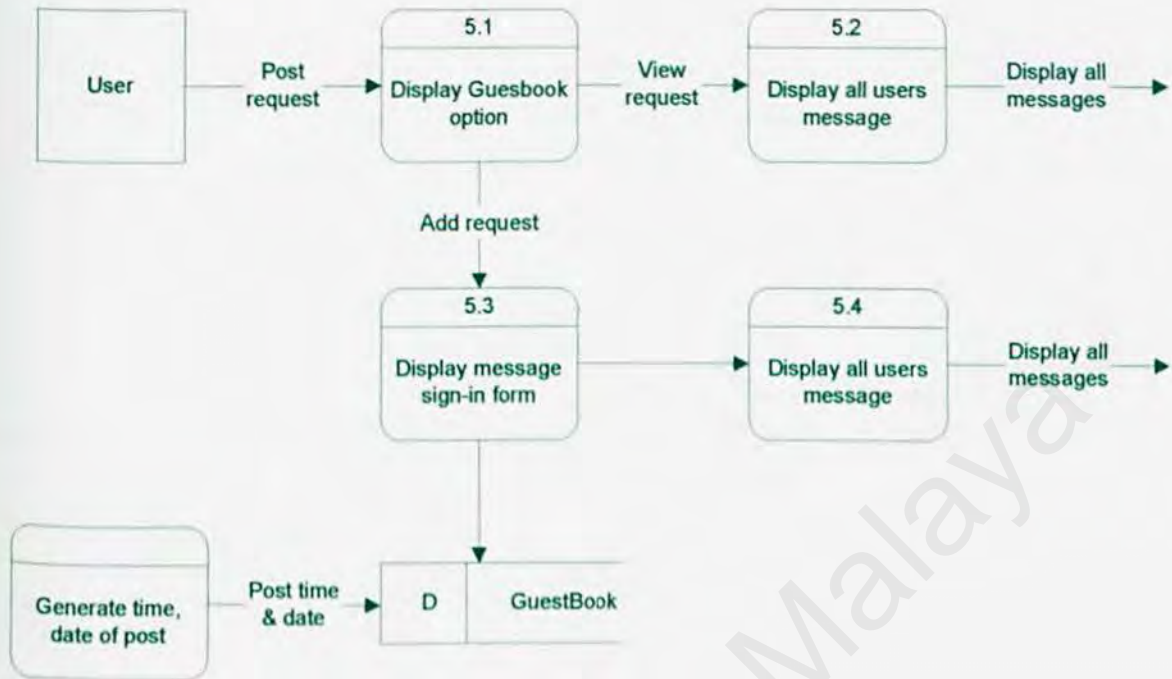


Figure 4.9 Data Flow Diagram 5 (Guest Book System)

Forum Discussion Module

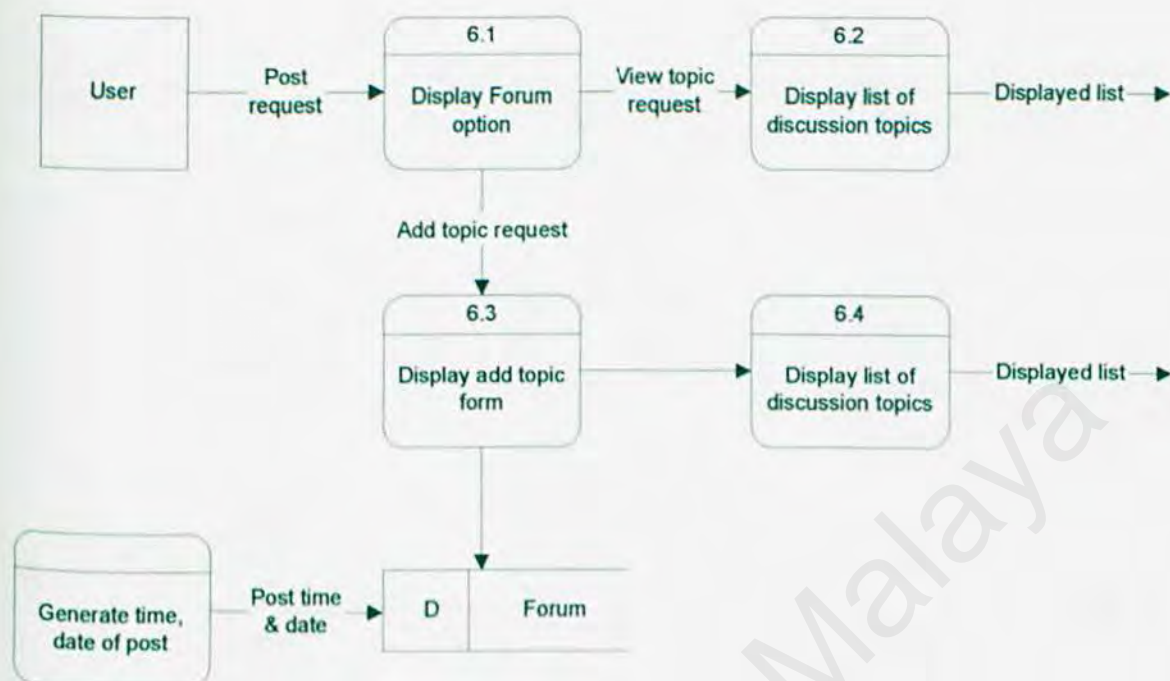
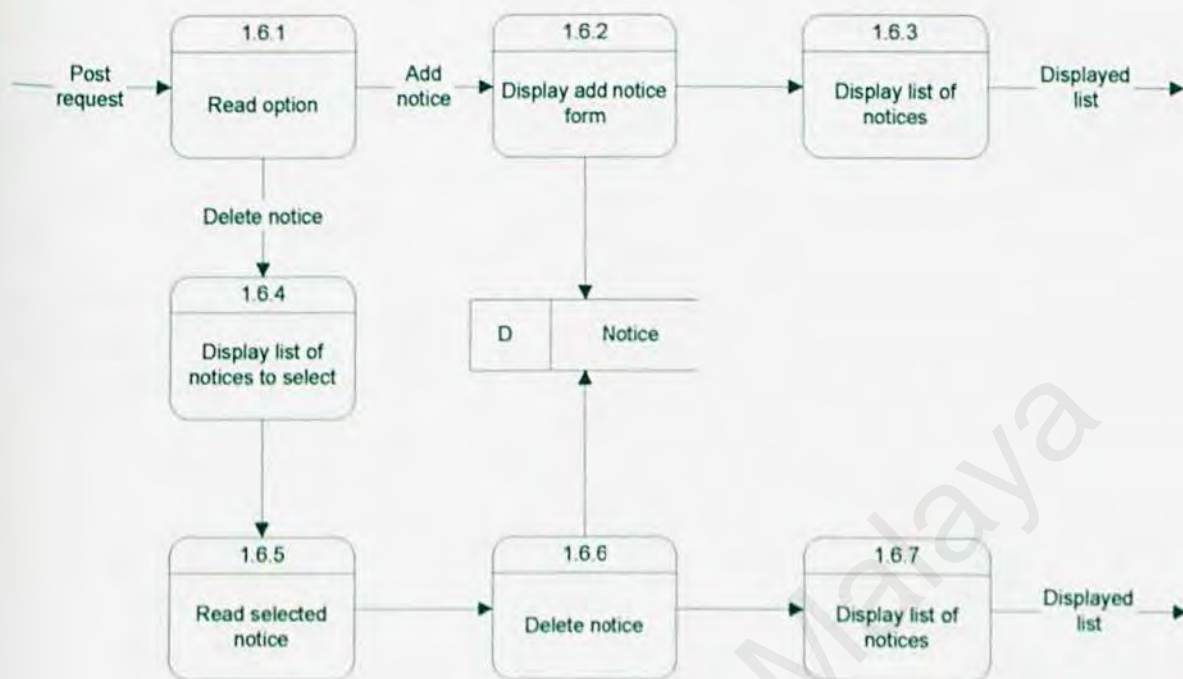


Figure 4.10 Data Flow Diagram 6 (Forum Discussion)

Add, delete notice in Notice Board**Figure 4.11 Data Flow Diagram Level 2 (add, delete notice)**

Add, delete Committee Member

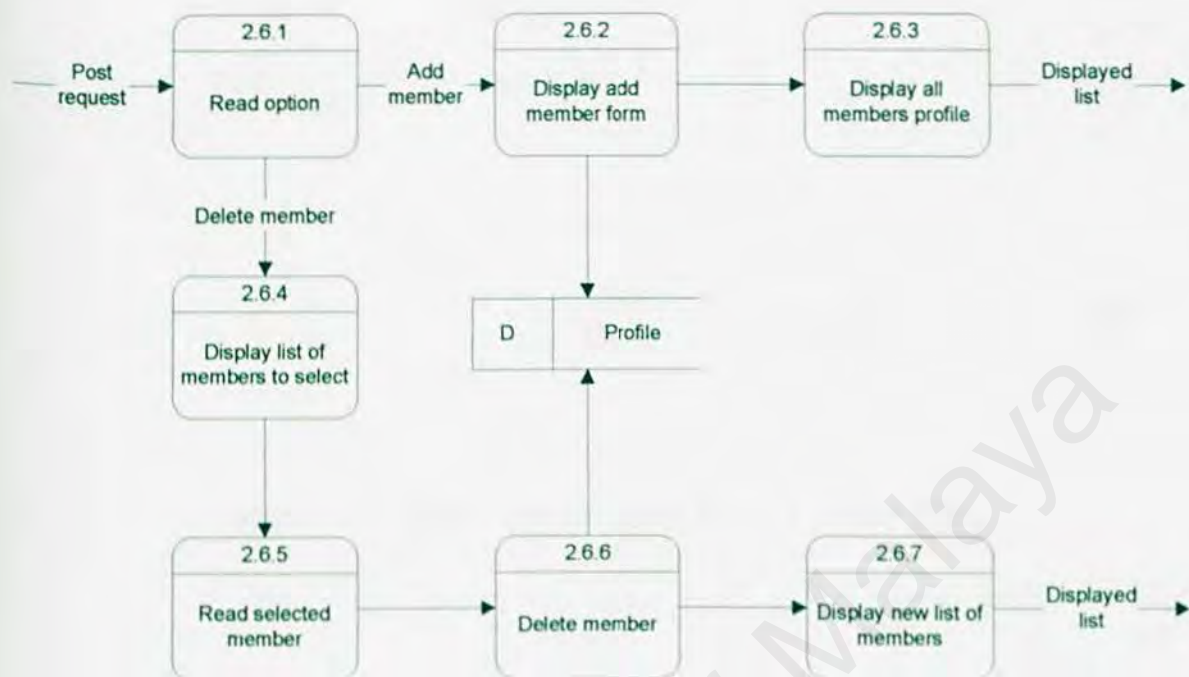


Figure 4.12 Data Flow Diagram Level 2 (add, delete member)

Delete URL in Linking

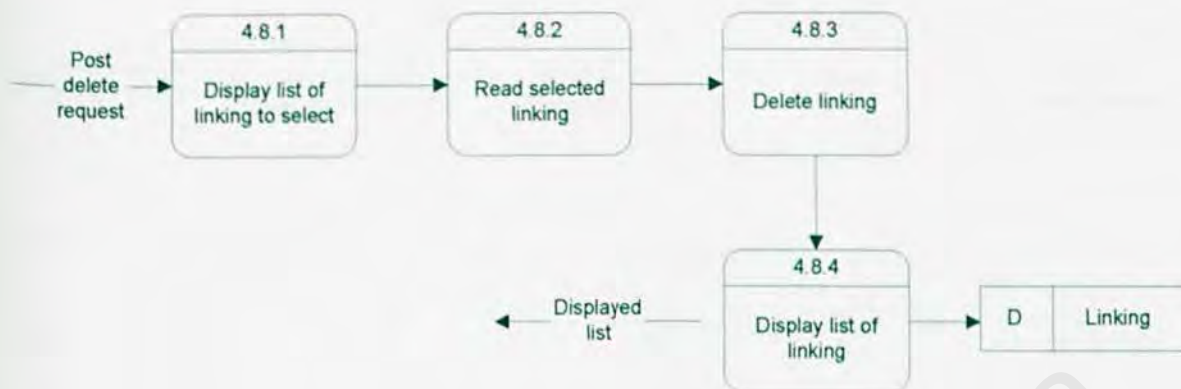


Figure 4.13 Data Flow Diagram Level 2 (delete URL)

Reply Forum's Discussion Topic

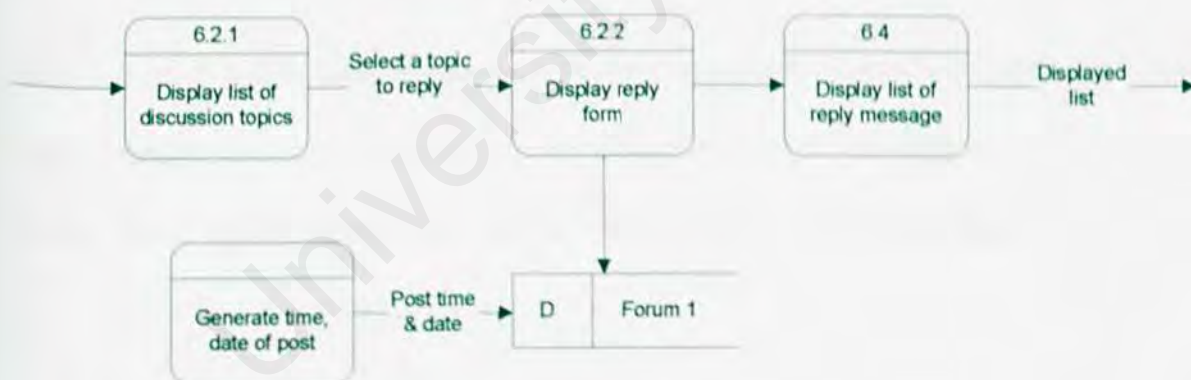


Figure 4.14 Data Flow Diagram Level 2 (Reply Topic)

Change Password

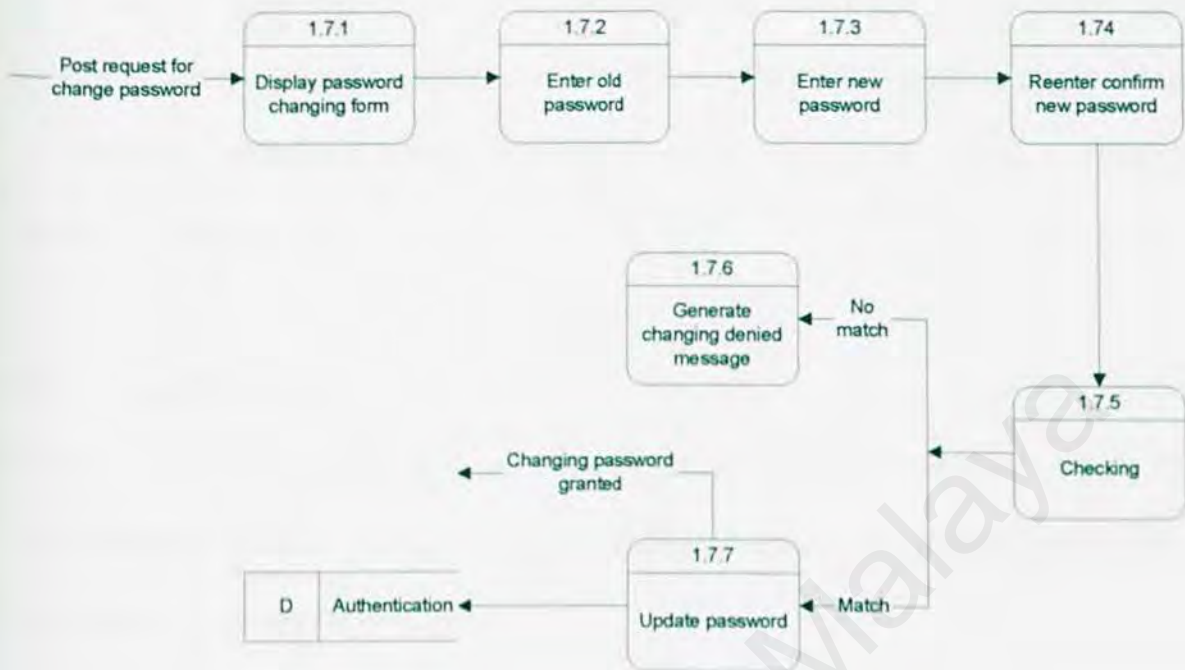


Figure 4.15 Data Flow Diagram Level 2 (change password)

This is a level 2 data flow diagram for change password sub module under the notice board module. The data flow diagram for change password sub module under the web bulletin board and member profile module will be as same as the notice board module.

4.3 Database Design

Data storage is considered by some to be the heart of an information system. A database is a central source of data mean to be shared by many users for variety of applications. The objectives of database design include efficient storage of data as well as efficient updating and retrieval [4].

4.3.1 Data Dictionary

Data dictionary explains the items and fields of the database that used in this project [4]. The following tables are some examples of data dictionary for sections of FSKTM Landscape Committee Homepage.

1. Profile Table

This table stores all the landscape committee members' personal profile.

<i>Field Name</i>	<i>Data Type</i>	<i>Size</i>	<i>Description</i>
ID	AutoNumber	Long Integer	Auto ID
Name	Text	50	Member name
Room	Text	10	Room number
Email	Text	20	Email address
Post	Text	50	Post
Contact	Text	20	Contact number

Table 4.1 Profile Table



2. GuestBook Table

This table used to stores users ideal and comment.

<i>Field Name</i>	<i>Data Type</i>	<i>Size</i>	<i>Description</i>
Name	Text	50	User name
Homepage	Text	50	User web site
Date	Date/Time	15	Sign in date
Message	Memo	---	User message

Table 4.2 GuestBook Table

3. Notice Table

This table stores all the landscape committee up-to-date notices.

<i>Field Name</i>	<i>Data Type</i>	<i>Size</i>	<i>Description</i>
ID	AutoNumber	Long Integer	Auto ID
Name	Text	50	Name
Room	Text	10	Room number
Email	Text	20	Email address
Date	Date/Time	15	Sign in date
Notice	Memo	---	Notice

Table 4.3 Notice Table

4. Linking Table

This table stores the URL in the World Wide Web, which are related to the field of landscape design.

<i>Field Name</i>	<i>Data Type</i>	<i>Size</i>	<i>Description</i>
Address	Text	50	URL
Description	Text	100	Web site description

Table 4.4 Linking Table

5. Suggestion Table

This table stores all suggestion about the homepage.

<i>Field Name</i>	<i>Data Type</i>	<i>Size</i>	<i>Description</i>
Name	Text	50	Name
Date	Date/Time	15	Sign in date
Suggestion	Memo	---	User's Suggestion

Table 4.5 Suggestion Table



6. Main Forum Table

This table stores all the discussion topics.

<i>Field Name</i>	<i>Data Type</i>	<i>Size</i>	<i>Description</i>
ID	AutoNumber	Long Integer	Auto ID
Name	Text	50	Name
Subject	Text	100	Topic title
Smile	Text	50	Location Icon
Date	Date/Time	15	Sign in date
Message	Memo	---	Discussion Content

Table 4.6 Forum Table

7. Replied Forum Table

<i>Field Name</i>	<i>Data Type</i>	<i>Size</i>	<i>Description</i>
Name	Text	50	Name
NewID	Number	Long Integer	ID
Date	Date/Time	15	Sign in date
Message	Memo	---	Discussion Content

Table 4.7 Replied Forum Table



8. Authentication Table

This table stores the login name and password for committee member.

<i>Field Name</i>	<i>Data Type</i>	<i>Size</i>	<i>Description</i>
Name	Text	10	Login name
Password	Text	8	Password

Table 4.8 Authentication Table

4.4 User Interface Design

User Interface is the interaction between the user and the computer system. Therefore, user interface is a very important in presenting the information from the computer system to the user and get the information from the user to be provided to the computer system. The following figures show some example of screen design of FSKTM Landscape Committee Homepage.



Figure 4.16 FSKTM Landscape Committee Main Page



FSKTM Landscape Committee GuestBook - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History Mail Print Edit

Address <http://localhost/lscorne/TMP270dd5gvj.htm> Go

Links [Free HotMail](#) [Microsoft](#) [Fiscone Homepage](#) [My Page](#) [Fiscone Group](#) [Customize Links](#) [Windows](#)

Landscape Committee **E-Corner** Dreamy Faculty You Will Never Walk Alone Universiti Malaysia FSKTM Homepage

Today is Wednesday - 22 August 2001 Best View with 800 x 600 resolution!

Main Page Members Forum Notice Board GuestBook Bulletin Board Suggestions Contact Me 2334 visitors	FSKTM Landscape Committee Guestbook Name: <input type="text"/> Homepage: <input type="text" value="http://"/> Email: <input type="text"/> Message: <input type="text"/> <input type="button" value="Send"/> <input type="button" value="Reset"/>	Committee Member Puan Salmah Mokhtar Mr Teh Yeng Wah Gan Wei Leong Add Member Greeting Card <input type="text" value="123greetings"/> <input type="button" value="go"/> Back
---	--	---

Local intranet

Figure 4.17 FSKTM Landscape Committee Guestbook System



FSKTM Landscape Committee GuestBook - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address: http://localhost/lscione/TMP777/ggqgu.htm

Links: Free HotMail Microsoft Fskione Homepage My Page Fskione Group Customize Links Windows

Landscape Committee E-Corner

Dreamy Faculty
You Will Never Walk Alone

Universiti Malaysia
FSKTM Homepage

Today is Tuesday - 23 August 2001 Best View with 800 x 600 resolution!

Name	Email	Room	Post
Puan Salimah Mokhtar	salimah@fsktm.um.edu.my	D12	Chairman
Mr Teh Ying Wah	tee@fsktm.um.edu.my	D09	Secretary
Gan Wei Leong	gan@fsktm.um.edu.my	---	Treasurer

Committee Member

Puan Salimah Mokhtar
Mr Teh Ying Wah
Gan Wei Leong

Add Member

Greeting Card
123greetings gol

2334 visitors

Local intranet

Figure 4.18 Committee Member Profile

4.5 Summary

This chapter covered all the system design includes database and interface design. The next chapter will discuss about the system and section implementation in detail.

Chapter 5

System Implementation

Chapter 5 System Implementation

The requirement analysis, system design and implementation phases do not have a clear boundary in a software project. Each phase tends to overlap one another. System implementation is a process that converts the system requirements and designs into program codes.

5.1 Development Environment

Development environment has certain impact on the development of a system. Using the suitable hardware and software will not only help to speed up the system development but also determine the success of the project. The hardware and software tools used to develop the entire system are as below:

5.1.1 Hardware Requirements

The hardware used to develop the system are as listed:

866MHz Pentium III Processor

256MB SDRAM

20.4GB Hard Disk

Other standard PC Components

5.1.2 Software Requirements

<i>Software/Software Tools</i>	<i>Purpose</i>	<i>Description</i>
Microsoft Windows 2000 Professional Edition	System Requirement	Operating System (OS)
Internet Information Server 5.0 (IIS)	System Requirement	Web Server Host [Final Stage]
Internet Explorer 5.5	System development	Web Browser
Macromedia Dreamweaver UltraDev 4.0	System development	Coding web pages, layout design and system file creation. Example: *.inc
Microsoft Visual Interdev 6.0	System development	Coding web pages
Macromedia Firework 4.0	System Development	Image design and creation
Adobe PhotoShop 6.0	System Development	Image design and creation
Swish 2.0	System Development	Flash movie
Microsoft Access	System Development	Database (build the database to store and manipulate the data)

Table 5.1 Summary of Software/Software tools Used

5.2 System Development

5.2.1 Methodology

FSKTM Landscape Committee Homepage is developed using a modular approach where each module is developed separately and are integrated later into a fully functional system. For each module, it is further refined into functions and procedures. By using a modular approach, future modifications and enhancements are made easy.

5.2.2 Web Pages Coding

An Active Server Page (ASP) is primarily a scripting environment. Languages used to develop web pages using ASP technology are HTML, VBScript, Jscript (By Microsoft) or JavaScript (By Sun). The challenge of coding in ASP is to determining and separating the HTML source code from the scripting counterpart.

The scripting language used by the ASP application is specified by using the statement `<%@ Language = "VBScript" %>`. This statement is placed at the beginning of the ASP application. The language keyword can be set equal to any supported scripting language, such as Jscript.

There are two types of scripting, which are client-side scripting and server-side scripting. For the client-side scripting, they must be delimited by the `<Script>...</Script>` tags. On the other hand, server-side scripting required the RUNAT attribute set to server so that the script will be executed on the server rather than the client (browser). Another easiest way for server-side scripting is using the script delimiters `<%` and `%>`. Any text enclosed within these delimiters will be processed as a script. Below are two examples of the ASP server-side scripting mentioned above:



```
❑ <Script language="VBScript" RUNAT="server" >

Sub Application_OnStart

Application ("Visitor") = 0

End Sub

</Script>    // This is a script run at server to count the number of visitor.


❑ <% set announment = Server.CreateObject("ADODB.Recordset")

announment.ActiveConnection = MM_Database_STRING

announment.Source = "SELECT Notice, Date FROM Notice order by date desc"

announment.CursorType = 0

announment.CursorLocation = 2

announment.LockType = 3

announment.Open()

announment_numRows = 0

%>    // This is a ASP code to create a notice Recordset
```

Besides scripting language, ASP has the built-in objects and components in supporting the web programming. For examples, there is Request object, Application object, Response object, Session object and others.

The process to develop web pages involves modification and testing of the ASP source code. It involves loading the file in the browser for viewing and validating and then going back to make further changes where necessary using any suitable web editor.



Below are two detail examples of ASP coding that I uses in project.

*' *** Checking the username and password for login*

```
MM_LoginAction = Request.ServerVariables("URL")

If Request.QueryString <> "" Then MM_LoginAction = MM_LoginAction + "?" + Request.QueryString

MM_valUsername=CStr(Request.Form("username"))

If MM_valUsername <> "" Then

    MM_fldUserAuthorization=""

    MM_redirectLoginSuccess="loginSuccess.asp"

    MM_redirectLoginFailed="nomatch.asp"

    MM_flag="ADODB.Recordset"

    set MM_rsUser = Server.CreateObject(MM_flag)

    MM_rsUser.ActiveConnection = MM_Database_STRING

    MM_rsUser.Source = "SELECT username, password"

    If MM_fldUserAuthorization <> "" Then MM_rsUser.Source = MM_rsUser.Source & "," &
MM_fldUserAuthorization

    MM_rsUser.Source = MM_rsUser.Source & " FROM login WHERE username=" & MM_valUsername
&"" AND password=" & CStr(Request.Form("password")) & ""

    MM_rsUser.CursorType = 0

    MM_rsUser.CursorLocation = 2

    MM_rsUser.LockType = 3

    MM_rsUser.Open

    If Not MM_rsUser.EOF Or Not MM_rsUser.BOF Then

        ' username and password match - this is a valid user

        Session("MM_Username") = MM_valUsername

        Session("name") = Session("MM_Username")

        If (MM_fldUserAuthorization <> "") Then

            Session("MM_UserAuthorization") = CStr(MM_rsUser.Fields.Item(MM_fldUserAuthorization).Value)
```




Else

Session("MM_UserAuthorization") = ""

End If

if CStr(Request.QueryString("accessdenied")) <> "" And false Then

MM_redirectLoginSuccess = Request.QueryString("accessdenied")

End If

MM_rsUser.Close

Response.Redirect(MM_redirectLoginSuccess)

End If

MM_rsUser.Close

Response.Redirect(MM_redirectLoginFailed)

End If

%>



<%

*' *** Restrict Access To Page: Grant or deny access to this page*

MM_authorizedUsers=""

MM_authFailedURL="error.asp"

MM_grantAccess=false

If Session("MM_Username") <> "" Then

If (true Or CStr(Session("MM_UserAuthorization"))="") Or _

(InStr(1,MM_authorizedUsers,Session("MM_UserAuthorization"))>=1) Then

MM_grantAccess = true

End If

End If

If Not MM_grantAccess Then

MM_qsChar = "?"

If (InStr(1,MM_authFailedURL,"?") >= 1) Then MM_qsChar = "&"

MM_referrer = Request.ServerVariables("URL")

if (Len(Request.QueryString()) > 0) Then MM_referrer = MM_referrer & "?" & Request.QueryString()

MM_authFailedURL = MM_authFailedURL & MM_qsChar & "accessdenied=" &

Server.URLEncode(MM_referrer)

Response.Redirect(MM_authFailedURL)

End If

%>

5.2.3 Web-Based Development Tools

Macromedia Dreamweaver UltraDev 4.0 is used as the main development tool for this project. This tool enables easy performance of the many complex programming and database tasks required in the creation of the web sites, as well as the incorporation of the HTML formatting layouts, graphics and other multimedia components.

When working on a web site with Macromedia Dreamweaver UltraDev 4.0 and performing tasks like adding to the site or editing any of the existing files, this creates a second copy of the files on the local computer. This is called the working copy. Whenever these working copies are saved, Macromedia Dreamweaver UltraDev 4.0 won't update the file on the server as well, the user must update the file manually.

Graphic is created and designed using Macromedia Firework and Adobe Photoshop. On the other hand, the web pages layout is designed inside the Macromedia Dreamweaver UltraDev.

5.3 Database Connection

The database for FSKTM Landscape Committee Homepage is created using Microsoft Access 2000. By using Microsoft Access 2000, creating and modifying the tables, views and their relationship is made easy.

All communication with a database takes place through an open connection. Before any information can be inserted into or retrieved from the database, a connection with the



database must be opened. Using the Open method to open the connection and close the connection using the Close method.

Below is the simple ASP coding for database connection:

```
<%  
MM_Database_STRING = "DRIVER={Microsoft Access Driver (*.mdb)}; DBQ=" &  
Server.MapPath("\thesis\database1.mdb")  
%>
```


Chapter 6

System Testing

Chapter 6 System Testing

All of the systems newly written or modified application program must be tested thoroughly. Testing is accomplished on subsystem or program modules as work progresses. It is done on many different levels at various intervals. All programs must be desk-checked, checked with test data and checked to see if the section work together with one another as planned before the system is put into used. This chapter gives some description about the testing stage, which involves unit testing, integration testing and system testing.

6.1 Unit Testing

Unit testing technique has been used to ensure that sections fix the bug without side effects. It is also important in verifying that each section meets its specification that has been determined in system design phase. After a new section has been developed, it is normally tested independently in order in assure their accuracy and to detect error in the section. There are three types of testing strategy have been carried out for unit testing which are source code reviewing, test cases and user testing.

6.1.1 Source Code Reviewing

Source Code Reviewing is a basic method used for testing purpose. The codes are examined line by line in order to make sure that any concealed semantic errors during the implementation could be revealed. In reviewing the source code, the correctness of coding was identified by comparing with the original design of the program flow. When



the logic and flow of the program were identified, comments were inserted into the sections of the code tested to ensure it can be easily traced in the future.

The flow and logic of the code was also traced and debugged to detect any errors in the coding. The debugging and tracing of ASP code were done with a few methods such as following:

1. Use the oldest method of debugging that is print out command (Response.write) to display output when error is detected. For example:

```
<%
```

```
    If IsNull (testvalue) then
```

```
        Response.write "Error"
```

```
    End If
```

```
%>
```

2. The print out command is also used to display a counter especially for identifying error inside a loop. For example:

```
<%
```

```
    Do While Variable <10
```

```
        Response.write Variable
```

```
    Loop
```

```
%>
```

However, if the code is simple and written with full of confidence, using this technique to test the code is just a redundant work.

3. One of the possible errors can be found in source code related to database access is the presence of empty record set. Empty record set would generate error when it is processed. Therefore some checking statement must be entered to test the record set. For example:

If (RecordSet.EOF and RecordSet.BOF) is true then the record set is empty.

6.1.2 Test cases

Besides reviewing the source codes, some test cases also have been used to test the system. This approach is used as some set of structural input is given and output is observed. This strategy is needed to identify the variance between the prototype and the requirement. In this testing, different test data is input into the program. For example, one of the sections tested is member section. All the input data required by the Add new member function were entered and submit. All the record in the database were checked and verified to ensure that they are same as the input data. The data is then output to the screen using the application function to make sure the data were displayed correctly. The input data were again entered into the application but deliberately left out some required field empty. As the result, the application was able to detect the empty field and generate the error message. Different field was selected in turn to test out. The system is able to detect this error for each required field. With this, the reaction of the program to the input

data could be tested. However, the JavaScript has been used in the client side to make sure the user enters all the required fields before send to the database.

6.2 Integration Testing

After all the sections were tested and met their specification and requirement, they were integrated into FSKTM Landscape Committee Homepage section by section. Integration testing was carried out in order to identify any fault and failure caused by the integration as well as to review and rectify the correct path of the system flow. It also aims to ensure the components of the system would support each other.

During the integration, all the section prototypes were combined and tested section by section in a testing environment. The testing environment was consistent for all the sections in terms of interface, data field, and system functions. The program flow and the testing needs for each of the sections were reviewed and tested. After that, the entire system was tested with some test cases. Finally, the system is published to let the other users to test it. The development of the FSKTM Landscape Committee Homepage is divided into sections and then all the sections are integrated as one main system. Therefore the bottom up approach has been used as the integration testing method.

6.3 System Testing

Last but not least, the system as a working whole must also be tested. This includes testing the interfaces between subsystems, the correctness of the output, and usefulness

and understandability of system documentation and output. The system testing is performed to ensure that the entire application, of which the modified program was a part, still works. It is used to test the integrated system and verify whether it meets the specified requirements.

As a conclusion, the system testing process can be illustrated as figure below:



Figure 6.1 System Testing Process

6.4 Summary

Testing is done throughout systems development, not just at the end. Although testing is tedious, it is essential series of steps that helps assure the quality of the eventual system. The following chapter will discuss about the project evaluation and some problems encountered throughout the project development.

Chapter 7

System Evaluation

Chapter 7 Project Evaluation and Problem encountered

Throughout the system life cycle, users have been evaluating the evolving information systems and networks in order to give feedback for their eventual improvement. This chapter will discuss some evaluation technique, system strength, system constraint, and problem encountered throughout the project development.

7.1 System Evaluation

The end product of the project is brought up for evaluation after the system implementation of the FSKTM Landscape Committee Homepage. Several evaluation techniques have been used for evaluating the final system such as user evaluation that emphasizes implementation problems and user involvement. Furthermore, evaluation following implementation allows the users to acquire ideas about how to proceed with future systems projects. From the user's result, most users are satisfied with the function provided by this system. The following section explains in detail about the system strength and its constraints and problems encountered throughout the development of FSKTM Landscape Committee Homepage.

7.1.1 System Strength

- ❑ Online update function

FSKTM Landscape Committee Homepage does on-line content update function for administrator to enter up-to-date information for the web site. Thus it is a dynamic web site which can provides later information for the faculty students.



❑ Web Enabled

FSKTM Landscape Committee Homepage is a web-based application. Therefore, it can be accessed easily using the web browser. Beside, It also using the client server approach that allows processing load to be shared between the client and the server, thus reducing the burden on the server and better service could be provided.

❑ Simplicity and user Friendliness of User Interface

The graphic interface design of the system is quite similar to the GUI of the window environment, this it ensures user friendliness of the system. As a result, the system will be easy to use and convenient for the users.

❑ Custom Password System

Creating a custom password-authentication system prevents unauthorized users from viewing pages that they don't have permission to access.

❑ Validation of the Input Field

This system posse's comprehensive error detection feature to ensure that only valid input is being passed to the server and it is done through client-side scripting.

❑ **Reliable System with Effective Error Recovery**

This is a reliable system as it caters for almost any possible errors encountered. Server side scripting will generate feedback or redirect appropriate page to user when error occurs. For example, a username and password verification failure is handled by the system and a user-friendly page is showed to inform the user about the error.

❑ **Relatively Fast Response Time**

The web pages are designed in such a manner that they are loaded in reasonable amount of time to ensure users need not wait too long to view the pages. Heavy graphics are avoided and the JavaScript and CSS (Cascading Style Sheet) are used together to design the layout instead of graphic.

7.1.2 System Constraints

This system is limited to certain platform in terms of openness. It support Windows 95/98/NT/2000/XP and Internet Explorer 4.0 or above. This limitation is the usage of DHTML and <marquee> tag in the system, which is not recognized by other browsers such as Netscape.

7.1.3 Future Enhancement

Some functionality of the system can be enhanced in order to improve the quality of the system. The following are the functionality that can be enhanced for this system.

❑ Maintenance of User Interface

The web page design for FSKTM Landscape Committee Homepage should be modified after a certain period to give the user a fresh and better look.

❑ Enhancement for functionality of sections

For example, the landscape picture section could be enhanced by considering the user can post their comment for each picture, which modified by the student or committee member.

❑ Add new sections

More new sections could be added into the FSKTM Landscape Committee Homepage to make it more completely and more powerful. New section such as committee meeting schedule, etc could be added.

❑ Support Other Browser

As stated, this system requires Microsoft Internet Explorer 4.0 and above for execution. In future, it can be turned to fulfill other browser requirement such as Netscape Communicator or Operas for execution. This is because Netscape has a sizeable share in the browser besides Internet Explorer.

- ❑ Language Support

Future enhancement for FSKTM Landscape Committee Homepage will include language support. This will enable information to be displayed in different languages like Malay, Chinese, Tamil or others.

7.2 Problem Encountered

Many and various problem was encountered during the development of the FSKTM Landscape Committee Homepage. Some of them could be solved through certain solution while others were not. The problems that encountered can be divided into system and section. The following are some of the problems that arise during the development process.

7.2.1 System Problems

- ❑ Changes of User Requirement

It is very difficult to develop and implement the system as the user requirement changes frequently. Sometimes it is easy to change the requirement. However, the coding needs to be changed in order to adapt the new requirement will require a lot of task.

- ❑ Set up and Configuration

Setting up a server is critical for the operation of the application developed. However, the setup process takes a lot of time due to the lack of experience.

Beside that, repeated failure of the server does require re-installation of the server consumed a lot of time and effort.

7.2.2 Sections Problems

❑ Main Page

For the design of the main page, it is a troublesome due to the lack experience of using the graphic software such as Photoshop or Macromedia Firework.

Solution: Therefore, a Macromedia Firework reference book has been borrows from my friend as a guide of using this graphic program.

❑ Counter

When the user clicks the refresh button or click the home button, the counter will be increase again.

Solution: The cookies have been used to store the status of the current user. The counter won't be increase unless close the browser and then open again.

❑ Picture upload function

It's very hard and difficult to write the ASP source code for upload the picture to the server because the complexity of the coding.

Solution: Therefore, a simple of upload function coding has been downloaded from the web site. Some modification was added to the downloaded source code, so that it can compatible with the FSKTM Landscape Committee Homepage.

7.3 Knowledge Gained

A lot of knowledge had been gained through the entire development of the FSKTM Landscape Committee Homepage. The following are some of the knowledge that has been gained throughout this project.

7.3.1 Setting up different kind of server

An opportunity for setting up the Windows 2000 and IIS 5.0 could be experienced through the development of FSKTM Landscape Committee Homepage. Besides that, a better understanding on how to manipulate the Microsoft Access also has been achieved. Several discussions have been held in solving the difficulties.

7.3.2 Additional knowledge of Using Software Tools

Throughout this project, knowledge had gained on how to write two new languages, which are JavaScript and ASP using VBScript. Beside, the knowledge of using the powerful graphic software such as Macromedia Firework and Adobe Photoshop also had been learnt. Flash movie software was also applied to design the interface of FSKTM Landscape Committee Homepage.

7.4 Summary and Conclusion

Overall, FSKTM Landscape Committee Homepage has achieved and fulfills the objectives and requirements as a web based system that provide effective and efficient



communication facility to assist the operation and management of the FSKTM Landscape Committee.

Finally, all the problems faced and experiences gained during the system development should be useful in the future endeavors. This is because the era is now moving towards Internet technology that requires decent knowledge in Internet programming including the knowledge in deploying the network systems and functionality.

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Acronyms

ADO	Active Data Objects
API	Application Program Interface
ASP	Active Server Page
CFML	ColdFusion Markup Language
CGI	Common Gateway Interface
DFD	Data Flow Diagram
FSKTM	Faculty of Computer Science and Information Technology
GUI	Graphic User Interface
HTML	Hyper Text Markup Language
IIS	Internet Information Server
IS	Information System
ISP	Internet Service Provider
LAN	Local Area Network
MMC	Microsoft Management Console
NIC	Network Interface Card
ODBC	Open Database Connectivity
OLAP	Online Analytical Processing
OOP	Object Oriented Programming
PERL	Practical Extraction and Report Language
PL/SQL	Procedural Language/ Structure Query Language
PWS	Personal Web Server
RDO	Remote Data Objects
SEED	Smart Extended Education
SQL	Structure Query Language
TCP/IP	Terminal Control Protocol/ Internet Protocol
WAN	Wide Area Network
WWW	World Wide Web