FACULTY OF COMPUTER SCIENCE AND
INFORMATION TECHNOLOGY

UNIVERSITY MALAYA

MEETING SUPPORT SYSTEM

Name : Hon Tian Yang
Metrics No : WEK 98014
Supervisor : Pn. Salimah Mokhtar
Moderator : Cik Nor Aniza

Abstract

This final year project is compulsory for all student of Faculty of Computer Science and Information Technology, University Malaya to graduate, and hoping that with this final year project, students can expose to the real working life environment.

This project will provide with an attractive and user-friendly interface that can be used by officers and lecturers in FSKTM for preparing and initializing meeting purposes. The project was carried out based on the *Prototyping Model* approach. This approach was selected because it is able to represent the numerous activities needed to develop this project. Besides, it has a systematic structure that can guide you through the development of the project. The development tools for this project are Microsoft Visual Interdev 6.0, Microsoft Personal Web Sever 4.0, VBScript, Adobe Photoshop and so on. Microsoft Visual Interdev is used to build web pages for up loaded to Internet using ASP and HTML. Microsoft Personal Web Sever 4.0 and Microsoft Access are used for prototyping development where as images editor such as Adobe PhotoShop 5.0 is used for web page design.

Acknowledgement

First and foremost, I would like to thank to my supervisor, Puan Salimah Mokhtar for her guidance, suggestions and advice throughout the process of preparing the proposal and report. Not mentioning her kindness in spending her time checking out the mistakes in my report and proposal. I would like to thank my moderator Cik Nor Aniza for her useful and valuable advises to my project.

Special thanks to Cik Agnas for her important information about the meeting sequences in FSKTM. Not forget for the FSKTM officers and lecturers who had kindly filled up the questionnaires for me. They had provided valuable information and data for this project.

Lastly, I would like to express my sincere gratitude to Mr Tan Poh Seong for his advice, ideas and supports to help me to complete the report.

Table of Contents

Chapter 4: System Design

Chapter 5: Implementation

Chapter 6: System Testing

List of Figures

List of Tables

Chapter 1:

Introduction

Chapter 1: Introduction

1.1 Project Overview

This project is intended to assist staffs and lecturers in Faculty of Computer Science and Information Technology in initializing and preparing meetings. It aims to provide a robust and efficient meeting support system using a web development tool, Microsoft Visual Interdev, with a back end database to manage the data storage. The main focus of this system is to computerize the process of initializing meeting, preparing minutes, communicating with committee and so on. This project consists of several components that are listed below:

1. Reminder System
2. Search Engine for Data Retrieval
3. Online Minutes Tool
4. Discussion Board
5. Announcement
6. Meeting Schedule
7. Others Supporting Tools

During the development of the project, the principles of Prototyping Model will be deployed. The requirements for the system in this project will be collected using questionnaire, interview or through the study of existing system. Besides, printed and electronic data is collected from the Internet, books, articles or journals. Prototyping will be used as development methodology.

1.2 Problems Definition

When a meeting needs to be initialized, the secretary is responsible to prepare a minute about the topics that will be discussed in the meeting. To do this, he/she has to refer to the previous minutes that could be store manually in printing paper or in computer. However, to find out the relevant data is very time-consuming especially if the data is stored in paper work.

After the minute is ready, the secretary has to make a copy to every attendees of the meeting. Problem will occur if there are not enough printed minutes for every attendee especially when there are any emergency changes of the meeting. This will probably cause a delay to the meeting.

The secretary also has to contact every attendees of the meeting about time, place and topics of the meeting. If there are any changes of the meeting such as changes in time and place, he/she has to contact the attendees to make sure that they know about the changes. Sometimes, he/she has to remind the attendees again about the meeting. For example, the officer in FSKTM will email to the attendees once again one day before the meeting. This is an extra work and may cause a problem if the officer forget about it. Besides, if an attendee need some newest information about the meeting, he has to email or phone to the secretary to get the information. If the secretary is not around, the attendee could be missed out of the meeting or any important information that could be useful during the meeting. Instead, it is very inconvenience and not efficient at all.

1.3 Objectives

Based on the definition of problems, objectives of this project are set out:

- Computerized all the data such as members details, minutes and so on in a standard database
- Able to track and retrieve the data effectively
- Computerized the process of preparing and separating a minute
- The minutes can be shown directly using a projector
- Using electronic meeting for eliminating the troublesome process of preparing a meeting
- A reminder is prepared to remind the committees members about the relevant meeting
- Strong security features - The user login password has its own privilege, 'user' or 'administrator'. The user with 'administrator' privilege can renew and modify the data in the database

1.4 Relevance and Significance

This project is relevant because the faculty really need an effective approach to help them to manage the meeting preparation work that has become more and more frequent recently. The system that used by the faculty currently is not systematic and efficient because many of the systems that use in meeting support is stand-alone program. Besides, the functionality of the program is not enough to support the meeting procedures.

An online meeting support system will totally increase the effectiveness of meeting management in our faculty. By applying the web technology, the project aims to make the system not only able to suit for the current situation but able to cater the future need as well.

1.5 Project Schedule

Project management is very important for the success of a project. A successful software project can be developed only if the developer understands the scope of the project, objectives of the project, task to be accomplished and the schedule to be followed.

Project Planning

- Defines the problem of the current exist method of initializing a meeting
- Determines the object and scope of the project
- Determines the development strategy approach

Project Estimation and Scheduling

- Identifies the tasks that need to be accomplished for each of the phases
- Estimates the time need for every tasks and phases

Project Monitoring

- Tracking and control activities are being done after the development schedule has been established
- If the tasks fall behind schedule, the management of schedule slippage on immediate project is determined and necessary action or adjustment made to solve the problems

There are varieties of techniques available for depicting and documenting projects plan. The plan can be presented in graphical or text report. A Gantt chart is a graphical representation of a project that shows each task activity as a horizontal bar whose length is proportional to its time for completion. Gantt chart are often more useful for depicting relatively simple projects. A PERT chart is a graphical depicting of project task activities and their inter-relationships. Gantt chart has been chosen to depict the project plan for this project.

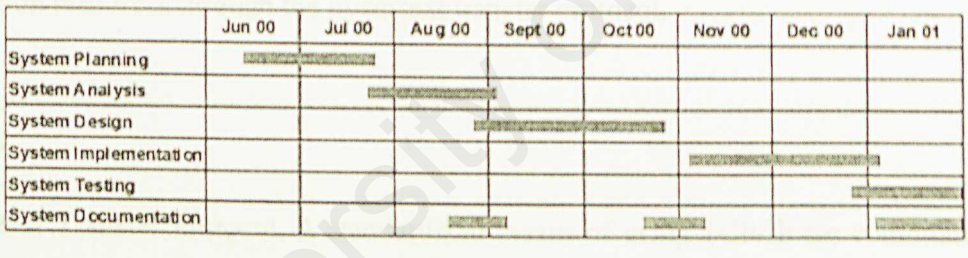


Figure 1.1 Project schedule

1.6 Glossary of Terms and Acronyms

Networks

Comprise the Wide-Area-Networks (WAN), Local-Area-Networks (LAN) and Wireless Networks.

Internet

Are more specifically its World Wide Web (WWW or the Wed), may be such a transforming technology. A worldwide, public network of computer that communicate using TCP/IP.

WWW

World Wide Web. A collection of Internet sites that offer text and graphics and sound and animation resources through the hypertext transfer protocol.

HTTP

Hypertext Transfer Protocol. A standardized means of using TCP/IP for communicating HTML documents over networks.

Browser

A program that accesses and displays files available on the World Wide Web.

HTML

Hyper Text Markup Language. A standardized system of tagging text for formatting, locating, locating images and other non-text files, and placing links or references to other documents.

Browser

A program that accesses and displays files available on the World Wide Web.

ODBC

Open Database Connectivity. An interface by which application programs can access and process SQL databases.

SQL

Structure Query Language. A language for defining the structure and processing of a relational database.

JScript

A scripting language in Visual Interdev 6 with using the format same as application Java.

VBScript

A scripting language in Visual Interdev 6 with using format same as application Visual Basic.

GUI

Graphical User Interface. An interface having windows, graphical symbols pop-down menus, and other structures that are often manipulated with a mouse pointer.

URL

Universal Resource Locator. The address of the file on the Internet.

Chapter 2:

Literature Review

Chapter 2: Literature Review

2.1 Purpose

Review of literature is a background study about the knowledge and information gained to develop this project. The purposes of literature review are to get a better knowledge on the development methodologies and to get a better understanding on the development tools that can be used while developing a project.

In addition, literature review also enables the developer to do comparison on the past-developed projects and studies the strength and weakness of it. It will also give an overview of how to improve the weakness and fulfill the requirements needed.

2.2 Approaches

A system is regularly interacting or independent group of elements forming a unified whole. Thus, a system is a collection of related parts treated as a unit where its components interact. To develop a system, a lot of information need to be gathered about system itself. Therefore, information has now moved to its rightful place as a key resource. In order to maximize the usefulness of information to a system, it must be managed analysts correctly. [1]

There are number of ways of gathering information from the users. One way is through interviews. Another is to use questionnaires. The third way is through observing decision-maker behavior and office environment. Underlying all of the data-gathering methods of investigation, system analyst can make these decisions based on a structured

approach, which is called sampling [2].

In this project, many books and references were used as a guild and to gain information as well as a better idea of how to develop the system. Beside that, questionnaires and interviews were done to gain information on system development and requirements.

Apart from that, the Internet was surfed and information was gathered from various sites. Search engines that were used to gather all information include MSN Search Engine, Yahoo Search Engine, InfoSeek Search Engine and Altavista Search Engine. The keywords that were used for these searches are listed below:

- Client-Server Architecture
- Meeting Support
- Meeting System
- Meeting Manager
- Meeting Help
- Microsoft IIS
- Microsoft InterDev
- JSP
- VBScript
- ASP
- Windows NT
- SQL Server and so on

2.3 Data Findings

All the gathered resources were either from printed resources or electronic resources. Printed resources are inclusive of books, notes, journals and so on while electronic resources is the web sites which are found by using keywords mentioned above on the search engine.

2.3.1 Computer

Computer nowadays is being widely used in our daily activities with or without our realization. In other words, computer has become part of our life. Computer is having continuously increasing influence and today, it is almost impossible to ignore it. It also has the ability to remember and to make what appear to be logical decisions. The general benefit of using computer may be summarized as follows:

1. Speed

A special feature of the computer is its speed of operation. Calculations are performed and decisions made in fractions of a second, a million of seconds is not unusual. This is something that human being incapable of doing even comprehending.

2. Accuracy

The computer can handle data and continue to handle it in such manner as to maintain accuracy and its standard of performance.

3. Retrieval of Information

The computer can maintain full historical records with a rapid access. Masses of information can be searched in a very small space within several seconds. Considerable

research is being carried out with a great measure of success into the construction of memory units where information is stored by using laser beams both to read and write information.

4. Handling Complex Problems

Tasks may be performed that are of almost infinite complexity, in fact as complex as the human brain can comprehend. If it were not for computers, human's progress into the outer space would be almost impossible. These benefits are what make computer unique in the business world and make it possible to control certain areas of business activity that have been previously uncontrolled because of the excessive cost of clerical labor.

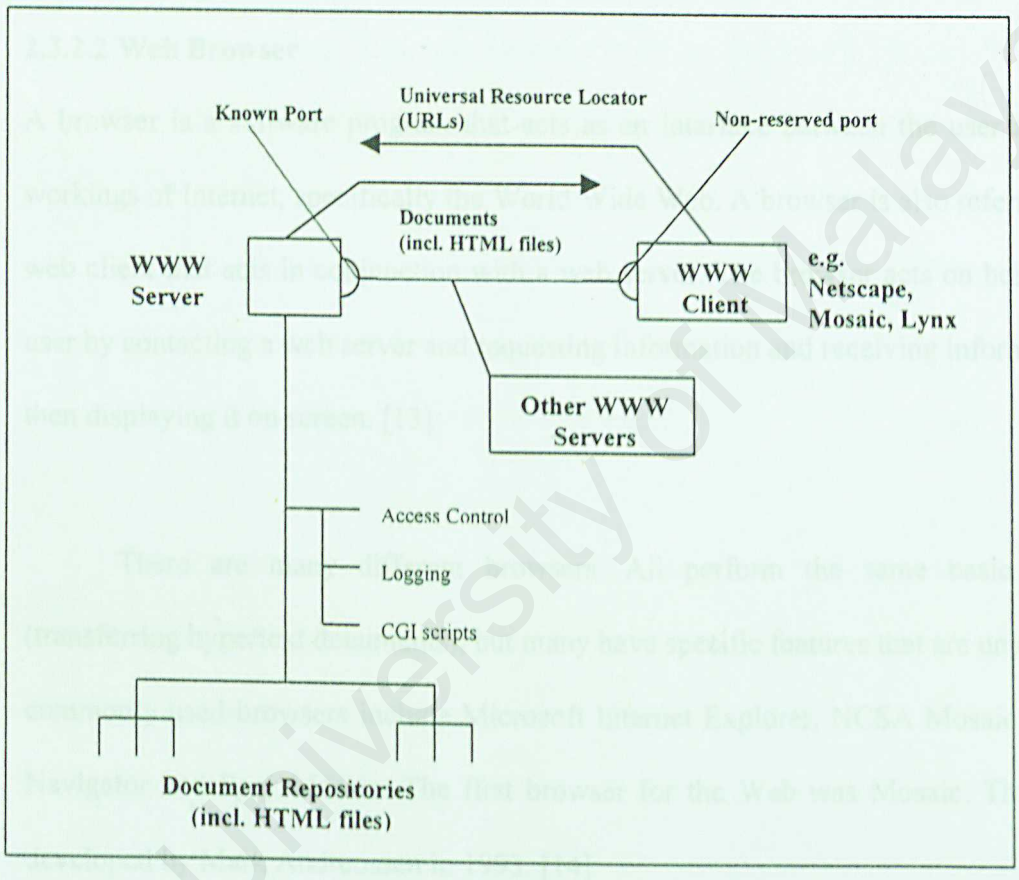
2.3.2 The World Wide Web (WWW)

World Wide Web is grew from a specific need in a very specialized research area – high-energy physics (HEP). The original design of WWW implemented very specific elements of hypertext theory at the time. It utilized "chunk style hypertext" which simply connects chunks of text by alternate choice. The user or reader moves through it by reading one chunk and then choosing the next. It also emphasizes the concept of "transclusion", where elements of a document physically reside in multiple locations, but give the appearance of a single document.

WWW operates by means of the client-server model. This paradigm forms the basic of most network communications on TCP/IP. The functionality of the client-server

model depends on the use of protocol port. In this model, a server waits for requests at a well-known port that has been reserved for the service. A client allocates an arbitrary, unused, non-reserved port for its communication whenever it makes a request. In this interaction, only one of the two ports needed for the communication needs to be reserved and servers are able to handle multiple requests simultaneously. Further discussion about the client-server computing will be discussed later in this chapter.

Figure 2.1 The WWW Client-Server Model



WWW was readily accepted by the High Energy Physics community. However, the universal appeal of its goals and its success was quickly recognized by a community far larger than HEP. The growth and widespread availability of WWW suggests that audience include persons from many walks of life with many different motivations. The Web provides a mechanism for individuals to publish and share their works, both literary

and artistic. Personal homepages allow persons to publish their photographs, their interests, and even their voices. Commercial web sites allow entrepreneurs the opportunity to reach entirely new audiences. [3]

2.3.2.1 Web-based application component

Developing the web-based application relies on many network and application components working together to deliver the information to the requesting client.

2.3.2.2 Web Browser

A browser is a software program that acts as an interface between the user and inner-workings of Internet, specifically the World Wide Web. A browser is also referred to as a web client that acts in conjunction with a web server. The browser acts on behalf of the user by contacting a web server and requesting information and receiving information and then displaying it on screen. [13]

There are many different browsers. All perform the same basic functions (transferring hypertext documents), but many have specific features that are unique. Some commonly used browsers include Microsoft Internet Explorer, NCSA Mosaic, Netscape Navigator and Spry Mosaic. The first browser for the Web was Mosaic. This browser developed by Mark Andreossen in 1993. [14]

Browser can be text-based or graphical. A graphical browser allows the user to see more of what the WWW has to offer (graphics, photographs and multimedia) and can make the Internet easier and more intuitive to use.

A text-based browser allows a user to see only text. Graphic elements are not displayed. Hypertext links are accessed by using the keyboard rather than a mouse. LYNX is an example of a text-based browser. [13]

2.3.2.3 Web Server

A web server is a software program running on a computer connected to the Internet. The term 'web server' is also used sometimes to refer to the computer on which the software is running. More often, the computer is called a server and is running more software than just web server software. Example of web server are Microsoft Internet Information Server (IIS) for Windows NT, Personal Web Server (PWS), Apache and so on.

The purpose of a web server is to respond to the requests for WWW files. When surfing the WWW, requests are sent to the web servers. The servers are sending back various files that are used to construct the web pages.

The web server acts as an intermediary when a web browser tries to access the information that stored in a database. The web server accepts the query from the browser and passes the query to the database server. Then, the result is sent back to the web browser which is in HTML format. [15]

2.3.2.4 Database Server

The database server plays a vital role in Internet application development. The database server can be used to store, search, and retrieve information that are stored in a database. This same database that distributes to Web users can also be accessed and maintained from within corporate walls.

When using the HTTP server as a connection utility to the database, there will have three components in the architecture. [16]

1. The requesting browser
2. Web Server
3. Database Server

The browser is responsible for submitting query requests and displaying the results from the database. The Web server is responsible for accepting the query from the browser, creating a connection to the database, querying the database, formatting the results into HTML, and delivering the HTML to the requesting browser. The database server is responsible for accepting requests from the Web server and delivering results back to the Web server.

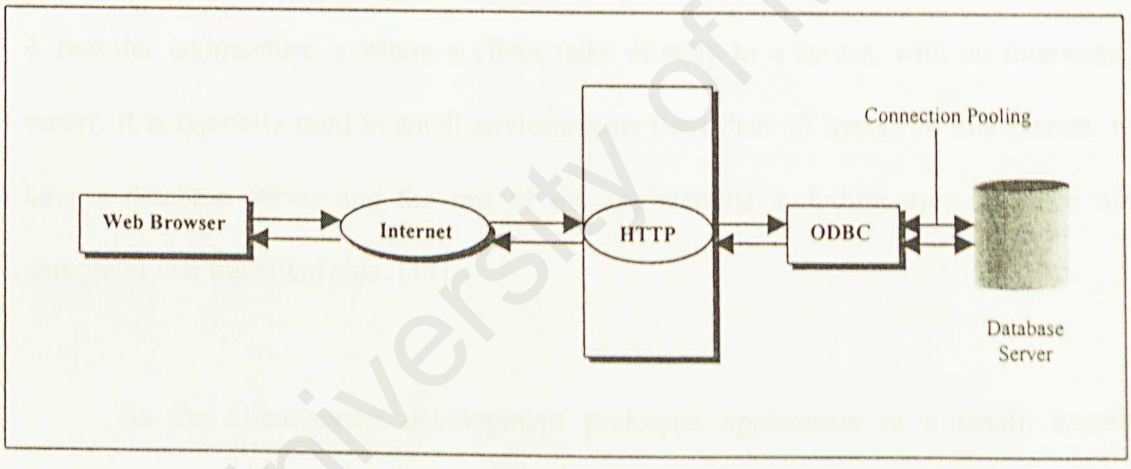


Figure 2.2 Interaction among requesting browser, web server and database server

2.3.3 Client-Server Computing

Client-Server computing is the logical extension of modular programming. Modular programming has as its fundamental assumption that separation of a large piece of software into its constituent parts ("modules") creates the possibility for easier development and better maintainability. Client/Server computing takes a step farther by recognizing that those modules need not all executed within the same memory space. [6]

2.3.3.1 Client-Server Architecture

The client-server model has evolved from a two-tier architecture to three-tier and multi-tier architecture.

Two-Tier Architecture

A two-tier architecture is where a client talks directly to a server, with no intervening server. It is typically used in small environments (less than 50 users). In this system, we have a database server and the rest of the applications including user interface runs completely on the client side. [17]

As the client-server development prototype application in a small, two-tier environment and then scale up by simply adding more users to the server, it will usually result in an ineffective system when the server becomes overwhelmed. To properly scale up to hundreds or thousands of users, it is usually necessary to move to a three-tier architecture.

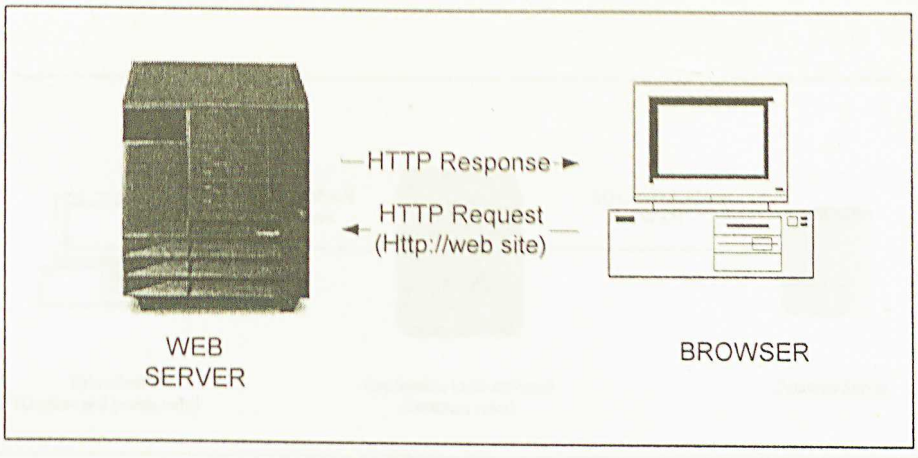


Figure 2.3 Two-tier Architecture

Three-Tier and Multi-Tier Architecture

A three-tier architecture introduces a server (or an "agent") between the client and the server. The role of the agent is manifold. It can provide translation services (as in adapting a legacy application on a mainframe to a client-server environment), metering services (as in acting as a transaction monitor to limit the number of simultaneous requests to a given server), or intelligent agent services (as in mapping a request to a number of different servers, collating the results, and returning a single response to the client. [10]

In multi-tier architecture, each of the major pieces of functionality is isolated. The presentation layer is dependent of the business logic, which in turn, is separated from the data access layer. This model requires much more analysis and design on the front-end, but the dividends in reduced maintenance and greater flexibility pays off. This model exhibits a much thinner client by bringing some processing tasks back to the server.

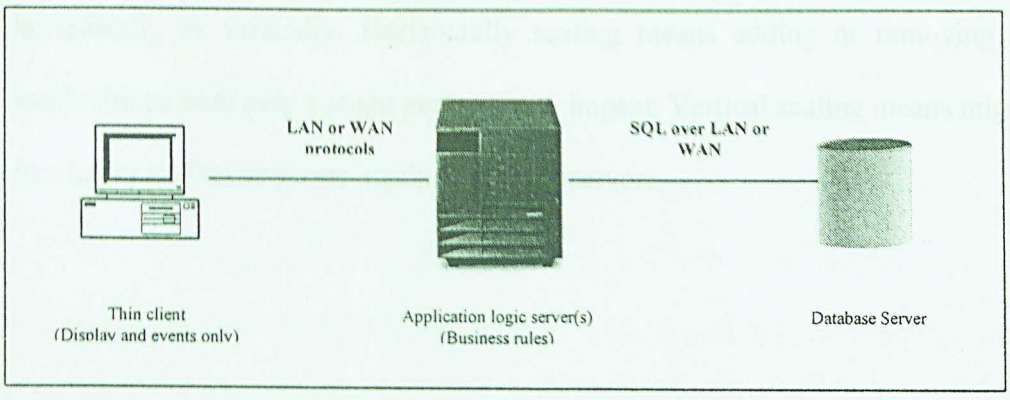


Figure 2.4 Multi-tier Architecture

Characteristics of Client-Server Architecture

The basic characteristics of client-server architectures are [18]:

1. Combination of a client or front-end portion that interacts with the user, and a server or back-end portion that interacts with the shared resource. The client process contains solution-specific logic and provides the interface between the user and the rest of the application system. The server process acts as a software engine that manages shared resources such as databases, printers, modems, or high powered processors.

2. The front-end task and back-end task have fundamentally different requirements for computing resources such as processors speeds, memory, disk speeds and capacities, and input/output devices. The environment is typically heterogeneous and multi-vendor. The hardware platform and operating system of the client and server are not usually the same. Client and server processes communicate through a well-defined set of standard application program interfaces (API's) and RPC's.

3. An important characteristic of client-server systems is scalability. They can be scaled horizontally or vertically. Horizontally scaling means adding or removing client workstations with only a slight performance impact. Vertical scaling means migrating to a larger and faster server machine or multiservers.

2.4 Questionnaire

Questionnaires are an information-gathering technique that allow systems developer to gather attitudes, beliefs, behaviors, and characteristics from several key people in the organization who may be affected by the current and purposed systems. Attitudes are what people in the organization say they want (in a new system, for instance); beliefs are what people thick is actually true; behavior is what organizational members do; and characteristics are properties of people or things.

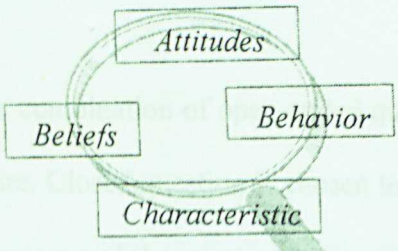


Figure 2.5 Kinds of information sought when using questionnaires

Planning For the use of Questionnaires

At first glance, questionnaires may seem to be a quick way to gather massive amounts of data about how users access the current system, what problems they are experiencing with their work, and what people expect from a new or modified system. While it is true you can gather lots of information through questionnaires without spending time in face-to-face interviews, developing a useful questionnaire takes extensive planning time in its own right.

Here are some guidelines to help to decide whether use of questionnaires is appropriates. Consider using questionnaires if:

i. The people you need to question are widely dispersed.

ii. There is a large number of people involve in the systems project and it is meaningful to know what proportion of a given group approve of a particular feature of the proposed system.

iii. You desire to do problem sensing so that any problems with the current system are identified and addressed in follow up interviews.

In this project, the combination of open-ended questions and closed questions are chosen in the questionnaire. Closed question is chosen to limit the option available to the respondents to control the scope of the question. Open-ended question is chosen to gather all possible responses from the respondents.

2.4.1 The respondents

All the lecturers and officers in FSKTM are potential users for this system.

2.4.2 Questionnaire Results

Questionnaires were distributed to the respondents in FSKTM and the gathered results were analyzed and tabulated.

2.4.2.1 Problems when attending a meeting

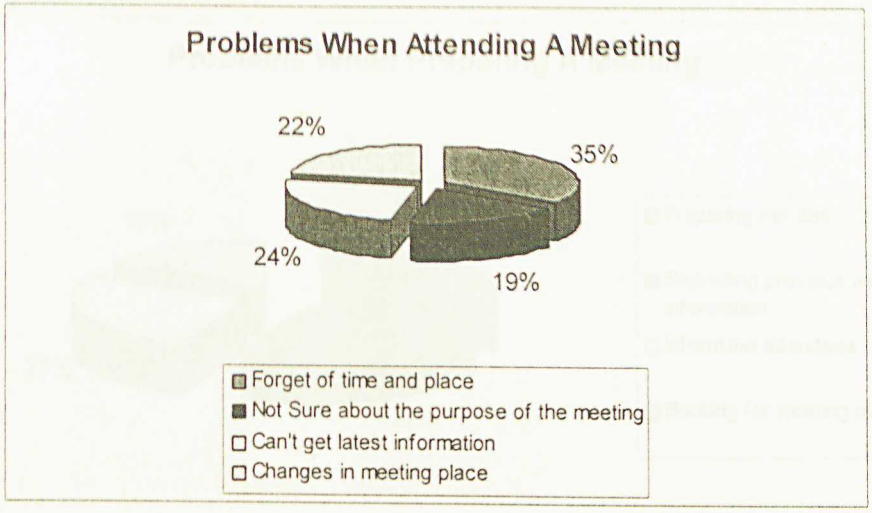


Figure 2.6 Problems when attending a meeting

Majority of the respondents felt that the most popular problem while attending a meeting is forgot about the time and meeting place. Mean while, one fourth of the respondents complain that they can't get the latest information before the meeting start. 22% of the respondents complain of the suddenly changes in meeting place and minority not sure about the purpose of the meeting.

2.4.2.2 Problems when preparing a meeting

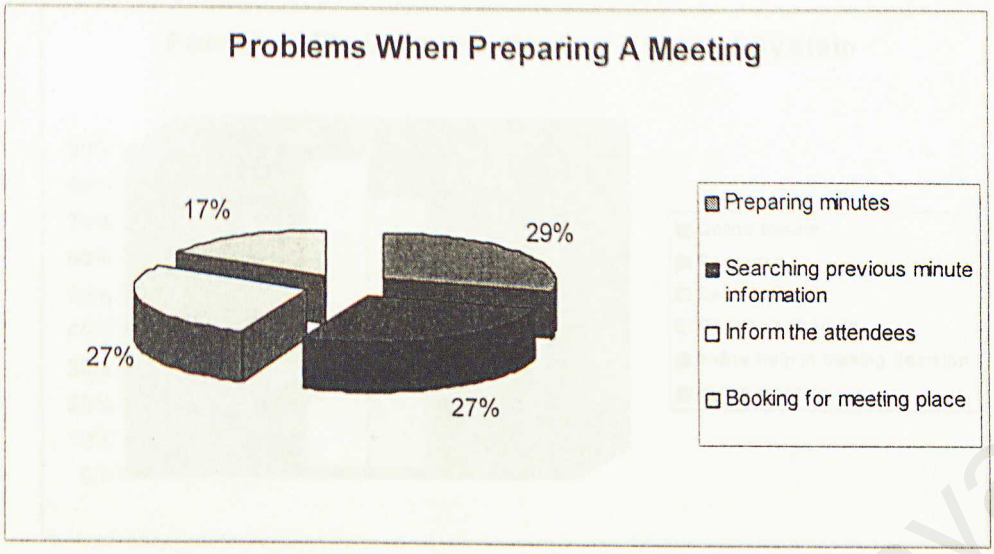


Figure 2.7 Problems when preparing a meeting

Among the four problems listed in the questionnaire, 29% of the respondents felt that preparing minutes is very troublesome. This is followed by 27% of the respondents who having problem of communicating with the attendees and the same amount do have problems with searching previous minute information. Lastly is the problem of booking meeting place that includes 17% of the respondents.

2.4.2.3 Functionality in online meeting support system

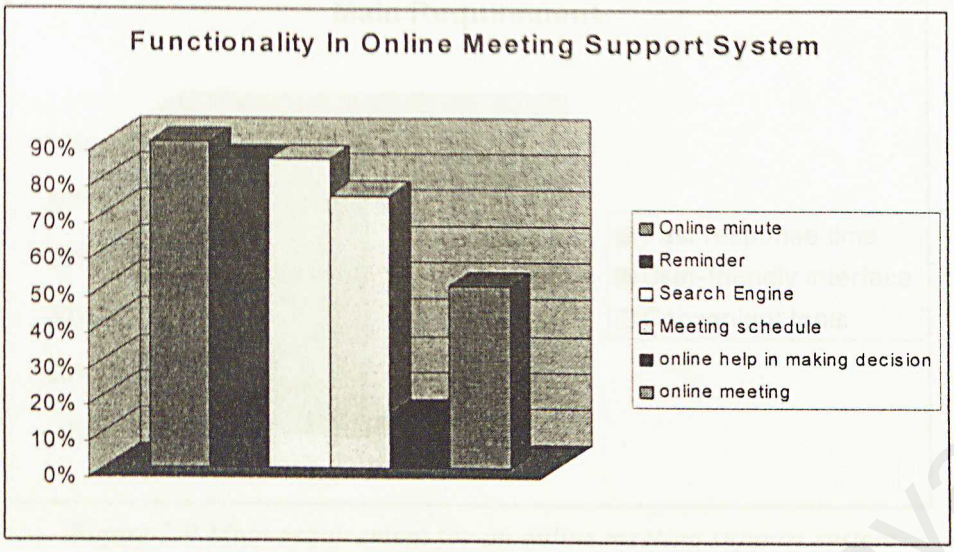


Figure 2.8 Functionality in online meeting support system

From the statistic, the main functionality that the users require in an online meeting support system is an online minute. 85% of the respondents prefer a reminder system and search engine that able to retrieve the previous minute information. Mean while, 80% prefer a meeting schedule includes in the system and 45% think that the system should have an online meeting system. Lastly there is only 15% of the respondents would have an online help in making decision.

2.4.2.4 Main requirement for an online meeting support system

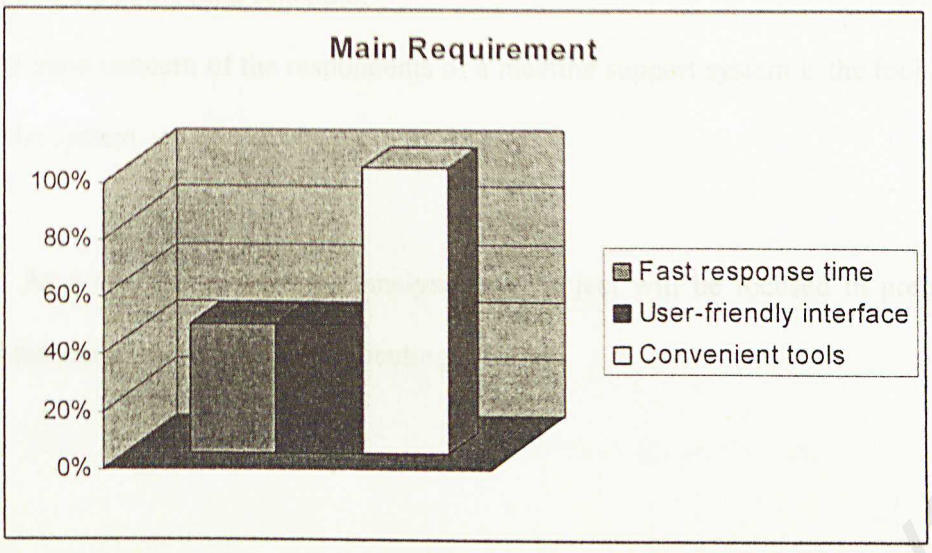


Figure 2.9 Main requirement for an online meeting support system

Majorities of the respondents feel that the main requirement of an online meeting support system is the preparing convenient tools in the system.

2.4.3 Summary of the Questionnaire

From the analysis of questionnaire, a few conclusions have been made according to the needs of respondents:

1. The respondents need a reminder system to remind them about the time and place of a meeting.
2. The respondents hope to have an online minute tool that can make the work of preparing minute easier.
3. A search engine to retrieve previous meeting information is required by the respondents.

4. The main functions that the respondents require is online minute, search engine, reminder and meeting schedule.
5. The main concern of the respondents of a meeting support system is the tool prepared in the system.

As a conclusion from the analysis, my project will be focused in preparing an online minute, search engine, and meeting schedule.

2.5 Interview

Interview is the other way to verify the functional requirements that I had deployed. I was having a face to face interview with the 'penolong pendaftar' of our faculty, Cik Agnes Clement Koros, to talk about the meeting sequence of our faculty.

From the interview, I had gained a lot of important information and detail about the procedure of a meeting and how the procedures flow from the administrator level to the attendees' level. The data is very useful in helping to develop my project.

2.5.1 Interview Result

A few important points are listed from the interview with Cik Agnes:

- The meeting time must be available for all the attendees (using timetable to check for convenient time – normally is Friday afternoon)
- The attendees will be informed about the meeting 3 days before meeting and reminded one day before the meeting
- The attendees will be informed by email and notice
- A meeting at least must be attended by 1/3 of the attendees
- Only the dean or the 'penolong pendaftar' can modified the place, time or topics of the meeting
- For a 'Jawatankuasa', all the committee members must attend for the meeting

2.5.2 Summary of the Interview

From the interview with Cik Agnas, a few conclusions have been made in order to suite the needs of the faculty:

- A notice about the meeting will be published on the system three days before the meeting
- An online bulletin board is needed for the committees to give their opinion about the meeting
- A reminder system that able to remind the committees one day before meeting
- A schedule of meeting of a week is needed for committees

72.6 Analysis Current Existing System

Currently, there is some meeting support software packages available in the market. I had done an analysis for software named CyberMatrix Meeting Manager. This analysis was carried out in order to understand the existing effort to solve the problems in managing meeting procedures. The system is analyzed based on three areas:

1. Functions supported by the system
2. Special features provided by the system
3. The design of user interface

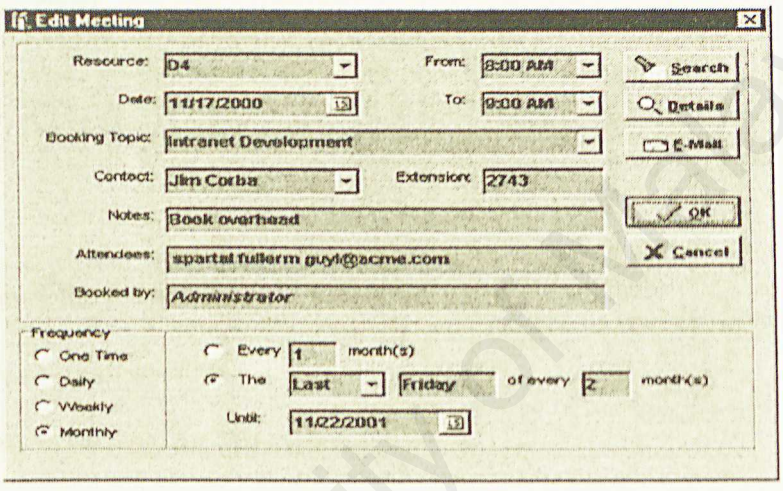


Figure 2.10 User Interface of CyberMatrix Meeting Manager

2.6.1 Functions Supported

This software has several functions:

- *A booking system with several features in consideration:*
  - Time
  - Place
  - Date
  - Booking topic
  - Attendees

- *A search engine that able to search for available resource at given time*

  With this functionality, one can search for the information inside the database. For example, if you need to book a room for meeting, you can search for the available room for that particular day and time with the searching system.

- *A week or month glance of the activities*

  One can look at the weekly or monthly activities and bookings for meeting by this functionality.

- *Generating report*

  The system allows printing reports of all bookings of a resource in a specified time period.

2.6.2 Features of the System

This system has several features:

- *Three levels of security for this system*

  For security purposes, the system has three levels of security.

  - User

    User security allows resources booking when the Login to Book option has been set in the program. Meeting Manager Administrator may have setup the application to default to allow only viewing and not booking. If this is the case and booking privileges is required, user must contact Administrator to receive the User security level password.

  - Superuser

    Superuser security is allowed to book resources marked as having exclusive access by Meeting Manager administrator. This feature must get from administrator.

- Administrator

  As well as having Superuser privileges, Administrator security is allowed to delete and edit any booking whether one have booked it or not. Only Administrators can access the Meeting Manager configuration section.

➢ *Resolving booking conflict*

Inevitably booking conflicts will arise. This is especially the case when using recurring events. When a conflict is arose, a message will be shown. At the end of the message information about the conflicting booking will be displayed.

2.6.3 User Interface

The user interface of the system is very simple and the layout is consistent. The screen is not crowded but the space among the events (date) is quite small. Overall, the design of the screen is understandable and right of flow.

2.6.4 Summary of the Analysis

CyberMatrix Meeting Manager is a system that is very essential for meeting booking and data searching. I have gained a lot from doing an analysis of this system. Some of the strengths of the system can be implemented to my project such as levels of security, a week or month glance of the activities and so on. Besides, I will try to improve the limitation of the system in my project and hope that the final outcome of the project will have larger scope of functionality as a meeting support system.

Chapter 3:

Methodology

Chapter 3: Methodology

This phase involves all the activities necessary to determine the system requirements and the approach needs to be taken to develop a system that satisfies the users' expectations. In this project, two models were chosen and studied, which are waterfall model and the prototype model.

3.1 Development Models

3.1.1 Waterfall Model

The waterfall model is the first model describes the life cycle as a series of steps in which all description levels between the problem and the implementation are found, starting from the definition and ending with operation and maintenance. Each step is linked to the next step to represent chaining and to the previous step to represent corrections by feedback. Each step is associated with a verification phase, the purpose of which is to check that the selected solution conforms to the step input specifications. Any lack of conformity will mean that the step or the results of the previous step has to be revised as shown in below. [11]

This waterfall model shows that the development cannot take place using a top-down progress only. As suggested by the closed loop control theory, uncertainties or errors and omissions are corrected by loopbacks as soon as variations are observed. Obviously, this is only possible if the result at the end of each phase is observable and can be compared with an objective.

(http://wwwpersonal.monash.edu.au/~mecheng/mec3409/softeng/devcycle/)

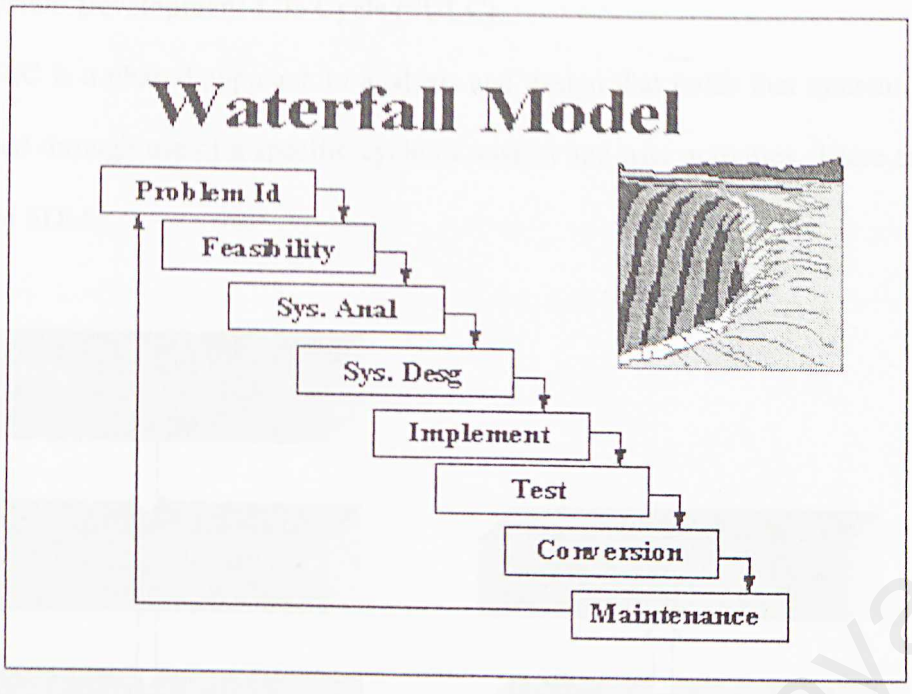


Figure 3.1 Waterfall Model

The waterfall model can be very useful in helping developers lay out what they need to do. Its simplicity makes it easy to explain to customers who are not familiar with software development; it makes explicit which intermediate products are necessary in order to begin the next stage of development [12].

A large amount of validation work during the early phases facilitates fast correction of early errors, since their correction later can be very expensive. This model is somewhat limited, and only partially takes account of the real iterative nature of the development.

3.1.2 System Development Life Cycle (SDLC)

The SDLC is a phased approach to analysis and design that holds that systems are best developed through use of a specific cycle of analyst and user activities. There are seven phases in SDLC.

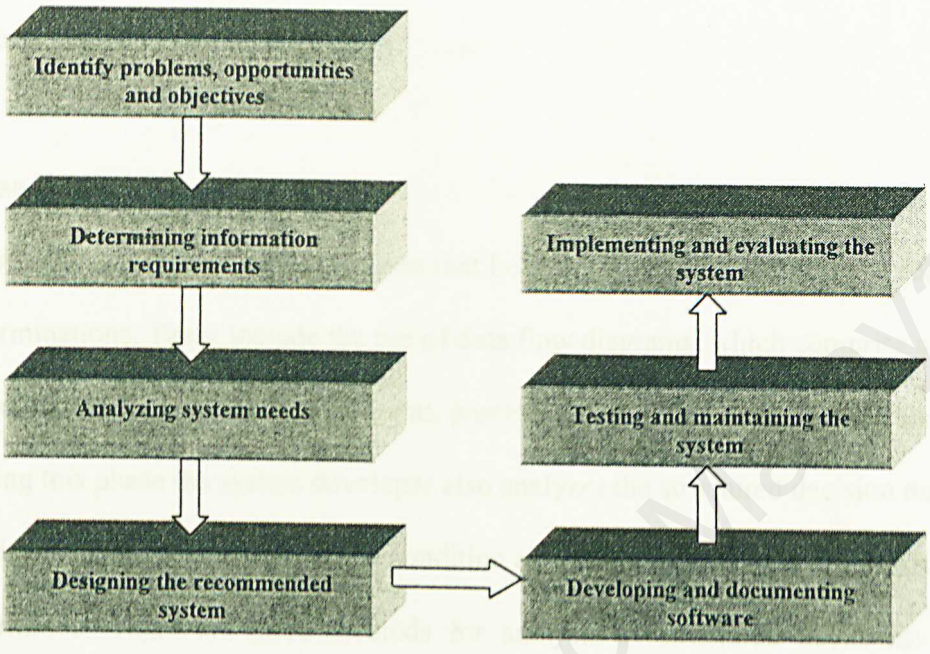


Figure 3.2 The seven steps of the system development lift cycle

Phase 1: Identifying problems, opportunities, and objectives

In stage is critical to the success of the rest of the project. The first phase requires that at what is occurring in a system. Then, follow by pinpoints problems. Identifying objectives is also an important component of first phase. First, the system developer must discover what the system is trying to do. Then the developer will be able see if some aspect of information systems applications can help the system reach its objective through addressing specific problems or opportunities.

Phase 2: Determining information requirements

The next phase that the system developer enters is that of determining information requirements for the particular users involved. Several tools are used to define information requirements in the system, including sampling and investigating of hard data; interviewing; questionnaires; observing decision-maker behavior and their office environments; and even prototyping.

Phase 3: Analyzing system needs

There are special tools and techniques that help the system developer make requirements determinations. These include the use of data flow diagrams, which comprise a structured technique to chart graphically the input, processes, and output of the business's functions. During this phase the system developer also analyzes the structured decision made, which are decisions where the conditions, condition alternatives, actions, and action rules can be determined. There are three methods for analysis of structured decisions: structured English, decision tables, and decision trees.

Phase 4: Designing the recommended system

In this phase of the systems development life cycle, the systems developer uses the information collected earlier in order to accomplish the logical design of the information system. The developer designs accurate data-entry procedures so that data going into the information system are correct. The developer also designs effective input to the information system using technique of good form and screen design.

Phase 5: Developing and documenting software

Some of the structured techniques for designing and documenting software include the HIPO method, flowcharts, Nassi-Schneiderman charts, Warnier-Orr diagrams, and pseudocode. During this phase, the developer also works with users to develop worthwhile documentation for software, including procedure manuals. Documentation tells users how to use software, and also what to do if software problems occur.

Phase 6: Testing and maintaining the system

Before the information system can be used, it must be tested. It is much less costly to catch problems before the system is signed to user. A serial of tests to pinpoint problems are run first with sample data and eventual with actual data from current system. Maintenance of the system and its documentation just begins in this phase. It is carried out routinely throughout the life of the information system.

Phase 7: Implementing and evaluating the system

In the last phase of system development, the system developer helps implement the information system. This involves training users to use the system. Additionally, the developer needs to plan for the smooth conversion of the old system to the new one.

3.1.3 Prototyping Model

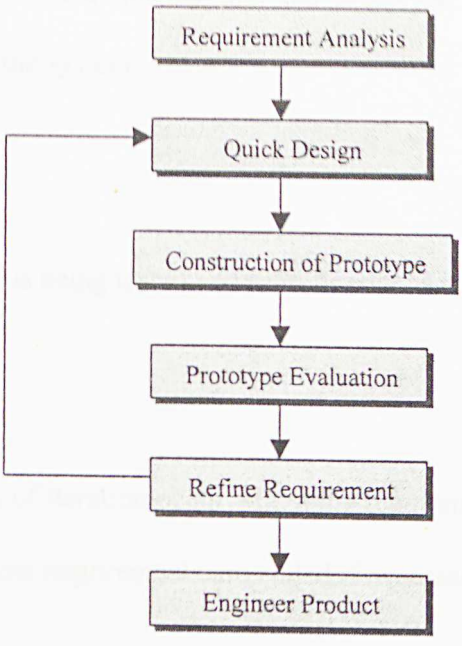


Figure 3.3 Prototyping model

Prototyping development is an idea of developing an initial implementation, exposing to user command and refining this through many various until an adequate system has been developed. The sequence of events for the prototyping paradigm is shown in the figure 3.3.

Requirement Analysis

Prototyping begins with requirement gathering and analysis. The system designer works with the user long enough to capture the overall objectives of the software, user's basic information needs and outline areas where further definition is mandatory.

Quick Design

In the phase, a representation of the aspects of the software will be visible to the user.

Construction of Prototype

A prototype is being created quickly and the prototype will only perform the most important functions of the system.

Prototype Evaluation

The prototype software is being tested and modification is suggested for the system.

Refine Requirement

At the phase, a process of iteration occur where the requirements are justified to suite the needs of the user and new requirements are added if necessary.

Engineer Product

When no more iteration are required, the approved prototype then becomes an operational product that furnishes the final specification for the application.

Advantages of Prototyping

- *Modification can be done in its early development*

  Early user feedback is one of the most important issues in doing modification to the system and making the system more responsive to the users' actual needs. Besides, early changes are less expensive and it will save cost of the system development.

- *Scrapping undesirable systems*

  Prototyping has the possibility of scrapping a system that is just mot what users and analysis had hoped. It will totally require less investment than a completely development system.

- *Designing a system for users' needs and expectations*

  As the prototype is developed based on the users' needs and requirements, it has a better fit with the users' expectations.

- *Time Saving*

  If the prototype is being successfully developed, the real release can be easily developed based on the prototype and it will save the time than developed a system without prototyping.

Disadvantages of Prototyping

- *Adopting a prototype system as a complete system*

  A prototype system may be accepted in its incomplete state where necessary refinement is not done. This may cause the system lack of certain functions and may result in errors.

- *Project Management*

  As several iterations of prototype may be necessary, the project management may have problems.

3.1.4 Summary of Development Models

The development model that is chosen for the project is the prototyping model. This model is chosen because it is inexpensive to implement and the system design using this model will suite the users' needs and expectations. Comparing to SDLC, prototyping give more concern of refinement requirements. This step is very important to make sure no changes of the system after the system is completely developed. This is because final changes in the system will cost more than early changes in the system. Waterfall model is not chosen because prototyping model is more sophisticate and complete if comparing to it.

3.2 Requirement Analysis

A requirement is feature of the system or a description of something that the system is capable of doing in order to fulfill the system's purpose. Requirement analysis covers two main categories, which are functional and non-functional requirement.

3.2.1 Functional Requirement

A functional requirement describes an interaction between the system and its environment. In this project, there are some components in the system and each supports specific function.

1. *Reminder*

   With this component, administrator (secretary) can inform every attendees of the meeting easily.

2. *Search Engine*

   The other important component in the system that able to keep track of the data inside the database and retrieve the relevant data according to the users' requirement.

3. *Announcement*

   This component is built for the user to make an announcement for any purposes especially when there is any important information that they need to remind to other users.

4. *Online Meeting*

   An online tool that enable the user to have a real time discussion through net.

5. *Meeting schedule display*

   The system will be search through the database and display the meeting schedule of the week or month according to the data in the database. The system should be able to update the display everyday.

6. *Authentication and authorization security control*

   Provides security mechanisms that authenticate a user or entity, authorize access rights and provide administrative capabilities.

7. *Discussion Board*

   This is an essential component that is for the users to create a discussion room to discuss of some meeting topic. With this component, the users can know more about the meeting topics or issues which will totally help them more the coming meeting.

3.2.2 Non-functional Requirements

Non-functional requirements are essential definition of the system properties and constraints under which a system must operate.

1. *Reliability*

   The application system, software and hardware should be stable and reliable and will not cause any unnecessary downtime of the overall environment.

2. *Accessibility*

   The application system, software and hardware should be highly available all the time.

3. *Correctness*

   The application system should satisfy the users' specifications and needs.

4. *Usability*

   The application system should be easy to use and accommodate to any level of user.

5. *User-friendliness*

   The user interface should be easy to understand. It should have high degree of understandability and avoid too much memorization of events and commands for the users.

6. *Expandability*

   The degree of the architecture, data or procedure design should be able to extend.

3.3 Consideration of Programming Technologies and Languages

The purpose of the section is to identify suitable programming technologies and languages to develop system. Analysis was done for several suitable programming languages and technologies and the best is chosen. However, consideration on the availability of the related development tools was also an important factor.

3.3.1 HTML

The Hypertext Markup Language (HTML) is a small collection of document markup tags that can be used to define hypertext documents, which are portable from one computing platform to another. HTML contains elements which are characteristic of descriptive and referential markup. The portability of HTML marked-up documents permits their independent use by WWW browser. [3]

Limitation of HTML

HTML provides a powerful mechanism for the definition of hypertext pages and documents. It has, however, been deliberately kept small so that the number of available tags remains manageable and easily remembered. Below listed some of its limitation:

- *HTML does not provide document and page styles or composition tools.*

  The document and page styles provided by conventional composition systems conform to those associated with paper or sequential documents.

- *HTML does not provide document navigation tool other than simple link*

  If a collection of pages constitutes a definition of a hypertext document, then it is the responsibility of the document author to provide the structure of that document

- *HTML does not provide content management tools*

  HTML allow an author to keep page or document structure separate from literary content

Advantages of HTML

Although HTML may sound somewhat limited, it provide several advantages.

- *HTML is compatible with any web browser*

  HTML documents are system-independent and they can be displayed in any browser that support HTML

- *HTML is structure-based rather than appearance*

  HTML can provide flexibility to the documents. For example, an author can let the user to choose whether to view the content of a short message in the page in font Italics or Times New Roman by clicking the choice button provided by the author.

- *HTML is easy to learn and use*

  As the numbers of available tags are kept small and manageable, users do not have to learn a lot for HTML. Besides, there are many HTML editors that the users can use for HTML developing.

- *HTML files are small*

  As the tags used to describe an HTML file has little overhead, the size of a HTML file usually is very small.

3.3.2 Common Gateway Interface (CGI)

The Common Gateway Interface is a mechanism for creating scripts on the server, which can be used to create dynamic web application. Now, the majority of dynamically created pages on web are created using CGI. CGI allows the user to invoke another program such as Perl Script on the web server to create the dynamic web page and the role of CGI is to pass the user-supplied data to this program for processing. [9]

Limitation of CGI

CGI have some sever shortcomings:

- *Extra level to browser-server model*

  It is necessary to run a CGI program to create the dynamic page before the page is processed on the server.

- *Need programming languages for manipulation*

  The format in which CGI receives and transmits data means that data is not easily manipulated by many programming languages. As a result, a programming language with good facilities for manipulating text and communicating with other software is needed.

- *Longer loading time*

  As a CGI program have to be run before the page is processed, more time is needed for loading the page.

3.3.3 Active Server Pages (ASP)

Active Server Pages is a Microsoft technology, and it is a technology that allows for the programmatic construction of HTML pages just before they are delivered to the browser. It works as an open, compile-free application environment in which one can combine HTML, scripts, and reusable ActiveX server components to create dynamic and powerful Web-based business solution. [8]

The power of ASP lies in two facts:

- HTML is not created until the user wants to see the web page
- It doesn't care what web browser is being used

ASP code is browser-independent. As ASP code is executed on the web server and generates pure HTML, the client machine doesn't need to provide any kind of ASP support. In fact, the web browser handles .htm pages and .asp pages in exactly the same way because the from the browser's point of view, the process involves sending a page request to a web server and receiving a stream of pure HTML.

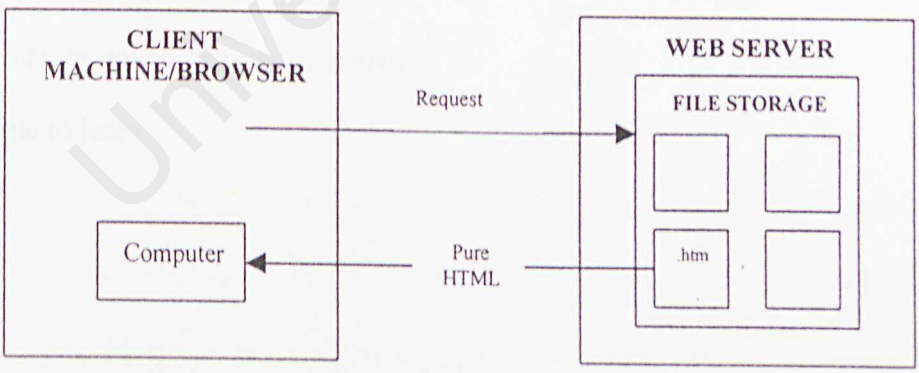


Figure 3.4 Requesting a pure HTML page

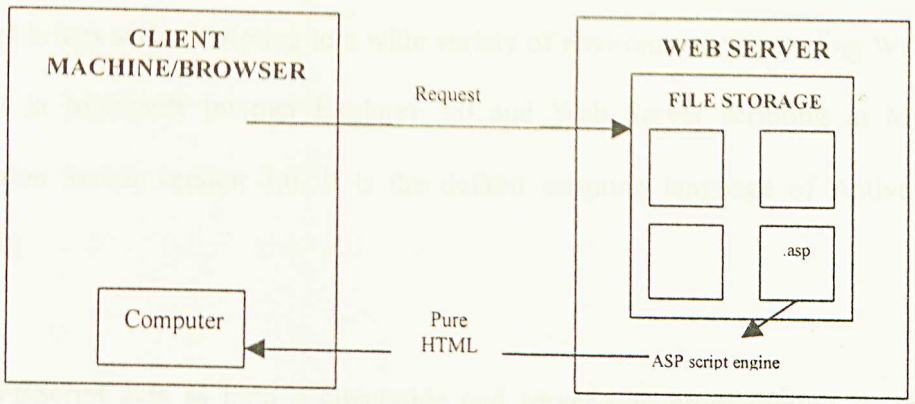


Figure 3.5 Requesting an ASP page

Advantages of ASP

- Allow program running in programming languages that aren't supported by your browser
- Enable one to program dynamic web applications browser-independently, without recourse to client-side programming features such as Java applets, Dynamic HTML, ActiveX controls, all of which are browser specific
- Provide the client (browser) with data that does not reside at the client
- Quicker loading time
- Provide improved security measures
- Simple to learn

3.3.4 Visual Basic Scripting Edition (VBScript)

VBScript brings active scripting to a wide variety of environments, including Web client scripting in Microsoft Internet Explorer 3.0 and Web Server scripting in Microsoft Information Server version 3.0. It is the default scripting language of Active Server Pages. [9]

VBScript acts as both a client-side and server-side programming language. A client-side programming language is a language that can be interpreted and executed by a browser. On the other hand, a server-side programming language is that the scripts work regardless of the browser being used.

VBScript enables authors to create scripts using a subset of the Microsoft Visual Basic language. It does not include functionality that directly accesses the client machine's operating system or file system so it is safe for the WWW. VBScript is implemented as a fast, portable interpreter for use in Web browsers and applications that use ActiveX controls, Java applets, and OLE Automation servers.

3.3.5 Cold Fusion

Cold Fusion enables servers to access data as the server builds an HTML page and Cold Fusion pages are readable by any browser. It utilizes a propriety set of tags, which are processed by Cold Fusion Server Software and it can be run on multiple platform such as IIS, Apache and Netscape Enterprise Server. One of the advantages of Cold Fusion is it can sport its own set of solutions to common problems, including access to ADO functionality.

3.3.6 Java Server Pages (JSP)

Java Server Page is new technology that allows combination of HTML or XML with Java code to dynamically generate web pages. The JSP specification is implemented by several web servers, and plug-ins are available that allow you to use JSP with IIS 4.0. One of the advantages of JSP is the portability of code between different servers.

3.3.7 JavaScript

JavaScript is a lightweight, interpreted scripting language that provides the same functionality as VBScript. The syntax of the JavaScript language is similar to C. JavaScript is the product of Netscape Communications Corporation and Sun Microsystems, Inc.

3.3.8 JScript

Jscript is Microsoft's version of JavaScript, and it was designed to lend OLE-based functionality found within VBScript to the JavaScript programming structure. The Jscript and JavaScript object models are similar, but variations between the models exist. As a result, the slight varieties can generate runtime errors when executing JavaScript.

3.3.9 Microsoft Visual InterDev

Microsoft Visual InterDev is a powerful development environment for rapidly creating database-driven Web applications. Integrated visual design tools, debugging, and database features enable user to build interactive, cross-platform Web sites quickly and easily. [6]

Features of Visual InterDev

- Visual InterDev provide a robust, integrated development environment to address the many capabilities of the Web. Integrated of various technologies can be done, like ActiveX controls and Active Server Components, to create a powerful application. The integrated development environment enables developer to use scripting languages like VBScript and JavaScript to create dynamic applications and Web pages.

- Visual InterDev includes a wide range of visual tools to augment application developer's productivity. HTML editing is significantly enhanced through the use of the HTML Layout Editor and a version of the FrontPage HTML editor. The HTML Layout Editor, introduced with the ActiveX Control Pad from Microsoft, enables the developer to precisely place ActiveX controls onto the web page. It also enables developer to control the x and y coordinates to ensure that the ActiveX controls are displayed in the proper manner.

- Visual InterDev also provides WYSIWYG editing through its own FrontPage 97 HTML editor. FrontPage can visually author the HTML page. Content authors can use FrontPage to create files that are completely compatible with Visual InterDev's version of the FrontPage Editor. Visual InterDev also provides site management tools that are very similar to those tools provided in FrontPage.

- The Script Wizard enables developer to associate specific actions with associated ActiveX control events. By linking these events and actions, the Script Wizard generates all of the necessary script language for developer. Once the language is generated, developer has the ability to modify and add to the code. This process can

save developer considerable development time by generating the routine script and enabling developer to focus on the more advanced code for the application.

- Visual InterDev also includes two tools for spicing up web pages. These tools focus on multimedia creation and management. The Microsoft Image Composer and Microsoft Music Producer enable developer to create graphical images, music, and sounds for your web site. The Music Producer enables developer to create music and sound effects for your web site.

- Visual InterDev provides some very robust database tools. The Visual Data Tools included with Visual InterDev are easy to use and significantly reduce the time and effort for adding database capability. Some of the features include the following:

  - **Data View**

    Visual InterDev project window that enables you to view all of your database objects including tables, views, stored procedures, and triggers.

  - **Query Designer**

    A tool that enables you to visually build your SQL database queries and test the results.

  - **Database Designer**

    A tool that enables you to design, create, and maintain your SQL database.

  - **Stored Procedure/Trigger Editor**

    A tool for editing stored procedures and triggers for Microsoft SQL Server 6.x and Oracle 7.x.

3.3.10 Microsoft FrontPage

FrontPage is a web creation tool from Microsoft that is designed to make building web sites as easy as word processing. It is designed for nonprogrammers, and robust enough even for experienced Web site developers. [8]

Microsoft FrontPage is the fast, easy way to create and manage professional-quality Web sites. It has easy-to-use functionality such as WYSIWYG editing, wizards to step through the creation of Web site, and integration with Microsoft Office. It eliminates the need to know Web-based programming languages by providing WebBot™ components that one can use to create advanced interactive functionality automatically.

Microsoft FrontPage also makes it easy for large teams to work together to create and manage sites. Its combination of flexible client/server architecture, passwords, user authentication, and other security features enables contributors in different locations to securely update different pages simultaneously on the same site.

3.3.11 Macromedia Director

Macromedia offers unique and distinctive technologies that provide a rich platform for development of high-impact Web applications. Whether you are coding a server-side e-commerce solution in JSP or a data-driven client-side multimedia application, visual development environments, extensible architectures, and ubiquitous runtimes let system developer deliver the most engaging experiences on the Web. The features of Macromedia Director are as follows:

- Edit multiple sprite properties with the centralized, context-sensitive property Inspector.

- Gain precision control with Guides, Sprite Locking, Zoom and Pasteboard Stage View.
- Sort cast member by name, size, date, type and comments with Cast Manager.
- Launch and edit Linked Lingo Scripts in your favorite text editor or source-code control system.
- Create extremely small, high quality shape with built-in Multiple Curve Vectors.
- Dazzle viewers with high-performance, low-bandwidth Runtime Imaging effects and Transition Behaviors.
- Mix, pan, seek, pause, and synchronize multiple sounds for immerse audio with Precision Sound Control.
- Deliver media-rich community applications using Shockwave Multiuser Server.
- Provide Loader Movies with custom progress bars, backgrounds, or games while movies download

Macromedia director also deliver custom Web applications based on Microsoft Active Server Pages, Java Server Pages, or Allaire Cold Fusion with Macromedia Dreamweaver UltraDev. Decrease the time to solution with an extensible environment that combines best-of-breed HTML authoring with application development. [19]

The director Shockwave Studio will enable system developer to develop quickly and efficiently, Build magnetic content that draws viewers and create widely viewable Web destinations.

3.3.12 Adobe Photoshop

Photoshop is an image-editing program. It allows you to create your own images and edit scanned images. Filters, layers and selection tools can alter images. The toolbox is similar to graphics programs.

Photoshop can support a lot of plugin whether is built by Adobe itself or by other inventor. With the existing plugin, many effects can be implemented to an image and created interesting and attractive effect.

Photoshop allows a user to save files to many different file formats. Below is a list of some as well as an explanation of each.

- Photoshop
- BMP
- EPS
- Filmstrip
- GIF
- JPEG
- PICT
- TIFF

3.4 Consideration of Database Implementation

Analysis was done to determine the most suitable Database Management System (DBMS) for storing and managing the require data. Selection was based on the consideration of the usability and effectiveness in the context of cross platform deploying, storage space required and the portability of the records.

3.4.1 Microsoft Access 2000

Microsoft Access is a relational database management system used to create and manage relational database. Together with ODBC driver for Access, data can be retrieved from the database in the client-server base system. However, there is a limitation for Access to handle very large database. In terms of efficiency, SQL server surpasses Access. [7]

3.4.2 Microsoft SQL Server 7.0

Microsoft SQL Server is a scalable, high performance database management system designed specifically for distributed client/server computing. Microsoft SQL Server has a unique advantage over its competitors like IBM's DB2 Universal database, Informix Dynamic Server and Sybase SQL Server as it provides tight integration with windows and window-based applications helping reduce the cost and complexity of deploying sophisticated applications. [4]

Features of Microsoft SQL Server:

- *Ease of Installation, Deployment and Use*

  Microsoft SQL Server includes many tools and features that simplify the ability to install, deploy, manage, and use databases. SQL Server provides database

administrators with all the tools required to fine-tune SQL Server installations running production online systems. SQL Server is also capable of operating efficiently on a small, single-user system with minimal administrative overhead.

- *Scalability*

  The same Microsoft SQL Server version 7.0 database engine operates on Microsoft Windows 95/98, Microsoft Windows NT Workstation, Windows NT Server, and Windows NT Server Enterprise Edition. The database engine is a robust server that can manage terabyte databases being accessed by thousands of users. At the same time, when running at its default settings, SQL Server 7.0 has features such as dynamic self-tuning that let it work effectively on laptops and desktops without burdening users with administrative tasks.

- *Data Warehousing*

  Microsoft SQL Server version 7.0 introduces several components that improve the ability to build data warehouses that effectively support decision support processing needs.

- *System Integration*

  Microsoft SQL Server is integrated with other products and environments.

3.5 Other Consideration

3.5.1 Microsoft Windows NT Server 4.0

Windows NT is both an operating system and a network operating system to help developers build and deploy business applications faster than ever before. NT provides the preemptive multitasking services required for a functional server. It provides excellent support for Windows clients and incorporates the necessary storage protection services required for a reliable server operating system.

Windows NT has some advantages:

- The cost of hardware for Windows NT is less than that for UNIX
- Windows NT has strong support from third-party vendors
- Windows NT is easy to administrator and has a user-friendly interface
- Windows NT provides strong security features

3.5.2 Microsoft Internet Information Server 5.0 (IIS 5.0)

Microsoft Internet Information Server (IIS) is an Internet file and application server included with the Microsoft Windows NT operating system. IIS can be used alone as a Web Server, or in conjunction with compatible technologies to set up Internet commerce, to access and manipulate data from a variety of data sources, and to build Web applications that take advantage of server script and component code to deliver client-server functionality.

IIS guarantees the network administrator and application developer the same security, networking, and administration functionality as Windows NT Server. Above and

beyond its use of familiar Windows NT Server tools and functionality, IIS also has built-in capabilities to help administer secure Web sites, and to develop and deploy server-intensive Web application.

3.5.3 Microsoft Personal Web Server (PWS)

PWS is a desktop Web server that can be used to host a Web site on the corporate intranet, or to develop and test a Web site before hosting the site on an Internet Service Provider (ISP). There are two versions of PWS, one is for Windows 98 and one is for Windows NT Workstation.

By installing the PWS package, there are some features include as below:

- *Microsoft FrontPage Server Extensions*

  Supports the use of Microsoft® FrontPage® to manage your Web site, as well as create the site content.

- *Microsoft Transaction Server 2.0*

  Supports creation of Microsoft® Transaction Server (MTS) applications. A transaction is a server operation that succeeds or fails as a whole, even if the operation involves many steps. MTS also supports process isolation of applications.

- *Microsoft Data Access Components 1.5*

  Easy use of databases with support for ActiveX™ Data Objects and the Microsoft® Access driver.

- *Message Queue Server 1.0*

  Makes it easy for application programs to communicate with other application programs quickly, reliably, and asynchronously by sending and receiving messages.

3.5.4 Summary on Technologies Analysis

Operating System

Windows NT Server 4.0 is chosen as the system operating system for its strong security and reliability.

Programming Technologies and Languages

It is decided that the project is built using ASP technology with VBScript as the main scripting language. This approach is chosen because ASP is more effective if comparing with CGI and it is easy to learn. Besides, no extra additional software is required for this approach. VBScript as the ASP default scripting language is chosen for its fast, portable interpretation.

Microsoft Visual InterDev has been chosen to create and edit content for system development for its rich features and integrated Web Browser inside the program. Microsoft FrontPage seems much weaker than Visual InterDev and does not have as many features as InterDev. Besides, the method of developing system using Notepad is not in consideration because this method is very time-consuming and not effective.

Database Implementation

As for the repository, Microsoft Access 2000 is chosen because it makes information easier to find and use. It also quickly analyzes details and sees vital relationships. Microsoft Access 2000 includes built-in Microsoft SQL Server integration that brings the power of high-end database management to the familiar Access environment. It takes advantage of scalable SQL Server technology to create enterprise-level databases.

Although Microsoft Access 2000 gives an excellent development environment with many of the capabilities of SQL Server available for testing and implementation planning, but it is a smaller engine and not truly client/server. Its use as a server system in a larger implementation is somewhat limited, but it manages to work well in my project. Those are the reasons that I choose Microsoft Access 2000 as the database backbone for this project.

Chapter 4:

System Design

Chapter 4: System Design

System design is a creative process of transforming the problem into a solution [21]. It is used to design, and implement improvements in the functioning of business that can be accomplish through the use of computerized information system.

There are 4 stages in the design process, mainly:

1. Data Modeling
2. System Architecture
3. User Interface Design
4. Process Design

4.1 Data Modeling

Data modeling is one part of the conceptual design process. The data modeling focuses on what data should be stored in the database. The information needed to build a data model is gathered during requirement analysis of the system. So, data modeling is a stage where information domain module created during analysis is transformed into the data s structure that will be required to implement the system.

An effective data model completely and accurately represents the data requirements of the end users. Data modeling is bottom up process. A basic model, representing entities and relationships, is developed first. Then detail is added to the model by including information about attributes and business rules.

4.1.1 Entity-Relationship Model (ER Model)

Entity-Relationship Model is a conceptual data model that views the real world as entities and relationships. A basic component of the model is the Entity-Relationship diagram, which is used to visually represent data objects. ER diagram can be a useful and effective tool in data modeling process. It can be used to build a conceptual data model needed by a system and illustrate data accurately.

ER model offer many benefits such as:

- It maps well to the relational model. The constructs used in the ER model can easily be transformed into relational tables.
- It is simple and easy to understand with a minimum of training. Therefore, model can be used to by the database designer to communicate the design to the end user.
- The model can be used as a design plan by the database developer to implement a data model in specific database management software.

ER Notation

There are many types of notation used in ER model such as crow's foot, IDEFIX, Bachman and Chen notation. All notational styles represent entities as rectangular boxes and relationships as lines connecting boxes. Each style uses a special set of symbols to represent the cardinality of a connection. The notation used in this project is from Martin.

The symbols used for the basic BR constructs is as below:

- Entities are represented by labeled rectangles. The label is the name of the entity.
- Relationship is represented by a solid line connect two entities. The name of the relationship is written above the line.
- Attributes, when included, are listed inside the entity rectangle. Attributes that are identifiers are underlined.
- Cardinality of many is represented by a line ending in a crow's foot. If the crow's foot is omitted, the cardinality is one.
- Existence is represented by placing a circle or a perpendicular bar on the line. Mandatory existence is shown by the bar next to the entity for an instance is required.

Concepts of ER Model :

Entities:

Entities are the principal data objects about which information is to be collected. Entities are usually recognizable concepts, either concrete or abstract, such as person, things or events that have relevance to the database.

Relationship:

Represents an association between two or more entities.

Attributes:

Describes the entity of which they are associated. A particular instance of attributes is a value. The domain of an attribute is the collection of all possible values an attribute can have.

Degree of Relationship:

The number of entities associated with the relationship.

Connectivity:

Describes the mapping of associated entity instances in the relationship. The values of connectivity are "one' or "many". The basic types of connectivity are: one-to-one, one-to-many and many-to-many.

Cardinality of Relationship:

The actual numbers of related occurrences for reach of the two entities.

Direction:

Indicates the originating entity of a binary relationship. The entity from which a relationship originates is the parent entity; the entity where the relationship terminates is the child entity.

4.1.2 Relational Database Model

Relational database model is chosen as the database model in this system design. Relational database consists of collection of tables in which data are stored. Data is represented in the form of tables. Tables also called relations, as they are related to each other by storing a common entity characteristic. Relational is a purely logical structure that ensures data independence and structural independence.

The reasons for choosing relational database model as the underlying implementation model is listed as below:

- Relational model leads to structure and data independence, which makes data design process simpler and the final system easy to maintain. The physical path to access the database is of no concern to the developer.

- Provides very powerful and flexible query capability that is the Structural Query Language (SQL) which makes the data retrieval and queries process much more efficient.

- Moreover, RDBMS model contains many facilities that make it easy to design and generate reports. Therefore, reports such as the monthly time report project report task list, address list and list of reminders can be generated easily.

A relation is a named, two dimensional table of data. Each relation consists of a set of named columns and an arbitrary number of unnamed rows. Each column in a relation corresponds to an attribute of that relation. Each row of a relation corresponds to a record that contains data values for an entity.

4.1.3 Normalization

Normalization is a process for converting complex data structures into simple, stable data structures. It can be accomplished in stages; each of which corresponds to a normal form. A normal form is a relation state that can be determined by applying simple rules regarding dependencies (or relationships between attributes) to that relation. This project concentrated on the three most frequently used:

1. *First Normal Form (MF)*

   A relation is in first normal form if and only if all underlying entries in columns are atomic. Any repeating value is removed, so there is a single value at the intersection of each row and column of the relation.

2. *Second Normal Form (2NF)*

   A relation is in second normal form if and only if it is in I NT and every non-key attribute is fully dependent on the primary key.

3. *Third Normal Form (3NF)*

A relation is in third normal form if and only if it is in 2NF and every non-key attribute is non-transitively dependent on the primary key.

4. *Boyce-Codd Normal Form (BCNF)*

A relation is in Boyce-Codd normal form (BCNF) if and only if every determinant is a candidate key.

4.14 Normalized Tables

There are 8 tables in the system. Table 4.1 lists out all the tables in the database for the system and its purpose and table 4.2 – table 4.x shows the details of all of the attributes of the tables.

Relation Name	Description
Announcement	To store the announcement information such as date, headline and etc.
SubAnnouncement	To store comments about the announcement
Discussion	To store the discussion information such as date, title and etc.
SubDiscussion	To store the message of the discussion
Login	To store information of the user login such as password, login id and etc.
MinuteData	To store the uploaded meeting minute and other relevant information
LecDetail	To store the information about the lecturer of FSKTM such as name, department and etc.
Index	To store the keyword of the meeting minute for searching purposes

Table 4.1 Relations Needed In Meeting Support System

Attributes	Description	DataType
Anokey	A key to recognize the announcement	Text
Date	Date the announcement being generated	Date/Time
Headline	The headline of the announcement	Text
User	User who generated the announcement	Text
Announcement	Announcement contents	Memo

Table 4.1.1 Announcement Table's Attributes

Attributes	Description	DataType
Anokey	A key to recognize which announcement the comments belongs to.	Text
Subkey	A key to recognize which comment that the subcomments belongs to	Text
Date	The date that the comments being submit	Date/Time
Comment	Comments of the announcement	Memo

Table 4.1.2 SubA*nnouncement Table's Attributes*

Attributes	Description	Data Type
Diskey	A key to recognize the discussion	Text
Date	Date the discussion being generated	Date/Time
Title	Title of the discussion	Text

Table 4.1.3 Discussion Table's Attributes

Attributes	Description	Data Type
Diskey	A key to recognize the discussion	Text
Subkey	A key to recognize which discussion the message belongs to	Text
Date	Date the message being generated	Date/Time
Message	The message of the discussion	Text

Table 4.1.4 SubDiscussion Table's Attributes

Attributes	Description	Data Type
Id	The user login Id	Text
Password	The user login password	Text
Status	The user login privilege	Text
Salary	The user salary number	Text

Table 4.1.5 Login Table's Attributes

Attributes	Description	Data Type
Filename	The uploaded minute file name	Text
File	The minute that had been uploaded to the database	OLE Object
MeetingDate	The meeting date	Date/Time
Topic	The meeting topic	Memo
Icount	A key to recognize the minute	Autonumber
MeetingTime	The meeting time	Text

Table 4.1.6 MinuteData Table's Attributes

Attributes	Description	Data Type
Name	The name of the user	Text
Salary	The salary number of the user	Text
Department	The department that the user belongs to	Text
Email	User's email address	Text
AltEmail	User's alternative email address	Text
Sex	User's sex	Text
Phone	User's phone number	Text

Table 4.1.7 LecDetail Table's Attributes

Attributes	Description	Data Type
Index	A key to determine which minute the keyword belongs to	Number
Keyword	An identifier for searching purposes	Text

Table 4.1.8 Index Table's Attributes

4.2 System Architecture

Meeting Support System is running in a centralized server using Windows NT server 4.0. Users can login to the system by a client PC. Figure 4.1 shows the system architecture of the system.

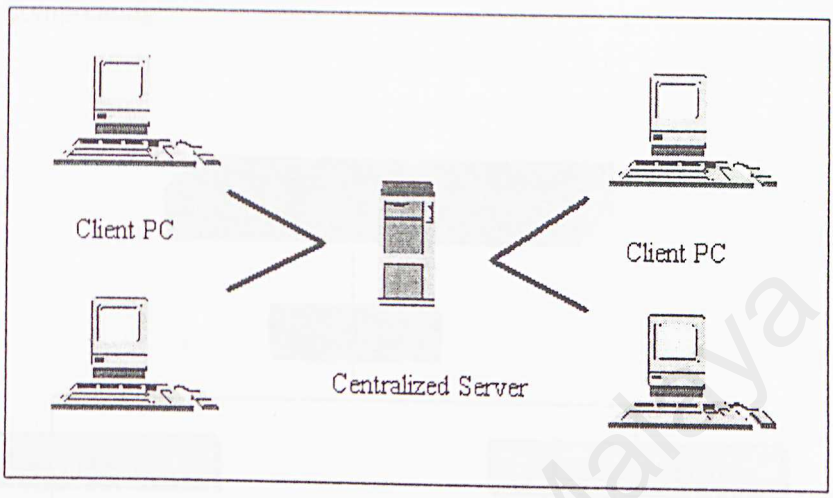


Figure 4.1 System Architecture

4.2.1 System Modeling

A system model is a representation of an in-place or proposed system that describes the data flow throughout the structure. The model describes the points where data or information enters a system and the places here it will be processed, as well as the actions taken and the points where data will be output.

A system model is documented through variety of design diagrams include data flow diagram (DFD), structured charts, decision trees and so on. For this project, structure chart was chosen to represent the system.

4.2.1.1 Structure Chart

Structure chart is used to depict high-level abstraction of a specified system. The use of the structure chart is to describe the iteration between independent modules. Major functions from the initial component part of the structure chart that can be broken into detailed sub-components.

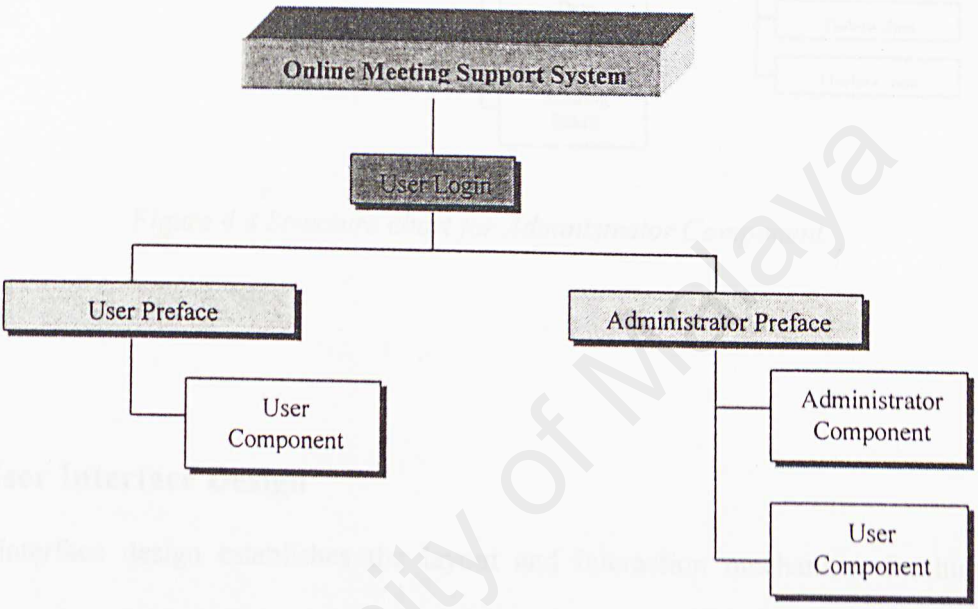


Figure 4.2 Structure chart for online meeting support system

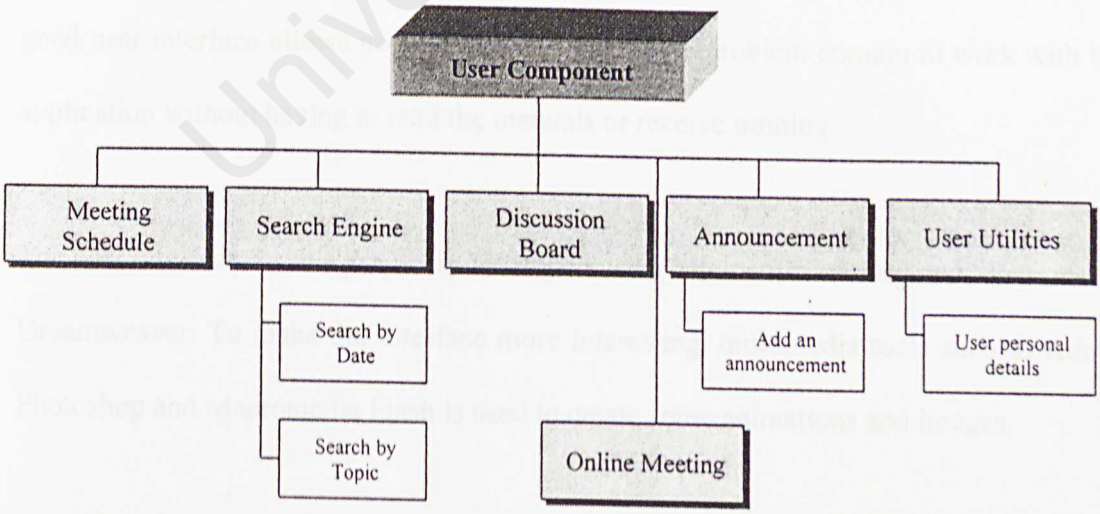


Figure 4.3 Structure chart for User Component

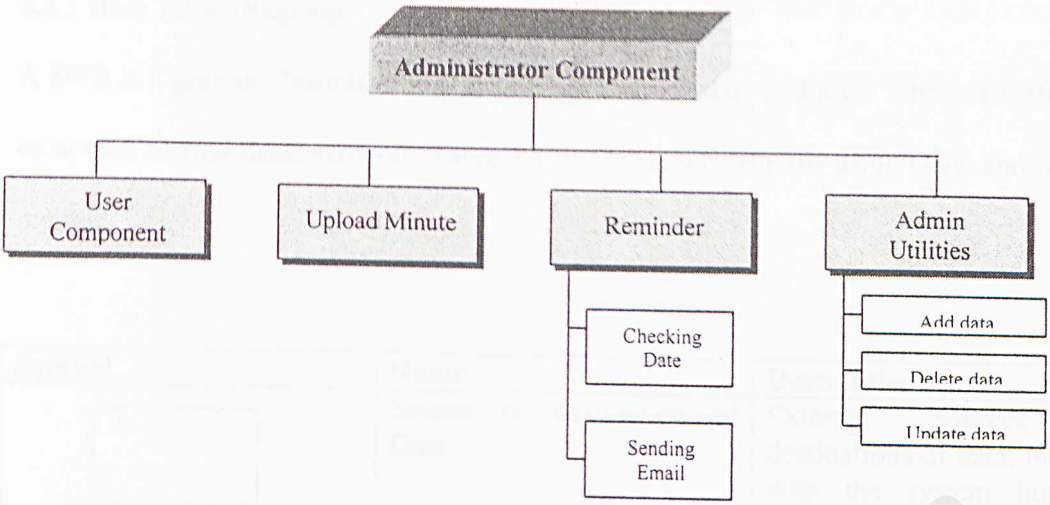


Figure 4.4 Structure chart for Administrator Component

4.3 User Interface Design

User interface design establishes the layout and interaction mechanism for human-machine interaction. A fundamental reality of application development is that the user interface is the system to the users. Constantine (1995) points out that the reality is that a good user interface allows people who understand the problem domain to work with the application without having to read the manuals or receive training.

The user interface for this project is developed using Microsoft InterDev and Macromedia Dreamweaver. To make the interface more interesting, multimedia tools such as Adobe Photoshop and Macromedia Flash is used to create some animations and images.

4.4 Process Design

4.4.1 Data Flow Diagram

A DFD is a graphic illustration that shows the flow of data and logic within a system. It composes of four basic symbols. Table 3.1 describes the symbols using Gane and Sarson method.

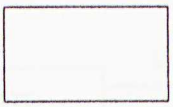
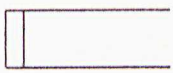
Symbol	Name	Description
	Source or destination of Data	External sources or destinations of data, interact with the system but are outside its boundary
	Processes	It represents the transformation or processing of information within a system
	Data Store	It is used for showing the data storage or referenced by a process
	Data Flow	It is used to show the movement of data from an origin to a destination with the head of arrow pointing towards the destination

Table 4.2 Symbols using Gane and Sarson Method (Senn, 1989)

4.4.2 Data Flow Diagram for Meeting Support System

To have a rough idea about how the system flow before the development of the system is put into action, a rough DFD diagram is built according the user expectations and needs.

4.4.2.1 Login

Context Diagram

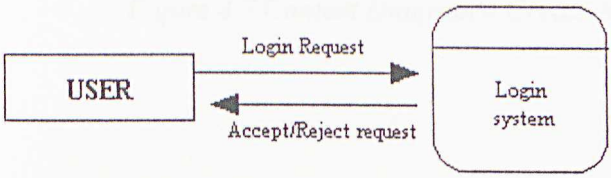


Figure 4.5 Context Diagram - Login

Level 0 Diagram

Figure 4.6 Level 0 Diagram - Login

4.4.2.2 Admin Utilities

4.4.2.2.1 Create New User

Context Diagram

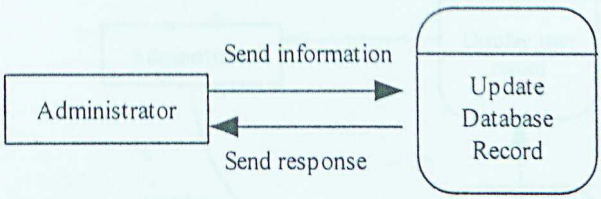


Figure 4.7 Context Diagram – Create New User

Level 0 Diagram

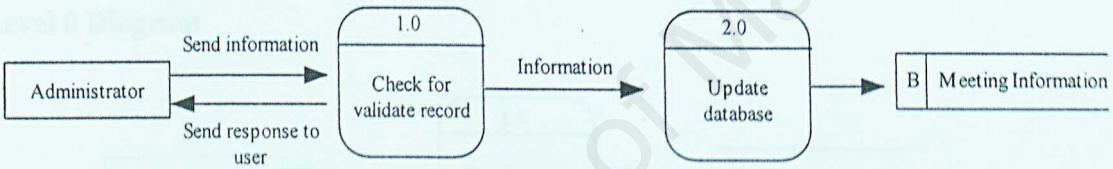


Figure 4.8 Level 0 Diagram – Create New User

4.4.2.2.2 User Information

Context Diagram

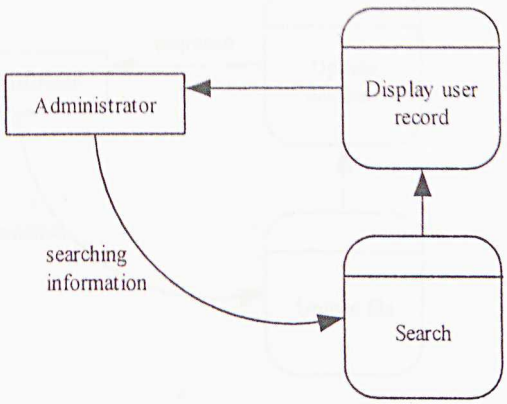


Figure 4.9 Context Diagram – User Information

Level 0 Diagram

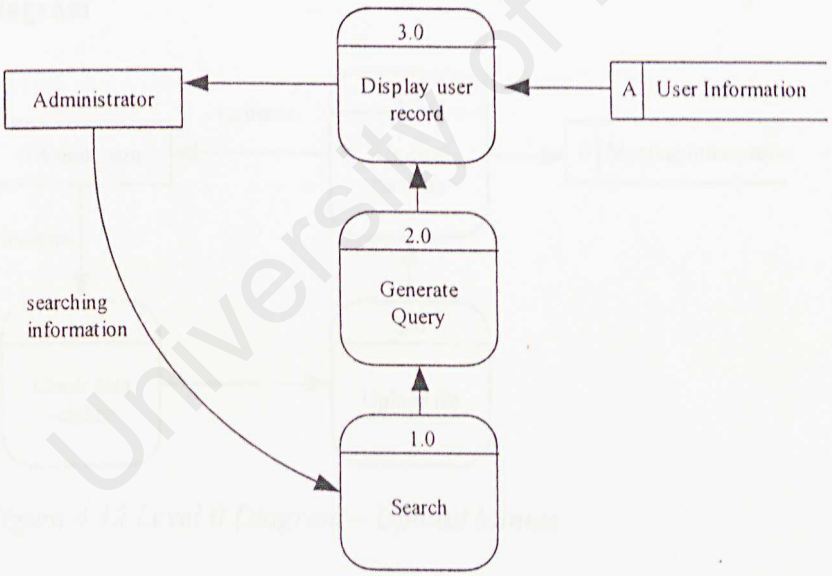


Figure 4.10 Level 0 Diagram – User Information

4.4.2.2.3 Upload Minute

Context Diagram

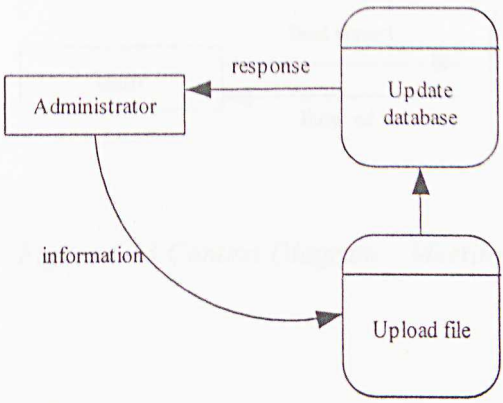


Figure 4.11 Context Diagram – Upload Minute

Level 0 Diagram

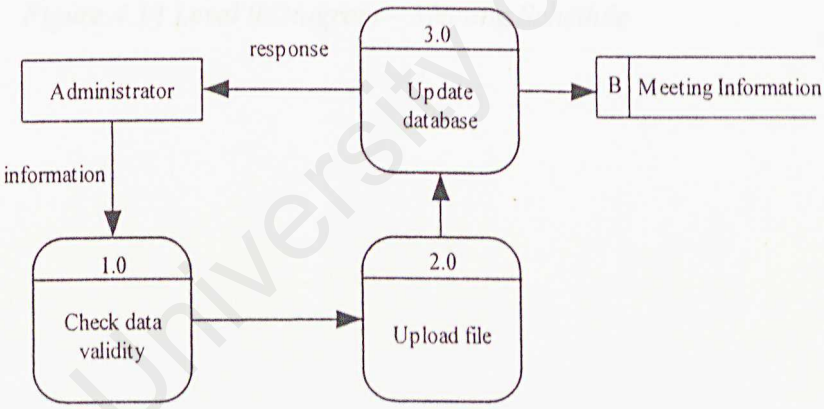


Figure 4.12 Level 0 Diagram – Upload Minute

4.4.2.3 Meeting Schedule

Context Diagram

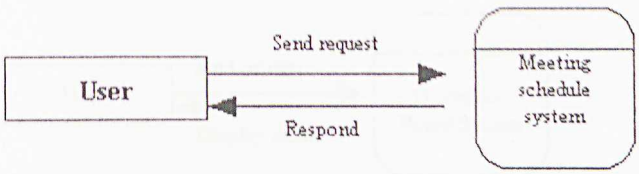


Figure 4.13 Context Diagram – Meeting Schedule

Level 0 Diagram

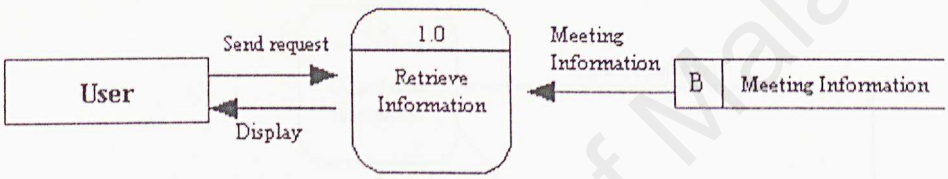


Figure 4.14 Level 0 Diagram – Meeting Schedule

4.4.2.4 Discussion Board

Context Diagram

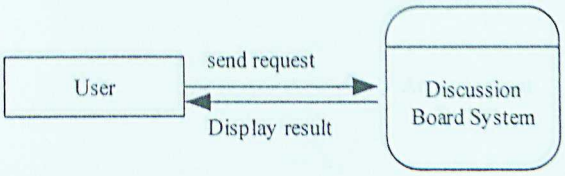


Figure 4.15 Context Diagram – Discussion Board

Level 0 Diagram

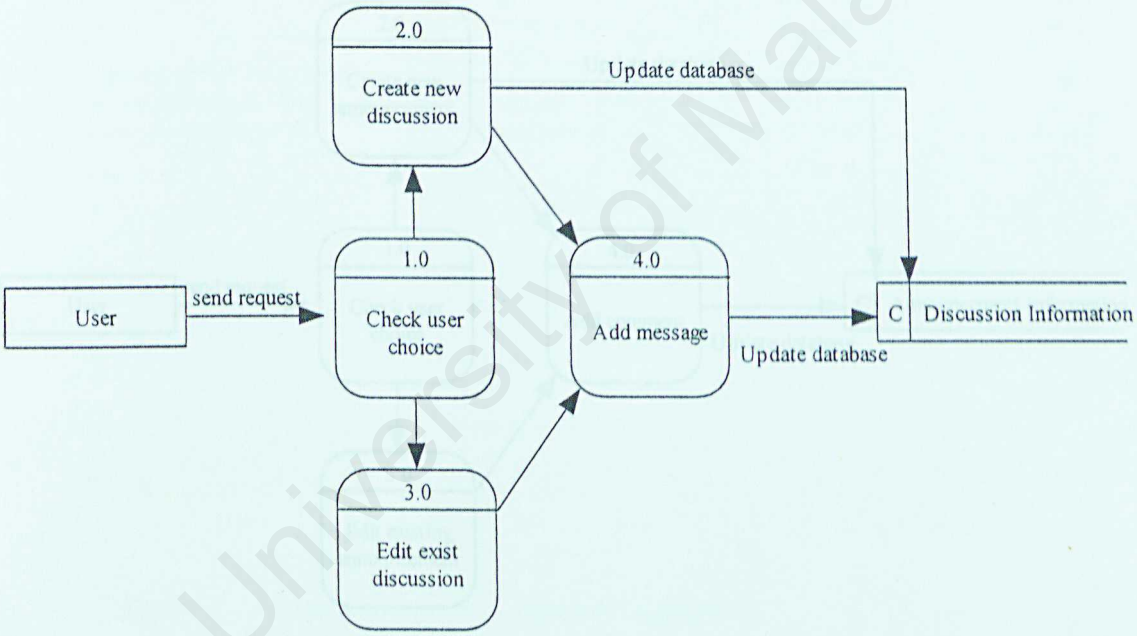


Figure 4.16 Level 0 Diagram – Discussion Board

4.4.2.5 Announcement

Context Diagram

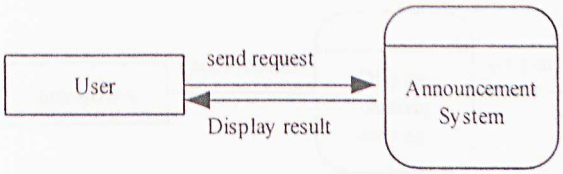


Figure 4.17 Context Diagram – Announcement

Level 0 Diagram

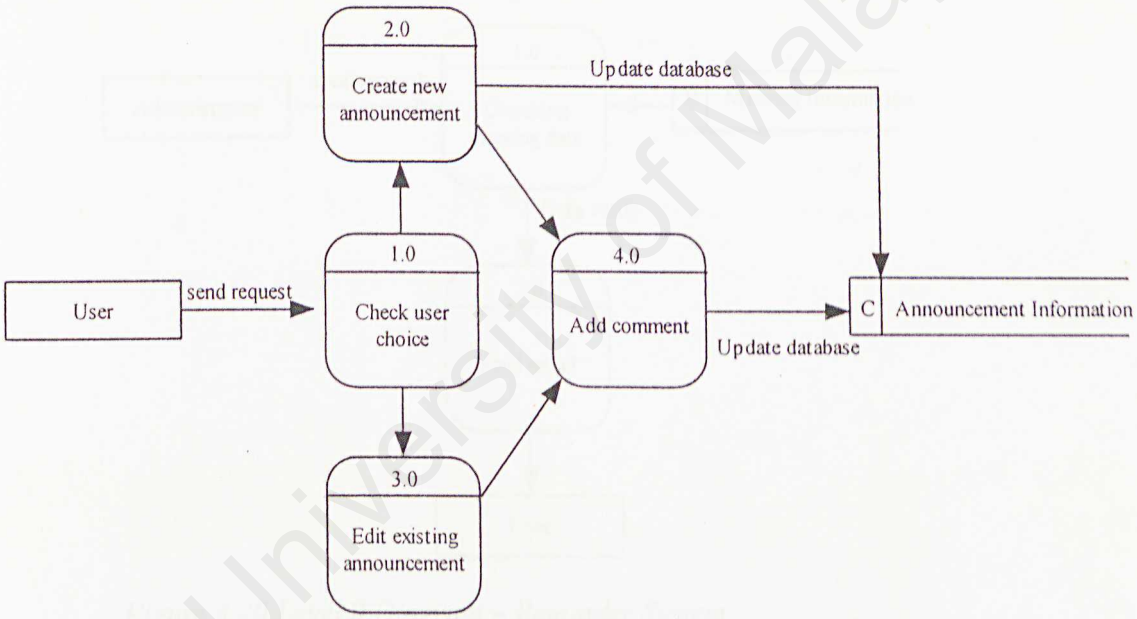


Figure 4.18 Level 0 Diagram – Announcement

4.4.2.6 Reminder System

Context Diagram

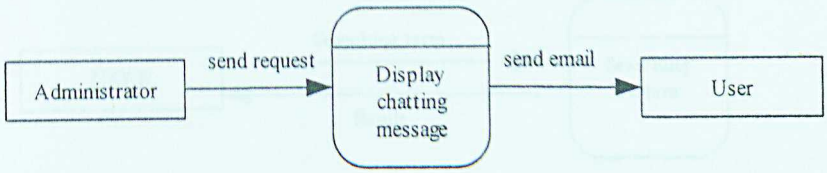


Figure 4.19 Context Diagram – Reminder System

Level 0 Diagram

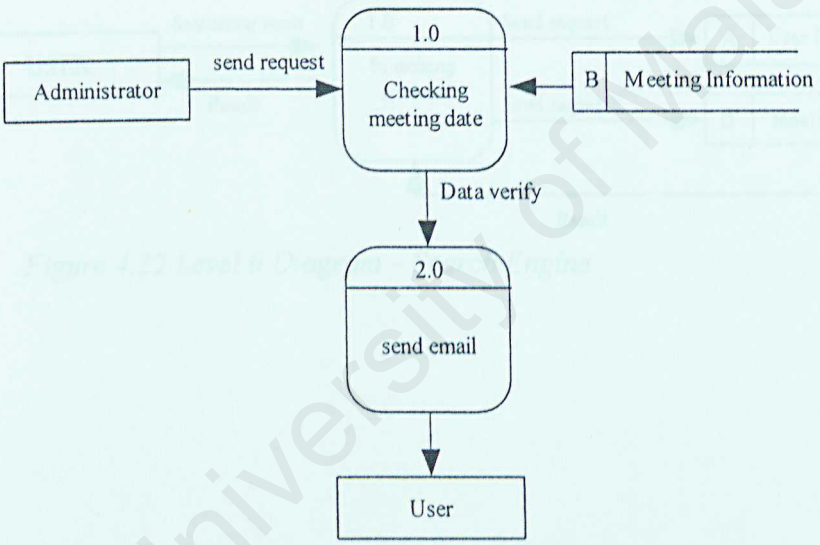


Figure 4.20 Level 0 Diagram – Reminder System

4.4.2.7 Search Engine

Context Diagram

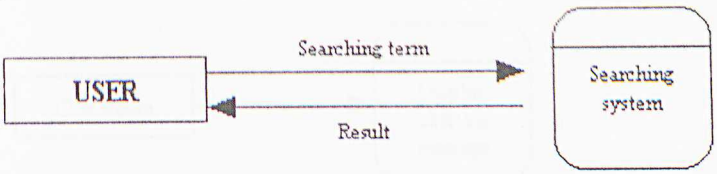


Figure 4.21 Context Diagram – Search Engine

Level 0 Diagram

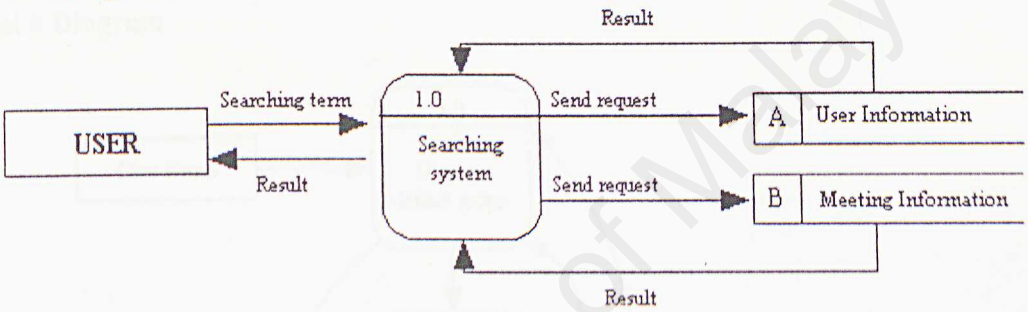


Figure 4.22 Level 0 Diagram – Search Engine

4.4.2.8 Online Chatting

Context Diagram

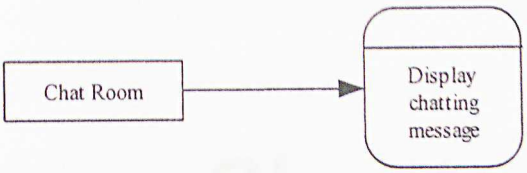


Figure 4.23 Context Diagram – Online Chatting

Level 0 Diagram

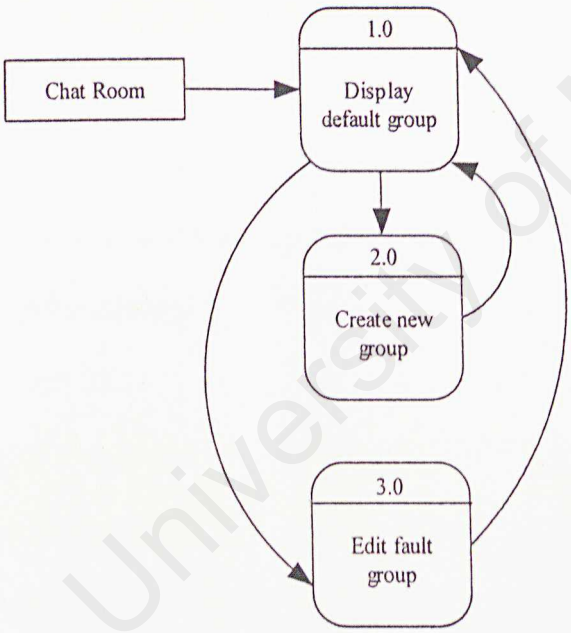


Figure 4.24 Level 0 Diagram – Online Chatting

Chapter 5:

Implementation

Chapter 5: Implementation

5.0 Implementation

System implementation is a process that converts the system requirement and designs into program codes. It involves coding step that translates a details design representation of software into a program language realization.

5.1 Development Environment

Development environment has certain impact on the development of a system. Using the suitable hardware will help speed up system development. The hardware and software tools used to develop and documented the entire system is as discuss below.

5.1.1 Hardware Requirement

The hardware used to develop this project are listed below:

- 233MHz Pentium II Processor
- 128MB RAM
- 36X CD-ROM Drive
- 5.2GB Hard Disk
- Other standard desktop PC components

5.1.2 Software Tools/Components requirements

- *Software Tools for Design and Report Writing*

  Design involves creating of charts like data floe diagram and structure chart that provides a greater overview of the system designed. Smart Draw 5.0 was used to

do the graphical design and Microsoft Word 2000 and Microsoft Excel 2000 was used to do the documentation and user manual.

+ *Software Tools for Development*

A few software tools were used for the system development as listed in Table 5.1.

Software/Tools	Purpose	Description
Windows NT Server 4.0	System Requirement	Operating System (OS)
Smart Draw 5.0	Data Modeling and Process Design	Design of ER Diagram and DFD
Microsoft Access 2000	Database	As the system database to store information
Microsoft InterDev 6.0	Coding and interface design	Coding ASP and HTML
Macromedia Dreamweaver	Interface design	Design web page interface
Macromedia Flash	Interface design	Create animation
Adobe Photoshop	Interface design	Create image

Table 5.1 Software Tools Used

5.2 Development of Meeting Support System

This section explained the development of this project, which focuses on the analysis of usage of the technology and development tools that had been used.

5.2.1 Database Development

The backend of this project is Microsoft Access 2000. The database is built according the system requirements as depicted in Chapter 4, "System Development". Microsoft Access 2000 is very user friendly and easy to use. More information about this software can be found through this web site:

http://www.microsoft.com/Office/access/Manage.htm

5.2.2 User Interface Development

The user interface for this project was developed using Microsoft InterDev and Macromedia Dreamweaver. Microsoft Interdev and Macromedia Dreamweaver are editor programs that allow the user to edit HTML and ASP file. They also have the build in user interface design tools that are user friendly and easy to use.

Besides, some of the multimedia and design software are used to make the interface of this project more attractive. Image editing tool such as Adobe Photoshop was used to create image for the project where as Macromedia Flash was used to create animation for the web page.

5.2.3 Application Development

The application development involves creating and designing the user interfaces, coding the application using Microsoft InterDev and Macromedia Dreamweaver and linking the application to the database.

Structured Programming

Structure programming extends the principles governing structured design to the writing of a program. It also is based on the principle of the modularization that follows from the top-down development.

Structure is a method of organizing and coding programs that simplifies control paths so that the programs can be easily understood and modified. Structured programming reduces the complexity created when programs jump forward and backward to other parts of the program, obscuring the logic and flow of the program. [22]

ASP (Active Server Pages) support structured programming by providing sequential, iteration (FOR and WHILE statements etc.).

Modular Programming

Modular programming is defined as breaking and application into small programming units that perform a single task. In ASP, this can be done by using the function and sub function based on the events.

When an application is composed of small functions that perform a single task, maintenance is much easier. Functions can be shared among forms by coding the functions into .inc or .asp file. The other file can share these functions by include that file in the header.

Naming Conventions

A naming convention has been formed to ease the understanding of the codes. Prefix used to identify the object type. Table below lists the standard prefixes for many of the components in HTML.

Object Type	Prefix
TextBox	txt
Password	psw
TextArea	txtarea
SubmitButton	sub
ResetButton	rst
CheckBox	chk
Radio Button	rad
FileField	file

Table 5.2 Prefix Identify the Object Type

Algorithm

The algorithm that used for the searching part is by using tree. After the meeting minute was uploaded to the database, the topic of the meeting minute will be generated as index in table Index with the filtering through a stoplist.

In searching the relevant minute, the user can search through meeting topic or meeting date or both of it. As the searching method that used for this project is Boolean search, all the relevant information that matches any of the queries will be display to the user.

The following is the example algorithm of the tree search:

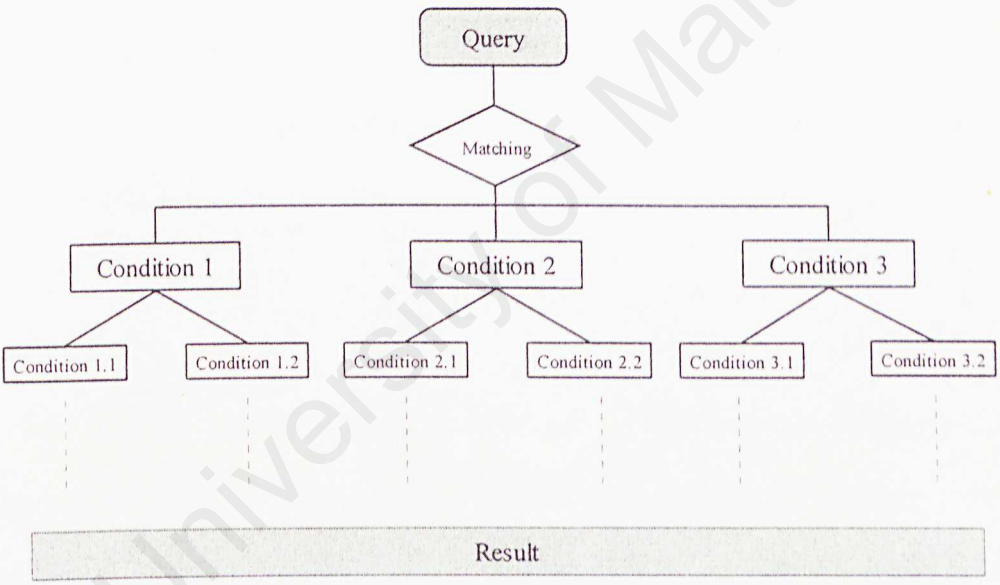


Figure 5.1 Example of Tree Search

Chapter 6:

System Testing

Chapter 6: System Testing

6.0 System Testing

Testing has been done in the same development environment. Testing is performed to ensure that the programs are executed correctly and conforms to the requirements specified. It provides a method to uncover logic error and for testing system reliability. A well-tested system boost user confidence in using the system. It is widely believed that the purpose of testing is to guarantee that the programs are error free; this foal is realistically impossible. No matter how exhaustive and thorough the testing has been conducted, no one program can be proved as total error free.

Testing should be viewed as a mean of locating errors in programs and focusing and finding ways to make a program fails. The strategies used for testing are unit testing, integration testing and system testing.

6.1 Unit Testing

Unit testing focuses on testing the functional part of the system. For example, the announcement component, it consists of several units, which are displaying exists announcement, creating a new announcement, view the comments of the announcement and so on. Each of this function is first tested separately to ensure that it works. Then all of these units are tested together in the integration testing to locate any errors or bugs when the units integrated and perform in certain situation.

6.2 Integration Testing

When the individual components are working correctly and meet the objectives, these components are combined into the main system by creating a linking between them. In other words, integration testing is the process of verifying that the system components work together as described in the system and program design specifications.

6.3 Test Data

In order to carry out testing, test data must be designed to execute the program. To ensure a comprehensive test, test data should be devised with the user. Two types of data have been used to do the testing, which are the actual data and stimulated data.

Stimulated Data

Stimulated data are the data created intentionally to test the functionality of the application. Stimulated data could be erroneous and could be correct data. Resting with stimulated data enables all functionality of the application to be tested whereby that could not be testing using actual data. Stimulated data are also important to discover bugs so that error checking could be done in the application.

Chapter 7:

System Evaluation and Conclusion

Chapter 7: System Evaluation And Conclusion

7.1 System Strengths

- **Simple and user-friendly interface**

  The user interface of the system is very user-friendly and quite consistent from one interface to another in the same component. The flow of the system is very easy to follow and users do not have to follow any complex procedure in performing certain function. All the functions can be performed easily by just clicking a button and filling the require information.

- **Security**

  Like most systems, security is one of the most important aspects in the system. This system provides three levels of user login controls that are the user, administrator and super administrator. Every logins have their own privilege and the privilege will determine the task that the user can handle in the system. With Microsoft NT Server 4.0 as the server operating system, all client machine that connect to it must be have a trusted connection or granted permission to manipulate the database stored inside it.

- **Maintainability**

  The system is easy to maintain because some of the functions are stored in files. Meanwhile every object type is written in standard form and the file name of every component also rename in a standard way. This is important for administrator in doing maintenance work.

- **System Transparency**

  System transparency refers to the condition where the users do not need to know where the database resides, how is the system structure, its database management system and anything related to the system built. This feature is very important to avoid confusion that could lead to destruction of the important data.

7.2 System Limitations

There are some limitations in this project. As the time for developing the system is not much, there are some functions not included in the system such as booking system, scheduling system and so on. However, the system can be integrated with other systems that are developed by students of FSKTM. This may solve the problem of limitation.

Another limitation is the user cannot obtain their password through web. This limitation exists due to the central maintenance by administration. However, this structure will increase the security of the system.

There is also another limitation where there is no reporting function in the system. The reporting function could be helpful for the administrator in doing maintenance.

7.3 Future Enhancements

System development is a dynamic process. This system was developed in less than three month. While developing this system, new ideas have come about. However, due to time constraint, not all of these ideas could be incorporated into the system. Some of the ideas that come about are as follows:

i) In order to make the system more detailed and comprehensive, the project can cater the scheduling meeting system and booking meeting room system

ii) The system also has a report generator to generate report when necessary

iii) The interface of the system can be designed in a more standardized way which show the professional of designing a system

iv) The reminder system will communicate with server to provide automatic remind services.

7.4 Overall Conclusion

The main objective of the Meeting Support System is to create an interactive and digital way to handle the meeting procedures. Overall, the objectives of the project had been achieved through there are still plenty rooms for improvements.

However, like other software application, this system is not escapable from its limitation. But these all can be overcome in time, by making the necessary future enhancement.

Apart from that, the development of the system has significance for me. It's will help me to learn how to develop a web site and system using the new web development tool such as Microsoft Visual Interdev 6.0 and Active Server Page (ASP). Knowledge gained in this field is a valuable one specially if one tends to serve the rapid growing Internet industry in the world currently.

Finally, while developing the project, I learned how to manage planning due to time constraint and also experience in problem solving while developing a system. It is hope that this project really helps in developing a digital way to handle the meeting procedures in Faculty of Computer Science and Information Technology, University Malaya.

Reference

[1] Gerald A. Silver, Myrna L. Silver, 2989. "*Systems Analysis and Design*", Addison-Wesley Publishing Company

[2] Kendall, Kenneth E, "*System Analysis and Design*", Prentice-Hall,Englewood Cliffs, 1988

[3] Bebo White, "*HTML and The Art of Authoring For The World Wide Web*", 1996, Kluwer Academic Publishers

[4] Robert Vieira, 1999, "*Professional SQL Server 7.0 Programming*", Wrox Press Ltd

[5] Dick Oliver, "*Teach Yourself HTML 3.2 in 24 Hours*", Sams.net Publishing

[6] L. Michael Van Hoozer, "*Teach Yourself Microsoft InterDev in 21 Days*", Macmillon Computing Publishing

[7] Duffy, Tim. "*Microsoft Office 2000 Professional*", 2000, Reading, Mass.: Addition-wesley

[8] Scot Johnson, Keith Ballinger, Davis Chapman and et al, "*Using Active Server Pages*", 1997, Que Corporation

[9] Chris Ullman, David Buser, Jon Duckett, Brain Francis, John Kauffman, Juan T. Llibre and David Sussman, "*Beginning ASP 3.0*", 1999, Wrox Press

[10] Kenneth E.Kendall & Julie E.Kendall, "*System Analysis & Design 4th Edition*", 1999, Prentice Hall International, Inc

[11] Shari Lawrence Pfleeger, 1998. "*Software Engineering Theory and Practice*". Prentice-Hall, Inc.

[12] Igor Hawryszkiewycz, 1998. "*Introduction to System Analysis and Design, 4th Edition*". Prientice Hall Australia Pty. Ltd.

[13] Information Literacy Topics 15 minutes series – Web Browsers, *http://www.lib.utc.edu/pages/web4_browsers/sld01.html*

[14] World Wide Web, *http://helpdesk.uvic.ca/resource/network/www.html*, Computer Help Desk, University of Victoria

[15] 15-minutes Series – What Is The World Wide Web, *http://telcom.coos.k12.or.us/WhatIsTheWWW/server.htm*

[16] AskNPAC on the primary NPAC web service site, *http://asknpac.npac.syr.edu/*, Northeast Parallel Architectures Center

[17] Usenet FAQs, *http://www.cis.ohio-state.edu/hypertext/faq/usenet/client-server-faq/faq.html*, OSU Department of Computer and Information Science

[18] Kalakota, R., "What are the characteristics of client/server architecture?", *http://www.cis.ohio-state.edu/hypertext/faq/usenet/client-server-faq/faq-doc-14.html*

[19] *http://www.macromedia.com/software/director/*

[20] What is Active Server Pages?, *http://asp-help.com/getstarted/ms/aspdocs.roadmap.asp*, Microsoft Server Pages

[21] Shari Lawrence Pfleeger, "Software Engineering theory and Practice", International Edition, 1998 pp. 192

[22] "Structured Programming", http://rkb.home.cern.ch/rkb/AN16pp/node278.html

User Manual

Table Of Contents (User Manual)

List of Figures (User Manual)

User Manual

Chapter 1: Introduction

This project is intended to assist staffs and lecturers in Faculty of Computer Science and Information Technology in initializing and preparing meetings. It aims to provide a robust and efficient meeting support system using a web development tool, Microsoft Visual Interdev, with a back end database to manage the data storage. The main focus of this system is to computerize the process of initializing meeting, preparing minutes, communicating with committee and so on. This project consists of several components that are listed below:

1. Reminder System
2. Search Engine for Data Retrieval
3. Online Minutes Tool
4. Discussion Board
5. Announcement
6. Meeting Schedule
7. Others Supporting Tools

This user manual will guide you through all the functions available in the system. This manual includes the following parts:

- System Overview and Essentials
- Administration Component
- User Component

Chapter 2: Hardware and Software Requirements

2.0 Hardware requirements

Listed below are the hardware requirements to run this system:

- A Pentium II 233 processor or above
- Minimum 32MB RAM (64MB RAM recommended)
- A SVGS Graphic Adapter
- Keyboard and Mouse as input devices

2.1 Software Requirements

The software requirements needed to run the system:

- Windows 95 or Windows 98 or Windows 2000 or Windows NT workstation
- Microsoft Internet Explorer or Netscape Communicator
- Macromedia Flash

Chapter 3: Getting Started with Meeting Support System

As MSS is a client/server application, it needs an establish network connection to put the system into function.

3.0 Access to MSS system

To use the system, the users need to use the browser (Internet Explorer or Netscape Communicator) to access to the system web site:

http://misserver/thesis/login.html

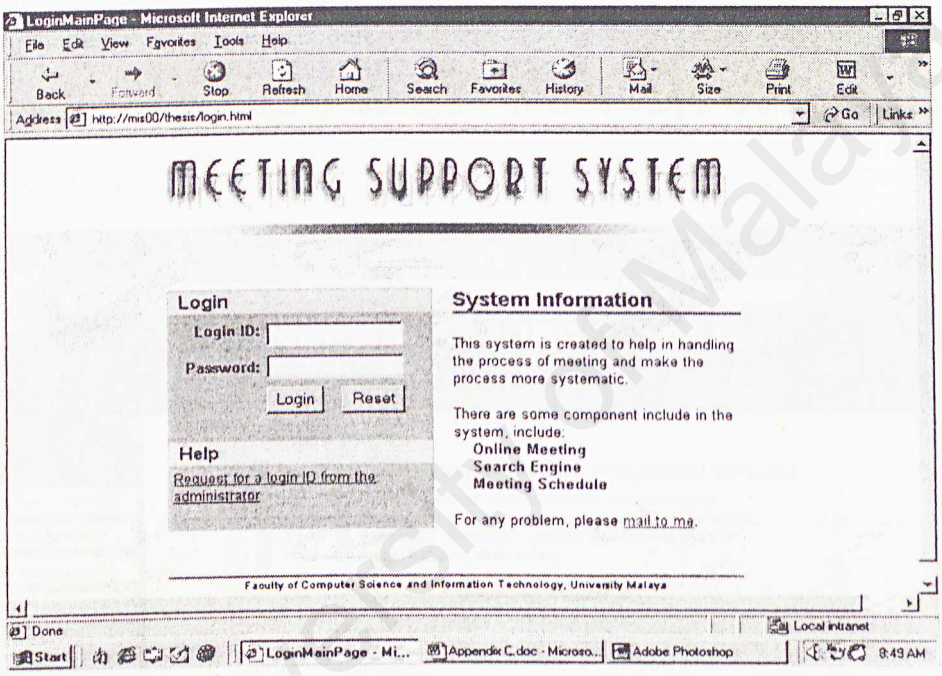


Figure 3.1 Login Interface

Login form is the first thing that you'll see when you go to the main web page. You must enter an authorized username and valid password. Username and password validation will be done on server. The user login will determine the user privilege when accessing the system. If the user types in the wrong password, the system will redirect back to the login page.

For those who do not have the login password, he can mail to the administrator to ask for it by clicking a link named "*Request for a login ID from the administrator*" on the login web page.

3.1 Administrator Component

3.1.0 Main Page of the System

This main page will display the newest announcement that had been created by the user and also the coming meeting information. Users can click on the button "*To all announcements*" to get all the announcement information. Users also can get all the meeting minutes information by clicking the "To all Meeting Information" button.

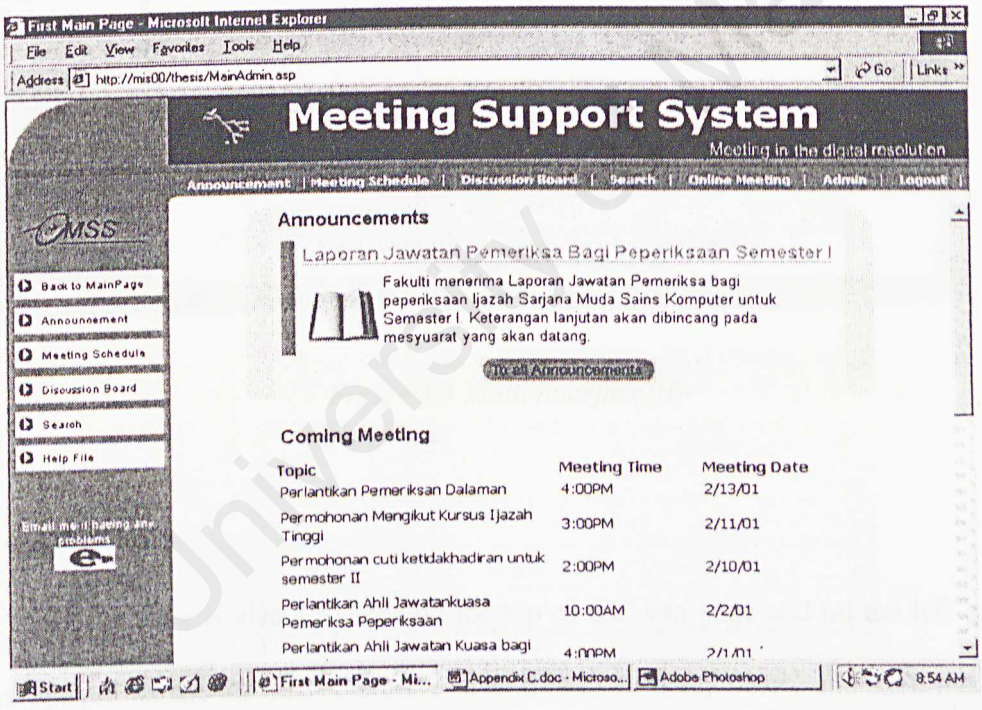


Figure 3.2 Main Interface(I)

There is also a button "*Go to Reminder*" for all the 'ADMIN' and 'SUPER' privilege login that enables user to send remind to all the users about the meeting. The functions will be discussed later. For the user privilege, there is only a button "*To All Meeting Info*" exist.

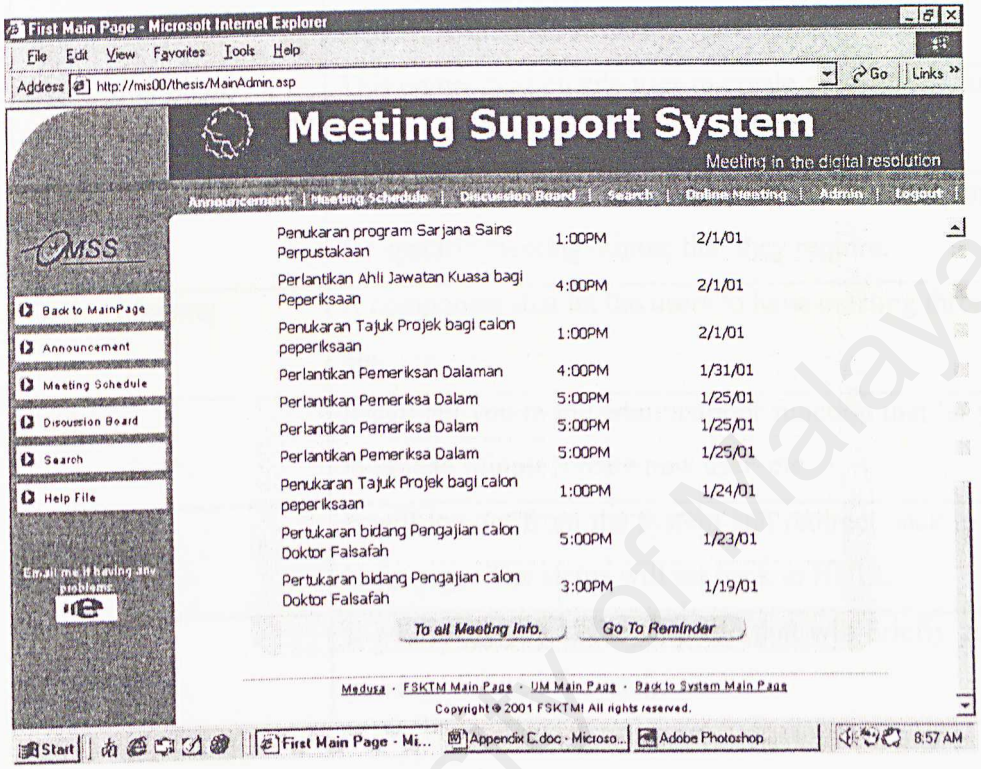


Figure 3.3 Main Interface(II)

There is also a toolbar on the top of the web page and on the left of the web page. For the toolbars, there are several links as listed below and each link will bring you to the specific component.

Link	Component
Announcement	It will get you to the announcement component that enables you to look at all the announcements or create a new announcement.
Meeting Schedule	It will bring you to the component that displays all the meeting minute information.
Discussion Board	This component enable user to create a new discussion room and discuss for a specific topic.
Search	This is a searching component that help user to search for specific meeting minute that they require.
Online Meeting	A component that let the users to have meeting through net.
Admin	It will get you to the administrator function that let you to upload minute, create new user, etc.
Logout	It will log out from the system and redirect back to the login page. The status will set back to NULL.
Help	It will bring you to the help file that will briefly guide you how to use the system.

Figure 3.4 Lists of Components in the System

3.1.1 Reminder

When user click on the button "*Go to Reminder*", all the coming meeting will be displayed and user can choose which meeting that they need to remind the other users by clicking on the link named *Reminder*.

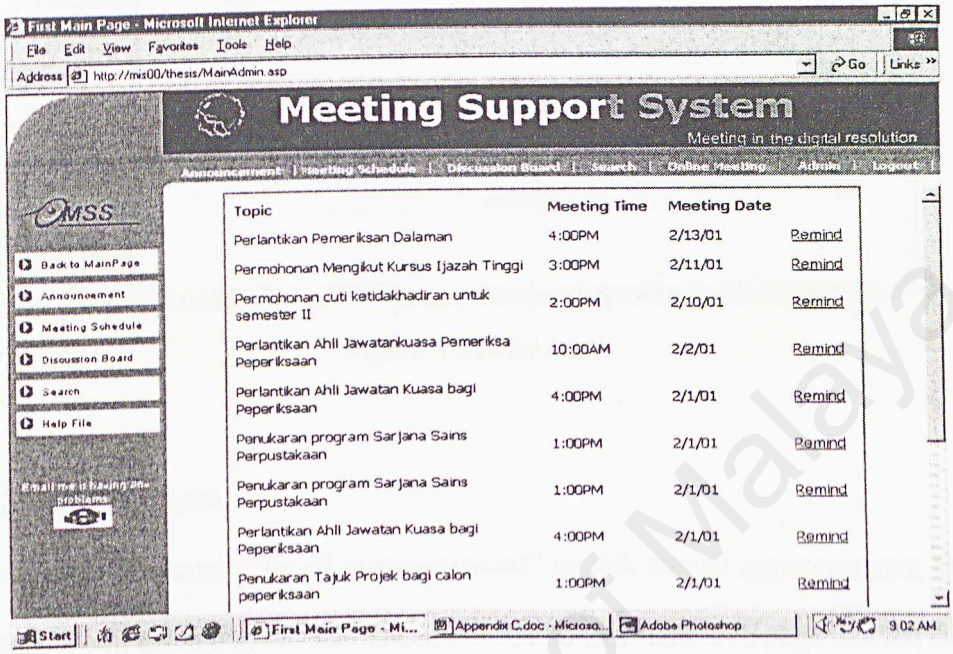


Figure 3.5 Reminder

The link will bring the user to a web page where user can send mail to remind other users about the meeting. The subject and message textbox will be filled according the details in the database and user can change it when it is necessary. Make sure all the fields are filled up and just click on the button '*Send*' to send the mail.

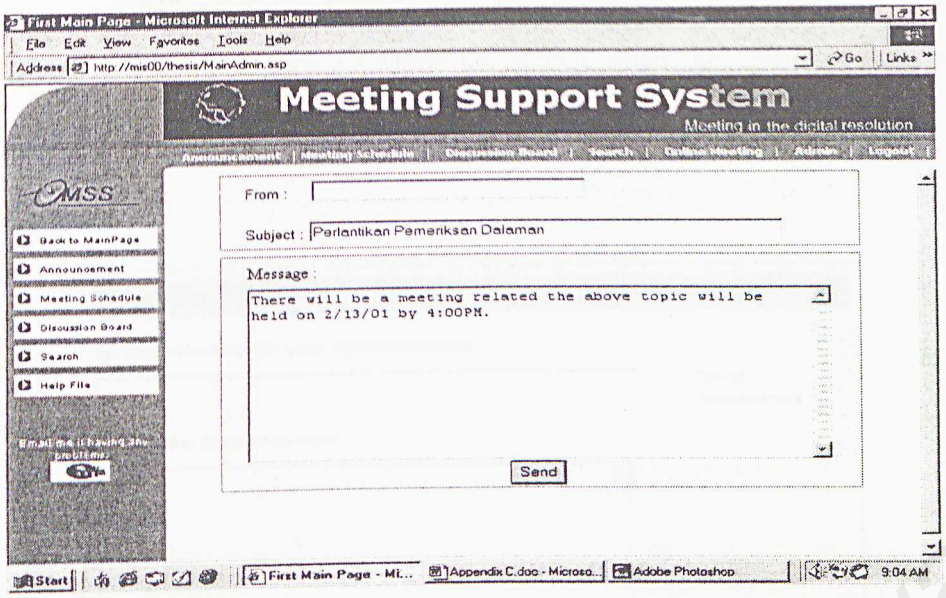


Figure 3.6 Send Mail

3.1.2 Announcement

By clicking the button "*To all announcements*" or link named *Announcement* in the toolbar, it will get you to the announcement component. This web page will list out all the announcements in the system with the announcement title and the date it had been established. User can look at the announcement contents by clicking on the announcement title.

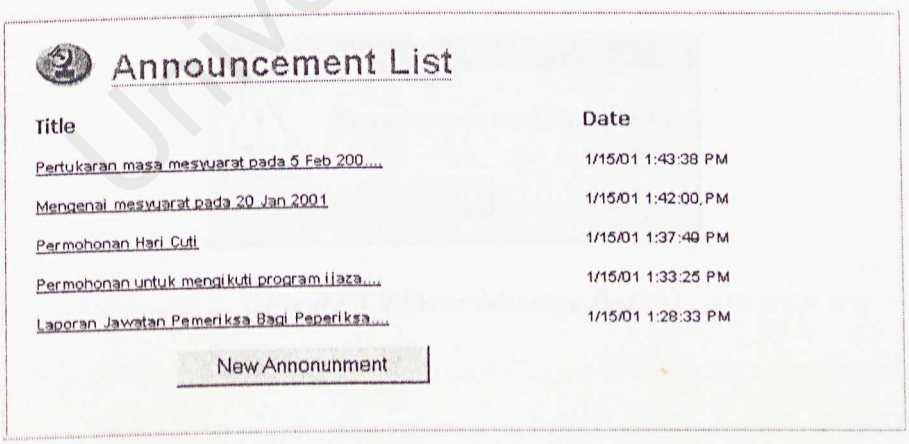


Figure 3.7 Announcement List

There is a button named '*New Announcement*' that let the user to create a new announcement. Figure 3.8 show the screen when the "*New Announcement*" *button* is clicked.

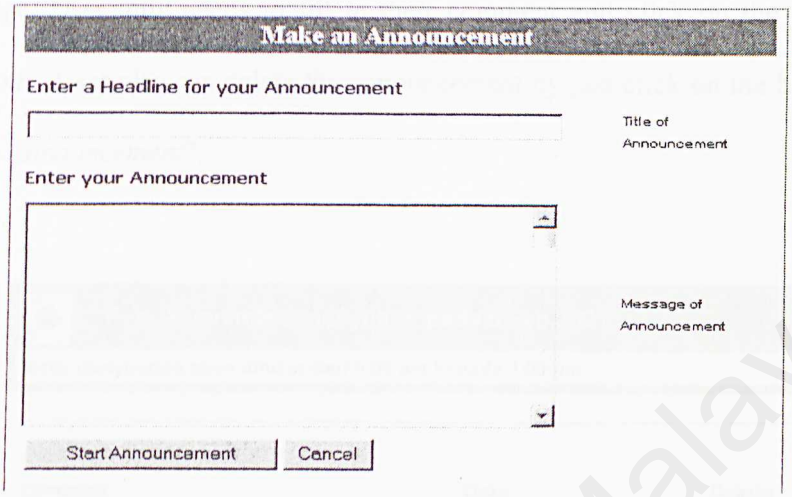


Figure 3.8 New Announcement

Just fill in all form and click on the "*Start Announcement*" button to start the announcement. If the form is not completely filled in, a message box will pop up to show user the error.

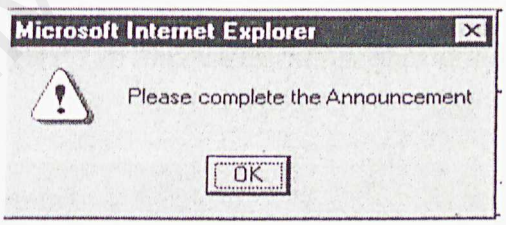


Figure 3.9 Error Message Box

The following web page display more details about the announcement title that include the comments about the title. User can look at the comment title by clicking on the comment title or delete the comment by clicking on the link named *delete*. User can also add their comments using the add comment textbox ready in the web page. User only needs to fill in their comment and click on the button "*Add Comment*". User also can delete the announcement by just click on the button named "*Delete Announcement*".

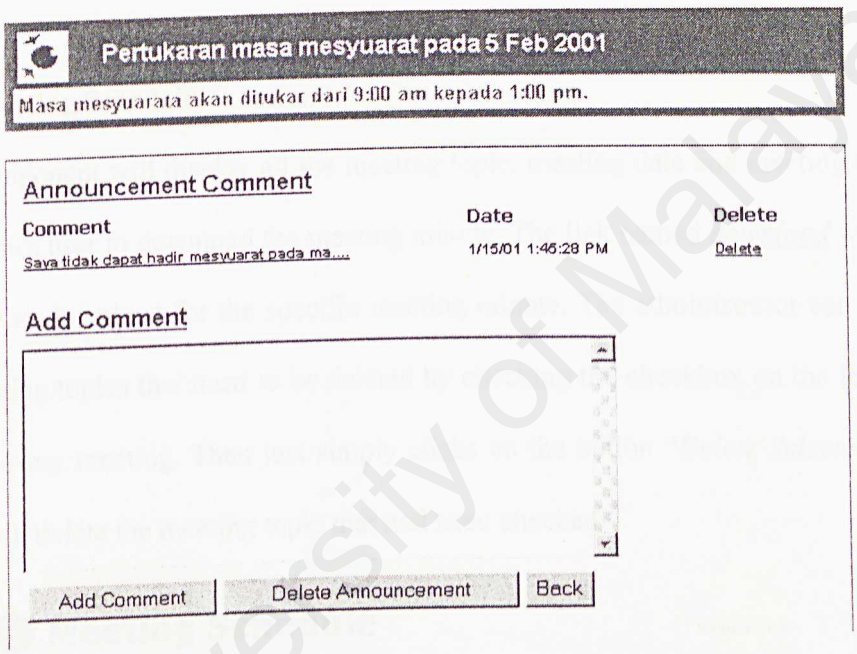


Figure 3.10 Announcement Interface (Edit)

When user clicks on the button "*Delete Announcement*", the following screen will be shown. Click the button "*Delete Announcement*" again to delete the announcement.

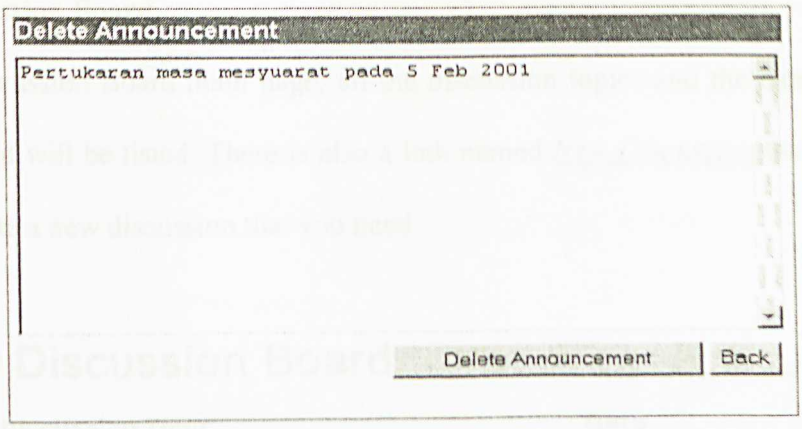


Figure 3.11 Delete Announcement

3.1.3 Meeting Schedule

This component will display all the meeting topic, meeting date and meeting time. It also allows user to download the meeting minute. The link named *download* will help the user to download for the specific meeting minute. The administrator can choose the meeting topics that need to be deleted by checking the checkbox on the left hand side of every meeting. Then just simply clicks on the button "*Delete Selected Item*" and it will delete the meeting topic that had been checked.

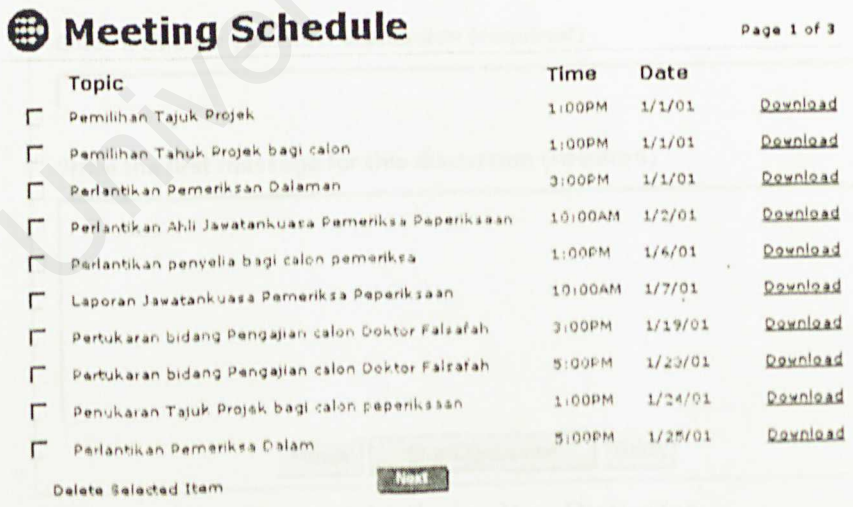


Figure 3.12 Meeting Schedule

3.1.4 Discussion Board

On the Discussion Board main page, all the discussion topics and the date they had been created will be listed. There is also a link named *New Discussion* that will help you to create a new discussion that you need.

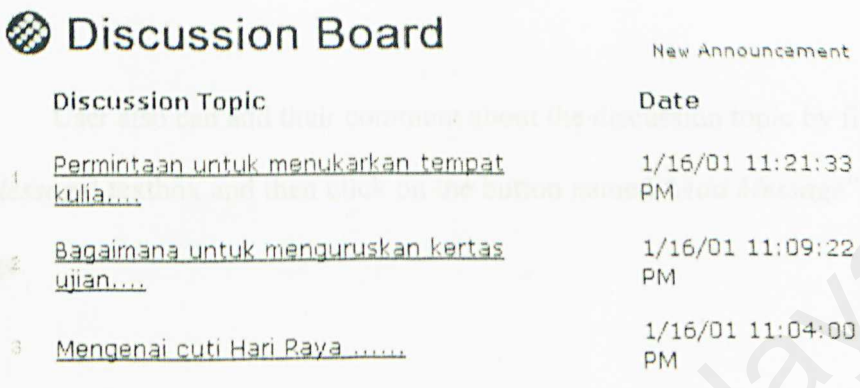


Figure 3.13 Discussion Board

After clicking on the *New Discussion*, it will display the web page that needs you to fill in the title for the discussion and the first message for the discussion. Just fill in all the fields and click on the button named "*Start Discussion*" to create the discussion.

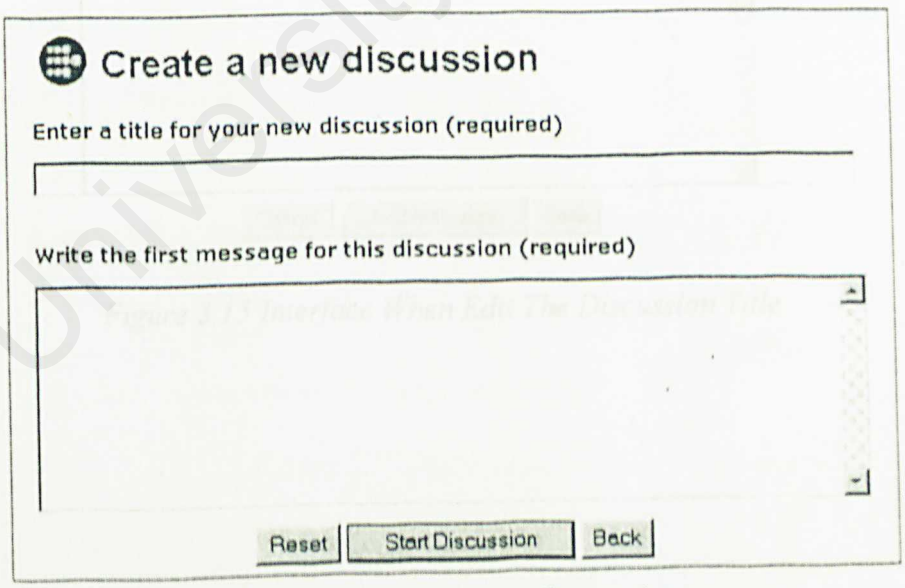


Figure 3.14 Create New Discussion

When user click on the title on the Discussion Board main page, the more details about the discussion will be displayed. All the messages about the discussion topic and the date that the messages had been created are displayed. User can delete the discussion by clicking on the link named *Delete Discussion* or delete the messages by just clicking on the link named *Delete*.

User also can add their comment about the discussion topic by filled up the '*Add Message*' textbox and then click on the button named "*Add Message*" to add the message.

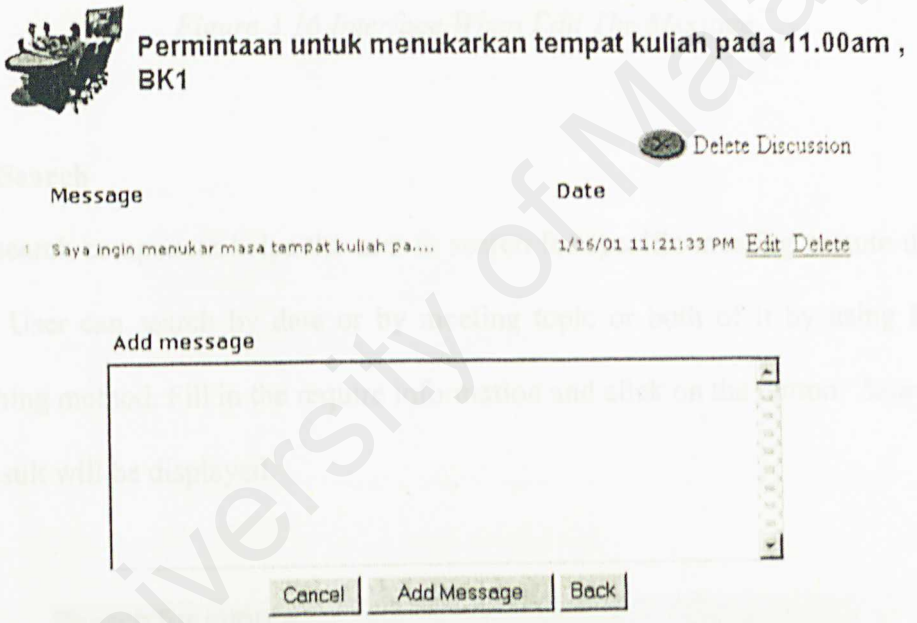


Figure 3.15 Interface When Edit The Discussion Title

The link named *Edit* will enable the user to look at the details of the message that posted by other users. In here too the user can comment about the discussion.

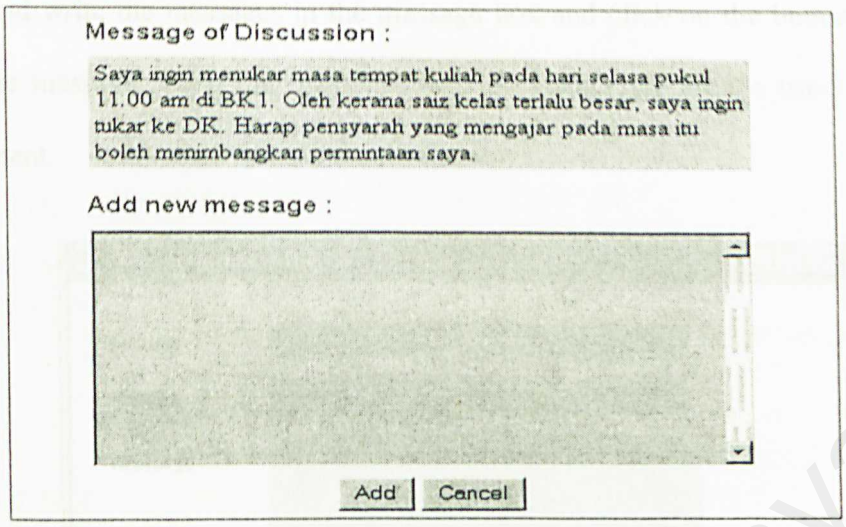


Figure 3.16 Interface When Edit The Message

3.1.5 Search

This search component helps the user to search for specific meeting minute that they need. User can search by date or by meeting topic or both of it by using Boolean searching method. Fill in the require information and click on the button "*Search*" and the result will be displayed.

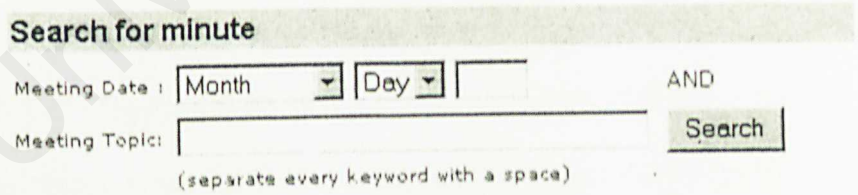


Figure 3.17 Search For Minute

3.1.6 Online Meeting

This component enables the users to have a meeting through net. Just fill in the user name and write the messages in the message box and click on the button "*Send*" to send the message. Then the messages will be visible for all the users using this component.

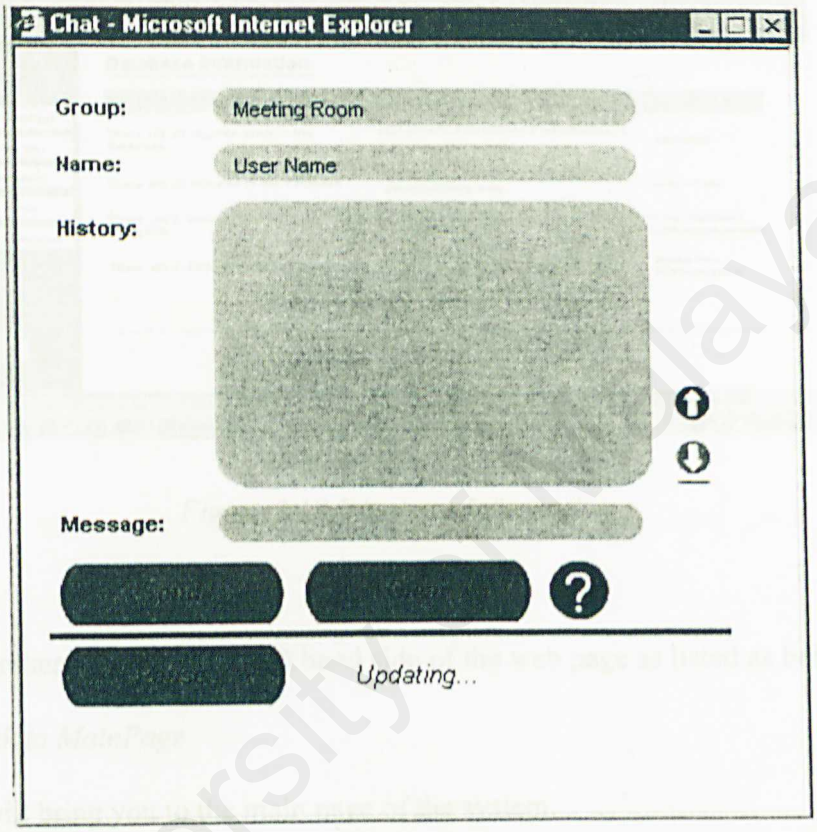


Figure 3.18 Online Meeting

3.1.7 Admin

When access to this link, the information about the database will be visible to the user. Below show the web page when user clicks on the *Admin* link.

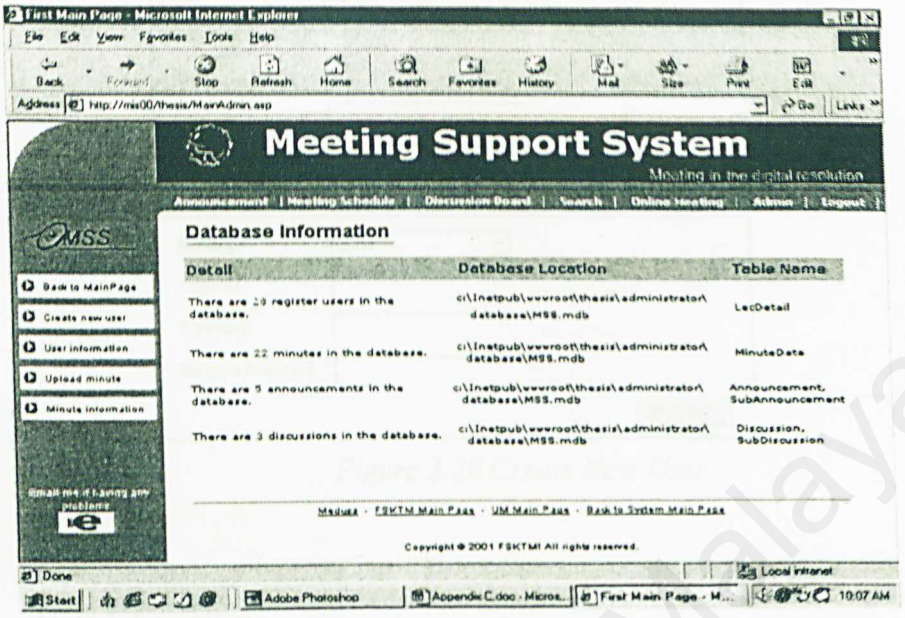


Figure 3.19 Database Information

There is another toolbar on the left hand side of the web page as listed as below:

i. *Back to MainPage*

It will bring you to the main page of the system.

ii. *Create New User*

It will display a form that let you to create a new user. Just fill in all the information needed in the web page and click on the button "*Register*" to create a new user. For the 'Super Administrator' privilege user, they can set the privilege for the new user they want to create (USER, ADMINISTRATOR or SUPER ADMINISTRATOR).

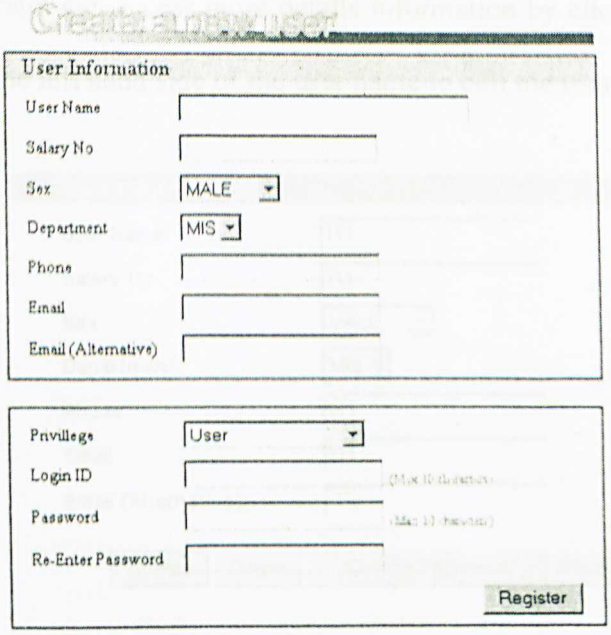


Figure 3.20 Create New User

iii. User Information

This will display all the user details including user name, salary number, department, email, sex and phone number. There is also a component that help user to search for specific user from the database. Administrator can search with department or salary number and click on the button 'Search' to start searching.

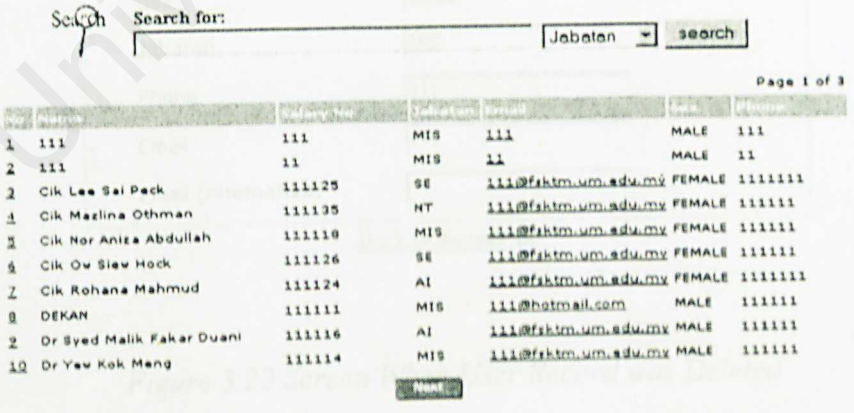


Figure 3.21 User Information

Administrator can access more details information by clicking on the number show on the left hand side of the user name to edit the user information.

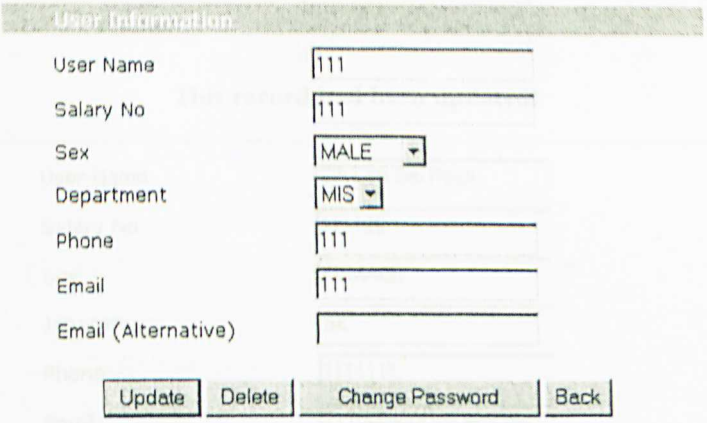


Figure 3.22 Display Detail User Information

In this page, administrator can modify or delete the user information. Just click on the button "*Delete*" to delete this user information. The screen will be shown after the user record is deleted from the database.

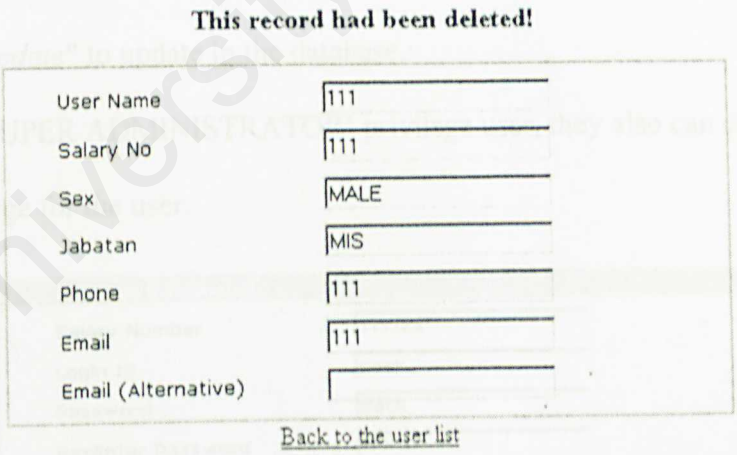


Figure 3.23 Screen When User Record was Deleted

Administrator also can change the user information by updating the information shown in the page and click on the button "*Update*". The screen below will be shown after the user record has been updated in the database.

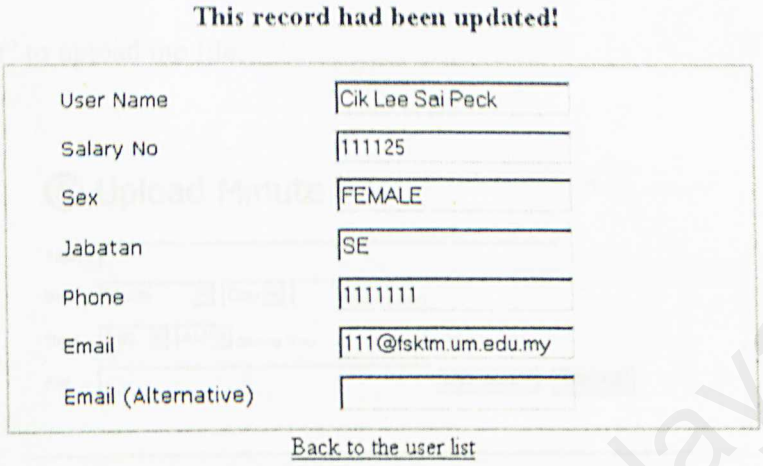


Figure 3.24 Screen When User Record was Updated

Administrator also can change the login password and ID for the user. By just click on the button "*Change Password*", the following screen will be displayed. Fill in the new password and ID and update it by clicking on the button "*Update*" to update in the database.

- For 'SUPER ADMINISTRATOR' privilege user, they also can change the privilege for the user.

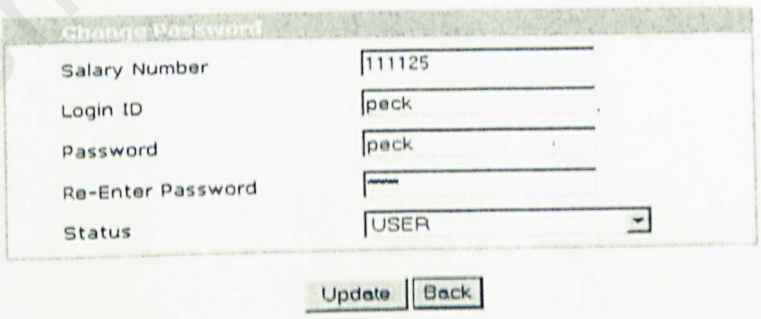


Figure 3.25 Screen for Change Password

iv. Upload Minute

This component is used to upload the meeting minute to the database. Administrator has to fill in all the require information to upload the meeting minute. After filling the requirement information, click on the button named "*Upload*" to upload the file.

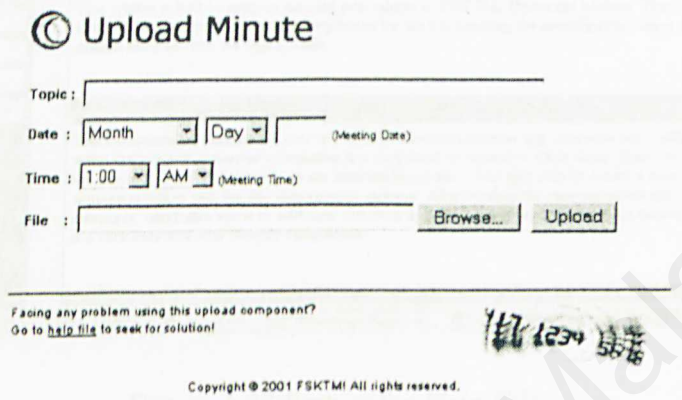


Figure 3.26 Upload Minute

v. Minute Information

This link will display all the meeting information that is same as the Meeting Schedule component as explain above.

3.1.8 Help

This link will display the help file for the system.

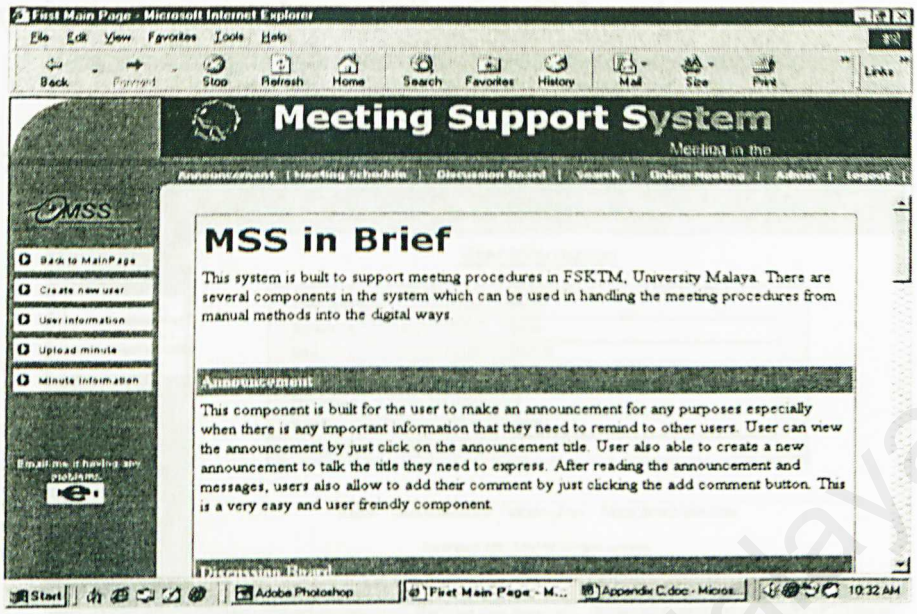


Figure 3.27 Screen for Help File

3.1.9 Logout

This link will log out the user and redirect to the login main page. User status will set back to NULL.

3.2 User Component

This component is shown when the user login privilege is 'USER'. It includes some of the function that let the users to handle their personal information.

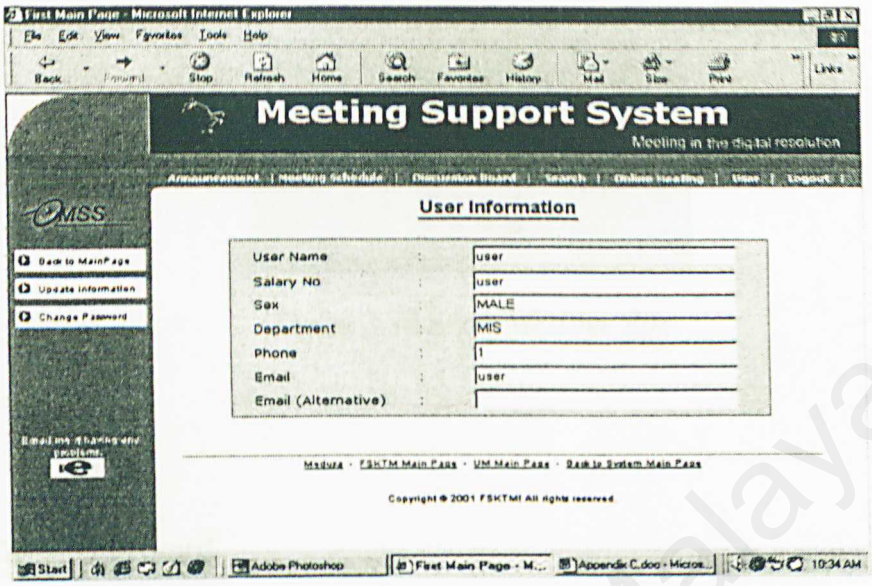


Figure 3.28 User Information

i. Update Information

In this function, the user can update their personal information such as user name, salary number, department, etc. User need to fill in all the require information to update the database.

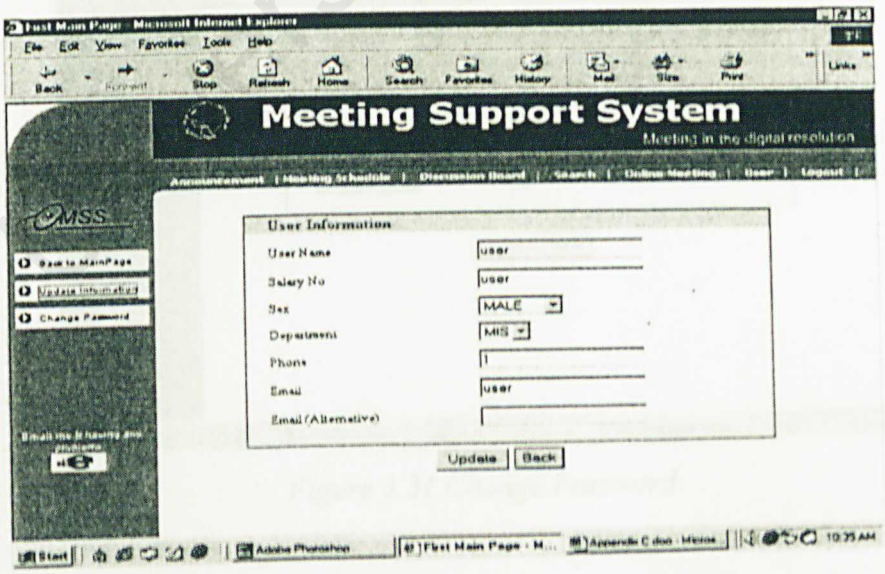


Figure 3.29 Update User Information

If there the information required is not filling in the form, a message box will pop up and show user the error. Users need to refill the form to correct the error.

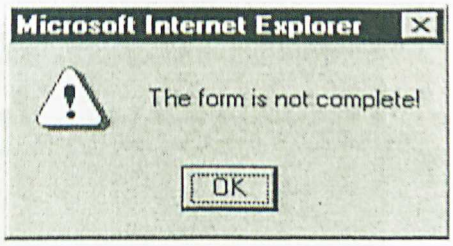


Figure 3.30 Error Message Box

ii. Change Password

In this function, the users can change their login password and login ID. User need to fill in all the require information to change the record.

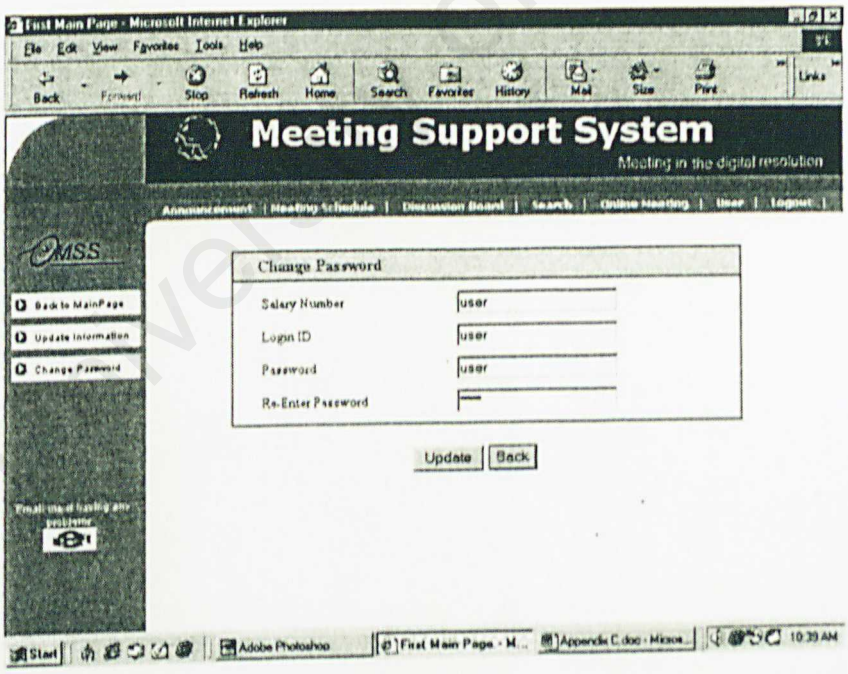


Figure 3.31 Change Password

If there is any information required not filling in the form, a message box will pop up and show user the error. Users need to refill the form to correct the error.

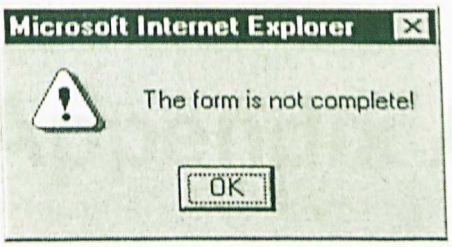


Figure 3.32 Error Message Form

Appendix A

Appendix A: Questionnaire

This questionnaire is intended to analyze the functional requirement of a meeting support system. The meeting support system is a web-based system mainly developed to help the users for preparing meeting procedure, minutes and so on.

1. How often are you attending a meeting or preparing a meeting in a week?
   - ❑ 1
   - ❑ 2
   - ❑ 3
   - ❑ 4
   - ❑ more than 4 time

2. Do you think that the current method for preparing a meeting is very inconvenient?
   - ❑ Yes
   - ❑ No

3. What problems are you facing while attending a meeting?
   - ❑ Forget about the meeting time and place
   - ❑ Not sure about the purpose of the meeting
   - ❑ Can't get the latest information about the meeting
   - ❑ Often changes in meeting place
   - ❑ Others _____

4. What problems are you facing when preparing a meeting?
   - ❑ Preparing the minutes
   - ❑ Searching for previous minute information
   - ❑ Inform the staff about the meeting
   - ❑ Booking for meeting place
   - ❑ Others _____

5. Do you agree that an online meeting support system will help in solving the above problems?
   - ❑ Agree
   - ❑ Disagree

6. For your opinion, what is the main requirement for an online meeting support system?
   - ❑ Faster response time
   - ❑ User-friendly interface
   - ❑ Existing tools preparing a meeting
   - ❑ Communication tools (communicate with the attendees)
   - ❑ Others _____

7. What functionality should be included in the system?
   - ❑ Online minute

- ❑ Reminder system
- ❑ Search Engine to retrieve previous meeting information
- ❑ Meeting schedule
- ❑ Online help in making decision
- ❑ Online meeting
- ❑ Others _____

8. Do you have any suggestion to improve the security portion of the system?

_____

_____

Appendix B

Appendix B: Comment on VIVA

I had presented my thesis proposal on 10 August 2000. The presentation took about 35 minutes to finish. There are some comments from my lecturer, Puan Salimah and my moderator, Cik Nor Aniza about the thesis title and contents. Some important point had been listed as below:

- A component that should be enable the user to having online meeting
- Others links in the project is not necessary
- Search Engine is using Boolean-based matching concept
- Others information in the project is not necessary

I would like to express my thankfulness to Puan Salimah and Cik Nor Aniza again for their useful and valuable advises during the presentation. Their advises help me a lot in designing the project.

Appendix C

Appendix C: Sample Code

Create Index:

This part of code will generate index according to the meeting minute topic. Before the index is generated, the code will first check at the stoplist to look or the common keyword that should be avoid from the index.

```
<!-- #INCLUDE FILE="adovbs.inc" -->
<!-- #INCLUDE FILE="stoplist.asp" -->

<SCRIPT = "javascript">
<!--
        function Back()
        {
                history.back(1);
        }
//-->
</SCRIPT>

<%
Dim CONN_STRING
Dim temp
Dim k
Dim i
Dim j
Dim counter
Dim Icount(255)
Dim str(50)
CONN_STRING = "DBQ=" & Server.MapPath("./Database/MSS.mdb") & ";"
CONN_STRING = CONN_STRING & "Driver={Microsoft Access Driver (*.mdb)};"

i = 0
j = 0

counter = 1
temp = Request.QueryString("topic")

For counter = 1 to Len(temp)
        If mid(temp,counter,1) = " " Then
                Icount(i) = counter
                i = i + 1
        End If
Next
```

```
k = 0
counter  = 1
Do While counter <> Len(temp)
        If k = i Then
                str(j) = LCase(mid(temp,counter,Len(temp)-counter+1))
                counter = Len(temp)
        Else
                str(j) = LCase(mid(temp,counter,Icount(k)-counter))
                counter = Icount(k) + 1
                j = j + 1
                k = k + 1
        End If
Loop

Dim oConn
Dim oRs
Dim oRs1
Dim icount_no
Set oConn = Server.CreateObject("ADODB.Connection")
Set oRs = Server.CreateObject("ADODB.Recordset")
Set oRs1 = Server.CreateObject("ADODB.Recordset")

oConn.Open CONN_STRING
strSQL = "SELECT * From MinuteData WHERE Topic = '" & temp & "'"
oRs.Open strSQL, oConn
icount_no = oRs.Fields("icount")

oRs1.Open "Index", oConn, adOpenKeyset, adLockOptimistic, adCmdTable

For counter = 0 to j
        call StopList(str(counter))
        If stopkey = 0 Then
                oRs1.AddNew
                oRs1.Fields("Index") = icount_no
                oRs1.Fields("KeyWord") = str(counter)
                oRs1.Update
        End If
Next

oRs.Close
Set oRs = Nothing
oRs1.Close
Set oRs1 = Nothing
oConn.Close
Set oConn = Nothing

%>
```

Stoplist:

This part of code will avoid the most common use word from being used as index in the searching component.

```
<%
        Dim stopkey
        Function StopList(strcheck)
                Dim stoplistvar(100)
                Dim count
                Dim check
                stopkey = 0

                stoplistvar(0) = "is"
                stoplistvar(1) = "a"
                stoplistvar(2) = "an"
                stoplistvar(3) = "the"
                stoplistvar(4) = "am"
                stoplistvar(5) = "are"
                stoplistvar(6) = "i"
                stoplistvar(7) = "and"
                stoplistvar(8) = "they"
                stoplistvar(9) = "me"
                stoplistvar(10) = "my"
                stoplistvar(11) = "we"
                stoplistvar(12) = "them"
                stoplistvar(13) = "saya"
                stoplistvar(14) = "akan"
                stoplistvar(15) = "dia"
                stoplistvar(16) = "dan"

                For count = 0 to 16
                        If strcheck = stoplistvar(count) Then
                                stopkey = 1
                        End If
                Next

        End Function


%>
```

Send Email

This part of code will send email through server using SMTP (Simple Mail Transfer Protocol).

```
<%@ Language=VBScript %>
<%Response.Buffer=true%>
<!--#INCLUDE FILE="ADOVBS.INC"  -->

<%

   Dim mymail
   Dim mybody
   Dim strSQL
   Dim myConn
   Dim myRec
   Set myConn = server.CreateObject("ADODB.Connection")
   Set myRec = Server.CreateObject("ADODB.Recordset")
   myConn.Open "Provider=Microsoft.Jet.OLEDB.4.0;Data Source= "&
                  Server.Mappath("./Database/MSS.mdb")&";"

   strSQL = "SELECT Email from LecDetail"
   myRec.Open strSQL,myConn,adOpenKeyset,adLockOptimistic,cdCmdTable

      If myRec.RecordCount = 0 Then
            Response.Write "No receiver details in the database."
      Else
            myRec.MoveFirst
            ToList = myRec("Email")
            myRec.MoveNext

            Do While Not myRec.EOF
                  ToList = ToList & "," & myRec("Email")
                  myRec.MoveNext
            Loop

            Set mymail = server.CreateObject("CDONTS.NewMail")
            mymail.From = Request.Form("from")
            mymail.To = ToList
            mymail.Subject = Request.Form("subject")
            mymail.Body = Request.Form("message")
            mymail.Send

            Set mymail = nothing
```

```
            If isObject(mymail) = false Then
                Response.Write "There are some problems to send the mail, pls
                                send again or go back to main index!!"
            Else
                Response.Write "<center><br><font color=navy face=tahoma
                                size=4>Email has been successfully sent to " &
                                Name list & "!</font> & nbsp;    
                                  </center>"

             End If

        End If
   myconn.Close
%>
```