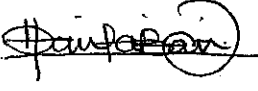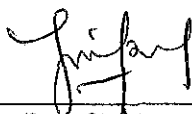UNIVERSITI
TEKNOLOGI
PETRONAS

Certification of FYP Dissertation Submission

Herewith I, (Azlena Bt. Arabi), [(1476)], certify that I am responsible for the work submitted in this project, and I have done all the modifications according to my supervisor's advice.

Thank you.

	Submit by Student	Verify by Supervisor
Signature	*(signature)*	*(signature)*
Name	Azlena Bt. Arabi	SRIPURNIOJAM MAHAMAD
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Date	05 June 2004	2/7/04

IMPROVING SECURITY IN MEETING ROOM BOOKING SYSTEM

By

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Dissertation Report submitted in partial fulfillment of

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List of Abbreviation

MRBS	Meeting Room Booking System
XHTML	Extended HyperText Markup Language
PHP	Hypertext Preprocessor
SKO	Sarawak Operation
PCSB	Petronas Carigali Sdn. Bhd
XML	Extended Markup Language

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ABSTRACT

Meeting Room Booking System is a web-based application system which is design to simplify the tasks of secretaries and receptionists where they can record the meeting room reservation online. This web-based application system also enables them to edit and delete the application of the reservation. This system also leads them to improve their task performance especially in doing the recording and reserving the meeting. Thus by providing the security mechanism such as the use of password and use of cookies, the administrator can made any administration tasks such as deleting, editing and inserting without any interference from other users. Besides that, by using the password, the system can identify the access level of the user which has been assigned by the system administrator.

This system also aims to computerize meeting room reservation and an up-to-date room reservation would be automatically maintained by the system. Besides that, with additional features like online record searching and admin page to add he meeting room database entry and valid user this system promises a better functionality, more efficient utilization of resources and time saving especially to the secretaries and receptionists.

In this project, the author also would like to study several topics such as creating effectives web-based application and security issues in web-based application. For the development of this system, the author has used the programming language that is PHP, XHTML and PostgreSQL. The use of these tools has enabled me to learn more about it since these tools are very important for the web-based application. The author has given a responsible to develop a Meeting Room Booking System that should include the information of the room, location of the room, date and time available. The method that the author applied for the development of this system is software engineering method and waterfall model.

ACKNOWLEDGEMENT

CHAPTER 1

INTRODUCTION

1.1 Background of study/research

The term "security" has been used in many ways of daily lives. A "security system" protects the house, warning the neighbors or the police if an unauthorized intruder tries to get in. "Financial security" involves a set of investments that are adequately funded; hoping the investments will grow in value over time, so having enough money to survive later. Just as each of these terms has a very specific meaning in the next of its use, so too does the phrase "computer security."

In the computer security there are three very important aspects of any computer related system: confidentiality, integrity and availability.

- Confidentiality ensures that computer-related assets are accessed only by authorized parties. That is, only those who should have access to something will actually get that access. By "access," we mean not only reading but also view, printing or simply knowing that a particular asset exists. Confidentiality is sometimes called secrecy or privacy.
- Integrity means that assets can be modified only by authorized parties or only in authorized ways. In this context, modification includes writing, changing, changing status, deleting and creating.
- Availability means that assets are accessible to authorized parties at appropriate times. In other words, if some person or system has legitimate access to a particular set of objects, that access should not be prevented. For this reason, availability is sometimes known by its opposite, denial of service.

The author has related the title of the project with Meeting Room Booking System as an example in order to show how the security issues included in the system.

The Meeting Room Booking System or also known as MRBS is a web based application system that simplifies the receptionists and secretaries tasks. This system enables the user to book, edit or delete the meeting room reservation record. With additional features like online record searching and admin page to add the meeting room database entry and valid user this system promises a better functionality, more efficient utilization of resources and time saving.

As this system involves only certain users, thus user authentication should be considered such as use of password and cookies.

1.2 Problem statement

1.2.1 Problem Identification

Currently, PCSB SKO is using piles of books and paper to book meeting rooms. Manual recording the log sheet, searching for schedule conflicts and available room deleting the cancelled meeting are tedious and time consuming. Most of all it can only be made at the receptionist desk. But the problem that has been faced by them is sometimes the data in this system might be unnecessary, deleted or redundant as this system can be access by all users. As we know, in computing, the choices are more limited and the possibilities less secure. Anyone can attempt to access the system. Unlike the manager who recognizes his staff's voice, the computer cannot recognize electrical signal from on person as being any different from those of anyone else. Thus, most computing authentication systems must be based on some knowledge shared only by the computing system and the user such as the use of password.

1.2.2 Significant of the project

The most common authentication mechanism for user to operating system is a password, a "word" known to computer and user. Passwords are mutually agreed-upon code words, assumed to be known only to the user and the system. In some cases, the user chooses passwords; in other cases they are assigned by the system. The length and format of the password also vary from one system to another.

The use of passwords is fairly straightforward. A user enters some piece of identification, such as a name or an assigned user ID; this identification can be available to the public or easy to guess because it does not provide the real security of the system. The system then will request a password from the user. If the password matches that on file for the user, the user is authenticated and allowed access to the system. If the password match fails, the system requests the password again, in case the user mistyped.

Meeting Room Booking System is a web-based application system which is design to simplify the tasks of secretaries and receptionists where they can record the meeting room reservation online. This web-based application system also enables them to edit and delete the application of the reservation. This system also leads them to improve their task performance especially in doing the recording and reserving the meeting. Thus by providing the security mechanism such as the use of password and use of cookies, the administrator can made any administration tasks such as deleting, editing and inserting without any interference from other users. Besides that, by using the password, the system can identify the access level of the user which has been assigned by the system administrator.

1.2.3 Objective & scope of study

1.2.3.1 Objectives of the project

The objectives implementing the Meeting Room Booking System are:-

a) To develop a web-based application that can record and view meeting room reservation online.

b) To provide security mechanism into the system.

c) To conduct research that can be used for a betterment of the application to be developed.

d) To design an effectives and efficient web-based application.

1.2.3.2 Scope of the project

The author wants to study several topics such as:

a) Creating effectives Web-based application

In developing the web-based application, the author must distinguish between good web pages and bad web pages. There are certain criteria need to be considered by develop the web-based application such as the response time and the font selection. Thus, it is very important to develop an effective's web-based application.

b) Security issues in web-based application

The author also would like to study on securities issues that related to the web-based application. In developing the system, the author should aware of the system being attacks by the hackers. Thus, the security needs to be included in this system.

1.2.3.3 Relevancy of the project

For the development of this system, the author has used the programming languages which are XHTML, PHP and MySQL. The use of these tools has enabled the author to learn more about it since these tools are important for the web-based application.

1.2.3.4 Feasibility of the project

The author responsible to develop a Meeting Room Booking System that should include the information of the meeting room reservation record as the example of on how the author can relate the security mechanism involves in the web-based application. From what the author has seen and studied, this system is very suitable for the receptionists and secretaries where before they have to do the reservation record for the meeting room using piles of books and papers. Manual recording the log sheet, searching for the meeting room reservation record and deleting the cancelled room reservation are tedious and time consuming. This development process should be completed within 4 months.

CHAPTER 2

LITERATURE REVIEW

2.1 Security Risks of XML Web Services

Just as with standard Web-based traffic, authentication, access control, encryption and data integrity play an important role in providing basic levels of security for communication with Web Services. In Meeting Room Booking System, the author would like to focus more into the authentication area.

- **Authentication**

As in standard web traffic, service requestors need to be authenticated by the service provider before information is sent. Standard web technologies using passwords, certificates, Kerberos, LDAP and Active Directory can be used to authenticate service requestors. However, service requestors need also to authenticate the service provider. Valuable information can be sent not only in the reply but in the request and it is paramount for service requestor to ensure that the service provider is who they think it is. For example, an e-commerce site may wish to authorize a credit card purchase and send a credit card number to a third party service for authorization. A WSDL file can be tampered with causing a service requestor to communicate with a spoofed Web Service. WSDL files in this case should be signed to ensure it has data integrity.

2.2 Extensible HyperText Markup Language (XHTML)

The Extensible HyperText Markup Language (XHTML™) is a family of current and future document types and modules that reproduce, subset, and extend HTML, reformulated in XML. XHTML Family document types are all XML-based, and ultimately are designed to work in conjunction with XML-based user agents. XHTML is the successor of HTML, and a series of specifications has been developed for XHTML.

XHTML 1.0 is the W3C's first Recommendation for XHTML, following on from earlier work on HTML 4.01, HTML 4.0, HTML 3.2 and HTML 2.0. With a wealth of features, XHTML 1.0 is a reformulation of HTML 4.01 in XML, and combines the strength of HTML 4 with the power of XML.

XHTML 1.0 is the first major change to HTML since HTML 4.0 was released in 1997. It brings the rigor of XML to Web pages and is the keystone in W3C's work to create standards that provide richer Web pages on an ever increasing range of browser platforms including cell phones, televisions, cars, wallet sized wireless communicators, kiosks, and desktops.

XHTML 1.0 is the first step and the HTML Working Group is busy on the next. XHTML 1.0 reformulates HTML as an XML application. This makes it easier to process and easier to maintain. XHTML 1.0 borrows elements and attributes from W3C's earlier work on HTML 4, and can be interpreted by existing browsers, by following a few simple guidelines. This allows you to start using XHTML now!

You can roll over your old HTML documents into XHTML using an Open Source HTML Tidy utility. This tool also cleans up markup errors, removes clutter and prettifies the markup making it easier to maintain.

Three "flavors" of XHTML 1.0:

XHTML 1.0 is specified in three "flavors". You specify which of these variants you are using by inserting a line at the beginning of the document. For example, the HTML for this document starts with a line which says that it is using XHTML 1.0 Strict. Thus, if you want to validate the document, the tool used knows which variant you are using. Each variant has its own DTD - Document Type Definition - which sets out the rules and regulations for using HTML in a succinct and definitive manner.

- **XHTML 1.0 Strict** - Use this when you want really clean structural mark-up, free of any markup associated with layout. Use this together with W3C's Cascading Style Sheet language (CSS) to get the font, color, and layout effects you want.

- **XHTML 1.0 Transitional** - Many people writing Web pages for the general public to access might want to use this flavor of XHTML 1.0. The idea is to take advantage of XHTML features including style sheets but nonetheless to make small adjustments to your markup for the benefit of those viewing your pages with older browsers which can't understand style sheets. These include using the body element with background color, text and link attributes.

- **XHTML 1.0 Frameset** - Use this when you want to use Frames to partition the browser window into two or more frames.

2.3 PHP

PHP is a server-side scripting language for creating dynamic Web pages. You create pages with PHP and HTML. When a visitor opens the page, the server processes the PHP commands and then sends the results to the visitor's browser, just as with ASP or ColdFusion. Unlike ASP or ColdFusion, however, PHP is Open Source and cross-platform. PHP runs on Windows NT and many Unix versions, and it can be built as an Apache module and as a binary that can run as a CGI. When built as an Apache module, PHP is especially lightweight and speedy. Without any process creation overhead, it can return results quickly, but it doesn't require the tuning of mod_perl to keep your server's memory image small.

In addition to manipulating the content of the pages, PHP can also send HTTP headers, set cookies, manage authentication, and redirect users. It offers excellent connectivity to many databases (and ODBC), and integration with various external libraries that can do everything from generating PDF documents to parsing XML.

PHP goes right into the web pages, so there's no need for a special development environment or IDE. Start a block of PHP code with "<? *Php*" and end it with "?>." The PHP engine processes everything between those tags. PHP's language syntax is similar to C's and Perl's. No variables declaration is needed before using them, and easy to create arrays and hashes (associative arrays). PHP's even has some rudimentary object-oriented features, providing a helpful way to organize and encapsulate the code.

CHAPTER 3

METHODOLOGY/PROJECT WORK

3.1 Procedure Identification

The first published model of the software development process was derived from other engineering process (Royce, 1970)[1]. Because of the cascade from one phase to another, this model is also known as the 'waterfall model' or software life cycle. The principle stages of the model map onto fundamental development activities:

1. Requirement analysis and definition

The system's services, constraints and goals are established by consultation with system users. They are then defined in detail and serve as a system specification.

2. System and software design

The systems design process partitions the requirement to either hardware or software systems. It establishes overall system architecture. Software design involves identifying and describing the fundamental software system abstractions and their relationships.

3. Implementation and unit testing

During this stage, the software design is realized as a set of programs or program units. Unit testing involves verifying that each unit meets its specification.

4. Integration and system testing

The individual program units or programs are integrated and tested as a complete system to ensure that the software requirements have been met. After testing, the software system is delivered to the customer.

5. Operation and maintenance

Normally this is the longest life-cycle phase. The system is installed and put into practical use. Maintenance involves correcting errors which were not discovered in earlier stages of the life cycle, improving the implementation of the system units and enhancing the system's services as new requirements are discovered.
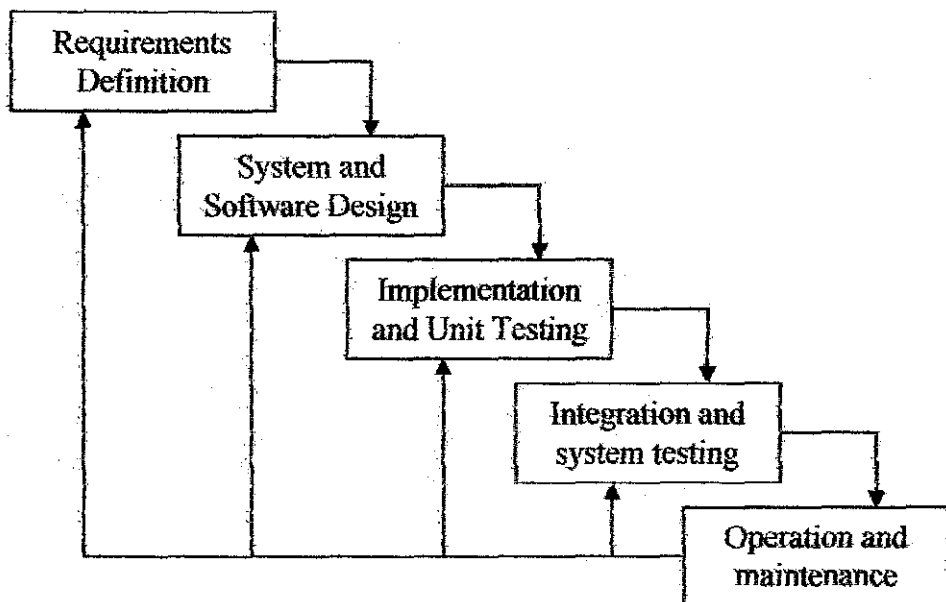
The author has applied only three phases of waterfall model in the Meeting Room Booking System (MRBS) which are:

1. Requirement analysis and definition

In this phase, the author has identified the goals that want to be achieving while developing the Meeting Room Booking System (MRBS). The author has developed this MRBS to the target user which is the receptionist or secretaries in Petronas Carigali Miri. The purpose of developing this system is to eliminate the traditional way to book the meeting room where the user still using piles of paper to record the reservation of the meeting room.

2. System and software design

The author has decided to use XHTML, PHP and MySQL in order to implement this Meeting Room Booking System. The main purpose the author use these programming languages because they are easy to be integrate with each other.

3. Implementation and unit testing

In the implementation and unit testing, the author has identified that there are 4 modules included in the Meeting Room Booking System. One of the most important modules in this system is security element that must be included as it is the requirement based on the title of the project.

Besides applying the three phases that has been mentioned above, the author also applied a Software engineering method. Software engineering is structured approach to software development whose aim to facilitate the production of high-quality software in a cost-effective way. Methods such as Structured Analysis (DeMacro, 1987)[1] and JSD (Jackson, 1983)[1] were first development in the 1970's. These methods attempted to identify the basic functional components of a system and function-oriented methods are still widely used. In the 1980's and 1990's, these function-oriented methods were supplemented by object-oriented methods such as those proposed by Brooch (1994) and Rumbaugh (Rumbaugh et

al., 1991)[1]. These different approaches have now been integrated into a single unified approach built around Unified Modelling Language (UML) (Fowler and Scott, 1997; Booch et al., 1999; Rumbaugh et al., 1999a, 1999b)[1].

3.2 Tools Required

Software	Hardware

• Extended HyperText Markup Language
• PHP
• MySQL
• Fireserv
• Dramweaver MX
• Photoshop Adobe
• Browser
	• Personal computer with a 486 or higher processor
	• Microsoft Windows 95 or later or Windows NT version 4.0 or later
	• 16 MB of RAM for Windows 95 or later
	• 24 MB of RAM for Windows NT
	• VGA or higher resolution monitor (Super VGA recommended)
	• Microsoft Mouse or compatible pointing device
	• Hard Disk requirement:
	    -52 MB for typical installation
	    -65 MB for maximum installation
	• CD-ROM drive

CHAPTER 4
RESULTS AND DISCUSSION

4.1 Introduction

The Meeting Room Booking System (MRBS) is a web based application systems that simplify the receptionists and secretaries tasks. This system enables the user to book, edit or delete the record searching and admin page to add the meeting room database entry and valid user this system promises a better functionality, more efficient utilization of resources and time saving.

MRBS engine v1.0.0 is consisting of 5 modules. Room reservation log sheet module for room booking data entry, search engine to find the booking record, reporting module to view the reservation record and the secure admin page to update meeting room database, edit validated user id and password and view log features to tract the login record based on user id. The features in the admin page are strictly for security purposes. From the Meeting Room Booking System, the author has taken the opportunity to include the safety elements that are useful to secure this system from unwanted user where the author will only focus more on password and cookies elements.

4.2 Brief description about the security element involves

4.2.1 Password Issue

For security purposed, passwords are included for the login page. It is necessary to protect the integrity of the data. However, there are several issues related to the password need to be considered. One of the issues is about attack on password. There are several ways to determined others person password:

- Try all possible passwords
- Try many probable passwords
- Try password likely for the user
- Search for the system list of password

Following are the technique use to gain other person password:

- **Exhaustive Attack**

   In exhaustive or brute force attack, the attacker tries all possible passwords. The number of possible passwords depends on the implementation of the particular computing system.

- **Probable Password**

   Here the penetrator searching for password based on human characteristics. Therefore, penetrators try techniques that are likely to lead to rapid success. If people prefer short passwords to long ones, the penetrator will try all passwords, but try them in order by length.

- **Password Likely For a User**

   People typically choose personal passwords, such as name of a spouse, a child, a brother or a sister, a pet, a street name or something similar. Selecting just names of people, streets, project and so forth, produce a list of only few hundred possibilities at most. These can all be tried in under a

second! Event a person working by hand could try 10 likely candidates in a minute or two.

From the findings, we need to choose type of password used in the system based on several criteria. Here are some guidelines for password selection criteria:

- Use characters other than just A-Z
- Choose long passwords
- Avoid actual names or words
- Choose an likely password
- Change the password regularly
- Do not write it down
- Do not tell anyone else

4.2.2 Cookies

Cookies are pieces of information generated by a Web server and stored in the user's computer, ready for future access. Cookies are embedded in the HTML information flowing back and forth between the user's computer and the servers. Cookies were implemented to allow user-side customization of Web information. For example, cookies are used to personalize Web search engines, to allow users to participate in WWW-wide contests and to store shopping lists of items a user has selected while browsing through a virtual shopping mall.

Essentially, cookies make use of user-specific information transmitted by the Web server onto the user's computer so that the information might be available for later access by itself or other servers. In most cases, not only does the storage of personal information into a cookie go unnoticed, so does access to it. Web servers automatically gain access to relevant cookies whenever the user establishes a connection to them, usually in the form of Web requests.

Cookies are based on a two-stage process. First the cookie is stored in the user's computer without their consent or knowledge. For example, with customizable Web search engines like My Yahoo!, a user selects categories of interest from the Web page. The Web server then creates a specific cookie, which is essentially a tagged string of text containing the user's preferences, and it transmits this cookie to the user's computer. The user's Web browser, if cookie-savvy, receives the cookie and stores it in a special file called a cookie list. This happens without any notification or user consent. As a result, personal information is formatted by the Web server, transmitted, and saved by the user's computer.

During the second stage, the cookie is clandestinely and automatically transferred from the user's machine to a Web server. Whenever a user directs her Web browser to display a certain Web page from the server, the browser will, without the user's knowledge, transmit the cookie containing personal information to the Web server.

4.3 System Design
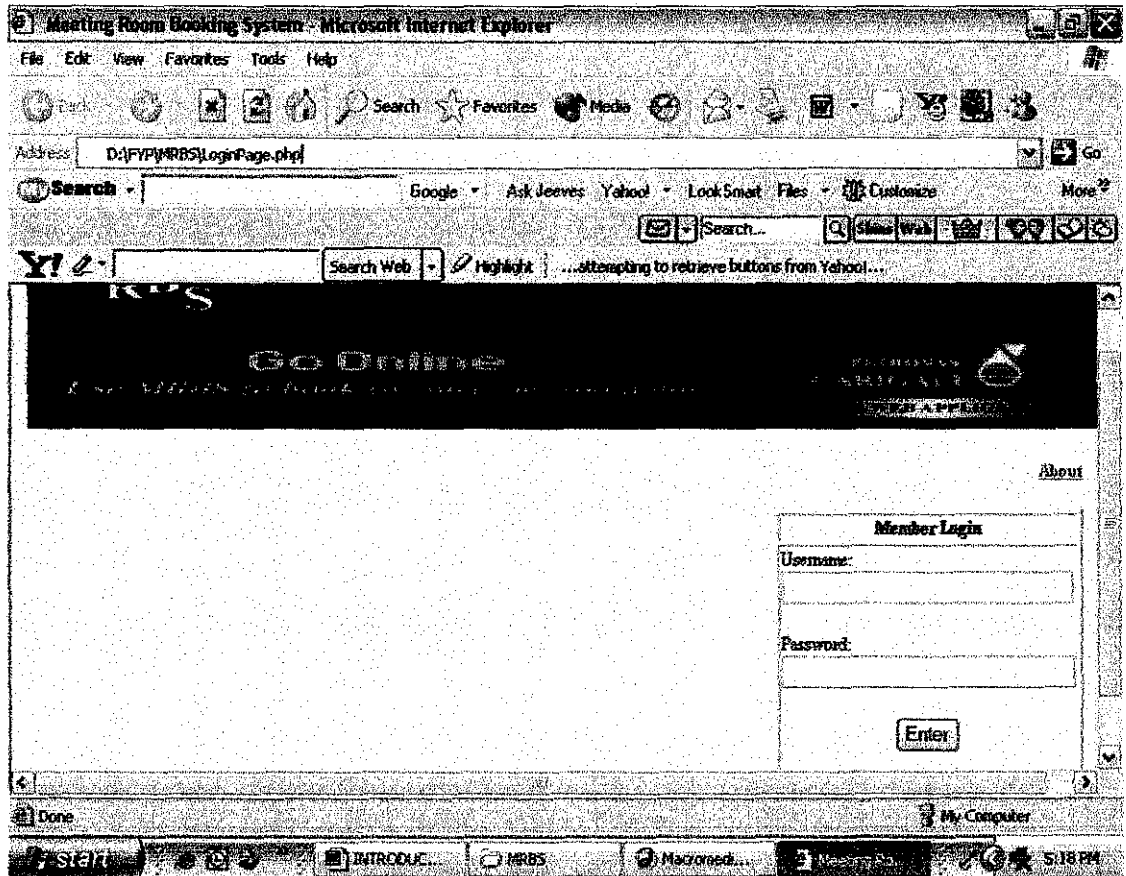
Figure 4.1: Login Page

This is the structure of the Meeting Room Booking System login page. This login page requires the user to insert their user id and password. The username and password included in this system as one of way to secure the system from any unwanted purpose.

What Is MRBS?

The Meeting Room Booking System (MRBS) is a web based application systems that simplify the task of the receptionists and secretaries. This system enable the user to book, edit or delete the meeting room reservation record. With additional features like online record searching and admin page to add the meeting room database entry and valid user this system promises a better functionality, more efficient utilization of resources and time saving.

This MRBS born with 5 modules which are:

• Room Reservation log sheet module

• Reporting and researching

• View Log Feature

• Updateable meeting room database

• System-side security Level-2

Back to main page

Figure 4.2: About MRBS (Not Login)

This page mainly consists of the general information about the system and the developer. The user can view this page even though there are not log in to the system.
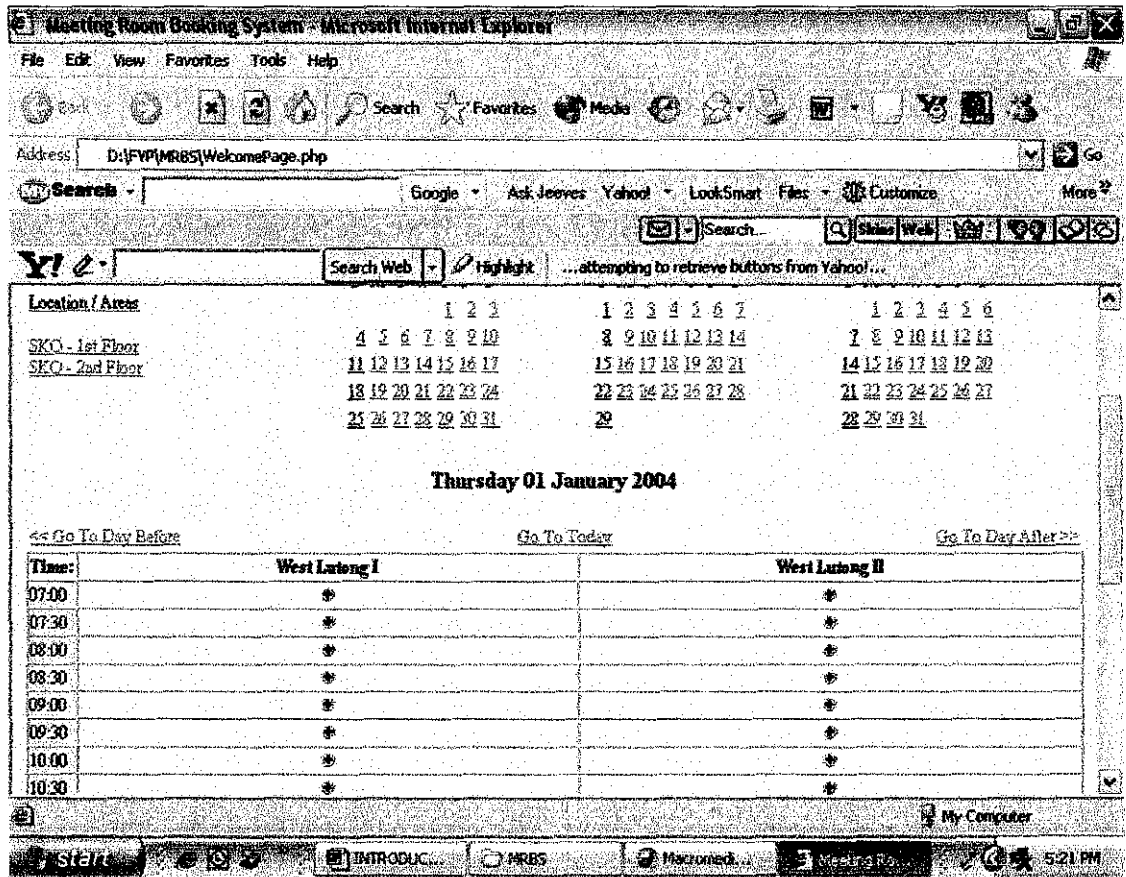
Figure 4.3: Welcome Page

After the successful login, the user will be redirect to this welcome page. This page will shown the date of the day and the detail of the room reservation for that day.
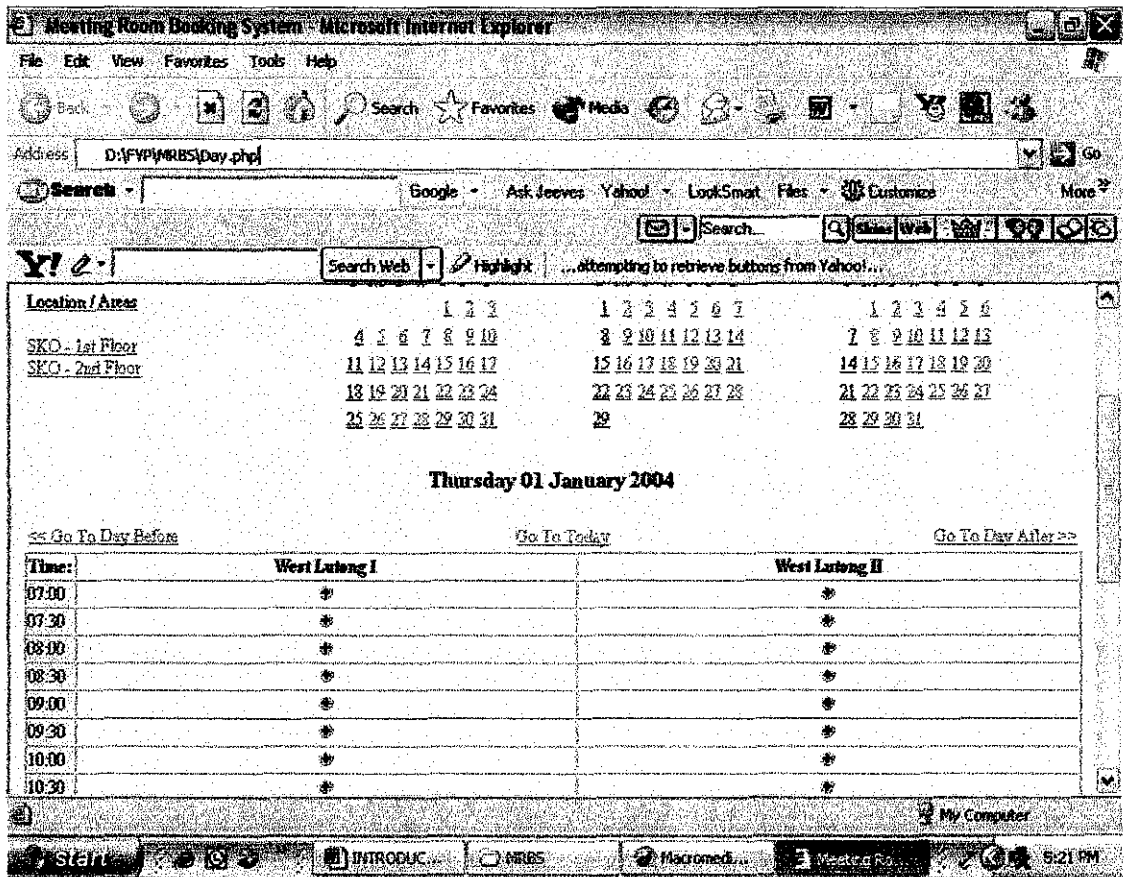
Figure 4.4: Room Reservation – View by Day

This page will let the user to view the room reservation by day. The user can select the room name from the location or area section.
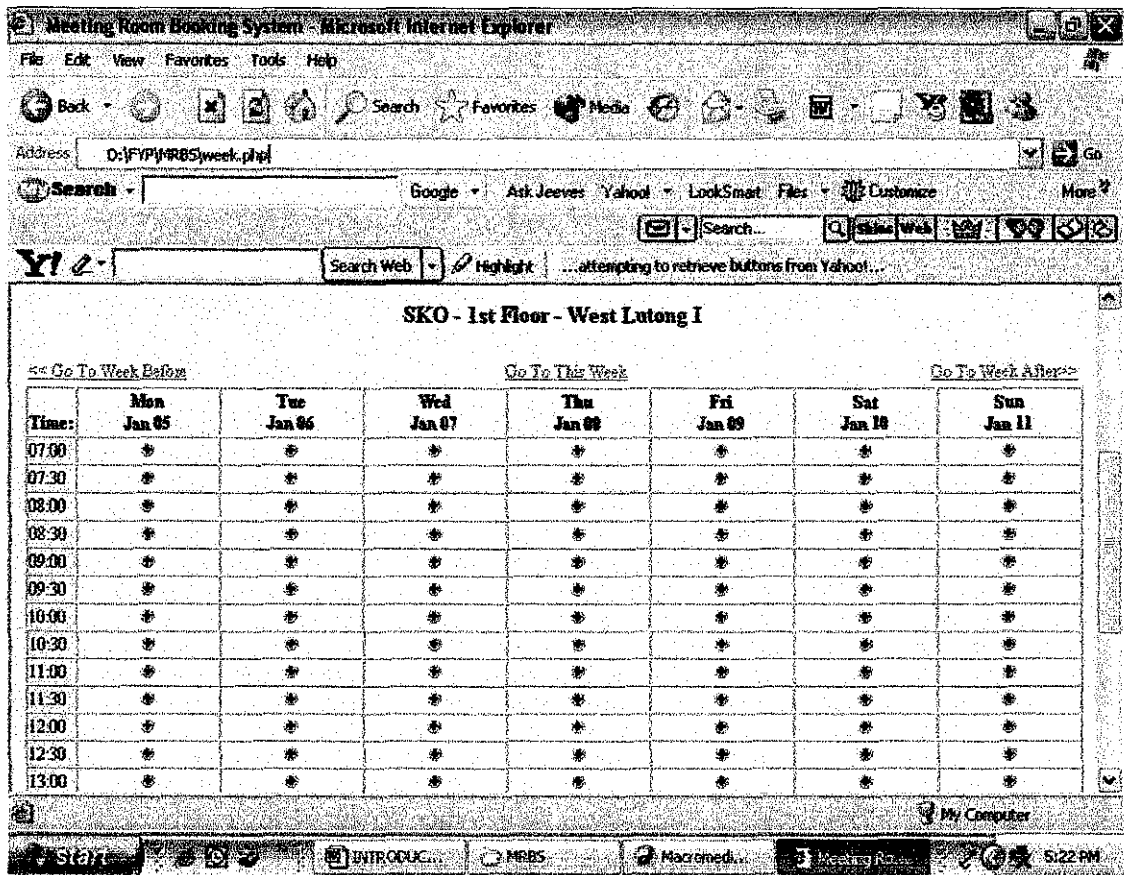
Figure 4.5: Room Reservation – View by Week

This page will let the user to view the room reservation by week where the user can have a view of the available room within the whole one week of the intended month.
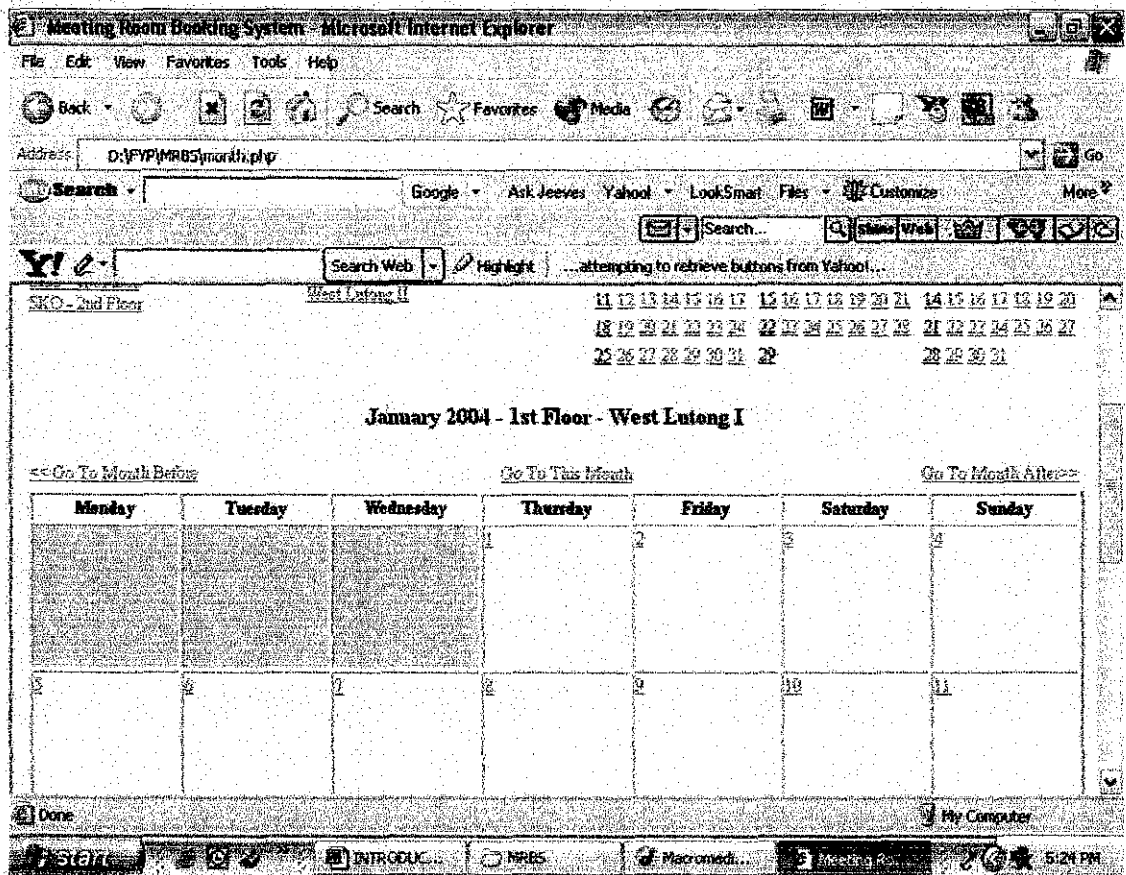
Figure 4.6: Room Reservation – View by Month

This page will let the user to view the room reservation by month. By viewing this page, the user will know the rooms that have been reserved for the intended month.
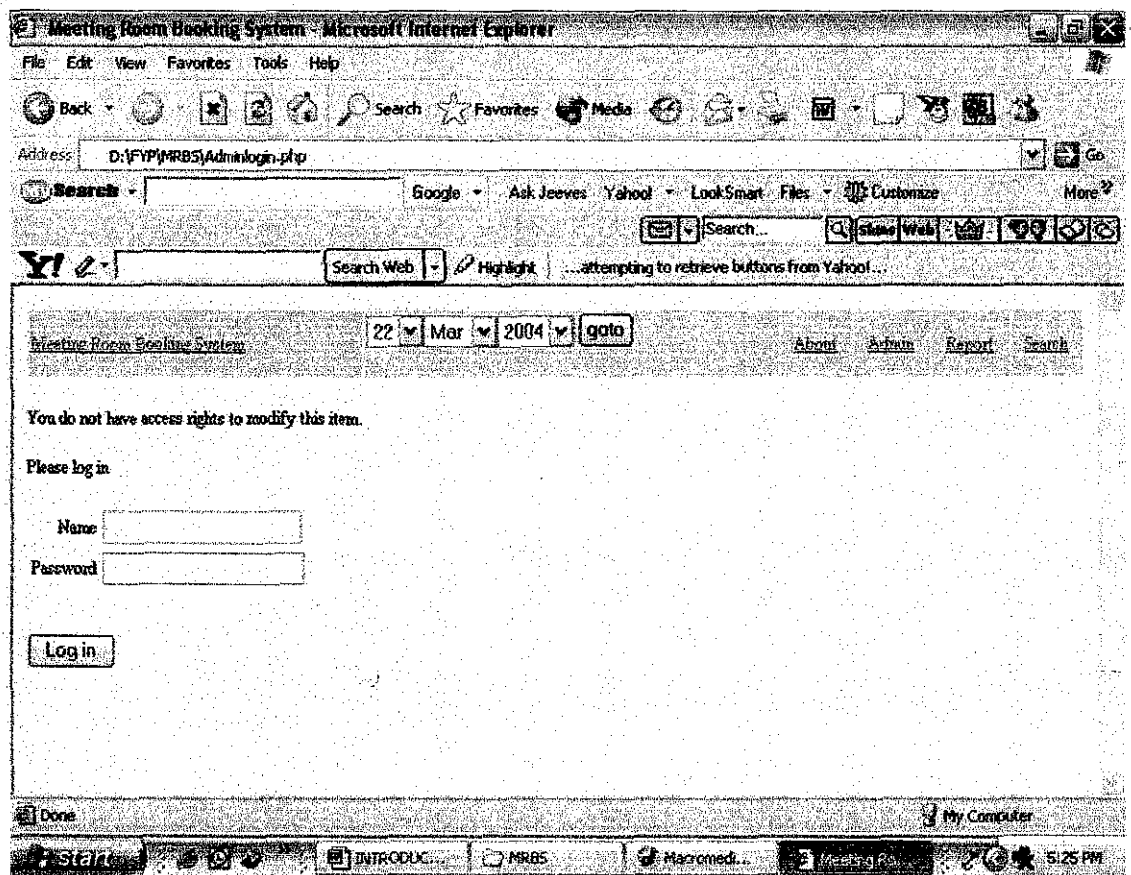
Figure 4.7: Administration Login Page

This page will require a password from the user before the user can access through it.
To go through the administration page, the user should have an administration access
level which has been set earlier by the administrator.
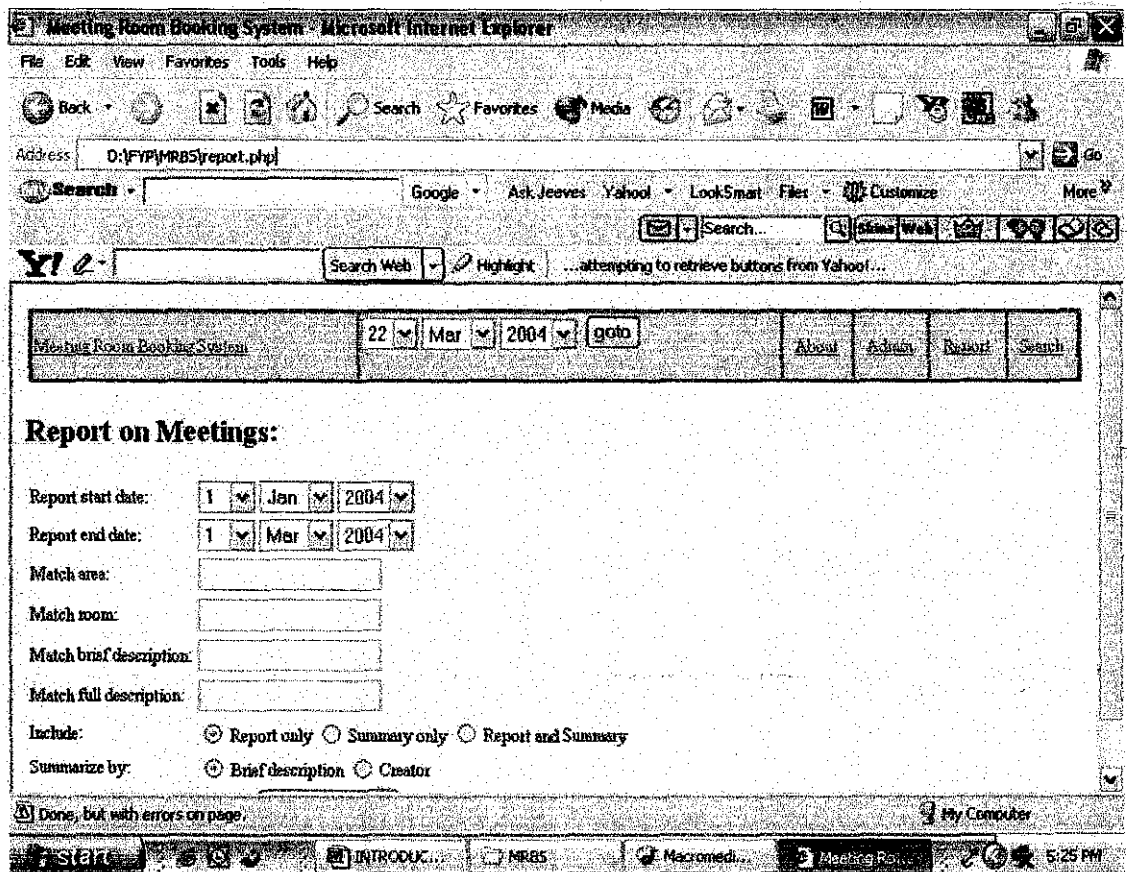
Figure 4.8: Report on Meetings page

User can view the report of the meeting room booking room reservation by accessing this page. On this page, the user can view the report by indicate the start date and end date. User can also view the report only, summary only or both of it. The purpose of this report page is to give the user the overall view of the meeting room description and information that available for those meeting rooms.
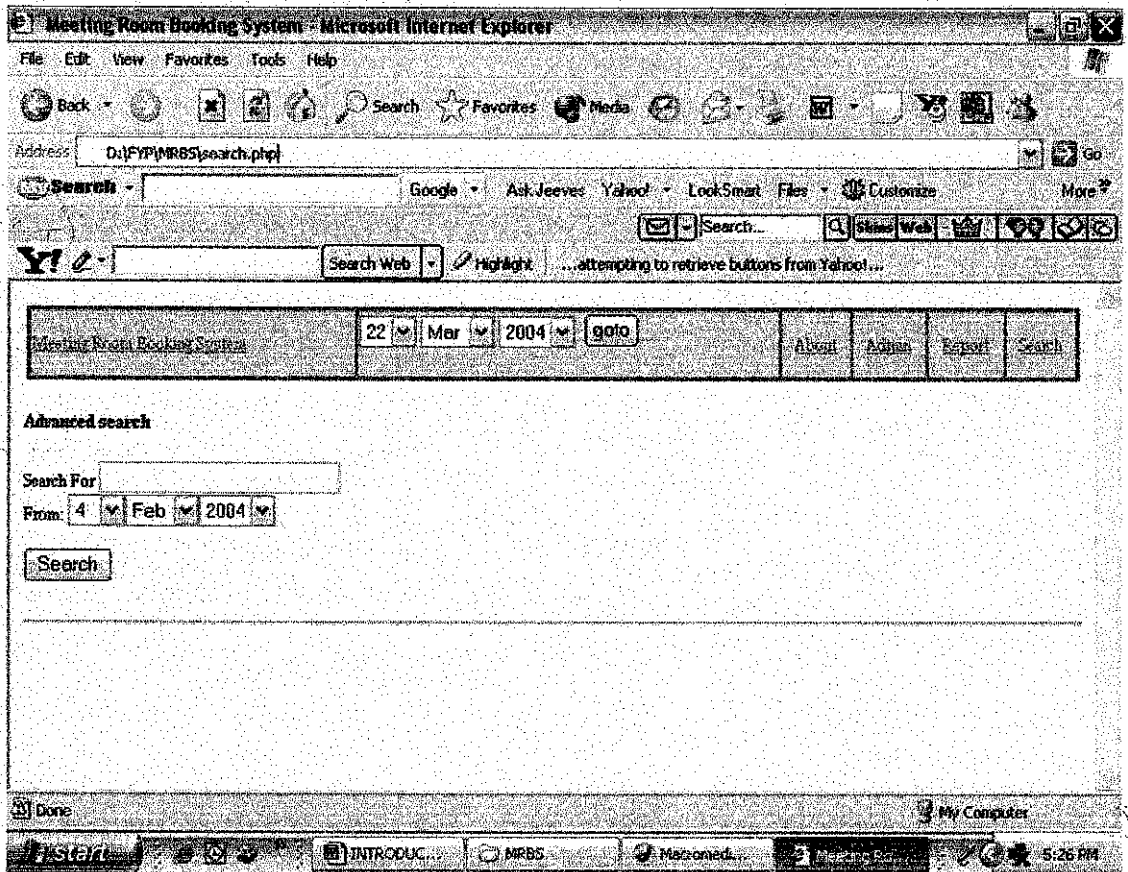
Figure 4.9: Search page

This page will redirect user through the advance searching. By accessing this page, user can search the intended date that they want to view and they can specify which room that they want to view for that specific date.

CHAPTER 5
RECOMMENDATION & CONCLUSION

5.1 Conclusion

The Meeting Room Booking System allows the receptionists and secretaries, making sure that the meeting room reservations are recorded and easy to keep track. With the additional features that will be include in this system, the secretaries and receptionist will easily to manipulate the database of the system such as edit, delete and add the record. Thus within four months of the development phase, the author have learn that it is very important to apply the knowledge that we have gained in the class before.

From this web-based application development process, the author has found that there are lots of experience and valuable lessons especially in the technical parts. The author also realized that security aspect should be considered for the system since this can avoid the hackers to hack our system and managed to view, edit and delete the confidential information.

As the author have added the login page and cookies feature in this system, the author have also realized that user authentication is a serious issue that becomes even more serious when acquainted users seek to share facilities by means of computer networks.

5.2 Recommendation

For recommendation part, the Meeting Room Booking System V1.0.0 still have feature to add on such as infrastructure feature. Since that in this version I have limited time to finish it so I just put is as static information and I hope that it will add to the next version. It would be nicer if it is in dynamic form, where admin can add to the next version. For the next version, I also want to suggest that this system should be include other security mechanism such as access control list, secure socket layer (SSL) and encryption.

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APPENDICES

Appendix A

Timeline

No	Detail/Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Selection of Project Topic	██													
	- Propose Topic														
	-Topic assigned to students														
2	Preliminary Research/ Design Work		██	██											
	- Introduction														
	-Objective														
	-List of references/ literature														
	-Project Planning														
3	Submission of Preliminary Report (Initial Proposal)			●											
4	Project Work				██	██	██	██							
	- List of reference/ literature														
	- Practical/ Laboratory Work														
5	Submission of Progress Report								●						
6	Project work continue								██	██	██	██			
	- Practical/ Laboratory Work														
7	Submission of Dissertation Final Draft												●		
8	Oral Presentation													●	
9	Submission of Project Dissertation														●

Appendix B

User Manual

MRBS V.1.0.0 User Manual

Introduction

Currently, PCSB SKO is using piles of books and papers to book meeting rooms. Manual recording the log sheet, searching for schedule conflicts and available room deleting the cancelled meeting are tedious and time consuming. Most of all it can only be made at the receptionist desk.

The Meeting Room Booking System (MRBS) is a web based application systems that simplify the receptionists and secretaries tasks. This system enables the user to book, edit or delete the record searching and admin page to add the meeting room database entry and valid user this system promises a better functionality, more efficient utilization of resources and time saving.

This MRBS v1.0.0 comes with 5 modules, which are:

- Room Reservation log sheet module
- Reporting and searching module
- View Log Feature
- Updateable meeting room database
- Security elements

MRBS Engine V1.0.0

MRBS engine v1.0.0 is consisting of 5 modules. Room reservation log sheet module for room booking data entry, search engine to find the booking record, reporting module to view the reservation record and the secure admin page to update meeting room database, edit validated user id and password and view log features to track the login record based on user id. The features in the admin page are strictly for security purposes.

MRBS Overall Process Flow

Process	Explanation
Accessing application	Using internet browser. Type in the specified address. (Refer details section)
Login	Enter user password and user id. If login failed – check id and password cases.
Select modules	Perform desired task from selection of menus:- • Reservation – to book meeting room • Report – to view the booking record • Admin – to add/edit user id, to view log and to add room • About - for more information on MRBS
Logout	If task completed logout from the system.
New session	Re-enter user id and password on 2 conditions: • If session expired and task not completed • Want to start another session after a successful logout.

Module Diagram
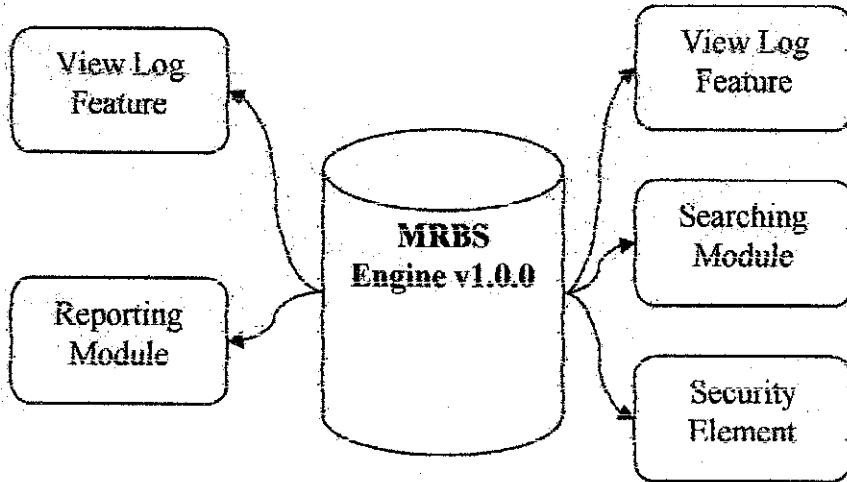
1. User Access Admin

Please consult your system administrator to get your Id and password. Only when you have the id and password then you can log into the system.

2. Details

Accessing the application

- Open internet browser (Internet Explorer/Netscape)
- Type address (http://160.0.107.129/MRBS/)

    Note: screen resolution should be set to 800 x 600

    The final backslash (/) is required

3. Users log in

- Enter User name
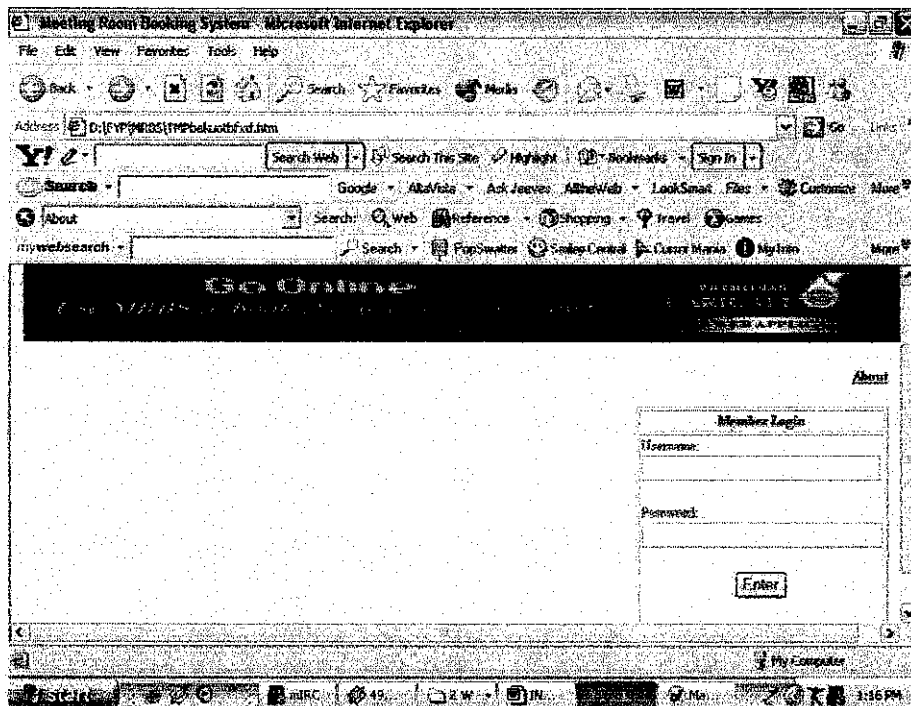- Enter user password
- Click Login button or <Enter>

Figure 1

- Successful login will produced the interface as figure 2

Figure 2

4. Perform desired tasks from the selection of menus

5. Logout of the system

6. Room Reservation Log Sheet Module

This module consists of 2 options-room reservation and room description. These two modules enable the user to book the room by fill in the meeting calendar and to view the available facilities in the meeting room.

6. 1 Room Reservation

The Concept

- This module by default will show the calendar of the current date when selected.

- On the top-left corner of the screen is the Location/Area section – to view the desired room location click on the floor number active link.

- On the top-right corner is the calendar section, which can link you to the desired day by clicking on the date.

- On the bottom of the meeting planner entry table is the daily/weekly/monthly planner view type. The function is to allow user allocate the availability of a particular room.

6.2 Step to book a room

- An interface (refer to figure 3) will appear.

Figure 3

- Select the room name from the location/ area section

- Select date from the calendar section

- You will be shown the meeting planner of the selected date and location

- From the planner entry click on the time meeting begin

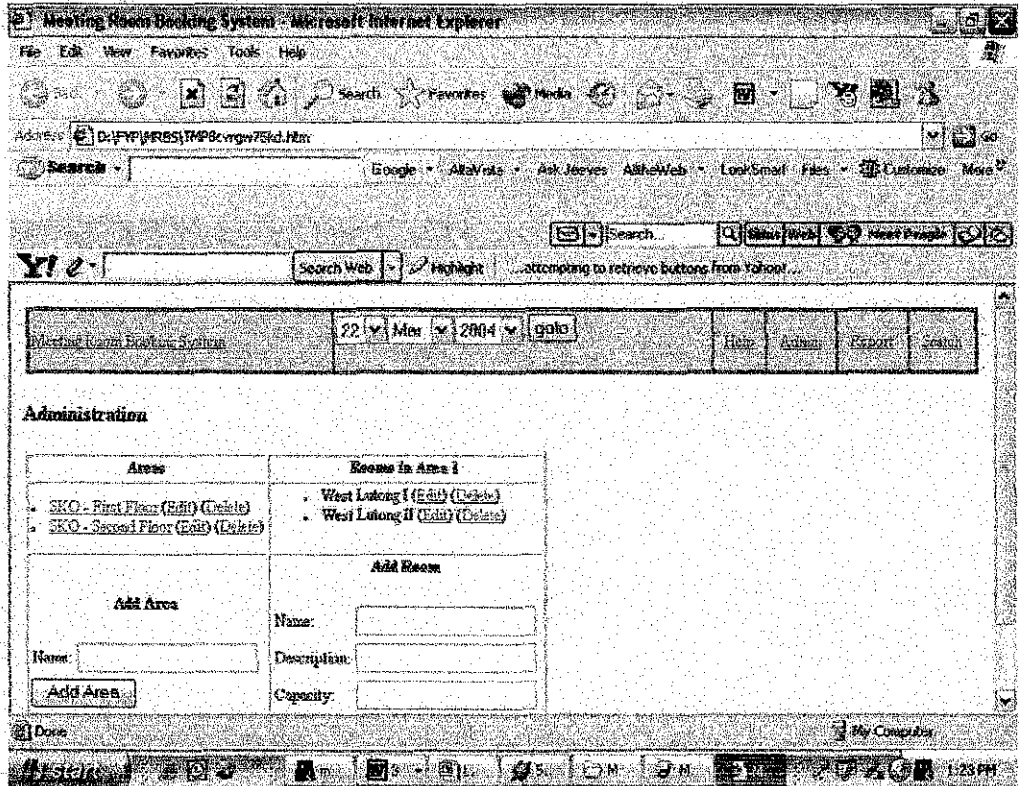- An interface as (figure 4) will appear.

Figure 4

- Fill in the details of the meeting.

- Click save button.

7. Room Description

The Concept

- This option enable user to view the available facilities in each room. This interface is for view only and there are no link related to this page.

7.1 Steps to view room description

- Point the cursor towards the reservation button.
- Click the room description.

8. Goto

The Concept

- This module is to search the meeting calendar of a selected date. It required the user to enter the date, month and year of the calendar needed. By default it will show the calendar of current date.

8.1 Step to search the meeting planner entry

- Point the cursor towards the reservation button. A pull down menu will appear.
- Click the Goto option.
- Fill in the desired record date, month and year.
- Click Goto button.
- You will be shown the meeting calendar of the selected date.

9. Reporting Module

This module consists of 1 option-view record. This option enables the user to view the record by several options from user specification.

The Concept

- This module will generate a report according to what the user had specified.
- By default it will generate a report from date start up to date end.
- To get a specific report, there are four options to be filling-up by user. you can get a report by specifying the
  - Match area – e.g. "SKO – 1st Floor"

- Match room – e.g. "West Lutong I"
- Match brief description – e.g. "Morning Meeting"
- Match full description – e.g. "Azlena Arabi"

- There are 3options on how the record features should be:
  - The report only
  - The summary only
  - Report and summary

- The summarized by options enable user to view the summary only part by:
  - Brief description
  - Creator (in terms of IP address)

9.1 Step to view record

- Point the cursor towards the report button.
- Click the report option.
- An interface as figure 5 will appear.
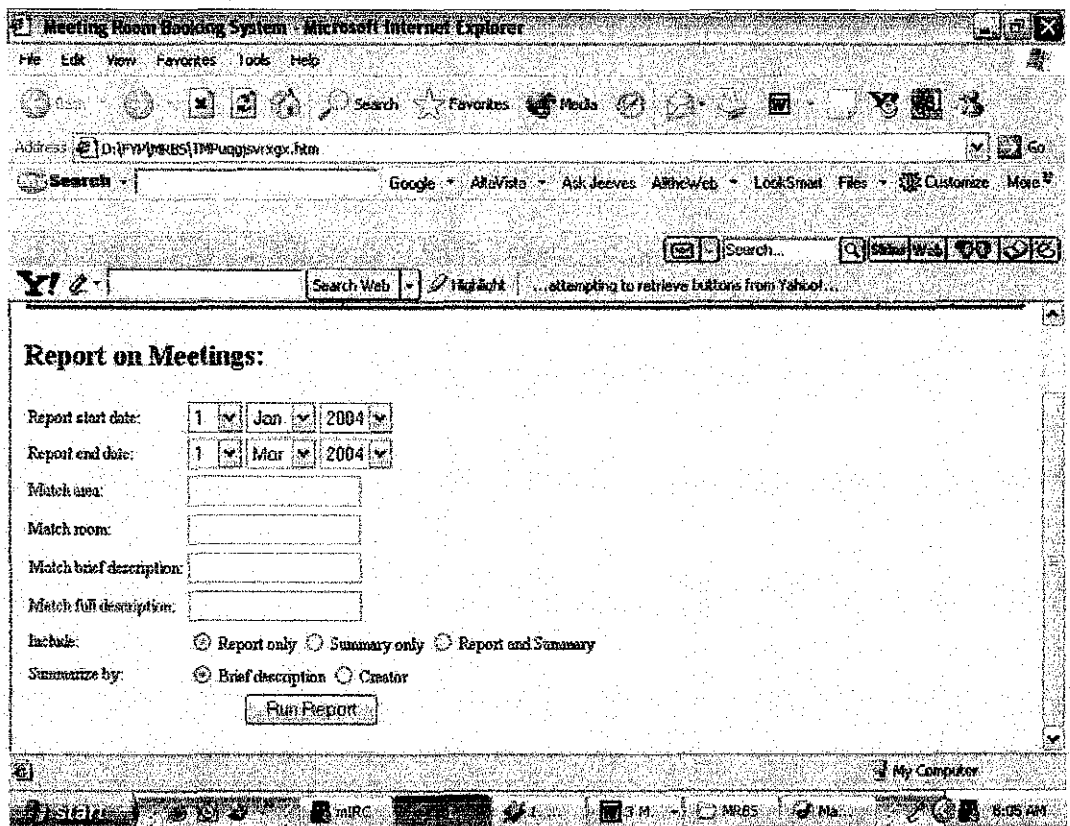
Figure 5

- Fill in details of record needed.
- Click run report or <enter>.
- Scroll down the page to view the record.

10. Admin Page

This module is strictly for administrator only. There are 3 options available in this module – add room to update the meeting room database, view log to check over the user that have log into the system and add user options to enter new user record.

11. Add Room

The Concept

- This module is use to update the room database. You can edit and delete the room if you are an authorized user.

- To add room, first you need to add the area.
- To delete area first you have to delete the room in it and clear of all the booking to be cancelled upon the deletion of the room.

11.1 Step to Add Room

- Point the cursor towards the report button.
- Click the New Entry option.
- From the add area column fill in the area name.
- Click add area button or <enter>
- The area name will be displayed at the location/area column. There will be an add room column entries on the bottom-right side.
- Fill in the details of the room.
- Click add room button.
- The room name will be displayed on the room column.

11.2 Step to Delete Room

- From the interface, click on the desired area link. (E.g. Sko-1st floor)
- The room list within the selected area will be displayed on the room column.
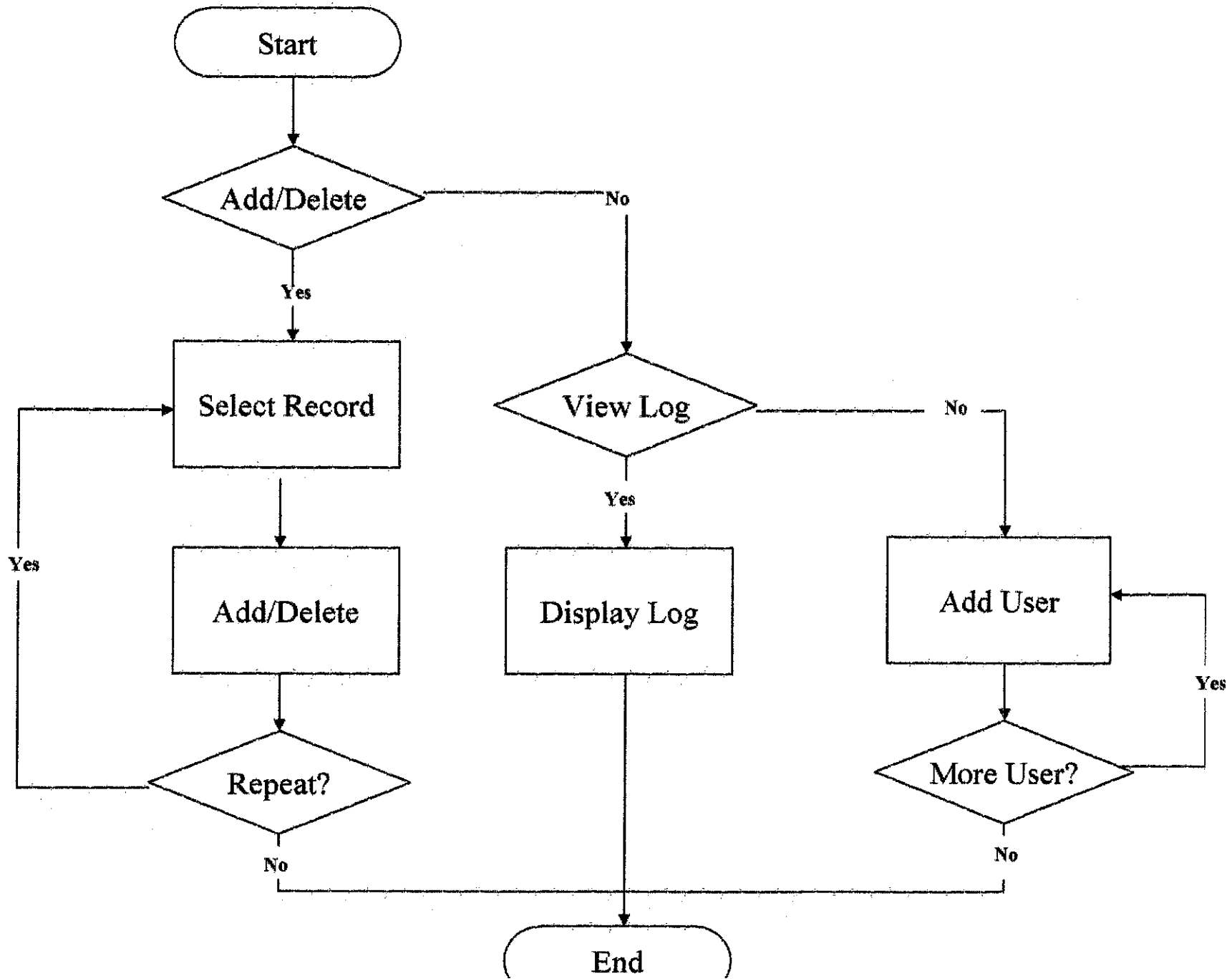- Click delete link beside the room name.

12. About

The Concept

- This section that can be divided into two about MRBS and about the Developer.
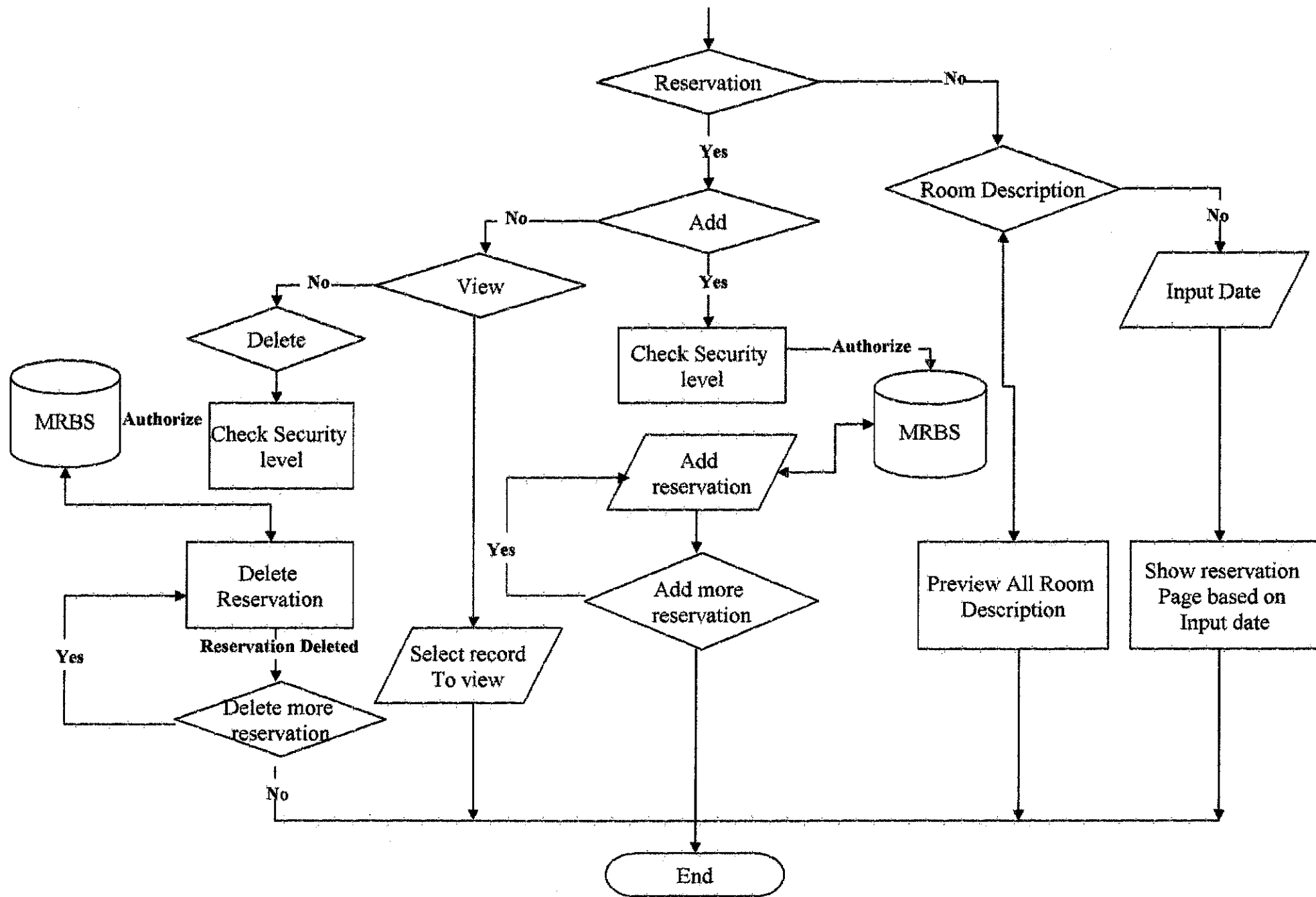- It mainly consists of general information about the system and the developer.

Appendix C
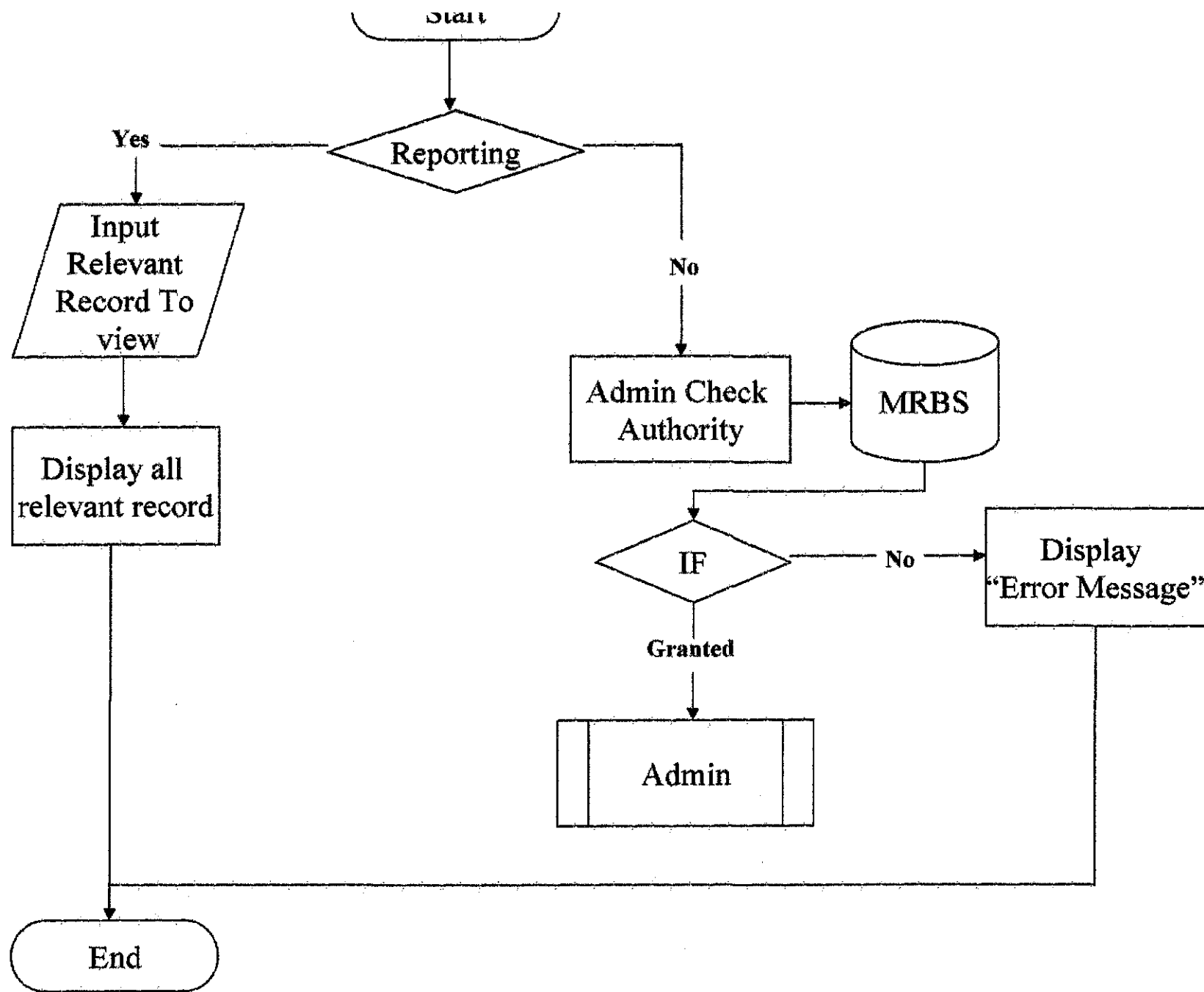
Process Flow

MRBS Overall Admin Process Flow

```
                    ┌─────────────┐
                    │    Start    │
                    └─────────────┘
                           │
                           ▼
                      ╱ Add/Delete ╲──────────── No
                      ╲            ╱               │
                           │                       │
                          Yes                      │
                           │                       ▼
      ┌──────────────┐     │                  ╱ View Log ╲───── No
      │ Select Record│◄────┤                  ╲          ╱       │
      └──────────────┘     │                       │              │
             │            Yes                     Yes             │
             ▼             │                       │              ▼
      ┌──────────────┐     │              ┌──────────────┐  ┌──────────────┐
      │  Add/Delete  │     │              │ Display Log  │  │   Add User   │◄──┐
      └──────────────┘     │              └──────────────┘  └──────────────┘   │
             │             │                       │              │           Yes
             ▼             │                       │              ▼            │
        ╱ Repeat? ╲────────┘                       │         ╱ More User? ╲────┘
        ╲        ╱                                 │         ╲           ╱
             │                                     │              │
            No                                     │             No
             └─────────────────────┬──────────────┴──────────────┘
                                   ▼
                              ┌─────────┐
                              │   End   │
                              └─────────┘
```

MRBS Overall Presentation Flow

MRBS Overall Reporting Process Flow

Start

Reporting

Yes

No

Input Relevant Record To view

Admin Check Authority

MRBS

Display all relevant record

IF

No

Display "Error Message"

Granted

Admin

End

PostgreSQL
ORACLE

MySQL

PHP

HTML

HTML