ONLINE RESERVATION SYSTEM (ORS) FOR A TRAVEL AGENCY

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ABSTRACT

This online reservation system for travel agency will be develop for the use of administrator of travel agency and also for the worldwide enthusiasts travelers. A highly quality web page will be built using tools which can create exciting, high quality, lively pages with state of art Web technology.

The objective for this project will be to keep track the travel agency user information, facilitate online reservation for accommodation and transportation, provide information about places of interest in Malaysia and help promoting Malaysia tourism industry. All data will be kept in database and can be retrieve easily.

Basically, this user-friendly system was developed using ASP technology with VBScript and Jscript as its scripting language. Software Tools for web development is Microsoft Visual InterDev. Visual InterDev is used to create and edit content and the content is automatically uploaded to web server. Microsoft FrontPage 2000 will be used occasionally to create interesting layouts. Microsoft SQL Server 7.0 is chosen as the database repository.

The approach of prototype model was chosen for developing this online reservation system for travel agency because it is a development model of a system for test purpose. Through prototyping, error can be detected earlier as prototyping encourage the involvement of end user during system development process.

It is believed that this Web-based database system will gradually become an essential to every travel agency in the future.

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CHAPTER 1 – INTRODUCTION

1. 1   Project overview

Traveling is actually going from one places to another places or making a journey along or through a country, while reservation is an arrangement to secure accommodations at a restaurant or hotel, on a boat or plane, etc.

Due to the fast development of Internet, the Internet has becoming a major influence in tourism industry. Traveling agencies using the traditional manual way can feel the impact and the important of the Internet technology in order to promote the tourism industry has started to change their manually reservation to web-based reservation system. This transition however is still no very popular as many travel agencies are still using the traditional way.

The **Online Reservation System (ORS) for a travel agency** is an online Internet based application that provide facilities for tourist to book the ticket from various travel services and also the accommodation (mainly hotel) during their stay in Malaysia. Beside, this user-friendly online system will provides useful and detail information about the place of interest in Malaysia to the tourists.

In this system, it allows two-type system login, the administrator and the normal user. The tourists can view through the entire WebPages. If they satisfy with the service provided, they can login as a member and get the information about the tourism hotspot in Malaysia. After they login as a user, they can enjoy the discount when booking the ticket or accommodation. The administrator or the staff can login as agency agent and they can get the full information about the system and made modification to the price especially for the discount. Usually the user will be invite to become a member so they can enjoy the benefit when they want to purchase airline ticket and hotel accommodation reservation. After the login, the administrator will record they record as a member.

The tourist can get the information by just refer to a map that provided by the travel agency. For their convenience, the agency provided various ways for tourist to travel, such by car, airline or cruises. The tourist can also easy get the information for accommodation after they decide where to go for a visit. User can give their suggestion to the agency after the visit, this mean to improve the service that provide by the agency.

For the administrator, they can update the database, this include update the prices for transport travel and accommodation or provide discounts. The administrators also have to receive the mail and give the replay to the tourist. Beside the administrator will also send out confirmation number for hotel and ticket the user book. This can enhance the relationship between the user and the administrator.

1.2   Objectives of ORS system

Keeping in mind that this reservation system provides an easy way to facilitate variations in making decision on reservation for accommodation and airfare, the system is aimed at the following:

- Developing interactive and secure web pages as the interface for airline ticket and hotel reservation besides providing useful information for a tourism hotspot.
- Providing timely and useful tip to aid traveler decisions.
- Cost and time optimizing for traveler, as this system will also provide information about tourism hotspot besides facilitate airline ticket reservation and hotel accommodation.
- Enable traveler to gain useful information on various places of interest in Malaysia besides making airline ticket and hotel accommodation reservation.
- To upgrade the conventional method of airline ticket reservation and hotel accommodation. .
- To develop a modular-oriented system that allows any automated processes or activities to be added or deleted easily
- To create an integrated system to manage airline ticket reservation and hotel accommodation.
- To promote Malaysia Tourism Industry to the eyes of people around the world.
- Expand reservation functionality to the Internet and provide reservation management capability.

1.3   Project Scope

This project is an Internet technology. It is a web site application, which contains server sites (including the database system), web server and client site.

- This program also facilitates airline ticket and hotel accommodation reservation around Malaysia.
- This program provides information on places of interest on Malaysia.
- All reservation records are updated as of last booking.
- Provide mailing system that will be send to the traveler through e-mail to confirm the reservation make.
- An information board purpose for reservation confirmation.
- To Implements a password-protected website.

1.4   Project Schedule

Key activity	JUN 01	JULY 01	AUG 01	SEPT 01	OCT 01	NOV 01	DEC 01	JAN 02	FEB 02
Semester I									
Introduction	▰								
Literature Review	▰▰								
System Analysis		▰▰							
System Design		▰▰							
Semester II									
System Coding				▰▰▰					
System Testing					▰▰▰				
System Documentation						▰▰▰▰			

1.5   Expected Strength's Of The ORS
The strength of this reservation system for a travel agency are listed and explained below:

1)   Reservation through Internet

User will be able to make reservation from anywhere via Internet as long as they have Internet access. They do not have to present personally to the travel agency office to make reservation by filling the reservation form manually.

2)   Security Control

ORS provides more security features. It's only allowed the users who are given the necessary access authority to login the system. Unauthorized users are prohibited from accessing its records stored in the database. The authorize user are given UserID and Password to enter the system.

3)   Improve Service

ORS offers a much simpler, easier, integrated and more attractive way for user to make reservation for accommodation and transportation. Besides, it is also much more easy for administrator (usually a travel agent) to respond to user request and reply feedback besides confirming a user reservation.

4)   Promoting Malaysia

This system on the web is one of the best telecommunication media to promote Malaysia tourism industry and will definitely give a boost to the Malaysia Tourism Industry.

5)   User Friendly and Convenient

This reservation on the web is user friendly and caters for all age users. Besides it is also convenient and easily accessible by anyone around the world.

1.6   Project Expectation

Basically, for any project, certain expectations of the outcome are projected before the work started. A few factors have to be considered in making these expectations. One of the important factors is the amount of time available to complete the project and also the technologies and resources available. The following are some of the expectations of the project:

i)   System can perform some basic function and meet some criteria such as stable, consistency, user friendly and also reliability.

ii) The systems will be able to fulfill the requirement of a travel agency and can perform the required functions such add, update, delete reservation efficiently and effectively.

iii) The proposed system is quite a complete solution. However, it needs to be enhanced so that more functionality can be added.

iv) The final implementation should allow for future enhancement as well as additional module to add functionality to the reservation system as business environment change rapidly.

CHAPTER 2 – LITERATURE REVIEW

2.1   Purpose

In the process of developing ORS, the part of the research is important. Research has been done to understand various new concepts, which especially focus on the information and information system. The purpose of this review of literature is to get better understanding on the development tools that can be used to develop a project and also get better knowledge on the development methodologies used while developing a project. A research also has been carried out to study the current Online Reservation System with the one we will be developed. This information gathering was done by using a number of methods such as surf through the Internet, reading from newspaper, brochures, journals, articles, books, interviews and other relevant materials.   This section will focus on the hotel reservation part of ORS while my partner will be doing on the other part that is ticket reservation.

2.2   Approach

To develop a system, a lot of information needs to be gathered about the system itself. All this information can be obtained from various sources. Basically each source will yield different information and facts and it depends on how the search was done.

For this ORS project, I used the few approach listed below.

a) The Internet was surfed and information were gathered form various sites on software to be used to develop this project, information on development tools, information on various programming concept, examples of reservation web sites. The search engine used to gather all this information includes Yahoo search, Altavista search, MSN search, Ingenta search.

b) Books, journal, brochures and others were read to get more information on tourism concept, role of travel agency and various information on programming tools/concepts.

c) Interviews were conducted to gain more in depth knowledge on how travel agency work and their backend processing while questionnaires were distributed and analyzed.

As a result of this research, below are all the findings and will be discuss in detail

Findings

2.3.   What is Internet?

The Internet is the largest computer network in the world – " a network of networks". It is an international computer network that connects millions of computer in just about every country in the world. It is understood that about 35 million people are connected to Internet. The Internet is a networked formed by cooperative interconnection of computing networks. [1]

In facts, the world "Internet" was coined from the word "interconnection" and "network". What this means is that many, many connecting networks, usually made up of differing kinds of computers and different technologies, are interfaced together so smoothly that the individual parts appear to be one network. This is accomplished by connecting networks using the same protocol: TCP/IP (Transmission Control Protocol/ Internet Protocol). TCP/IP is a common set of rules that allow the variety of systems to communicate. However, computers on non-TCP/IP networks can access the Internet through gateways that perform the necessary protocol translation and allow appropriate communication. [1]

There is no central authority, no governing body nor any overall organizational scheme to the vast amounts of information available. The Internet transfers or accesses data in five different ways: gophers, telnet, FTP (File Transfer Protocol), HTTP (World Wide Web) and e-mail. Each computer that is connected to the Internet is provided a unique address or URL (Uniform Resource Locator).

The main uses of Internet are do research; download software, education, business, Telemedicine, entertainment, send mail, IRC (Internet Relay Chat), news group, get information and etc. During the early '90s, the World Wide Web(WWW) started to take of. Today WWW is one of the fastest growing services on the internet.

2.4   World Wide Web

WWW is an Internet Navigator tool through which the Internet users can access the other front ends, Navigators, information, services and resources. One of the major problems with the existing Internet was very unorganised and unconnected. It was a vast library that had no central index. It was a treasure house of information, but unfortunately no way of accessing the information. The solution to this problem that emerged is known as WWW (World Wide Web). [1]

English Tim Berners-Lee invented the World Wide Web in 1990 while working at CERN, the European Particle Physics Laboratory. At first, the web was set up as a way for scientists to share information with each other. It has since become a worldwide success because it makes it very easy for computer novices to browser through text, graphics, and multimedia. [1]

WWW is an information system based on hypertext, which offers a means of moving from document to document (usually called to navigate) within a network of information. WWW uses the concept pf a page for viewing information. Each page is actually a single text file written in something called Hypertext Markup language, or HTML this HTML file is retrieved from a remote computer, known as the HTTP server, by a WWW browser, and is used it determine the appearance of that particular WWW page. NA HTML document can contain pointers to other HTML document, graphics. Files, sounds, and even descriptions for buttons and other on-screen elements for displaying data. This interconnection of HTML documents on computers all over the Internet, each containing pointers to other HTML documents on other computers on the Internet, is where the term "web" came from. [2]

2.5   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.

2.5.1 Web Browser

A browser is a software program that acts as an interface between the user and the inner working of the 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 a screen.

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 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. [3]

Text-based browser allows a user to see only text. Graphic elements are not displayed. Using the keyboard rather than a mouse accesses hypertext links. LYNX is an example of a text-based browser. [3]

2.5.2 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. [4] Some examples of Web

servers are MS Internet Information Server for Windows NT, Personal Web Server for FrontPage 98, Netscape Enterprise Server and Apache. [5]

The purpose of a web server is to respond to requests for WWW files. When you surf the WWW, you are sending requests to Web servers all over the country or world. The servers are sending back various files that are used to construct the web pages you see. [4]

When a web browser try to access the information stored in a database, Web server acts as the client to the Database server. The Web server accepts the query from the browser and passes the query to the Database server. Moreover, the Web server also formats the results into HTML, and sends the result back to the browser.

2.5.3 Database Server

With the existence of database server, the client passes SQL requests as message to the database server. The results of each SQL command are returned to over the network. The code that processes the SQL request and the data resides on the same machine. The server uses its own processing power to find the requested data, instead of passing all the records back to a client and allowing it to find its own data. Database server provides the foundation for decision support system that requires ad hoc queries and flexible reports. [3]

2.6   Client/Server Architecture

The client/server architecture is based on hardware and software components that interact to form a system. The client is any computer process that requests services from the server. The client, also known as front-end application, is where the end user usually interacts.

On the other hand, the server is any computer process providing services to the clients. The server, also known as back-end application, reflects the fact that the server process provides the background services for the client process. A few typical background services on the server are file services, print services, communication services, and database services. There are two types of client/server architectures.

2.6.1   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 environment (less than 50 users). In this system, we have a database server and the rest of the applications including user interface runs completely on client. [5]

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

2.6.2   Three-tier Architecture

The three-tier, later to be called multi-tier; architecture grew out of this early experience with "distributed" applications. As the two-tier applications percolated from individual and departmental units to the enterprise, it was found that they do not scale very easily. And in our ever-changing business environment, scalability and maintainability of a system are primary concerns. Another factor that contributes to

the move from two to multi-tier systems is the wide variety of clients within a larger organization.

In multi-tier architecture, as shown in Figure 2.1, each of the major pieces of functionality is isolated. The presentation layer is independent 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 pay off time and again.
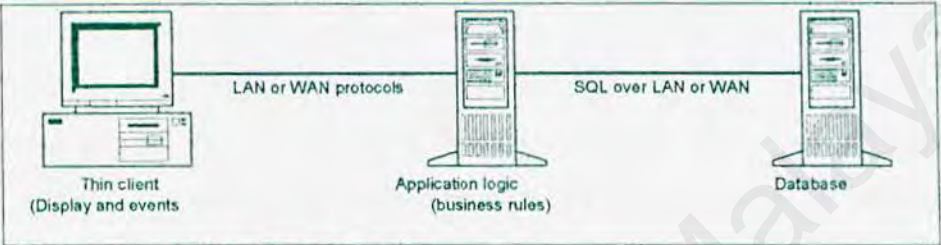
Figure 2. 1: Multi-Tier Architecture

2.7   Web Application Programming Technology

2.7.1   Active Server Pages (ASP)

Active Server Pages (ASP) is a language-independent technology developed as server-based technology by Microsoft for building dynamic and interactive Web pages. The basic of ASP is the Microsoft's Internet Information Services (IIS) software. [6]

In fact, ASP is not an application. It is a VB Script and J script interpreter that is integrated with IIS, together with an interface for other custom component. It is also able to include other Web Pages component like ActiveX controls and Java Applets. Therefore, Asp is considered as a glue technology, which binds together other various server-based systems to help build interactive Web pages. [6]

Microsoft recommends the use of server side ASP rather than a client side script. This is because the server side script will result in an easy displayable HTML page where else the client side scripts for example JavaScript may not work as on older browser. [7]

2.7.2   Common Gateway Interface (CGI)

The Common Gateway Interface(CGI) was one of the first methods used to create dynamic HTML. It is the traditional definition of how server and browser interact. CGI is an interface specification. It does not define how a Web server works or how a program is expected to produce results, but it establishes a set of guidelines that both must follow in order to interoperate. [8] For example, a vendor has a product database on his system that he would like users on the Web to use, but the Web server does not understand the database internals. Using a CGI program must link both the Web server and the database. This last functionality works only because the Web server and the program have established rules for communication between the two.

The rules make them able to interface-they are called the Common Gateway Interface. See Figure 2.2 for a representation of this example.
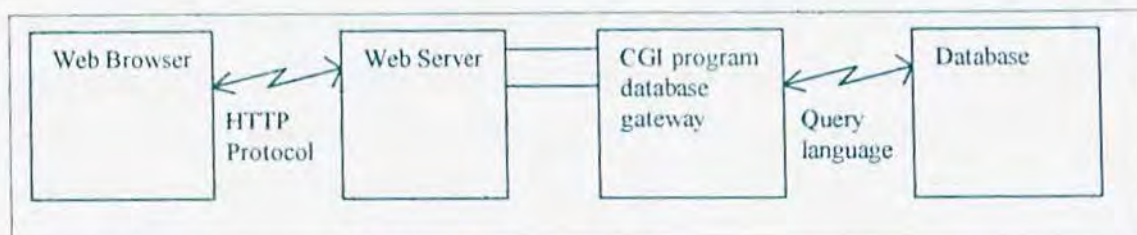
Figure 2.2: Common Gateway Interface (Source: [8])

Before Java, ASP and other technologies, the standard of developing homepages with interactivity was by using CGI. CGI remains the predominant teen of interactivity in the UNIX.

2.7.3 Internet Server Application Programming Interface

The Internet Server Application Programming Interface (ISAPI) shares the same functional aspects of CGI programming but differs from traditional CGI programming in the way the script is executed. ISAPI relies on loading scripts into the HTTP server's memory space to reduce resource drain required to create a new process. The significance of using a shared memory space is that all the resource made available to the HTTP service are now made available to ISAPI applications. Thus careful and thorough coding and testing must be used when creating an ISAPI application. This because the ISAPI application shared the same memory space as the HTTP server, if the ISAPI application crashes, u can also bring down the whole the HTTP server. [6]

2.8   Consideration on the Database Implementation

Several database software are actually been look into. Analysis was done to determine the most appropriate database management system (DBMS) for storing and managing the require data. We based our selection on the consideration for usability and effectiveness in the context of cross platform deploying, storage space required and the portability of the records.

2.8.1   Text-based file

The text-based file system is most suitable for maintaining and constructing a simple variable length table such as the simple text format record. It does not need any management system for implementation. However, as ORS database structure is highly complex involving many data types, this system are sure unsuitable for ORS.

2.8.2   Microsoft Access 2000

Access 2000 is a member of Microsoft Office 2000 that provide object-oriented development environment. MS Access is a relational database management system used to create and manage relational databases. Together with the ODBC driver for Access, data can be retrieve from the database in the client/server-based system. However, there is a limit for Access to handle very large database. In terms of efficiency, SQL server surpasses Access. [9]

2.8.3   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 Sever 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.

SQL Server is an ideal database engine for powering web sites. Through tight integration with Internet Information Services, SQL Server can be queried and updated via popular Web browsers. SQL Server's native ODBC lets it inter-operate smoothly with the Internet Database Connector interface included with Internet Information Services. [10]

2.9   Consideration On Implementation Platform

2.9.1 Window 2000 Professional (Window NT server 5.0)

Windows NT Server is a remarkable network operating system, but it's only now beginning to meet with remarkable commercial success unlike other Microsoft Operating Systems, Windows NT is a cross-platform product; identical versions are available for Intel X86, Digital Alpha, Silicon Graphics MIPS, and Apple/IBM/Motorola PowerPC computer. Major hardware manufacturers such as Hewlett-Packard, IBM, Digital, Tandem, Amdahl, and Unisys offer high-end servers designed specifically to run Windows NT.

Windows NT Server provides several networking features, the most important of which for networking are the Distributed Common Object Model (DCOM, formerly called NetworkOLE) and a substantial improvement in the Domain Name Service (DNS) for TCP/IP networks. Microsoft needs DCOM to implement its plans for distributing ActiveX (formerly OLE) controls and documents via the Internet and to fully implemented three-tier client/server computing using Automation (formerly OLE Automation)

2.9.2   UNIX

Unix, like other operating systems, is a layer between the hardware and the application that run on the computer. It has functions that manage the hardware and functions that manage executing applications. The UNIX system is actually more than strictly on operating system components. In addition, a standard UNIX system includes a set of libraries and a set of applications. Basically, there are two things that make the UNIX differ from other operating system, internal implementation and the interface.

The part of UNIX that manages the hardware and the executing processes is called the Kernel. In managing all hardware devices, the UNIX system views each

device as a file (called a device file). This allows the same simple method of reading and writing files to be used to access each hardware device. The file system manages read and writes access to user data and to devices, such as printers, attached to the system. It implements security controls to protect the safety and privacy of information. In executing processes, the UNIX system allocates resources (including use of the CPU) and mediates accesses to the hardware. [11]

2.10   Web Server

2.10.1   Microsoft Internet Information Services 5.0

Internet Information Services (IIS) 5.0 for Microsoft Windows 2000 brings the power of Web computing to Windows. With IIS, you can easily share files and printers and create applications to securely publish information to improve the way your organization works. IIS is a secure platform for building and deploying e-Commerce solutions. IIS also makes it easy to bring mission-critical business applications to the Web. [12]

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. [12]

Because of its tight integration with Windows 2000, IIS guarantees the network administrator and application developer the same security, networking, and administration functionality as Windows 2000. Above and beyond its use of familiar Windows 2000 tools and functionality, IIS also has built-in capabilities to help administer secure Web sites, and to develop and deploy server-intensive Web application. [12]

2.11   Consideration on Development Tools

2.11.1   Visual Basic 6.0 (VB6.0)

The "Visual" part refers to the method used to create the graphical user interface (GUI). Rather than writing numerous lines of code to describe the appearance and location of interface elements, you simply add pre-built objects into place on screen. If you've ever used a drawing program such as Paint, you already have most of the skills necessary to create an effective user interface. [13]

The "Basic" part refers to the BASIC (Beginners All-Purpose Symbolic Instruction Code) language, a language used by more programmers than any other language in the history of computing. Visual Basic has evolved from the original BASIC language and now contains several hundred statements, functions, and keywords, many of which relate directly to the Windows GUI. Beginners can create useful applications by learning just a few of the keywords, yet the power of the language allows professionals to accomplish anything that can be accomplished using any other Windows programming language. [13]

Visual Basic 6.0 is one of the most productive tool for creating high-performance enterprise and Web-based applications. Integrated Visual Database Tools and a RAD environment promote productivity while native code compilation provides fast applications.

2.11.2   Microsoft Visual Interdev 6.0

Microsoft® Visual InterDev™ is a powerful Web development tool designed for programmers who want to create: [14]

- **Data-driven Web applications** using a data source supported by ODBC or OLE DB, such as the database management systems from Microsoft.

- **Broad-reach Web pages using HTML and script** in Web applications that take advantage of the latest advances in browser technology, such as Microsoft® Internet Explorer 4.0, Dynamic HTML and multimedia features.

- **Robust development environment** with a Scripting Object Model, design-time controls (DTCs), and an extensible toolbox for rapid design, testing, and debugging of your pages.

- **Web teams that can develop pages in isolation** and maintain ready access to a master version, or teams that include nonprogrammers who work on the master version through Microsoft® FrontPage®.

- **Integrated solutions** that can include applets or components created in Microsoft® Visual Basic®, Visual C++®, Visual J++™, and Visual FoxPro®.

2.12   Scripting Languages

A scripting language is a type of programming language used to provide control in another host environment. It is interpreted rather than compiled. This means that a program built with a scripting language must be run in the environment that contains the scripting language's interpreter and cannot be run as a stand-alone application.

HTML cannot interpret a scripting language itself, but it knows enough to call the interpreter of the scripting language to carry out the interpretation. This enables you to go above and beyond HTML, using any browser-supported scripting language you want to extend the web page. [15]

2.12.1   VBScript

Visual Basic Scripting Edition (VBScript) is a subset of the Visual Basic Programming Language and is implemented in Microsoft Internet Explorer and Microsoft Internet Information Services. The language itself has the same syntax as Visual Basic, and it is 100 percent compatible with Visual Basic. VBScript is intended to be a safe subset of the language; therefore it does not include file input/output or direct access to the underlying operating system. VBScript allows you to control the browser, link controls to pages, automate Java applets, and link forms to databases. VBScript is supported in the latest versions of Microsoft Internet Explorer for Windows 95/98, Windows NT, Windows 3.x, and the Macintosh. It is the default scripting language of Active Server Pages. [16]

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 a language that executes on the server a Web site's files. The advantage of client-side programming language is that browsers do all the work. This places fewer burdens on the server. However, currently, the only browser that can understand VBSript as a

client-side language is Microsoft Internet Explorer. The advantage of using VBScript as a server side programming language is that the scripts work regardless of the browser being used.

2.12.2   JScript

Microsoft's extendable, open implementation of JScript is 100 percent compatible with the JavaScript implementation in Netscape Navigator. JScript allows developers to link and automate a wide variety of objects in Web pages, including ActiveX controls and "applets" created using Java. JScript is supported in the latest versions of Microsoft Internet Explorer for Windows 95/98, Windows NT, Windows 3.x, and the Macintosh. A programmer can create certain Active Server Pages with JScript and certain Active Server Pages with VBScript, depending on which language is more appropriate. [16]

Because the implementations of VBScript and JScript are fairly similar, it is relatively easy to program in both, optimise for all browsers, or change code from one to the other. You can also have both languages performing actions on the same HTML page. HTML code and script code sit together on each HTML page

Jscript was designed as a general-purpose scripting language that would appeal to the many programmers who use C, C++, and Java. This means that it "borrows" features from these languages where appropriate, but is a language in its own right and includes many features not found in C or Java. It's important to note that JScript is not just confined to use in the browser; JScript can be used in most applications in which VBScript also can be used. [17]

2.13 The Hotel Industry

One of the great hotelman of all time was Cesar Ritz whose name is immortalized in the hotels he created and many others who simply borrowed it. He taught the world a new way of living and a better one than it had known before. Many ordinary folk who live in Ritz's day would not have thought of entering a hotel, now appreciate hotels as the new and better way of living. [18]

A hotel can be define as an establishment held out by the proprietor as offering food, drink and if so required, sleeping accommodation, without special contract, to any traveller presenting himself who appears able and willing to pay a reasonable sum for the services and facilities provided and who is in fit state to be received. In short hotel is the name applied since the late 17th century to an establishment supplying both food and lodging to the public [19] As a consequence, while there are other establishments, which provide accommodation services such as hospital or university hostels, they do not come under the definition of hotels because they can not cater for the specific needs of travellers.

2.14 Hotel Industry Segments

The industry can be classified into different segments according to their target market, size, location, facilities, luxury and ownership. Different types of hotels will provide different kinds of services for their guests and will be run differently. The hotel industry segments can be roughly divided into economy, mid market, all suite, first-class and luxury as table 2.1 below.

Industry Segment	Description	Example
Economy/Limited service	Provides basic sanitary lodging. Keeping low operation costs by eliminating food / beverage service.	Days Inn Suisse Chalet
Mid-market	Provides above average luxury and comfort. On premises food and beverage service	Hilton Ramada Inn Sheraton
All-suite	Provides separate sleeping and living areas in all rooms. Some properties are designed for extended stays.	Hilton Hyatt Embassy
Firsr-Class	Provides exceptional food / beverage facilities.Usually have luxury suites, two or more dining rooms and a cocktail lounge	Park Hyatt
Luxury	Offers highest standard of excellence in luxury, comfort, food and beverages. Usually has two or more dining rooms, at least one grourmet-style restaurant with a classically trained chef.	Hillton Suites Marriot Suites Sheraton Suites Regent International Hotels

2.15   The Roles Of Travel Agency

Arguably, the main role for a travel agency is to provide a convenient location for the purchase of travel. At these locations they act as booking agents for holidays and travel as well as a source of information and advice on travel services. The customers will be looking at travel agent of a particular travel agency for advice to plan their trip.

The range of products that a travel agency offer will vary and depend upon the demand within the catchments area, the degree of specialisation of the agency and the preferences and marketing policies of the proprietor. An agency that attempt to provide a full range of services to the public would sell air tickets, cruise and ferry ticket, car hire, hotel accommodation and package tours. [20]

2.16   Electronic Resources

2.16.1 Sites on travelling, Agencies and Placrs of Interest's

This studies about relevant information system on the web about tourism in Malaysia in a better perspective. It was focus mainly on the web pages listed below.

1.   http://www.tourism.gov.my/

This site was obtained from Altavista search engine and was maintain by the Malaysia Tourism Promotion Board(Tourism Malaysia). It enable the surfers to find for interesting places and event happening in Malaysia. There are various links connecting this homepage to relevant information . It also provive frequently asked questions and answers. This official web site of tourism Malaysia is a must for any one who wish to visit Malaysia.

2.   http://www.all-malaysia-hotels.com/malaysia-hotels.htm

This site was ontained from Altavista search engine using the keyword Malaysia hotel. This web site is specially for hotel reservation. On the right hand site of this web page, it also provide information about Malaysia, places of interest, festival, arts and culture,link to tourism Malaysia office all around the world and others interesting fact about Malaysia. As this web sites focus mainly on hotel reservation, there is information about hotel on major Malaysia city as well as discount offered by hotel. Besides it aslo provide review about hotel

3.   http://www.expedia.com/discount airfare, flights, hotels, cars, vacation packages, cruises, maps.htm

This site was found using keyword tourism form Altavista search engine. This comprehensive web site provide a lot of function from information about flights hotel cars packages, cruises destinations & interests maps and others. This web site also

provide link to affiliate of Expedia, Inc. This sites has give me a lots of idea of developing my system.

4. http://hotels.source.cz/

This web sites was mainly design to help tourist to choose a hotel of their choice by using a rating system Besides it also provide other useful link link weather car renting and others. It has some nice icon which give me some ideas to implement it into ORS.

5. http://www.Travelocity.com/

Travelocity is an online agent backed by Sabre. You need to provide a credit card number to make reservations, but they won't charge you until you tell them to. Tickets can be issued by mail or through any Sabre travel agent. There is also a great deal of travel destination information of variable usefulness. Unlike most other web-based systems, it lets you hold a reservation without buying it. It also handles hotels reservation and rental cars. A nice fare watcher feature lets you list a few routes you're interested in, and it sends you e-mail when an interesting fare becomes available. This site will ask for login name and password.

6. http://www.famtravel.com/

FAMTRAVEL.COM SDN BERHAD, is one of the leading and reputable Travel Agency established more than twenty years ago. It has vast experience in the travel trade, besides having a chain of networks and partners both home and abroad. It has a wonderful web page design and provide many services such as Ticketing/ Reservation(International and Domestic),tour package(Inbound and Outbound), Ocean Cruise / Free and Easy Travel and others services. This site will ask for login name and password to proceed.

7.   http://www.orbitz.com/

Orbitz intended to be the "killer" airline ticket web site, launched on June 4th. It's owned by United, Northwest, Continental, Delta and American, with at least 25 other airlines as affiliates. It has a very nice lowest fare search engine. You can give it ranges of dates and tell it how far you're willing to drive to or from an alternate airport. They promise unbiased fare and schedule listings, and have agreements with affiliate airlines to include all publicly available fares such as web specials.

8   http://www.travelweb.com/

Travelweb has a lot of travel info, graphics that look like they were drawn with a crayon (it's an aesthetic effect, I guess), and airline reservations via Expedia.. You can find help on searching for hotels and flights, and where to find additional information. You can also find everything you ever wanted to know about TravelWeb and our parent company, Pegasus Systems, Inc., including press releases, sponsorship information, their latest accolades, and a current list of all the electronically bookable hotels found here.

Basically, there is a few common and similar features that was gather about the above specified web-based information system which can be summarized as below :

1)   Information Based – Text and image

These web page above provide information related to trips and hotel at various destination and tour packages that are available by using plain text and various picture which contain beautiful scenary to attract the tourist. Besides some web page also provide animation to display information to tourist.

2)   Mode of Contact

Basically, almost all information systems encourage inquiries to be done via email or by facsimile . Besides the telephone number and address for direct visit is also provided.

3)   Related link

Almost all the web pages mentioned above also provide hyperlinks with their affiliate that also provide information about tourism. Besides link to other services like food, transportation and other also provided.

4)   Feedback

Basically, a feedback form are presented to help improve the level of quality provided and also to help the user the enquiry anything information there might be needed.

2.17   Types of Reservation System

Basically we can categorized reservation system into two major categories, that is the manual reservation systems and computerized reservation systems. [21]

a)   Manual Reservation systems

The Traditional reservation function is a manual process. It involves a reservation book or ledger, which is organized like a calerdar or diary. The name of each person who requested a reservation is written on the opage for the appropriate date. The reservation system might also includes racks containing reservation slips on which guest names and dates are written and involves types of reports. A process like checking room availablity or to confirm a reservation might take up hours or days to accomplish.

b)   Computerized Reservation Systems

As development in the computer technology gained pace so too did the developments in the use of computers in reservations. Despite the change in the systems methods, the basic principles are still the same but are done in a much faster way. Normally for a group of hotel, they joined together to form a centralized reservation systems. A user can place a reservation and the system will check the room availablity of the nearest hotel for him. If the accomodation is available, all relevant details willll be stored directly into the database at the centralized reservation systems. So the individual hotel must provide the system with regulary update and accurate information on room availability.

2.18 Online Reservation Systems

Online reservation systems are usually incorporated with Internet technology that had been discuss earlier in this chapter. Basically reservation systems can be roughly divided into two distinct types: affiliate or nom affiliate based on its participating hotels.

a) Affiliate Reservation Systems

An affiliate reservation system is a hotel reservation system in which all hotels within the same chain participated [22]. Guest can make reservations for future or onward accommodation at any of the hotels in the chain. The key advantage of this type of reservation system is to reduce operation costs and thus increase service facilities to guests. By doing so, it can improve profits and encourage brand loyalty.

As for example to describe this type of system, I use Hilton Reservations Worldwide Central Reservation System (HRW CRS). HRW CRS provide services for hotels that are owned, managed or franchised by Hilton Hotel Corporation and Hilton International Corporation. To make it simple, this system will allow processing of all reservations originated on all Hilton's web site.

We can draw out a few benefits from HRW CRS system such as user friendly, in-depth information, guest's recognition tools and others benefits. Besides this system also ensure interconnectivity of all reservation system to share information and also easy to make any customisation necessary.

b) Non-Affiliate Reservation Systems

Non-affiliate reservation system is a subscription system that connects its client hotels to form a reservation network. It is set up to provide referral reservation facilities through subscription of member hotels. Guest can make reservation at any of the subscribed hotels in the network. [11]

Providers of the reservation services are usually online travel service providers. They represent various geographical areas where they take reservation and extend the

work of their member hotel's sales department. Room booking for any member hotels can be done via the web site of the online travel services like leisurePlanet and travelocity or through home pages created specially for promoting a destination such as the Sabah Hotels Booking Centre and the Penang Home Pages.

This type of online reservation systems usually provides facilities which allows customer or visitors to the web site to search for a set of close-matched hotel based on parameters entered by customers such as location, rate, room type, facilities and others. Connection between non-affiliate reservation system, transportation arrangements and car rental companies is also common.

2.19 Survey On Current Online Reservation System

2.19.1   Manual system

The traditional way of making reservation is done manually by travel agency staff (travel agent). The reservation processes are rather cumbersome. The user needs to go to the travel agency to fill in application form and submit to a travel agent to be recorded into a book or file. To retrieve a reservation make by a customer or if a user want to modify his particular, a travel agent must search through various file. This is time consuming and not efficient enough. Besides if a user want to know about a particular tourism hot spot, he needs to look various brochures.

2.19.2   System Done By Senior

a)   Web Based Information System For Tourism

This system was done by Ms. Kalaivani A/P K.Radakrishnan and focus only on presenting top ten information about places of interest in Malaysia. It major drawbacks are the information presented are limited to only top ten destinations and do not provide any reservation function to handle a user request.

b)   Central Reservation System

This system was done by Ms. Fong Phey Sun and is built to manage online reservation but it only cater for hotel reservation.

2.19.3   Existing System

There are a few existing system available in the market such as a reservation system used by Triways Travel Network (M) Sdn. Bhd , and FarmTravel.com. Their reservation system facilitate online reservation for hotel, ticket, tour and others. Their interesting interface provides a picture on how to develop my project into a better one.

2.20   Interview Conducted

a) Telephone Interview with Chan Chee Kheong & Brothers Travel Sdn Bhd agent

From this interview with Ms Chan Siew Hah, I gained much in-depth knowledge on how a travel agency respond to a user when he/she makes to make a reservation. Ms Chan told me that the respond time depends on the particular hotel or transportation company. For example, if a hotel has a fast respond time, then the travel agent can confirm the reservation on the spot. But if not the travel agent will had to wait for the hotel to reply before confirming the reservation, so normally they set a two days limit before deciding on weather the user successfully make that reservation. Usually their travel agency only had e-mail address of a hotel and do not link to that hotel database. Besides, for any reservation that is not confirmed immediately, the confirmation will be sending to the user e-mail or through telephone.

a) Interview With Senior Programmer From Micro-Labs Asia

My partner and I went to interview Mr Eng Choon Siang. He and his team from Micro-Labs Asia had develop a online reservation system for Triways Travel Network (M) Sdn. Bhd. The system was done using Active Server Page (ASP) to create a dynamic web page that is interactive and attractive to the tourist.During the interview, we were given the opportunity to examine the program that is still under construction. This exposures gives a lot of information about the actual online reservation use in today challenging business world. It also gives me a new dimension of idea on how my programs are to be done in a correct sequence. The online reservation system they created include the ticket reservation for the flight, rent for car and shipment, reserve a hotel and shopping list. This system creates two types of user login that is a tourist normal login and a travel agent administrator login. For a normal login there will be restricted to access fewer module of the program such as to

gain discount while administrator login can gained access to update the database and other. One of the most important knowledge we gain was the respond time needed for their system to respond to user reservation. Mr. Eng explain that this reservation system will give the user answer on weather their reservation was successful or not normally in two day after the user make the reservation. Besides, Mr Eng. also shared his experience on how to counter the problem faced during the development of their project, how to develop a better system and others valuable opinions.

As for my conclusion, the main idea I gained by examined this web page is enormous and will be applied to my ORS.

2.21   Questionnaire

2.21.1   Reason to use a questionnaire

- The people need to be questioned are widely dispersed that range from various walk of life.
- We can get the overall opinion from various kinds of people before the system project is given any specific direction.
- Problem sensing is done so that any problems with the current reservation process are identified.

2.21.2   Questionnaire Design

The questionnaire is the combination of open-ended and closed questions. The open-ended question is use to get all possible response to the question form the opinion of respondents. A closed question is chosen to limit the response option available for the respondent to answer the questions. The design of the questionnaire is attached in Appendix.

2.21.3   The respondents

Anyone that can be the potential user for this system

2.21.4   Questionnaires results

100 questionnaires have been distributed to the people inside and outside the campus. Response gained through the open-ended and closed questions has been analyzed and was interpreted. All the findings are listed in the table below:

Table: 2.2 : Statistical result on what attract users most when they visit a web page dedicated for online reservation

	Total (x/100)	Percentage (%)
Information provided	11	11
Fast respond time	13	13
Interactivity	10	10
Special Offer	11	11
Easy to Use	19	19
Responsive	12	12
Attractive	15	15
Others (like fast loading, interesting link)	9	9

The statistical reveal that most of the users demand a very user-friendly interface and easy to use. Some of the others factors like attractive and fast response time are also consider important to attract user to surf our website. This gives me an idea that the interface of ORS must be user-friendly, attractive, and provide fast response to users.

Table: 2.3: Statistical result on what kind of information users wish to have if they surf a web page that provide reservation function

	Total (x/100)	Percentage(%)
Information about place of interest in Malaysia	25	25
Information about the reservation for ticket	31	31
Information about the reservation for hotel	35	35
Others (like events happening)	9	9

The statistical result above reveal that a user would love to be provided information on accommodation and transportation before there make any decision to make a reservation. Besides some user about 34 % of them wanted information on places of interest and others information such as events happening so they can know better about the place that they going to visit.

Table: 2.4: Statistical result on provided feedback or comment to/from a travel agency is a good way to communicate

	Total (x/100)	Percentage(%)
Very good	25	25
Good	39	39
Not good	13	13
Not idea	23	23

Majority of the respondents say that having feedback maintenances from travel agency is a brilliant idea as 64 % of the respondents are agreeing with that. This give me an idea that this services should be included in ORS to improve the relationship between the travel agents and users besides solving the problem that face by the users.

2.22   Online Reservation System Architecture

Figure 2.3 shows the overview of **ORS** architecture to be built after the feasibility study and shows the relationship between the services.

Figure 2. 3: Overview of ORS Architecture
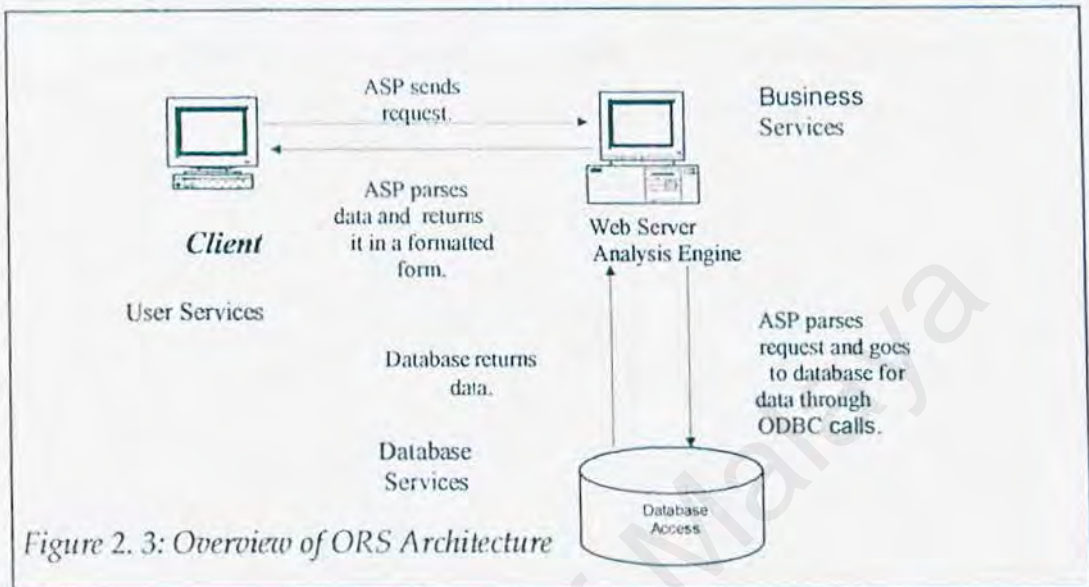
ORS is designed to leverage the traditional client/server architecture and extend it to the web, divided into three distinct tiers – user services, business services and database services. Components were built into each tier to fulfil its role and then tied together to form a final solution.

User Services

At the user services level (which is the client browser), there is a component to gather input variables for the analysis (e.g. a user request or query). There is also a component to display the results of the analysis to the client.

Business Services

At this level, there is an engine, which performs the analysis. This tier resides on the machine running Internet Information Server. Request and response are controlled by written codes specifying its business rules. An example of business rule is a set of procedures that handle password validations. These rules are coordinated by both client and server side scripts, which exist in an Active Server Page document

(component scripting). A more detailed model of the links between components will be explained in the Process Design section later in Chapter 4.

Database Services

At the database service level, a repository of relevant data stored in the Microsoft SQL Server database is available to support the work performed by the analysis engine.

2.23 Summary

As for summary, all the research done was to gather a clearer view on how to develop a better ORS system. The information gained covers web technologies that will be use, the current available information system and related database and client server system, how does a travel agent respond to user that make reservation and others valuable information.

Well to conclude the literature review, all information gathered will be analysed and will be used for development of Online Reservation System (ORS) effectively and efficiently.

3.1   Introduction

Systems analysis is a problem-solving technique that decomposes a system into its component pieces for the purpose of studying how well those component parts works and interacts to accomplish their purpose. System Analysis is one of the most important phases in software development. Requirement analysis enables the system engineer to specify software function and performance, indicates software interface with other system elements, and establishes design constraints that the software must meet. A complete understanding of software requirements is essential to the success of a software development effort. No matter how well designed or well coded, a poorly analysed and specified program will disappoint the user and bring grief to the developer [23].

3.2   Objectives

In order to get an overview of the system requirements, an extensive analysis is needed. System analysis is conducted with the following objectives in mind: -

1)   To ascertain the functional and non-functional requirements of web-based reservation system.

2)   To ascertain the programming languages, databases and hardware needs of this web-based reservation system.

3)   To ascertain the mixed of various kinds of tools that will be used to build the web-based reservation system as new technologies are emerging.

3.3   Methodology

Basically, before developing a system, the proper methodology must be identified clearly. Methodology can be said as a coherent set of methods used to do several complex activities while developing a system. [24]

The methodology used in this project is the software prototyping methodology, due to the fact that it allows the entire system to be constructed quickly. This will assist us in understanding and clarifying issues, which is uncertain and therefore will reduce the risks found in the development.

Prototyping consists of building an experimental system rapidly and inexpensively for end users to evaluate. By interacting with the prototype, users can get a better idea of their information requirements. The prototype endorsed by the users can be used as a template to create the final system.

The prototype is a working version of an information system or part of the system, but it is meant to be only a preliminary model. Once operational, the prototype will be further refined until it confirms precisely to users' requirements. For many applications, a prototype will be extended many times before a final design is accepted. Once the design has been finished, the prototype can be converted to a polished production system.[1]

3.3.1   Prototyping Model
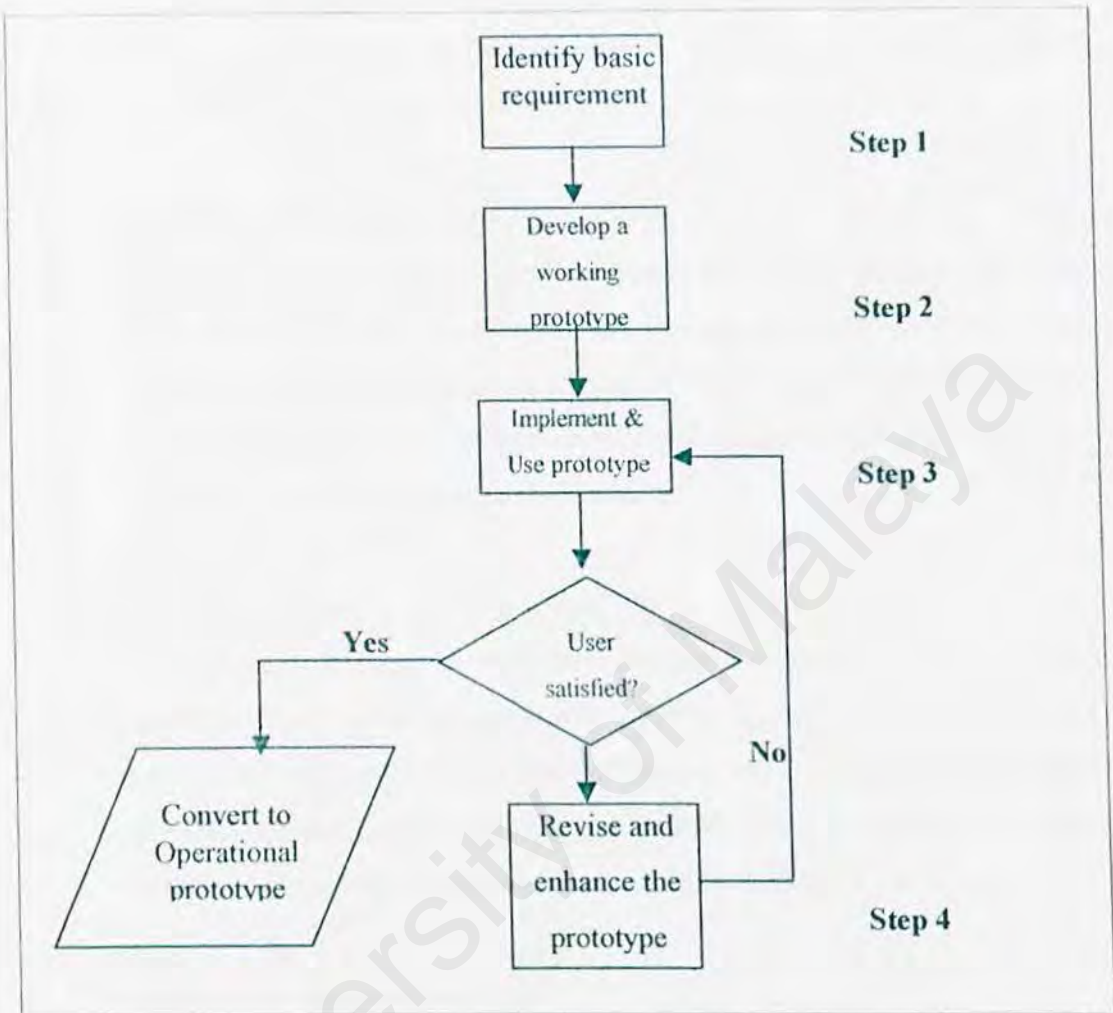
Figure 3.1: Prototyping mythologies (Source: [1])

3.3.2   Steps on Prototyping

Figure 3.1 shows a four-step model of the prototyping process. The steps consist of the following:

1.   Identify the user's basic requirements.

     The system designer (usually an information systems specialist) works with the user to capture the user's basic requirements needs. To do so, they

determine the purpose of the system will serve and the scope of its capabilities. Throughout this and all the steps in the prototype development, many responsibilities are shared between user and analyst. In other word, the end-user is directly involved.

2. Develop a working prototype

    The system designer creates a working prototype quickly. The prototype may only perform the most important functions of the proposed system, or it may consist of the entire system with a restricted file. Speed in producing a running system is essential so that momentum on the project is not lost and so that user can quickly begin evaluating the application.

3. Use the prototype

    The user is encouraged to work with the system to determine how well the prototype meets his or her needs and to make suggestions for improving the prototype. Experience with the system in the actual application setting should provide the familiarity needed to determine what changes or enhancements are necessary or which inadequate or undesirable features to eliminate.

4. Revise and enhance the prototype

    The system builder notes all changes requested by the user and refines the prototype accordingly. After the prototype has been revised, the cycle returns to step 3. Step 3 and 4 are repeated until the user is satisfied.

When no more iteration is required, the approved prototype then becomes an operational prototype that furnishes the final specifications for the application.

3.3.3   The Use of Prototypes

There are four ways to proceed after the information gained from developing and using the prototype has been evaluated:

- Abandon Application- both prototype and application are discarded. Developing the prototype provided information from which to determine that the application or the intended approach is inappropriate to justify additional development. In some cases, circumstances may have changed so that the application is no longer needed. [23]

- Implement Prototype- the features and performance of the prototype will meet user needs either permanently or for the foreseeable future. This strategy may be selected when the application environment is changing so fast that is difficult to determine long term or stable application requirements. [23]

- Redevelop Application- Development of the prototype provided sufficient information to determine the features necessary in the full application. This information is used as the starting point for development of the application in a manner that makes the best possible use of use of resources. [23]

- Begin New Prototype- Information gained by development of the initial prototype suggests alternative strategies or circumstances. A different prototype is constructed to add information about application requirements. [23]

3.3.4   Advantages of Prototyping

i)   User Orientation

One of the advantages of prototyping is that the system being developed should be a better fit with users' needs and expectations. Many studies of failed information systems indicate the long interval between requirements determination and the presentation of the finished systems while sequestered away from users during this critical period.

ii)   Changing the early in its development

Successful prototyping depends on early and frequent user feedback to help modify the system and make it more responsive to actual needs. As

with any systems effort, early changes are less expensive than changes made late in the project's development.

iii)   Scrapping undesirable systems

Another advantage of using prototyping is the possibility of scrapping a system that is just not what users and analysis had hoped. Once again, the issue of time and money spent arises. A prototype represents much less of an investment than a completely developed system.

iv)   Fewer Errors

An approved prototype is a working equivalent to a paper design specification, with one exception -- errors can be detected much earlier.

3.3.5   Disadvantage of Prototyping

i)   Managing the project

Although several iterations of the prototype may be necessary, extending the prototype indefinitely also creates problems. It is important that the systems analysis team devises and then carries out a plan regarding how feedback on the prototype will be collected, analysed, and interpreted. Set up specific time periods during which you and management decision makers will use feedback to evaluate how well the prototype is performing.

ii)   Adopting an incomplete system as complete

A second major disadvantage of prototyping is that if a system is needed badly and welcomed readily, the prototype may be accepted in its unfinished state, and pressed into service without necessary refinement. While superficially this may seem an appealing way to short circuit a lot of development effort, it works to the business and team's disadvantage.

3.4   Conclusion on Technologies Analysis

3.4.1   Proposed Tools

After studies on the strengths, constraints and limitation of the various technologies, it is decided that the ORS to be built using ASP technology with VBScript as its main scripting language. However, Jscript will be used when certain features needs are not found in VBScript but found in Jscript. The approach is chosen because it is simple to implement and no extra additional software is required besides Window 2000 Professional (Windows NT server 5.0) and Internet Information Services 5.0(IIS 5.0). Although JavaScript (JScript) is more widely supported, VBScript is chosen because majority of the scripts embedded in the web pages is server scripts interpreted only on the IIS. Another reason is the similarity of VBScript and Visual Basic. Due to time constraints, this similarity is desired for it to lightened the burden of learning a whole new language like JavaScript (JScript). Tools for web development is Microsoft Visual InterDev. Visual InterDev is used to create and edit content and the content is automatically uploaded to web server. Microsoft FrontPage 2000 will be used occasionally to create interesting layouts.

As for the database repository, Microsoft SQL Server 7.0 is chosen. The database is accessed using ActiveX Data Objects (ADO).

3.4.1.1   Active Server Page

Active Server Pages is being considered for the Web-based Reservation System because of its main features especially in the web server technology.
The reasons are as follows:

♦ It works together with Windows 2000 and IIS to provide a comprehensive set of key software technologies which enable secure exchange of information over public networks, access control to server resources and confident identification of server and client

♦ It is suitable for publishing and collecting data on the web

♦ It provides a way for building secure transactions, server-based application and web sites

♦ It provides Active Database Object, one of the Active Server Components allows easy but powerful connections to be made to almost any database system for which as open Database Connectivity (ODBC) driver is available

♦ It has pre-build Active Server Component which provide plug-in objects that will perform specific tasks

♦ It can interact with almost any existing dynamic Web page technology such as CGI (Common Gateway Interface), ISAPI (Internet Server Application Programming Interface) or script written in PERL.

♦ It is suitable for building multi-tier internet and intranet applications

♦ It supports client-server programming. Furthermore, the combination of ASP, client-side scripting and objects can be used to create client/server application

♦ It is able to create client side code dynamically on the server.

♦ It is browser independent because Active Server Page is executed on a Web server and not within a browser. This means that an Active Server Page is not dependent on the capabilities of a browser. Unlike JavaScript, Active Server Pages can be written so they work with any browser.

♦ ASP provides all of the functionality of CGI/ISAPI applications in an easier-to-use and more robust environment.

3.4.1.2   Microsoft SQL Server 7.0

SQL Server 7.0 is chosen as the database server because:

○ SQL Server support using Windows NT(Window 2000) security accounts to authenticate users who are logging on to a database. This means that, unlike security for Access/Jet databases, if users are already logging on to a Windows NT (Window 2000) network, you can use their existing Window 2000 security groups and accounts to define permissions in your

database, as an alternative to creating and maintaining accounts on the database server yourself.

o It can handle more concurrent users as compared to Microsoft Access

o As this project is designed to handle large amount of data, therefore, SQL Server is most viable solution to accommodate the vast storage requirements

o Through tight integration with Internet Information Services (IIS), SQL Server can be queried and updated via popular Web Browsers.

o When you are using a database server, you can use an automatic scheduler to back up your database without having to exclude users from the database.

o SQL Server log transactions so that updates made within a transaction can always be recovered or rolled back to the last consistent state if either the client or the server computer fails. Although the Microsoft Jet database engine and .mdb files also provide transactions, the transactions in .mdb files aren't managed by a separate transaction log and can fail without recovery if the database file becomes damaged.

o If either a workstation or file server fails while an .mdb file is being written to, the database may be damaged. You can usually recover a damaged database by compacting and repairing the database, but you must have all users close the database before doing so. This rarely happens with a server database such as Microsoft SQL Server.

o Using an .mdb file, regardless of where it is located, requires your solution to load the Jet database engine locally to process queries on the client. For large databases, this can involve moving a lot of data over the network. In contrast, SQL Server runs queries on the server, which is typically a much

more powerful computer than the client workstations. Running queries on the server increases the load on the server more than would happen with an Access file-server solution, but it can reduce the network traffic substantially—especially if users are selecting a small subset of the data.

3.4.1.3   Window 2000 Professional (Window NT server 5.0)

Window 2000 was chosen as the implementation platform because:

- o *Reliability* By protecting the core operating system from malfunctioning applications and by isolating the operating system and applications from direct operations on hardware structured exception-handling handles processing of application and low-level errors. NTFs provide increased reliability for file operations by a built in transaction logging system.

- o *User Friendly Environment/Ease of Use* Ease of use is an important factor to consider when choosing a development platform. Ease of use of the operating system and various applications being used directly affects the productivity of users. When an operating system is not user friendly or an application has a user interface that is too cryptic, a great deal of time can be wasted by figuring out how to perform various tasks as opposed to actually performing them and moving on to something else. Windows NT provides users with a familiar environment that is easy to work with. This increases user productivity and results in more time being spent on finding innovative solutions to various problems as opposed to finding various innovative ways of dealing with an operating system that is not user friendly.

- o *Extensibility* by adapting a client/server model using a base operating system (kernel, the client) extended by application programming interfaces (APIs, the servers). In this case, the term Client/server model applied to network and database applications.

o *Portability* across different processor platforms, including RISC Systems, through the use of a processor-specific Hardware Abstraction Layer (HAL) that provides the isolation layer between the operating system and hardware.

o *Security* by compliance with at least the US Department of Defense C2 Standard, which provides" need-to-know" protection and auditing capability. Security in Windows NT primarily is implemented through ACLs (Access Control Lists).

o *Compatibility* with existing 16-bit DOS and Windows applications, plus the most common PC hardware devices and peripherals. Windows NT also provides the capability to execute applications written to the POSIX.I standard.

o *Performance.* The advancements made throughout Windows 2000 Professional are accentuated by the operating system's speed. As shown in ZD Labs tests running the most popular business applications, with 64 MB of RAM, Windows 2000 was 32 percent faster than Windows 95 and 27 percent faster than Windows 98. It is also significantly faster than Windows NT 4.0 on configurations with 32 MB of RAM.

3.5   Development   Strategy   for   Travelling   Agency's Information System

As describe early in this chapter, this reservation system is going to be developed using the prototyping approach. So I will follow closely the steps that are involved in the prototyping model. The steps will be described below:

3.5.1   Identifying Requirements

To develop a system, we need to identify the system requirements. So in order to identify the system requirement, a lot of information is needed. As for this project, information were gathered from various source and discuss in detail in chapter 2. From section 2.20 and 2.21, the result showed that most users would like to have the following features in web sites

- Attractive interface
- Informative
- Interesting links
- User friendly
- Easy to use
- Responsive
- Fast loading
- Confidentiality

After going through the phase of information gathering and analyzing, the requirement for this project was outlined. Basically they are divided into functional requirement and non-functional requirements and will be discuss in details in section below.

3.5.2 Requirement Analysis

Requirement analysis covers the area of functional requirement, non-functional requirement of this web-based reservation system.

3.5.2 .1   Functional Requirement

Functional requirements are set of functions or subsystems that are must to the system. It describes the interaction between the system and its environment. The absent of functional requirement will make the entire system incomplete. These functional requirements are discussed in depth in next section and can be divided into two separate sections, mainly hotel reservation section and ticket reservation section. I will be taking the task to complete the hotel reservation section. This two section will be divided into 2 modules, that is the user module and the administrator module. The functional requirements of each of this section will be described as follow: -

3.5.2.1.1 Functional Requirement – Entire System

a) *Authentication and Authorization Module*

Some of the document in ORS required user identify and password to access. An authentication and authorized process is vital to the system in order to protect its Web pages and database from any non-authorized user. Users are required to enter their user identity and password to access the system. This will increase the security level of the system.

b) *Account Initiation Module*

This module should enable the users to change their password for security reasons. Old password must be keyed in before any changes can be made to ensure that the valid user is making the changes. Confirmation upon the new password is needed too.

3.5.2.1.2   Functional Requirement – User Module

a)   *Main page*

This main page gives a brief introduction of the ORS to the user. User has the choice of choosing his own preferences to view other pages or to do the online booking of hotel and ticket. The user must login to get the more information about the ORS.

b)   *Personal Data Management*

This module is provided for a user to update certain personal information if there are any changes. There are certain fields, which are editable such as permanent and current address, contact telephone number and others.

c)   *User information*

After the user login, there will be pages that greet the user and a variety of pages that she/he could surf.

d)   *Preview reservation*

This module allows the user preview their latest reservation status both for the hotel and ticket reservation.

e)   *Add new reservation*

This function is for adding a new reservation to the database. Any reservation shall have a confirmation number associated with it. This module will be able to check the availability of the ticket or room for the reservation. A message will be giving to the user regarding the results of the reservation that the user has made.

f)   *Retrieval and updating*

This function will be able to retrieve any valid reservation using conformation number. Update to the existing reservation shall be possible to make the system more reliable.

g)   *Conformation and Cancellation*

This module mainly gives the conformation to the user for the reservation that has make. It shows the information of the reservation to the user to get the conformation. If the user did not satisfied regarding the reservation or a mistake occur regarding to the reservation, the user has the authority to cancel the valid reservation or send request to change the reservation.

h)   *User authentication and authorization*

This module enables the user to change their password frequently so to protect the user form other misusing they access password, which was coincidentally found.

i)   *General information*

This module shows the Malaysia map and the other details. The map is very important to show the user the detail information of some hot place.

j)   *Help file*

This system should provide an online help file to guide the user using the system. It is very important when the users are facing some error or information that they do not understand. This help file will guide they through a complete help contents and context sensitive link to the related pages to easy the user.

3.5.2.2.3   Functional Requirement – Administrator Module

a)   Database maintenance

This module allows an administrator to manipulate all the records in the ORS database system. The administrator has the full right to create, delete and update any data in the database. To avoid editing a large amount of data at once time, the administrator may select data based on the criteria options provided. Records that will be available for editing in this module are tourist records, all the record of the reservation of ticket and booking hotel, provide promotion discount and others.

b)   Reservation result

This module let the administrator to check the reservation of some user so their can give the notice to the user.

c)   Password

This module allows the administrators to change their own password for the security reason.

d)   Searching

This module enables the administrator to search the user name to enable them to find the record of some user in a short time.

e)   Feedback Maintenance

This module allows the administrator to receive the feedback and reply the user.

3.5.2.2   Non-Functional Requirement

Non functional requirement are as important as functional requirement. Non functional requirement describe restrictions on the system that limits the choices for constructing a solution to the problem.

a)   ***Browser***

This web-based reservation application system requires a Microsoft Explorer browser that can support VBScript scripting languages.

b)   ***User Friendly and Usability***

This system can be considered as attractive and easy-to-use application because user only have to click on the task or image by using the mouse. The use of suitable and meaningful icons will help the user to use the system with more confidence; the use of menu should give the user sufficient information to use the system.

Confirmation message for any non-trial process such as updating or deleting a record should be displayed. Confirmation messages should be displayed after adding, updating and deleting a record. Besides that, a user should be allowed to cancel an editing process.

The system provides an effective error handling and validation procedure so that user can use this system easily. The system displays an error message or warning if errors occur, such invalid password or user ID, invalid data input, unsuccessful connection etc.

c)   ***Reliability***

A system is said to have reliability if it does not produce dangerous or costly failures when it is used in a reasonable manner, that is, in manner that a typical user expects in normal. This definition recognizes that a system may not be used in the ways that the designer expects. ORS is also required to be reliable, so as to produce accurate results and information.

d)   *Efficiency*

This is one of the most important requirements of the system, where it should provide a good response time to all user requests. This system should not cause any delay in processing the user request or even in the midst of retrieving information.

e)   *Modularity*

Modularity involves breaking the programming into logical, manageable portions or modules. Ideally, each individual module should be functionally cohesive, so that it is charged with accomplishing only one function.

Advantages:

- Modules are easier to write and debug because they are virtually self-contained. Tracing an error in a module is less complicated, since a problem in one module should not cause problems in others.
- Modules are easier to maintain. Modifications usually will be limited to a few modules and will not spread over an entire program.
- Modules are easier to grasp, because they are all self-contained subsystems. Therefore, anyone can actually understand its function by looking at module code listing.

f)   *Maintainability and Expandability*

This system is also required to have the ability to be maintained and expanded for future enhancements. Therefore, this system is to be developed using common languages like VBScript where users can get to learn the language easily or even get some reference point from other people who can provide them with relevant information.

g)   *Security*

This system should be equipped with sufficient security. Users must login with their correct user ID and password to prevent unauthorized access into the user and

administrative section. Authorized users can change their password if they choose to do so. The password should be encrypted.

h)   Flexibility

The system should have the capability to take advantage of new technologies and resources. The system should be able to implemented in the changing environment.

i)   Accuracy

The system must be able to perform accurately as requested by the user so that the users are convinced in using this system.

3.6   Hardware and Software Requirement

3.6.1   Server Hardware Requirements

The server computer requirements are:

1)   A server with at least Pentium 133 MHz processor

2)   At 2 GB of free hard disk space

3)   At least 32 MB RAM of memory

4)   Network Interface Card (NIC) and network connection with recommended bandwidth at 10 Mbps or more

3.6.2   Server Software Requirements

To host and run the system, the server computer needs to have various supporting software installed.

Table 3. 1: Server Software Requirements

Software	Description
Windows NT Server 5.0(Window 2000)	Network Operating System
Internet Information Services (IIS) 5.0	Web Server Service
Active Server Page (ASP) 3.0	Server Scripting Engine
Microsoft SQL Server 7.0	Database Server
Microsoft Internet Explorer 5.0	Precondition for ASP Installation

3.6.3   Client Hardware Requirements

The client hardware requirements are quite minimal as long as it has a reasonable amount of RAM and a reasonable quality dial-up connection line. The recommended configurations are:

- At least 32MB memory
- Network connection through existing network configuration or modem (Recommended at least 28.8 Kbps)

3.6.4 Client Software Requirements

The client software requirements fall on the browser used by users. It requires Microsoft Windows family operating system that can run Microsoft Internet Explorer 4.0 and above or any other browsers that support ActiveX and VBScript. Besides, Microsoft Outlook should also present for mail application

CHAPTER 4:   METHODOLOGY & SYSTEM DESIGN

4.1   System Design

A design specification describes the feature of the system, the components or elements of the system and their appearance to users. [25] The purpose of system design is to select and plan system that meets the requirements needed to deliver the problem solution. System design results in a new or modified system and thus results in change. In general, a system design is formulated to

- Incorporate system features that are easy to understand and use.
- Have the functions in a manner that seems natural to the user.
- Identify user error or carelessness.
- Prevent failures or improper procedures that will crash the system.

In this system design phase, the information collected earlier is being used to accomplish the logical design of the information system. Part of the logical design of the information system is devising the user interfaces. Besides, this designing phase also includes designing files and databases that will store much of the data needed by the decision makers.

In this web-based reservation system development, the design phase can be divided three sections that are database design, user interface design and system functionality design.

4.2   System Functionality Design

System functionality design is based on the system requirements stated in chapter 3. It translates the system requirement into system functionality. This design focuses on the system structure design and data flow design.

4.2.1 System Structure Chart

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

ORS is divided into 2 major components: Administrator Section and User Section. Each of the two components is further divided into 2 main modules that is the Ticket Reservation module and the Ticket Reservation module. Then this two modules will be further divided into many modules.
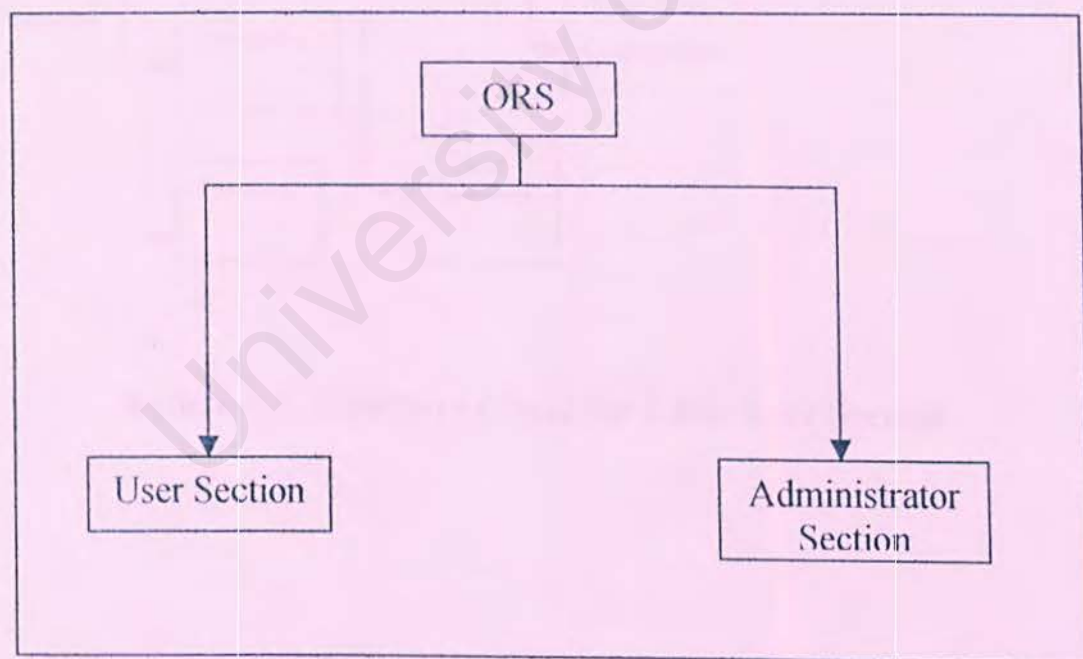
Figure 4. 1: Structure Chart for ORS Main System
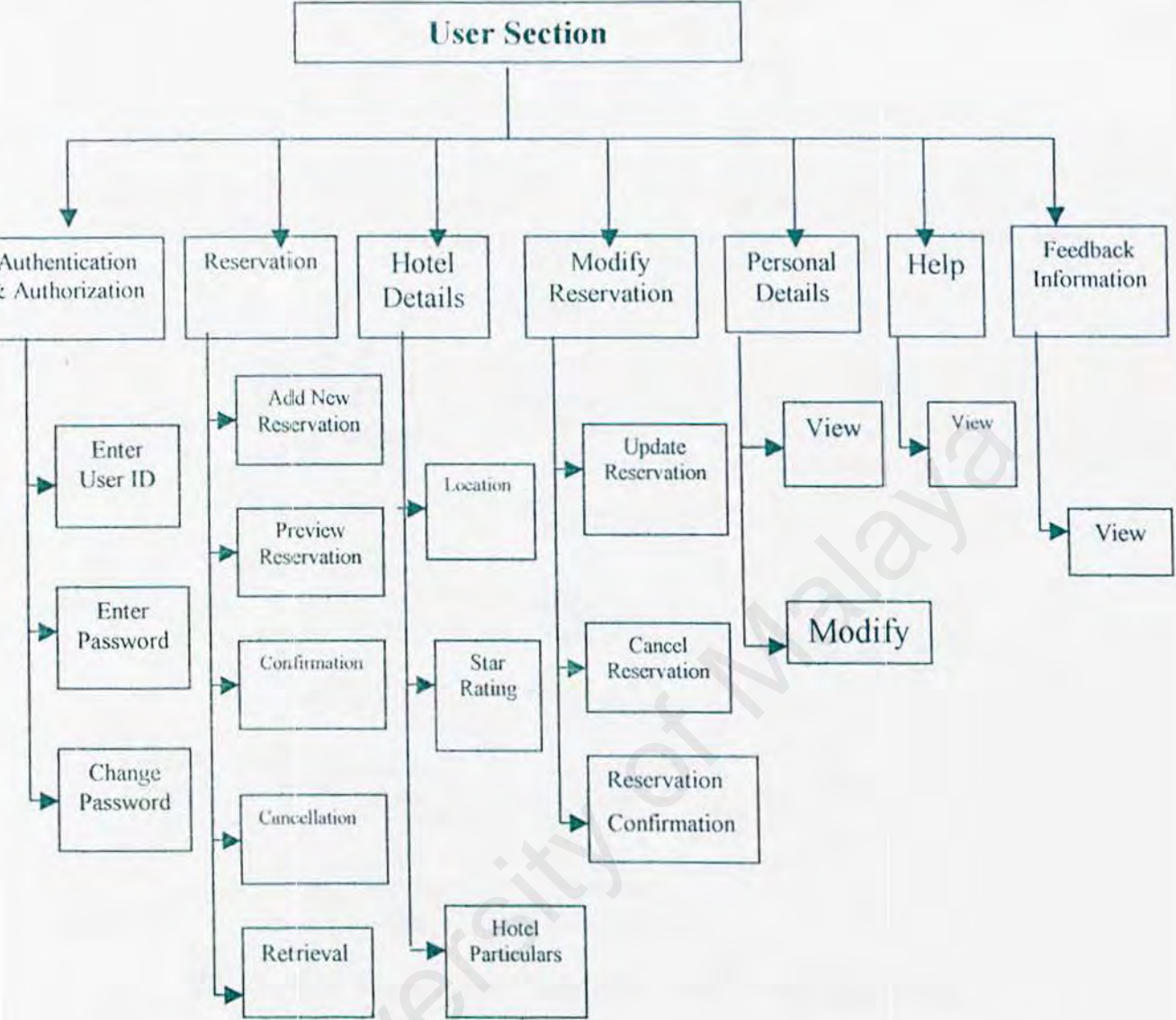
Figure 4.2: Structure Chart for ORS- User Section
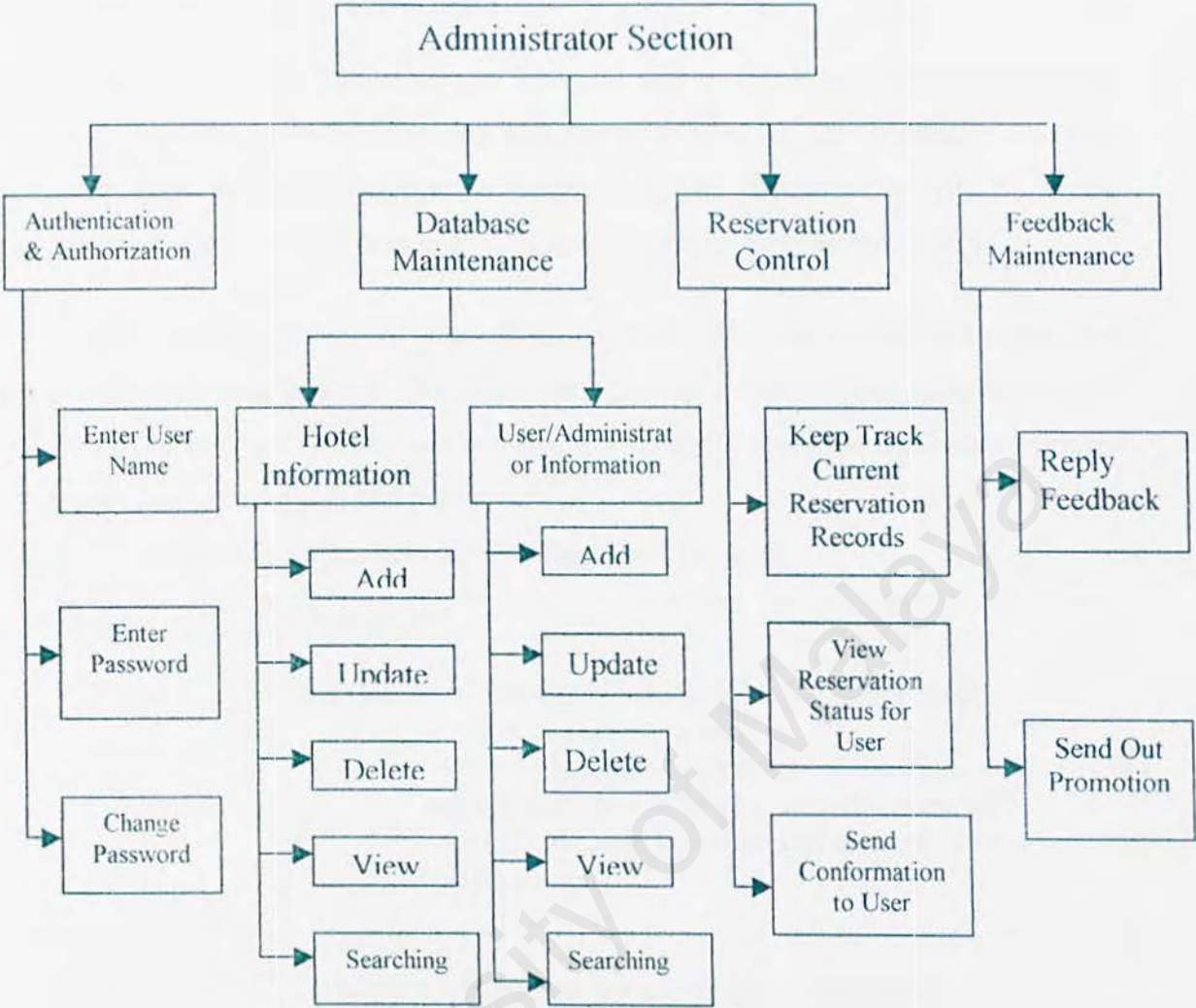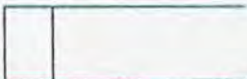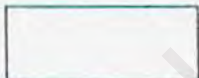
Figure 4.3: Structure Chart for ORS - Administrator

4.2.2 Data Flow Diagram (DFD)

Data Flow Diagram is a means of representing a system at any level of detail with a graphic network of symbols showing data flows, data stores, data processes, and data sources/destinations. DFD depicts the broadest possible overview of system inputs, processes and output, which corresponds to data movement through the system.

Most modules or sub modules of data flow in ORS are similar and occur in a rather straightforward manner. Therefore, they are represented in one generalize DFD. Below are the DFD for the function in ORS. The components of the DFD are composed of the four basic symbols shown below.

Table 4.1: Description of Symbols Used In Data Flow Diagram

Component	Description
Data	Data Flow – Represent the flow of data or information from one object to another - Arrow denoted the direction of data flow - Each data flow is labeled with the name or details of the information represented by the data flow
ID Stored Data	Data Store – Hold data for a time within the system - Comprise two sections: 1. Identifier Information 2. Description of the data stored
	External Entity – Any Objects in the real world, for example Person – Determine the system boundary.
	Process – represents an activity that transforms or manipulates the data - Comprise two or three sections: 1. Top section contains the identifier information 2. Center section contains a description of the process 3. Lower section contains the physical or computer program information
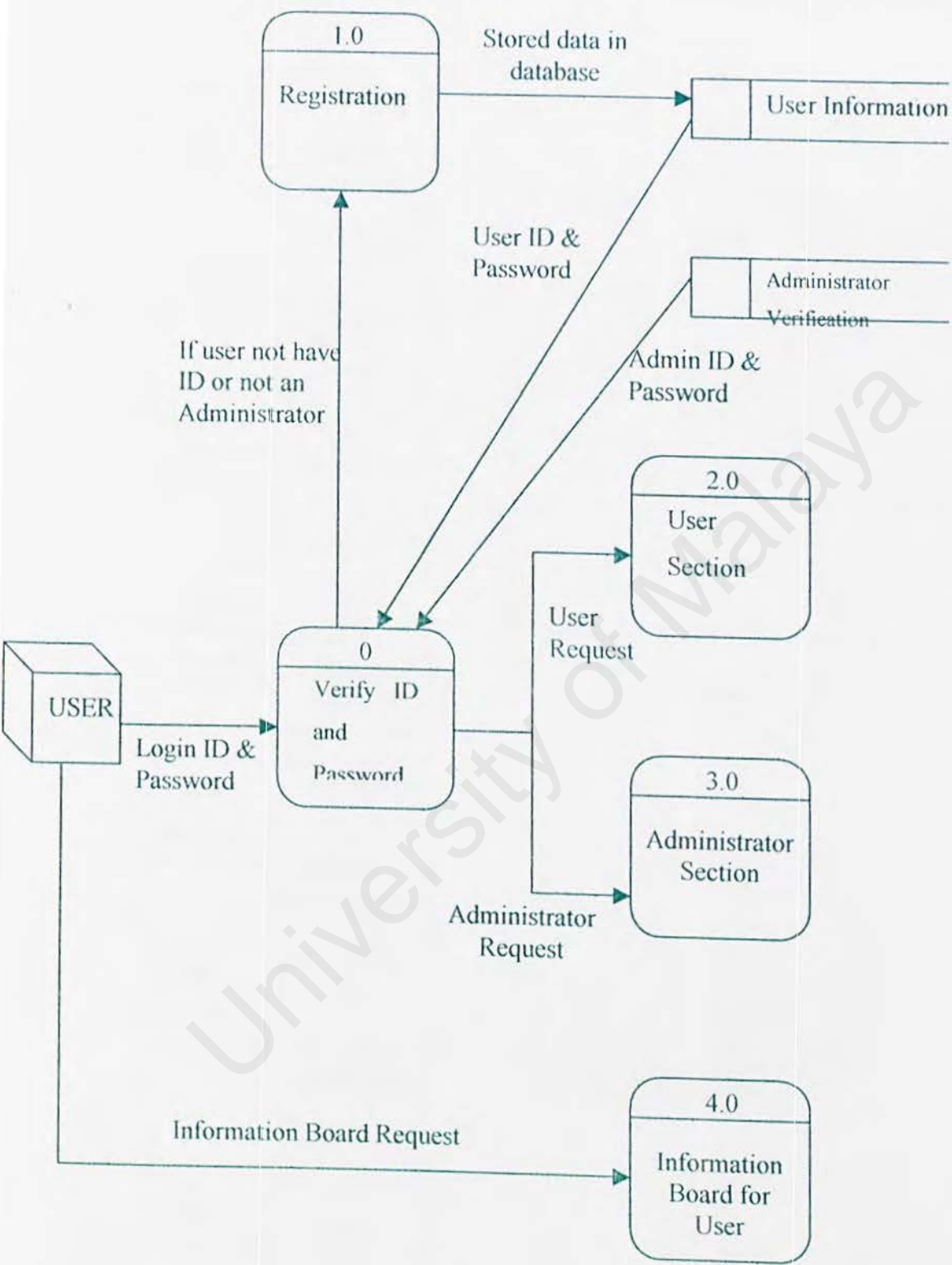
Figure 4.4: Data Flow Diagram for System Overview
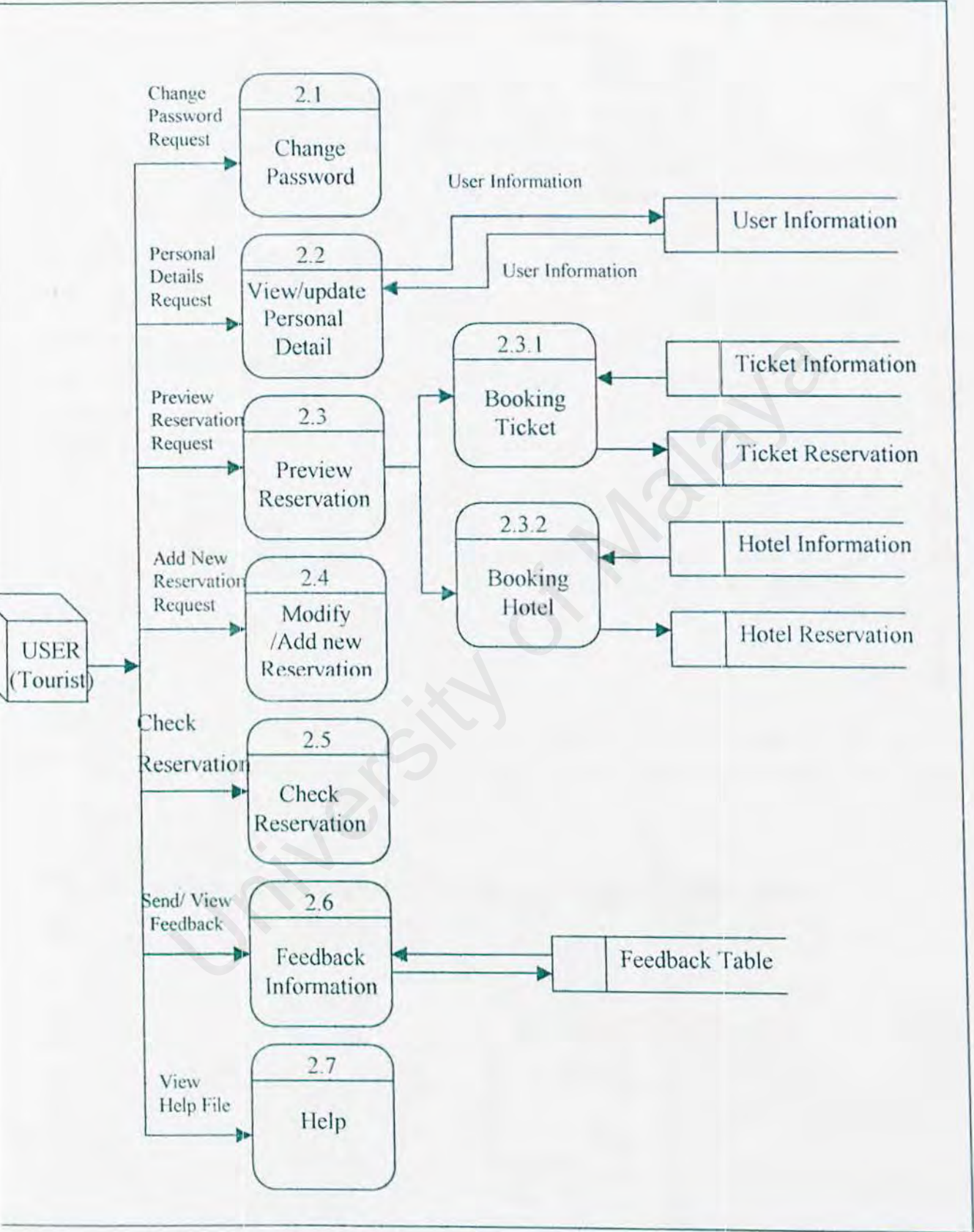
Figure 4.5: Data Flow Diagram for User (Tourists) Section
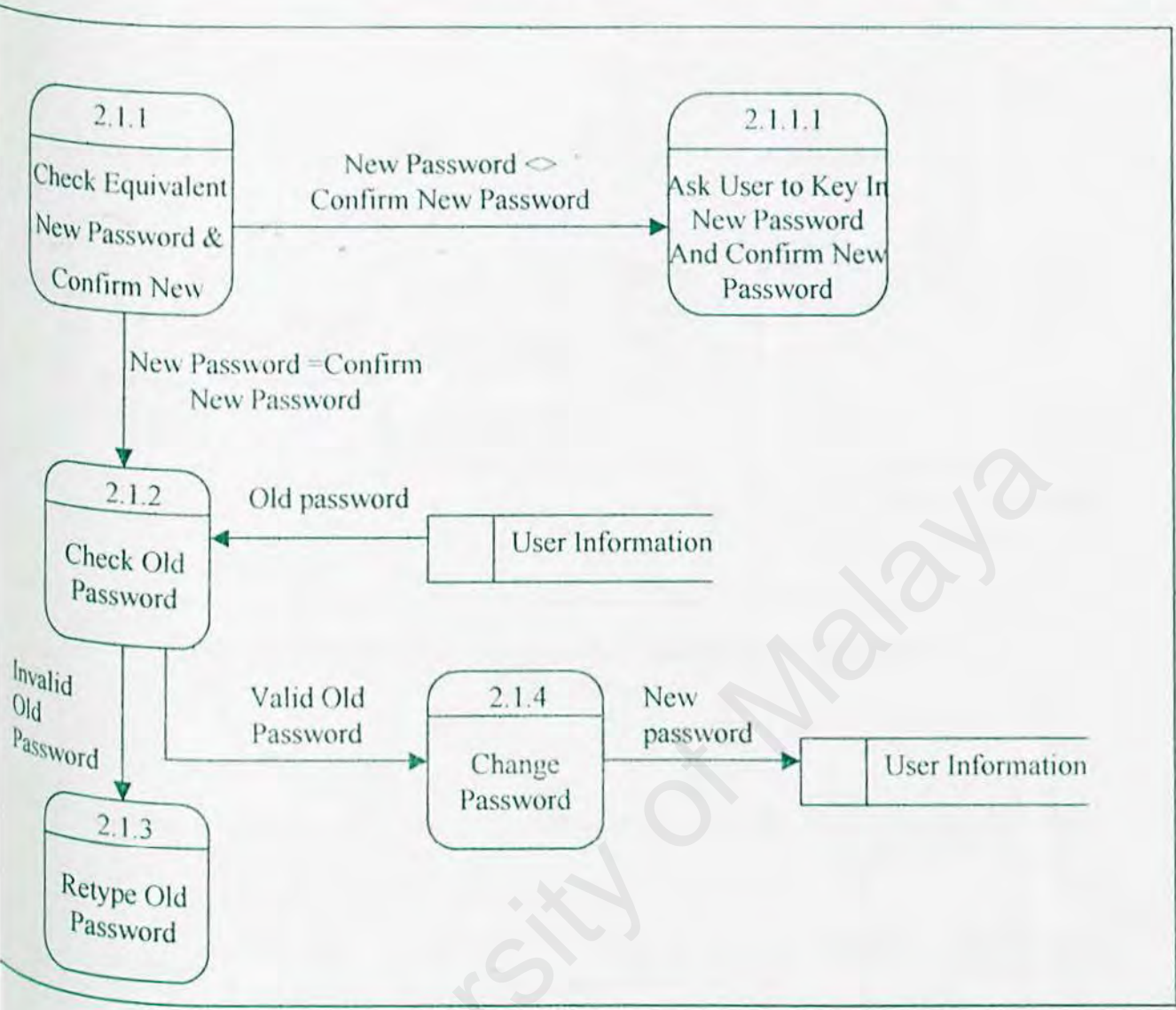
Figure 4.6:Data Flow Diagrams for Change Password (For User)
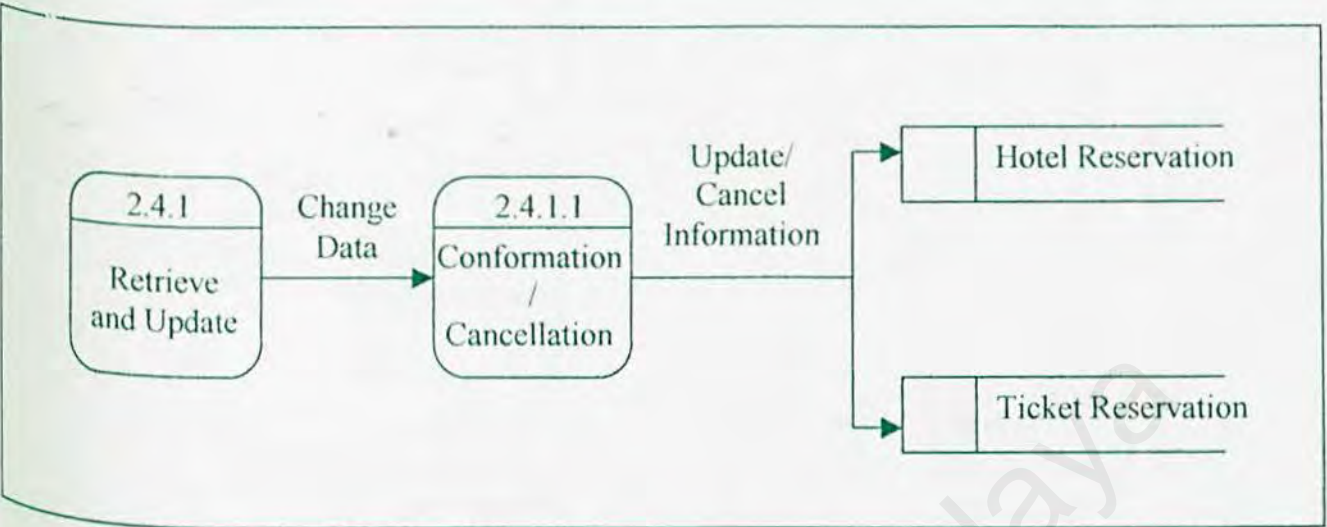
Figure 4.7: Data Flow Diagram for Adding New Reservation
(User Section)
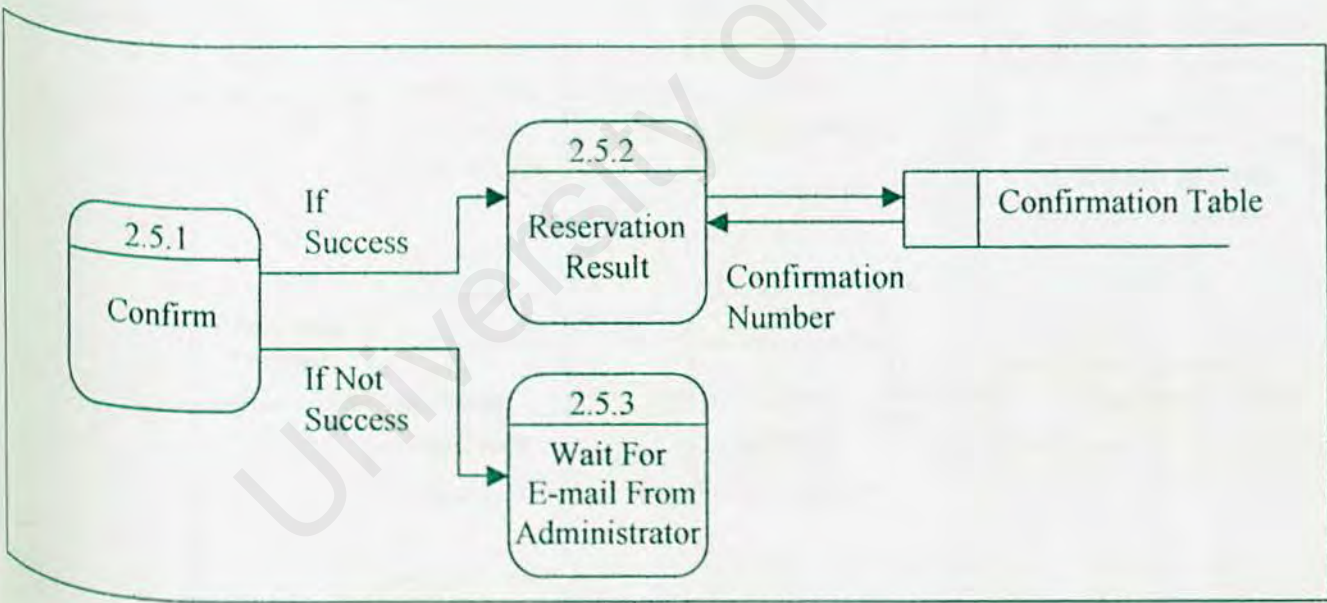
Figure 4.8: Data Flow Diagram for Confirmation
(User Section)
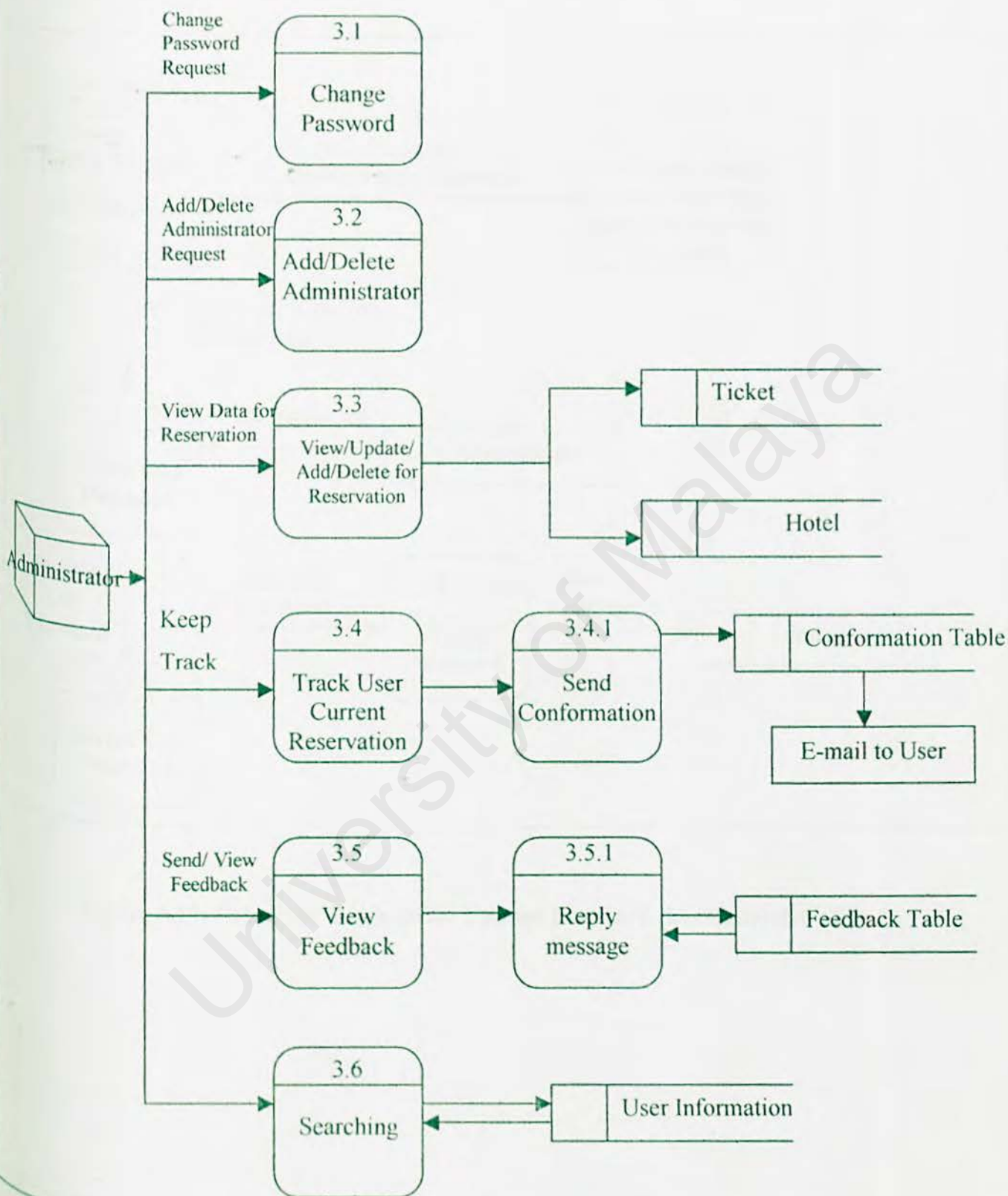
Figure 4.9: Data Flow Diagram for Administrator Section
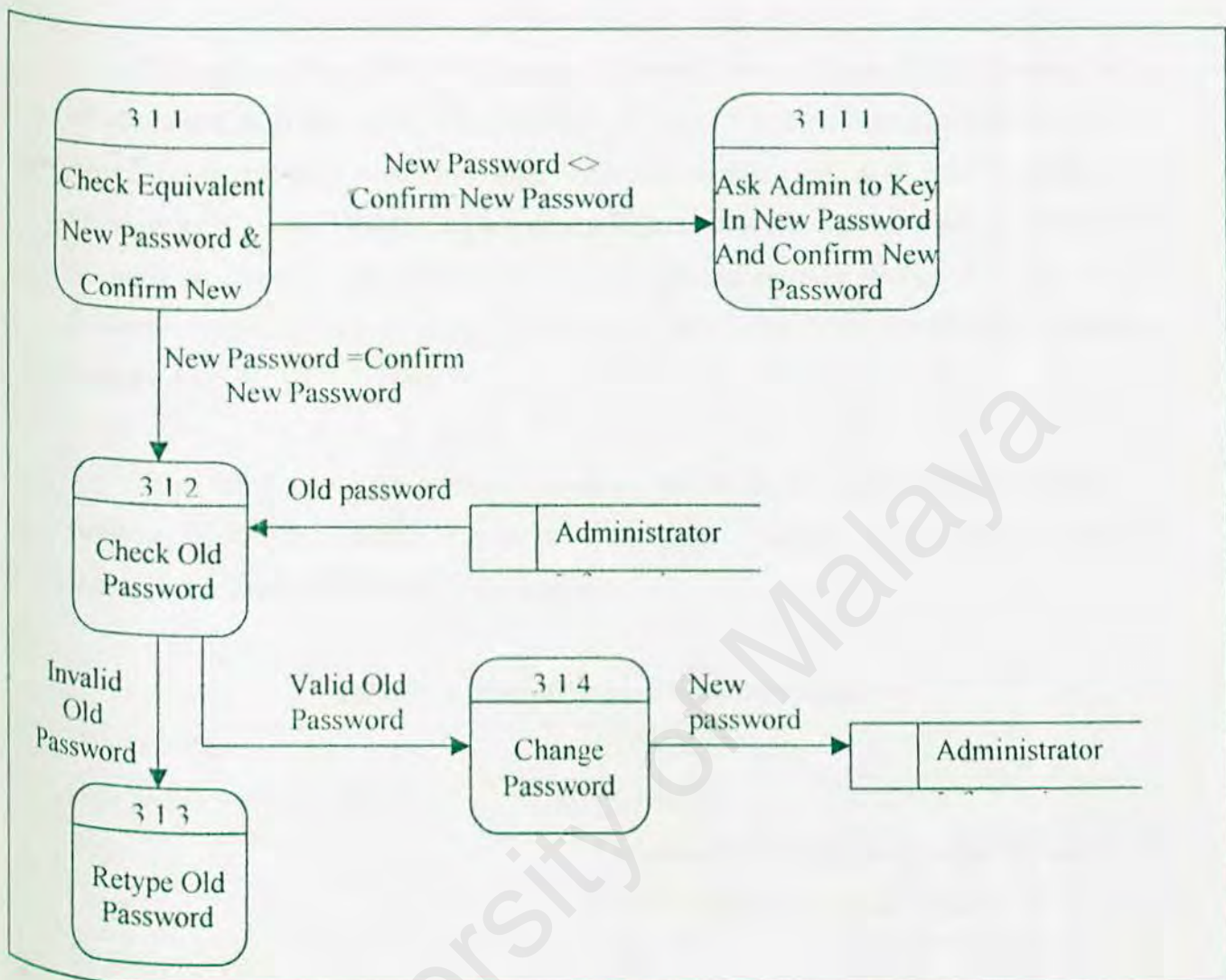
Figure 4.10: Data Flow Diagram for Change Password (For Administrator)

4.3   Database Design

Databases and database technology are having a major impact on the growing use of computers. It is fair to say that database will play a critical role in almost all areas where computers are used, including business, engineering, and etc. A Database Management System (DBMS) is a collection of programs that enables users to create and maintain a database. The DBMS is hence a general-purpose software system that facilitates the processes of defining, constructing, and manipulating databases for various applications.

The ORS uses the relevant database model in its corresponding database implementation. The database is constructed using the Microsoft SQL Server 7.0. Listed below are the attributes related to the database.

Table 4. 2: ORS Database General Profile

Database Name	OSR.mdf
Data Source Name (DSN)	ORS.dsn
Type	Microsoft SQL Server relational database
Usage	Keeps the records of the system
Number of Tables	18

4.3.1   Data Dictionary

The database structure of the relevant relations in the ORS database is listed in the following section.

4.3.1.1   USER INFORMATION

The user personal profile is stored in this relation. The primary key for this relation is field URIN_USRID

Table Name: URIN_TBL

Table 4.3: Database Structure for URIN_TBL Relation

Field Name	Data Type	Size	Description
URIN_USRID	nvarchar	20	USER IDENTIFICATION
URIN_PWORD	nvarchar	20	UESR PASSWORD
URIN_NAME	nvarchar	50	USER NAME
URIN_NEWIC	nvarchar	15	NEW IC NUMBER
URIN_CADD	nvarchar	100	CURRENT ADDRESS
URIN_CPCD	nvarchar	16	CURRENT POST CODE
URIN_CCITY	nvarchar	35	CURRENT CITY
URIN_CSTE	nvarchar	35	CURRENT STATE
URIN_CTELN	nvarchar	10	CURRENT TELEPHONE NUMBER
URIN_MTELN	nvarchar	10	CURRENT TELEPHONE NUMBER
URIN_CNTRY	nvarchar	30	COUNTRY
URIN_GENDR	nvarchar	6	SEX
URIN_EMAIL	nvarchar	65	EMAIL ADDRESS
URIN_JOIN	smalldatetime	mm/dd/yyyy	DATE OF SIGNING UP
URIN_LUPDT	smalldatetime	mm/dd/yyyy	LAST UPDATE DATE
URIN_SQUES	nvarchar	65	USE TO RETRIVE PASSWORD
URIN_SANSW	nvarchar	65	ANSWER TO RETRIVE PASSWORD

4.3.1.2   ADMINISTRATOR VERIFICATION

This relation stores all the details of a travel agent/administrator. The primary key for this relation is. **ADVE_USRID.**

Table Name: ADVE_TBL

Table 4.4: Database Structure for ADVE_TBL Relation

Field name	Data Type	Length	Description
ADVE_USRID	Nvarchar	20	Administrator Identification
ADVE_PWORD	Nvarchar	20	Administrator Password
ADVE_USRNM	Nvarchar	50	Administrator Name
ADVE_LUPDT	Smalldatetime	4	Last Update Time
ADVE_QUEST	Nvarchar	50	Question to Ask When Admin Forget Password
ADVE_ANSW	Nvarchar	50	Answer to Admin When Forget Password
ADVE_ICNB	Nvarchar	20	Administrator IC Number
ADVE_POSTI	Nvarchar	50	Administrator Position in Company
ADVE_HADDR	Nvarchar	100	Home Address
ADVE_CITY	Nvarchar	35	City Live In
ADVE_STATE	Nvarchar	35	State For City
ADVE_PCODE	Nvarchar	20	Postcode For City
ADVE_PHONE	Nvarchar	10	Home Phone Number
ADVE_MPHONE	Nvarchar	10	Admin Hand Phone Number
ADVE_EMAIL	Nvarchar	50	Admin Email Address

4.3.1.3   HOTEL INFORMATION

This relation stores the information about a hotel. The primary key for this relation is HTIN_IDEN.

Table Name: HTIN_TBL

Table 4.5: Database Structure for HTIN_TBL Relation

Field Name	Data Type	Size	Description
HTIN_IDEN	nvarchar	50	HOTEL IDENTIFICATION
HTIN_NAME	nvarchar	50	HOTEL NAME
HTIN_ADDR	nvarchar	500	HOTEL ADDRESS
HTIN_DESC	nvarchar	500	HOTEL DESCRIPTION
HTIN_STAR	int	4	HOTEL STAR RATING
HTIN_LOCAT	nvarchar	50	HOTEL LOCATION
HTIN_DEPRC	float	8	DELUXE ROOM PRICE
HTIN_STPRC	float	8	STANDARD ROOM PRICE
HTIN_SUPRC	float	8	SUITE ROOM PRICE
HTIN_HLINK	nvarchar	65	HOTEL LINK

4.3.1.4   HOTEL RESERVATION

This relation stores the unconfirmed reservation make by the user. The primary key for this relation is HTRE_TEMPN.

Table Name: HTRE_TBL

Table 4. 6: Database Structure for HTRE_TBL Relation

Field Name	Data Type	Size	Description
HTRE_CONN	nvarchar	10	HOTEL RESERVATION TEMPORARY CONFIRMATION NUMBER
HTRE_USRID	nvarchar	20	USER ID
HTRE_CIDT	datetime	8	CHECK IN DATE
HTRE_CODT	datetime	8	CHECK OUT DATE
HTRE_REDT	nvarchar	8	RESERVATION DATE
HTRE_IDEN	nvarchar	50	HOTEL ID
HTRE_DEROM	nvarchar	30	DELUXE ROOM PRICE
HTRE_TROOM	smallint	2	TOTAL ROOM
HTRE_TGUES	smallint	2	TOTAL QUEST
HTRE_PAYMT	float	8	TOTAL PAYMENT
HTRE_SUROM	nvarchar	30	SUITE ROOM PRICE
HTRE_STROM	nvarchar	30	STANDARD ROOM PRICE
HTRE_LCANT	nvarchar	30	LAST CANCEL TIME
HTRE_RPREF	nvarchar	30	ROOM PREFERENCES
HTRE_BDTYP	nvarchar	30	BED TYPE
HTRE_SMOKE	nvarchar	30	SMOKING AREA
HTRE_ACCES	nvarchar	30	ACCESIBLE
HTRE_CRIB	nvarchar	30	CRIB
HTRE_EARLY	nvarchar	30	EARLY CHECK IN

HTRE_FOAMP	nvarchar	30	FOAM PILLOW
HTRE_ROAWY	nvarchar	30	ROLLAWAY BED
HTRE_ROLOC	nvarchar	30	ROOM LOCATION
HTRE_REUPD	datetime	8	RESERVATION UPDATED DATE
HTRE_ADCHK	int	4	ADMINNISTRATOR CHECK FLAG

4.3.1.5   HOTEL CONFIRMATION TABLE

This relation stores the confirmation number for any reservation. The primary key for this relation is **HCFM_CONN** field.

Table Name: HCFM_TBL

Table 4.7: Database Structure for CNRE_TBL Relation

Field Name	Data Type	Size	Description
HCFM_CONN	nvarchar	10	HOTEL CONFIRMATION NUMBER
HCFM_USRID	nvarchar	20	USER ID
HCFM_CIDT	smalldatetime	4	CHECK IN DATE
HCFM_CODT	smalldatetime	4	CHECK OUT DATE
HCFM_IDEN	nvarchar	50	HOTEL ID
HCFM_DEROM	nvarchar	30	NUMBER OF DELUXE ROOM
HCFM_SUROM	nvarchar	30	NUMBER OF SUITE ROOM
HCFM_STROM	nvarchar	30	NUMBER OF STANDARD ROOM
HCFM_TROOM	Int	4	TOTAL ROOM
HCFM_TGUES	int	4	TOTAL GUEST
HCFM_RPREF	nvarchar	30	ROOM PREFERENCES
HCFM_BDTYP	nvarchar	30	BED TYPE
HCFM_SMOKE	nvarchar	30	SMOKING AREA
HCFM_ACCES	nvarchar	30	ACCESSIBLE
HCFM_CRIB	nvarchar	30	CRIB
HCFM_EARLY	nvarchar	30	EARLY CHECK IN
HCFM_FOAMP	nvarchar	30	FOAM PILLOW
HCFM_ROAWY	nvarchar	30	ROLLAWAY BED
HCFM_ROLOC	nvarchar	30	ROOM LOCATION
HCFM_CONDT	smalldatetime	4	CONFIRMATION DATE
HCFM_ROONM	nvarchar	50	ROOM NUMBER
HCFM_PAYMT	float	8	TOTAL PAYMENT

4.4.1.6 FEEDBACK TABLE

This relation stores information about feedback/respond provided by the user/administrator. The primary key for this relation is FEBK_USRID.

Table Name: FEBK_TBL

Table 4.8: Database Structure for FEBK_TBL Relation

Field Name	Data Type	Size	Description
FEBK_USRID	Nvarchar	20	USER IDENTIFICATION
FEBK_USCOM	Ntext	16	USER COMMENT
FEBK_CDATE	smalldatetime	4	COMMENT DATE
FEBK_AREPY	Ntext	16	ADMIN REPLY
FEBK_AREDA	smalldatetime	4	ADMIN REPLY DATE
FEBK_ADMID	Nvarchar	50	ADMIN ID
FEBK_RWEB	Nvarchar	10	COMMENT ON WEB
FEBK_RFACI	Nvarchar	50	COMMENT ON FACILITY
FEBK_RSERV	Nvarchar	50	COMMENT ON RESERVATION FUNCTION
FEBK_UPDCO	Int	4	ADMIN CHECK FLAG

4.4.1.6 CREDIT CARD TABLE

This relation stores information about credit card detail provided by the user.

Table Name: CRCM_TBL

Table 4.9 Database Structure for CRCM_TBL Relation

Field Name	Data Type	Size	Description
CRCM_COMNM	Nvarchar	50	CREDIT CARD COMPANY NAME
CRCM_CRNUM	Nvarchar	10	CREDIT CARD COMPANY RETURN NUMBER
CRCM_USRID	Nvarchar	20	USER ID
CRCM_DATE	Datetime	8	LAST UPDATE TIME
CRCM_PAYMT	Nvarchar	50	TOTAL PAYMENT
CRCM_CONN	Nvarchar	10	HOTEL/TICKET CONFIRMATION NUMBER
CRCM_JDATE	Datetime	8	DEPARTURE/CHECK IN DATE
CRCM_CRNM	Nvarchar	50	NAME ON CREDIT CARD
CRCM_RTYPE	Nvarchar	10	RESERVATION TYPE

4.4.1.7 USER ERROR LOG TABLE

This relation stores problem face by ORS user when they use ORS.

Table Name: URER_TBL

Table 4.10 Database Structure for URER_TBL Relation

Field Name	Data Type	Size	Description
URER_USRID	Nvarchar	20	USER ID
URER_CONN	Nvarchar	10	CONFIRMATION NUMBER
URER_PRODS	Ntext	16	PROBLEM DESCRIPTION
URER_ERRDT	Datetime	8	ERROR LOG SUBMIT DATE
URER_ADRPL	Int	4	ADMINISTRATOR REPLY FLAG
URER_ADANS	Ntext	16	ADMINISTRATOR ANSWER
URER_AREDA	Datetime	8	ADMINISTRATOR REPLY DATE
URER_ADMID	Nvarchar	50	ADMINISTRATOR ID

4.4.1.8 Ticket Reservation Table For Bus

This relation stores the information of bus ticket booking by the user. The primary key for this table is TKRE_AUTO.

Table Name: TKRE_TBL

Table 4.11 Database Structure for TKRE_TBL Relation

Field name	Data Type	Length	Description
TKRE_AUTO	Nvarchar	10	Bus Ticket Reservation Temporary Confirmation Number
TKRE_USER	Nvarchar	50	User Name
TKRE_USRID	Nvarchar	20	User ID
TKRE_COMPID	Nvarchar	20	Bus Company ID
TKRE_COMP	Nvarchar	50	Bus Company Name
TKRE_DEPT	Nvarchar	35	Departure Place
TKRE_ARRIV	Nvarchar	35	Arrival Place
TKRE_DDATE	Nvarchar	30	Departure Date
TKRE_DTIME	Nvarchar	30	Departure Time
TKRE_BDATE	Nvarchar	30	Date for Booking Reservation
TKRE_PAYM	Float	8	Payment for The Ticket
TKRE_TRANS	Ntext	16	Transportation Type
TKRE_SITCL	Ntext	16	Passenger Sitting Class
TKRE_PCHILD	Int	4	Children Passenger
TKRE_PADULT	Int	4	Adult Passenger
TKRE_PSENIOR	Int	4	Senior Passenger
TKRE_TPSSENG	Int	4	Total Amount of Passengers
TKRE_TPAYM	Float	8	Total Payment

4.4.1.9 Ticket Information Table For Bus

This relation stores the information for the bus ticket reservation that are available.

Table Name: TKIN_TBL

Table 4.12 Database Structure for TKIN_TBL Relation

Field name	Data Type	Length	Description
TKIN_IDEN	Nvarchar	10	Bus Agency Identification
TKIN_COMP	Nvarchar	50	Bus Agency Name
TKIN_DEPT	Nvarchar	35	Departure Place
TKIN_ARRIV	Nvarchar	35	Arrival Place
TKIN_PRICEE	Float	8	Price For Ticket In Economy Class
TKIN_PRICEB	Float	8	Price For Ticket In Business Class
TKIN_DTIME	Nvarchar	30	Departure Time
TKIN_ATIME	Nvarchar	30	Arrival Time

4.4.1.10 Bus Company Information Table

This relation stores the information of the bus agency. The primary key for this table is TKCI_IDEN.

Table Name: TKCI_TBL

Table 4.13 Database Structure for TKCI_TBL Relation

Field name	Data Type	Length	Description
TKCI_IDEN	Char	10	Bus Agency Identification
TKCI_COMP	Nvarchar	50	Bus Agency Name
TKCI_ADDR	Nvarchar	50	Bus Agency Address
TKCI_EMIL	Char	30	Bus Agency Email Address
TKCI_TEL1	Char	15	Main Telephone number of Bus Agency
TKCI_TEL2	Char	15	Other Telephone number of Bus Agency
TKCI_FAX	Char	15	Fax Number of Bus Agency

4.4.1.11 Ticket Reservation Table For Cruise (CRRE_TBL)

This relation stores the information of cruise ticket booking by the user. The primary key for this table is CRRE_AUTO.

Table Name: CRRE_TBL

Table 4.14 Database Structure for CRRE_TBL Relation

Field name	Data Type	Length	Description
CRRE_AUTO	Nvarchar	10	Cruise Ticket Reservation Temporary Confirmation Number
CRRE_USER	Nvarchar	50	User Name
CRRE_USRID	Nvarchar	20	User ID
CRRE_COMPID	Nvarchar	20	Cruise Company ID
CRRE_COMP	Nvarchar	50	Cruise Company Name
CRRE_DEPT	Nvarchar	35	Departure Place
CRRE_ARRIV	Nvarchar	35	Arrival Place
CRRE_DDATE	Nvarchar	30	Departure Date
CRRE_DTIME	Nvarchar	30	Departure Time
CRRE_BDATE	Nvarchar	30	Date for Booking Reservation
CRRE_PAYM	Float	8	Payment for The Ticket
CRRE_TRANS	Ntext	16	Transportation Type
CRRE_SITCL	Ntext	16	Passenger Sitting Class
CRRE_PCHILD	Int	4	Children Passenger
CRRE_PADULT	Int	4	Adult Passenger
CRRE_PSENIOR	Int	4	Senior Passenger
CRRE_TPSSENG	Int	4	Total Amount of Passengers
CRRE_TPAYM	Float	8	Total Payment

4.4.1.12 Ticket Information Table For Cruise (CRIN_TBL)

This relation stores the information for the cruise ticket reservation that available.

Table Name: CRIN_TBL

Table 4.15 Database Structure for CRIN_TBL Relation

Field name	Data Type	Length	Description
CRIN_IDEN	Nvarchar	10	Cruise Agency Identification
CRIN_COMP	Nvarchar	50	Cruise Agency Name
CRIN_DEPT	Nvarchar	35	Departure Place
CRIN_ARRIV	Nvarchar	35	Arrival Place
CRIN_PRICEE	Float	8	Price For Ticket In Economy Class
CRIN_PRICEB	Float	8	Price For Ticket In Business Class
CRIN_DTIME	Nvarchar	30	Departure Time
CRIN_ATIME	Nvarchar	30	Arrival Time

4.4.1.13 Cruise Company Information Table

This relation stores the information of the cruise agency. The primary key for this table is CRCI_IDEN.

Table Name: CRCI_TBL

Table 4.16 Database Structure for CRCI_TBL Relation

Field name	Data Type	Length	Description
CRCI_IDEN	Char	10	Cruise Agency Identification
CRCI_COMP	Nvarchar	50	Cruise Agency Name
CRCI_ADDR	Nvarchar	50	Cruise Agency Address
CRCI_EMIL	Char	30	Cruise Agency Email Address
CRCI_TEL1	Char	15	Main Telephone number of Cruise Agency
CRCI_TEL2	Char	15	Other Telephone number of Cruise Agency
CRCI_FAX	Char	15	Fax Number of Cruise Agency

4.4.1.14 Ticket Reservation Table For Flight

This relation stores the information of flight ticket booking by the user. The primary key for this table is FLRE_AUTO.

Table Name: FLRE_TBL

Table 4.17 Database Structure for FLRE_TBL Relation

Field name	Data Type	Length	Description
FLRE_AUTO	Nvarchar	10	Flight Ticket Reservation Temporary Confirmation Number
FLRE_USER	Nvarchar	50	User Name
FLRE_USRID	Nvarchar	20	User ID
FLRE_COMPID	Nvarchar	20	Flight Company ID
FLRE_COMP	Nvarchar	50	Flight Company Name
FLRE_DEPT	Nvarchar	35	Departure Place
FLRE_ARRIV	Nvarchar	35	Arrival Place
FLRE_DDATE	Nvarchar	30	Departure Date
FLRE_DTIME	Nvarchar	30	Departure Time
FLRE_BDATE	Nvarchar	30	Date for Booking Reservation
FLRE_PAYM	Float	8	Payment for The Ticket
FLRE_TRANS	Ntext	16	Transportation Type
FLRE_SITCL	Ntext	16	Passenger Sitting Class
FLRE_PCHILD	Int	4	Children Passenger
FLRE_PADULT	Int	4	Adult Passenger
FLRE_PSENIOR	Int	4	Senior Passenger
FLRE_TPSSENG	Int	4	Total Amount of Passengers
FLRE_TPAYM	Float	8	Total Payment

4.4.1.15 Ticket Information Table For Flight

This relation stores the information for the flight ticket reservation that available.

Table Name: FLIN_TBL

Table 4.18 Database Structure for FLIN_TBL Relation

Field name	Data Type	Length	Description
FLIN_IDEN	Nvarchar	10	Flight Agency Identification
FLIN_COMP	Nvarchar	50	Flight Agency Name
FLIN_DEPT	Nvarchar	35	Departure Place
FLIN_ARRIV	Nvarchar	35	Arrival Place
FLIN_PRICEE	Float	8	Price For Ticket In Economy Class
FLIN_PRICEB	Float	8	Price For Ticket In Business Class
FLIN_PRICEF	Float	8	Price For Ticket In First Class
FLIN_TYPE	Char	20	Type of Airplane
FLIN_DTIME	Nvarchar	30	Departure Time
FLIN_ATIME	Nvarchar	30	Arrival Time

4.4.1.16 Flight Company Information Table

This relation stores the information of the flight agency. The primary key for this table is FLCI_IDEN.

Table Name: FLCI_TBL

Table 4.19 Database Structure for FLCI_TBL Relation

Field name	Data Type	Length	Description
FLCI_IDEN	Char	10	Flight Agency Identification
FLCI_COMP	Nvarchar	50	Flight Agency Name
FLCI_ADDR	Nvarchar	50	Flight Agency Address
FLCI_EMIL	Char	30	Flight Agency Email Address
FLCI_TEL1	Char	15	Main Telephone number of Flight Agency
FLCI_TEL2	Char	15	Other Telephone number of Flight Agency
FLCI_FAX	Char	15	Fax Number of Flight Agency

4.4.1.17 Confirmation Table for Bus, Cruise and Flight Reservation

This relation stores the reservation of bus, cruise and flight ticket that has been confirmed by the administrator. The primary key is TCFM_AUTO.

Table Name: TCFM_TBL.

Table 4.20 Database Structure for TCFM_TBL Relation

Field name	Data Type	Length	Description
TCFM_AUTO	Nvarchar	10	Ticket Reservation Confirmation Number
TCFM_USER	Nvarchar	50	User Name
TCFM_USRID	Nvarchar	20	User ID
TCFM_COMPID	Nvarchar	20	Travel Agency ID
TCFM_COMP	Nvarchar	50	Travel Agency Name
TCFM_DEPT	Nvarchar	35	Place of Depart
TCFM_ARRIV	Nvarchar	35	Place of Arrive
TCFM_DDATE	Nvarchar	30	Departure Date
TCFM_DTIME	Nvarchar	30	Departure Time
TCFM_BDATE	Nvarchar	30	Date for Booking Reservation
TCFM_PAYM	Float	8	Payment for The Ticket
TCFM_TRANS	Ntext	16	Transportation Type
TCFM_SITCL	Ntext	16	Passenger Sitting Class
TCFM_PCHILD	Int	4	Children Passenger
TCFM_PADULT	Int	4	Adult Passenger
TCFM_PSENIOR	Int	4	Senior Passenger
TCFM_TPSSENG	Int	4	Total Amount of Passengers
TCFM_TPAYM	Float	8	Total Payment
TCFM_STINO	Nvarchar	10	Seat Number
TCFM_CRFNM	Nvarchar	20	Ticket Number That Will Be Verify By Travel Agency.
TCFM_TYPE	Nvarchar	20	Type Of Travel Such as Bus Travel, Cruise Travel or Flight Travel.

4.3.2   Relationship

A relationship is an association between entities (tables) in the database. There are three type of relationship:

- One: One
- One: Many
- Many: Many

The relationship of ORS database is stated as below:

a)   User Information – Hotel / Ticket Reservation

- 1: Many
- One user can make many reservations for tickets or hotels room.
- One ticket /hotel reservation can be given to one user.

b)   Administrator Verification – Hotel / Ticket Information

- 1: Many
- One administrator can get/manage many reservations information for tickets or hotels.
- Only one reservation information can manage by one administrator at once time.

c)   User Information – Feedback Table

- 1: Many
- One user can send many feedbacks.
- One feedback can only send by one user.

d)   Administrator Verification – Feedback Table

- Many: Many
- One administrator can reply many feedbacks to user.
- Many feedbacks from different administrator can receive by one user.

e)   **User Information – Confirmation Table**

- 1: 1
- One user can receive one confirmation result.
- One confirmation for reservation can send to one user.

f)   **Administrator Verification – Confirmation Table**

- 1: 1
- One administrator can confirm for one reservation result.
- One administrator can confirm one reservation result.

4.4   User Interface Design

The interface design describes how the software communicates with itself, to systems that interoperate with it, and with humans who use it. An interface implies a flow of information (e.g., data and/or control). Therefore, the data and control flow diagrams provide the information required for interface design.

Since ORS system is a web-based system, the web page design considerations are taken into account. The web page design considerations are stated as the following:

i)   Design an effective user interface to enable the users to be effective in accomplishing their tasks.

ii)   Provide a common and consistent look and feel across the application. The pages should reflect a consistent page font, color, image, page background and page layout

iii)   Give navigational way to provide the proper guidance to the users in their journey, make sure the users are informed where they are going during the navigation

iv)   Provide the user with a path at all times. Do not create dead-end pages

There will be a top header for each page, there are headers for main pages, administrator section, user section, and online reservation section and information board section and help section. Images, button, page format and choice of colors are standardized.

The following pages show some of the screen of the system's user interfaces.

Figure 4.11: Welcome to the Online Reservation as a Main View

Figure 4.12: Administrator's Main Login Page

Figure 4.13: User's Main Login Page
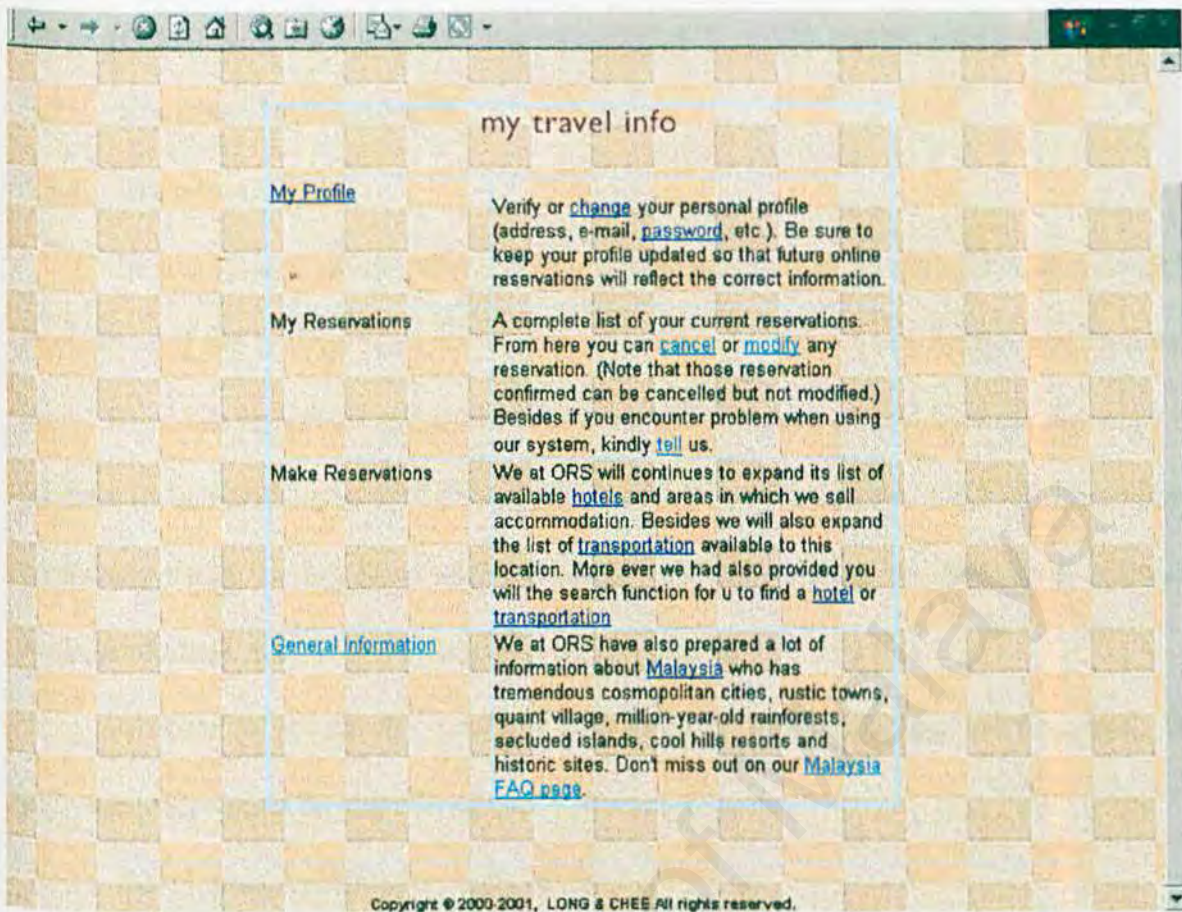
Figure 4.14: User's Main Page

CHAPTER 5: SYSTEM DEVELOPMENT AND IMPLEMENTATION

5.1   System Development

5.1.1   Introduction

In the system development phase, the design has to be transfer into workable modules and the coding must be written according to the system design and business logic. This is an important phase and developer must be very careful because any error or mistake in this phase will affect the performance of whole system. ORS was developed modularly using the top-down approach that involves building the high-level software modules that are refined into functions and procedures

In order to reduce the mistakes and increase the quality and performance, the following steps must be considered when develop a system:

1. Development platform configuration

2. System Development

5.2   Development Platform Configuration

Development environment has certain impact on the development of a system. To produce a high quality and error free system, the development environment must be configured correctly. Normally the platform consists of hardware and software. Therefore, platform configuration means to configure the hardware and the software needed.

Using the suitable hardware and software will not only help to speed up the system development but also determine the success of the project. The hardware and software tools used to develop the entire system are as discuss below.

5.2.1 Hardware Requirement

The hardware used to develop the system are as listed below:

- 733MHz Pentium III Processor
- 512K Pipeline Burst Cache
- 128MBRAM
- 15 GB hard Disk
- Other Standard desktop PC components

5.2.2   Software Tools Requirement

5.2.2.1 Software Tools for Design and Report Writing

There are a lot of software tools, which can be used in designing and writing report. The design process involves the drawing of structure chart, data flow diagram and others that form the foundation of the software development. The purpose of this graphically logical design is to provide an overall view of system and interconnection between the modules. Visio Professional is used to design and Microsoft word for report writing.

5.2.2.2 Software Tools for Development

During the course of ORS development, a vast array of software tools was used. Table 5.1 below depicts the software used to develop the system.

Software	Purpose	Description
Microsoft Windows 2000 Professional	System Requirement	Operating System
Internet Information Services 5.0	System Requirement	Web Server Host
Microsoft Visual Interdev	System Development	Coding the web pages
Internet Explorer 5.0	System Development	Viewing the web pages
Active Server Pages 3.0	System Development	Coding the web pages
Hyper Text Markup Language (HTML)	System Development	Coding the web pages
Microsoft SQL Server 7.0	Database	Build the database to store and manipulate the data
Dream weaver 4.0	User Interface Design	Image design and creation
Adobe Photoshop 6.0	User Interface Design	Image design and creation

Table 5.1: Summary of Software/Software Tools Used

5.3 System Development

5.3.1 Coding Format

Several programming format have been employed in writing the program to ensure system consistency, maintainability and readability. All the programming format are as following:

a) Use meaningful variable names; constants names, procedure names and parameter variable names help a program to be "self-documenting" without excessive use of comments.

b) Layout program source code to improve its readability. Each sentence is begun on a new line; statement following control structure is indented; white space is used to set off related blocks of code.

c) All variables are declared at the beginning of procedure and declarations are separated form executable statements with a blank line to improve program readability.

d) Insert comments to document the programs and improve program readability.

e) Group related types of code together.

5.3.2 Web Pages Coding

An Active Server Page is primarily a scripting environment. Language used to develop an ASP is HTML and VBScript or Jscript. The challenge of coding in ASP is of determining and separating the HTML source code from the scripting counterpart.

The scripting language used by the ASP application is specified by using the statement <%@ LANGUAGE = "VBSCRIPT"%>. This statement is placed at the beginning of the ASP application. The LANGUAGE keyword can be set equal to any supported scripting language, such as Jscript. For client –side scripting, they must be delimited by the <SCRIPT LANGUAGE = "VBSCRIPT"> …</SCRIPT> tags. On the other hand, server-side scripting requires the RUNAT attribute set to Server so that the script should be executed on the server rather than the client (browser). An Example is as below:

```
<SCRIPT LANGUAGE = "VBSCRIPT" RUNAT= "SERVER">

...

...

...

...

</SCRIPT>
```

ASP subroutines can be also being placed directly in the server-side code between the <% and %> delimiters.

Below is an example taken from the project filename" CheckUserLogin.asp":

Note: ' is used to create a comment

<% if Request.Form("command") = "" then %> **'IF there is no button being pressed**
<form method=post action=DoChangePassword.asp>**'Form is passed back to DoChangePassword for Processing**
<p>FONT face"" size=4>Matric No
<INPUT name ="Back To User Main Page" style="HEIGHT:22px; WIDTH: 135px"></FONT></p> **'Create a text field with name" Back To User Main Page"**

...

...

...

...

<%END if%>

<% Dim MatricNo, Name, Batch   **'Declare variables**
MatricNo=gfValidSQLStr(Request.Form("loginuserid")) **'Get the input from text fields**
Name = Request.Form("txtName")
Email = gfValidSQLStr(Request.Form("Email"))
%>

...

...

Preparation of a HTML and ASP document involves endless cycle of testing and modifying of the ASP source codes, loading the file in the browser for viewing and validating and then going back to make further changes where necessary.

5.3.3 Database Connection

Database is the most critical and important thing in a system. It plays an important role during the development and also for future enhancement and customization. A proper design database will ease the development and customization process and vice versa.

I use the Microsoft SQL Server 7 to create the database for this system. ActiveX Data Object (ADO) is used to store and retrieve data from a database. ADO is a group of objects designed to provide a simple programming interface to databases. To make the database available to Active Server Pages, database must be placed on the Web server and connected using a connection string created in a file call 'connection.asp' to ease the system setup process.

All communication with a database takes place through this open connection. Before any information can be inserted into or retrieved from a database, a connection with the database must be opened. The ADO Connection object serves the purpose. Below are a few steps to follow in order to open a database connection.

1) Create an instance of the Connection object to open a connection with the database
2) Call the open method of the Connection object to actually open the connection

Below is an example:

```
<%

dim strConn Set strConn = Server.CreateObject ( "ADODB.Connection")
```

```
strConn.Open "provider=SQLOLEDB;" & "data source= 10.100.1.195;" & "Initial
Catalog= ORS;" & "user ID=wek990046;" & "password=fsktm;"

...

...

strConn.Close
%>
```

5.3.4 Development Tool-Microsoft Visual Interdev

Visual InterDev 6.0 is the main code editor used in the coding phase of ORS. It is the Microsoft's latest Rapid Application Development (RAD) development tool for web applications. Visual InterDev has an IDE environment, which allow easy switching between different views in project. These views are *Design, Source* and *Quick View*. Design view allows developer to drag and drop the ASP component object. Source view allows developer to edit the source code of the project whereas Quick view enables users to preview the appearance of web page.

This tool enables easy performance of the many complex programming and database tasks required in the creation of a Web site, as well as the incorporation of HTML formatting and layouts, graphics and other multimedia components.

When working on a Web Site with Visual Interdev and performing tasks like adding files to the site or editing any of the existing files, this tool creates a second copy of the files on the local computer. This is called the working copy. Whenever these working copies are saved, Visual Interdev updates the file on the Web Server as well.

5.4 System Implementation

5.4.1 Introduction

System implementation is a process that converts the system requirements and designs into program codes. In a software project, the requirements analysis, system design and implementation phases do not have a clear boundary in a software project. Each phase tends to overlap one another. This phase at times involves some modifications to the previous design. The strategy used to implement the system is a straightforward deployment.

5.4.2 Deployment

The deployment of this ORS is ease and simply. It only consists a few steps. First, upload all the file(with asp or html extension) into the server. Then we can access the file by typing http://server_name/folder_name/the_file.asp. Remember to place the database into the server first in order to allow the client computer to access the database and run the program. The detail step of deployment and setup can be referring to the user manual.

5.4.3 Training

For each new system, training must be carrying out in order to explain to and train the user about the functions provided by the system and the correct way to use it. As the potential user of this system are not IT-savvy (staff of a non IT background for administrator part and non-IT savvy user for user part), user training must be done properly to ensure that the user understand how to handler and use this system. Normally, a comprehensive user manual that contains guidance and instruction to the system will be prepared for this purpose.

CHAPTER 6: SYSTEM TESTING

6.1   Testing the System

Testing is the process of exercising or evaluating a system by manual or automatic means to verify that it satisfied requirements or to identify differences expected and actual results. It is also a critical element of software quality assurance and represents the ultimate review of specifications, design and coding [26]. Testing is probably the least understood part of a software development project. A bug is any unexpected, questionable, or desired aspect or behavior displayed, facilitated, or caused by the software being tested. Testing can uncover different classes of errors in a minimum amount of time and with a minimum amount of effort.

Although the main purpose of the testing process is to find the errors in the system, but it also have others objective stated as bellow:

- Testing is a process of executing a program with the intent of finding an error.
- To demonstrate that software functions appear to be working according to specification and that performance requirements appear to have been meet.
- To reveal different types of error with a minimum amount of time and efforts.
- To assure the customers that the system they requested is the system that was built for them.

Testing is not the first place where faultfinding occurs; but testing is focused on finding faults, and there are many ways to make the testing efforts more efficient and effective. The strategies used for testing are unit testing, integration testing and system testing.

6.2   Unit Testing

Unit testing verifies that the component functions properly with the types of input expected from studying the component's design. The main objective of unit testing is to ensure program accuracy, data integrity, usability and efficiency at the module level. The first step is to examine the program code by reading through it, trying to spot algorithm, data and syntax faults. This is follow by comparing the code with specifications and with the design to make sure that all relevant cases have been considered. Next, the browser is used to view the result/web page and then eliminate remaining syntax faults if necessary. Finally, test cases are developed to show that the input is properly converted to the desired output.

In the development of ORS, unit testing is done concurrently with the prototyping phase. The steps involved in unit testing of this system as listed as bellow:

1. First, examine the program coding by reading through it, trying to spot algorithm, data and syntax faults.
2. Then, compare the code with the specifications and design to make sure that all relevant cases had been considered.
3. After finished the coding of that module, then compile the code and eliminate remaining syntax faults or errors if exist.
4. Finally, develop the test cases to show that the input is properly converted to the desired output.[26]

The test cases, which will be built, are used to test some important aspects of the system such as the interface, local data structure, output of the program, boundary conditions and also the error handling paths.

6.2.1 Conclusion of Unit Testing

Unit testing has been done during the coding and development phase. It is a continuous process, which must be carried along this phase to ensure that the output and the logic and process flow of that unit or module can satisfy the user requirement. In this project, the programmer or developer who build up this system did the unit testing.

After carried out the unit testing, a lot of logic errors, data structure faults, input validation and unexpected output have been found. These errors and faults need to be solve before proceed to the integration testing process.

As the conclusion, some modification has been carried out in order to fix these errors and upgrade the functionality of this system. Therefore, a lot of new control functions had been inserted into the program in order to control the input and output value of the program, for example the automatic send email function, input validation function and so on.

6.3   Integration Testing

When the individual components are working correctly and meet the objectives, these components are combined into working system. 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.

Integration testing is used on ORS for constructing its program structure while at the same time conducting tests to uncover errors associated with interfacing. The objectives are to take unit-tested modules and build a program structure that has been dictated by design. This testing will ensure that the interfaces such as the module calling sequence in ORS are systematized and link to the correct document.

In ORS, an incremental integration strategy approach is used. ORS main system constructed and tested in small segments, where errors are easier to isolate and correct; interfaces are more likely to be tested completely.

After finished the integration test, those errors and faults discovered should be corrected as soon as possible in development in order to proceed to the system-testing phase.

6.4   System Testing

The last testing procedure done is system testing. Testing the system is very different from unit and integration testing. The objective of unit and integration testing is to ensure that the code implemented the design properly. In other words, the code is written to do what the design specifications intended. In system testing, a very different objective is to be achieved, to ensure that the system does what the users want it to do.

The objective of system testing is to verify and validate the functional and non-functional requirements of the system. The functional and non-functional requirements of ORS are as defined in chapter 3.

There are several types of system testing that can be used to test a software system. But only three types of system testing are used for this system:

❑ Function testing

Function testing focus on the functionality of the system. It is based on the system functional requirement. The process is to check whether the system provides the function to do the task, which it supposes to do.

❑ Security testing

The main objective of security testing is to verify that protection mechanism (Authentication Module) built into the system will protect it from improper penetration.

❑ Performance testing

This testing is carrying out after the function testing process. When the system performs the function required by the requirements, the testing process then turn to test the way in which those functions are performed. Thus, the performance testing addresses the non-functional requirements. The purpose of this testing is to test the run time performance of this software within the context of an integrated system. It involves both hardware and software instruments.

6.5   Summary Of User Testing

There are some people who are not involved in the development process have tested this system. They are two programmers from UM Computer Science and some non IT-savvy users.

This system testing by programmer and end user was carried after the developer has completed the system testing. The purpose of this testing activity is to find out some unexpected errors and bugs in the system. Besides that, by performed this testing, developer can get some useful advices and suggestions from the end user to upgrade the performance of the system.

The user testing was carried out in the development environment. During the testing process, users are encourage to give their opinion about the system when they feel that it was something wrong or they don't understand the business flow or how to use the system.

After perform this system testing, a lot of useful information has been gained. This information is very useful and helpful when performing the system upgrade process and mistake or bugs checking process. Bellow is a summary of some comments given by the user during the system testing process.

- o The interface design is not enough attractive, it will cause the user feel bored when using the system. Some colorful but formal picture and icon can be insert into the system to make the interface look more nicely.
- o The reporting module only provides some common reports, more details report about ORS system is not provided.
- o The system must have a help file, which can guide the user when using this system. So, it can reduce the mistake or error cause by unskillful user.
- o More control need to insert into the system to validate the data entered by the user before update into database.

After study these comments by those users, some comments have been considered during the upgrade process and modification has been performed to eliminate or reduce those weaknesses.

CHAPTER 7: SYSTEM EVALUATION

Introduction

This is the final phase in the life cycle of this project. During the period of coding and implementation, various problems were encountered. So, this chapter will highlight some of the problems faced throughout the project duration and also with the solution that has been taken to solve it. Besides that, this chapter also will include the evaluation of the system to identify its strengths and limitations. As suggestion to further improvement of this system, the possibility to enhance the system also explored.

7.1   Project Problems and Solutions

7.1.1   Problems and Solutions during Project Studies and Analysis

A lot of system analyses need to be done on technologies and programming concepts before starting to develop ORS. The basic knowledge needed as a foundation in building an application of this nature involves studies in fields such as the Internet, Information systems and basic reservation procedures. The following are some of the major problem encountered from beginning to the completion of the system development.

7.1.1.1   Difficulties in Choosing a Development Technology, Programming Language and Tools

Choosing suitable development tools is the most important and critical process in the software development cycle. There are many software tools available to develop a web based database system currently as stated in the earlier chapters. Choosing a suitable technology and tool was a critical process as all tools have their strengths and weaknesses. In addition, the availability of the required tool for development was also a major consideration. A tough decision was needed to choose from Active Server Page technology, CGI or Java. In order to solve this problem, seeking advises and views from project supervisor, course mates and even seniors engaging in similar project were carried out. Furthermore, surfing the Internet and visiting the library helped to clarify some doubts.

7.1.1.2   Lack of knowledge and experience in the web development

One of the common problems that cause by the developer itself is lack of experience or knowledge in developing web application. This lack of experience and knowledge has proved to be an obstacle in the beginning. The developer has struggled to understand the concepts of web programming and application and differentiate them from the conventional programming concepts to which he is more accustomed.

This problem can be solved by putting a lot of hard work and asking advice from course mate who are using the same tools. Luckily, there are abundant reference materials available for the developer on the subject. This is especially true for the ASP (which currently using in this project). Therefore, this problem only proved to be slight delay in the schedule with several weeks with little progress. After the knowledge and skills has been familiarized, everything went on rather smoothly

7.1.1.3 Handling New Operating System

As Windows 2000 Professional is a new operating system to me, it took quite some time for me to learn the features in Windows 2000 Professional and what it is capable of doing especially the features of Internet Information Services 5.0.

7.1.1.4 Determining Scope of the System

It is impossible to build a full-scale complete system within the time given frame. ORS include user and administrator section. It is a huge program. Inexperience with the current reservation system available was another hindrance to implement true workable reservation system. Many discussions were held with project supervisor to outline the scope of project to be built during the initial stages of the project. After the scope has been defined, analysis of current reservation system was as reported in chapter two.

7.1.1.5 Inexperience in the Chosen Programming Language

Since there was no prior knowledge in ASP and HTML, there was an uncertainty on how to organize the codes in the web page. These new programming languages and

concepts were never taught before and to implement such an application requires a fair grasp of the language. Although it took time for me to learn the new technology, choosing to program in ASP proved to be wise move. Most of the problems faced were manageable through surfing the Internet for related materials and referring to the reference book available in the market. Discussion with friends using the same technology was a great help. A more efficient was through trial and error during the coding phase.

7.2 System Strength

During the analysis and development of this project, several strengths were identified:

7.2.1 Security (User ID and Password)

ORS is password-protected by the session-based authentication. By giving authorize user a username and password, unauthorized user are prohibited from accessing its records stored in the database. This is to make sure the system is secure.

7.2.2 Simple and User friendly Interface

User Interface in ORS is easy to understand and user friendly. In addition, the web pages are designed to suit a wide spectrum of user-from normal user to administrators. The learning curve is foreseen to be short and the user should be able to use the system with ease within minutes. User manual can help the user to handle this system.

7.2.3 Reliable System with Effective Error Recovery

This is reliable system as it caters for almost any possible errors encountered. Server side scripting will generate appropriate feedback to user when error occurs. For example, a password validation failure or a user username is handled by the system and a user-friendly message is generated informing the user about the type of error.

7.2.4 Able to provide database maintenance

Administrators are able to do housekeeping for database maintenance. They can add, delete, update, the records or approve/reject the user reservation. Besides that, they also can keep track the records and view the reports. This feature allows administrators to views reservation make by the user.

7.2.5 Report Generating

ORS is able to generate report. Administrator can view their reports based on reservation make and result of the reservation.

7.2.6 Provide easy to use functions and tools

ORS is user-friendly system seems it provides appropriate message to guide the users whenever they make mistakes

7.2.7 Easy Accessibility

This system is web based application and can be accessed easily using the web browser. The web browser needed especially Internet Explorer 5.0, which could be downloading free from Microsoft's Web Site.

7.2.8 Fast response time

Each web page is designed as simple as possible to allow fast loading. Large size graphical images are avoided. This consideration has also been taken into the scripting part where overhead of calling script are kept to a minimum. The data validations are also carried out at the client site to enhance fast response time.

7.2.9 Reliable processing

The programming logic applied in the program is well tested to ensure it accuracy and correctness. Data entry was verified and validated first before any updating carried out into the database to preserve the database integrity.

7.2.10   Integrate With Mailing Capabilities

The current system completed with a mail server services. With this mailing capability, the administrator can easily reach every user for sending out confirmation email or to reply the user feedback or error log and others.

7.3   System Limitations

Due to project boundaries, there are some limitations in ORS. The limitations are stated as below:

7.3.1   Browser Limitations

ORS can only run in Internet Explorer 4.0 and above. ORS requires a browser that can understand VBScript, the default supporting language for ASP. User uses browsers that do not support these features will not able to use the available function in this system.

7.3.2   Functional Limitations

Due to the time constraints, ORS does not reflect a real reservation scenario. At this stage only sufficient rules and procedures are implemented in the system. Some of the procedures such as automatic approving the user reservation, credit card authorization and other still need to be done manually. Administrators still need to keep track the problems with reservation approval and reservation rejection. For example, the user can only choose 3 type of room and this applies to all hotels, which is not good because the other type of room like presidential suite and others are not included.

7.3.3   User Customized report

The customize report functions provided by the system are not powerful enough. User has the limitation in choosing the type and style of report they preferred.

7.3.4   Limitation in Administration Tasks

The administration tasks provided by the system are very limit. Administrators still need to perform a lot of tasks manually such as database backup.

7.3.5 Payment Method for User

The payment procedure in ORS just can be manages by Credit card. This system will ask the user to input the valid credit card number before can proceed further. This causes a lot of inconvenient to the user if they don't have credit card.

7.4   Future Enhancement

Future enhancement can be done to make the system more advance and ease to use. A system development knows no boundaries as new requirements and better implementation method continue to arise and evolve. There are several enchantments that could extend the usability of the developed system.

7.4.1   Extent the ability of Browser

As stated, ORS requires IE4.0 and above for execution. In future, ORS can be turned to fulfill other browser requirements such as Netscape Navigator for execution. This is because Netscape has a sizeable share in the browser market besides Internet Explorer and it has a lot of users in the world.

7.4.2   More Administration Task

Administration task can be further enhanced to include more features to ease maintenance process. Among the features may be included are multiple user grouping according to access right(for administrator part), analytical tools, data mining and database backup

7.4.3   Online Demonstration Help System

A complete ORS system is not complete without a online demonstration help file. Demonstration basis help system may also be incorporated to reduce the system learning curve to enhance usability among its users.

7.4.4   Attractive Homepage

ORS will become better publicized if its homepage is enhanced to be more attractive and interactive by adding more meaningful and user-friendly images, 3D images, animation images and sounds.

7.4.5   Other Language Support

A successful system is the system that can support more than one communication language. This system can be enhancing to include more than one language such as Chinese, Malay and so on to broaden the usage of the system. By having this multiple language function, it can be used by others countries with different national languages.

7.4.6   Enhance the Existing Reporting Module

The existing reporting module needed to enhance to provide more powerful function. It should have the function, which allows the user to customize the type and style of report they needed. Besides that, the users must be provided with the function, which enable them to save the reports in certain format or type of document file they want for further study or analysis.

Conclusion

Overall, this project has achieved and fulfilled the objectives and requirements as an online reservation system as determined during the system analysis. ORS is not only a reservation system useful for normal user but also includes an administration module for the system administrator. ORS has reduced the need of a traveler to travel by allowing them to make reservation through web browser. It simplifies the reservation process, achieves paperless administration and reduces the time for processing because ORS includes the administration module. Besides using the database management system to do maintenance chores directly, the administration module provides an alternative to do remote maintenance anywhere on the road. ORS enables faster and efficient reservation process for the Internet users as well as providing a borderless database management system for the administrator.

However, ORS can be further enhanced to become a more powerful and sophisticated information system. There are still many rooms for improvement in ORS, in terms of implementing a comprehensive online reservation system and gearing towards complete online system maintenance

A lot of knowledge was gained throughout the development of the system. These include knowledge in setting up window 2000, Internet Technologies, programming and concepts as well as using SQL Server. Programming in ASP, HTML, VBScript, JavaScript proved to be valuable experience.

Finally, the entire problem faced and experiences gained during the system development should be useful in my future endeavors. This is because the era is now moving towards Internet technology that requires decent knowledge in the Internet programming including the knowledge in deploying the network systems and functionality. Besides, I hope that this proposed system can benefits any target company by prepared them with the higher competitive advantages in the business world.

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