University of Malaya

Faculty of Computer Science & Information Technology

Online Shopping Cart & Ordering System

Report for

WXET 3182 Projeck Ilmiah Tahap Akhir II

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ABSTRACT

E-commerce (electronic commerce or EC) is the buying and selling of goods and services on the Internet, especially the World Wide Web. E-commerce makes purchasing easier for customer. However, it will cost a corporation a lot of money to build up a dynamic e-commerce website. To overcome this issue, a web-based E-commerce development tool is developed to create web page to selling the corporation 's products. The proposed project offers a web-based service to let any shopping stores build their own web store from start to finish. It include template for online shopping cart, backend management and database. The dynamic database is hooked up to the existing back-end system for order fulfillment (storefront) and member registration process (storefront).

The aim of this project – Online Shopping Cart and Ordering System (OSCOS) is to develop and design the e-commerce application for a shopping cart and ordering system. This project also defines the objectives, scope, problems and tools to use that should be identified before the development of this system.

Several research and case study had done to do assessment and review about the system. Waterfall Model used as a methodology of the proposed project. Three-tier client/server architecture will be implemented to model the system architecture. In addition, Online Shopping Cart and Ordering System (OSCOS) is planned to be developed by using Personal Home Page (PHP) technology and Apache Web Server on the Window 98 platform utilizing database created using MySQL. The system design is dynamic and supporting concurrent users to interact with the system over Internet.

Finally, the intended Online Shopping Cart and Ordering System (OSCOS) should able to produce the web pages that allow users to do online shopping and order the desired products. A database also has to be implemented for storing data that would be retrieved for display and captured from users.

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INTRODUCTION

1.0 INTRODUCTION

1.1 Dealership E-Commerce Package

The term "Electronic Commerce" or "E-Commerce" has evolved from its meager notion of electronic shopping to mean all aspects of business transactions and market processes enabled by the Internet and the World Wide Web technologies. It is like a process of buying and selling products, services, and information over computer networks.

By now, everyone has done it – his/her have bought something online. Maybe they have purchased quite a bit off the Web. If so, they are in good company: consumers around the world are logging on in droves, and shopping ups a storm. Which all points to one conclusion -- if any corporations have got something to sell, they would be wise to start selling it online.

However, it will cost them a lot of money to build up a dynamic e-commerce website. To overcome the problem faced in the conventional e-commerce business models, Dealership E-Commerce Package is being developed. A corporation develops this proposed project that it offers a free web-based services to let dealer build their own Web store from start to finish, including all of the elements that they would expect in a store such as shopping carts, credit card processing, and even promotional tools. It enables the corporation to widen its sale coverage and tap new market by providing a dynamic e-commerce web page for the dealers to selling their own products. In the mean time, the dealers must be agree to include the corporation ' s products in their developed web page as well.

This proposed project consists four main models including:

- Online Inventory Control System
- Online Shopping Cart & Ordering System (OSCOS)
- E-Payment System
- Configuration Web Template

1.2 Online Shopping Cart & Ordering System

I am going to develop an Online Shopping Cart & Ordering System which is one of the main modules in this Dealership E-Commerce Package project. Online Shopping Cart & Ordering System is a web based electronic commerce ordering system developed for a shopping store. Shopping cart means select a product online and drop it in a cart for purchase. Meanwhile, ordering is defines as "command to issue order" or " to give or place an order". The Online Shopping Cart & Ordering System is an essential part of e-commerce solution. The system combines online shopping cart and ordering process into an easy-to-use interface. Customers can easily select merchandise, review their selections and make their purchases without having to understand the complexities of a merchandise database.

The system will publish a front store at Internet and offers web site visitors the convenience of ordering directly via the Internet 24 hours a day and 7 days a week. Basically, the shopping cart and ordering system can be divided into 2 sections: Customer Section (Storefront) and Administrator Section (Store back).

The customer section is designed to function as an online catalogue, which displays all the products available at the web page. Users can view all the related products available in the store or search on certain products by using search engine provided by the system. Besides, the system will provide a login system for authorized members to shop on-line. As for the new visitors who wish to register themselves as authorized members, OSCOS system will provide registration procedure for them to register via the Internet. Moreover, the system will also enable existing members to update their own profile as any changes occur. Furthermore, OSCOS system will be equipped with shopping cart technology to help users in their ordering process. The shopping cart system will keep track of users ordering information and enable users to manipulate their orders. After completing the product selection, users may make their payment using the payment system option provided by the system.

For the administrator section, OSCOS system will establish another different website for the system administrator. As in this section, administrators are granted to access the system to manipulate administrator profile, customer profile and order records.

1.3 Project Objectives

Today, the Internet is on the verge of becoming a global marketplace for services and information dissemination. With the boom of the electronic commerce revolution, web base shopping ordering system will certainly spur the growth of the market share in Malaysia. Therefore, engaging in this project will definitely spur a good start in joining the Internet bandwagon.

The objectives of the proposed project are listed below:

- To design and develop an interactive, user-friendly and reliable web based commerce solution for the shopping store to promote and sell products to its customers.
- To develop reliable and secure ordering services to the customers to purchase the products being promoted on-line.
- To improve the convenience, accessibility and quality of interaction between dealers and customers.
- To enable store administrator to maintain the system via the Internet.
- To provide a comprehensive ordering system for the medium scale shopping sore to conduct their business online. Normally only huge shopping store will plan to conduct their business through the web. Now, medium to small scale shopping store will also be able to promote and sell their products via the Internet.
- Easy maintenance through the Storeback site, the dealers can be easily keep track and maintain customer profile, product information, order record and transaction of the day.
- Ready-Market.
- Professionalism & Reliability.

1.4 Project Scope

The scope of this project is development of a system involving a client/server environment. Generally, emphasis of OSCOS system will be on two sections, which are:

Customer Section is a series of web pages that will allow customers from browsing the content of the web site to making order through the ordering system and finally performing online payment transaction. Basically, Customer Section will provide the following facilities:

- Enable registration for new members.
- Logging in either as an individual user/customer and logging out.
- Allow existing member to login into the system and update his or her own profile.
- Include shopping cart technology into the system and allow customers to manipulate the ordered products in his/her shopping cart.

Administrator Section will allow system administrator to access and maintain the database. Facilities provided in this section are:

- Maintaining customer 's profile
- Maintaining order's profile
- Maintaining and viewing the transaction of the day.

1.5 Project Expected Outcomes

As proposed, the outcomes of the project will be a web-based storeback application for online shopping cart & ordering system. The functions or modules that are expected in this project are as below:

a) Registration Module

This module will enable new user or non-member to register with the system. The system will require user to fill in a registration form and the user information will be kept in the database to process.

b) Login Module

This module is responsible for allowing user to identify them to the system. User verification will be based on user identification (user id) and password. Meanwhile, the application will prompt user if they are a new user to the system. If

user is a valid user or authorized member of Online Shopping Cart & Ordering System, then user is allowed to log on into the system and continue browsing through the web pages and make order.

c) Edit/Update Customer Profile Module

This part will enable authorized user to edit his/her own personal profile as any changes occur. After user filled the customer updating form, database will be update the particular user 's information into the customer table and the user 's profile is updated.

d) Shopping Cart & Ordering Module

Once the user has been successfully registered on the system, the next phase of the application will allow the user to select their desired products from the store. After viewing all the related product information, if user would like to made an order, he/she can add the product into the shopping cart, system will automatically sum up the total amount of the products being chosen and user is allowed to modify his/her shopping cart by remove or changing the order. If user would like to purchase, he/she can amend the order and system will allow user to checkout.

e) Administrator – Order Module

This module enables administrator to search, view and delete order records in the database. After administrator log on to the system, order profile can be viewed and deleted from the order records.

f) Administrator – Customer Module

This module enables administrator to search, view and delete customer records in the database. After administrator log on to the system, customer profile can be viewed and deleted from the customer records. The dealer also can search or retrieved the customer detail dynamically.

1.6 Project Limitations and Strengths

1.6.1 Limitations

There are some limitations in this suggested system as listed below:

- The system would not generate any printed reports for the management.
- The system must include the products of the company who provide the e-commerce web site for dealer. Therefore, there will be a product competition because a competitive product from the company itself is marketed online together with the dealer's products.

1.6.2 Strengths

The Online Shopping Cart & Ordering System project can be accomplished with these strengths as listed below:

- The system is the first system, which a company provides a free e-commerce development package for the dealer. This system never been developed in Malaysia and it is a new and interesting project.
- The information displayed would be well organized and displayed systematically. User can retrieve the related information efficiently.
- The web page that including many images and graphic design can be retrieved and shown in web sites very fast.
- The database can be easily updated especially the ordering and customer information, because of the data can be captured directly into the database when customer submit the form in the web.
- The data of customer and ordering record can be updated and maintained by the administrator time to time.
- Security issue is in emphasis because the users need to be authenticated as a member of the system before they can checkout the shopping cart.
- The ordering system will be user friendly, systematic, tidy and easily understood by any users.

1.7 Project Schedule

In view of developing the project, a project schedule is planned as a guideline to manage the time and tasks need to be accomplished. The project timeline is as shown:

	Jun 2001				July 2001				August 2001			
	1	2	3	4	1	2	3	4	1	2	3	4
Project Definition												
Literature Review												
System Analysis												
System Design												
Viva												
Report Completed												

Table 1.1 Project Schedule

LITERATURE REVIEW

2.0 LITERATURE REVIEW

2.1 Electronic Commerce

Overview

Business-centered electronic commerce began more than two decades ago with the introduction of electronic data interchange (EDI) between firms (sending and receiving order, delivery and payment information).

Electronic commerce means doing business online or selling and buying products and services through Web storefronts. Products being traded may be physical products such as used cars or services (e.g. arranging trips, online medical consultation, and remote education). Increasingly, they include digital products such as news, audio and video, database, software and all types of knowledge-based products. It appears then electronic commerce is similar to catalog shopping or home shopping on cable TV.

Electronic commerce is not limited to buying and selling products online. But, along with customers, it will also find its suppliers, accountants, payment services, government agencies and competitors online. This online or digital partners demand changes in the way we do business from production to consumption, and they will affect companies who might think they are not part of electronic commerce. Along with online selling, electronic commerce will lead to significant changes in the way products are customized, distributed and exchanged and the way consumers search and bargain for products and services and consume them. In short, the electronic commerce revolution is in its effects on processes.

2.1.1 Benefit of Electronic Commerce

- Enable direct selling of goods and services over the Internet.
- Enable low-cost sale transactions.
- Eliminate middleman.
- Strengthen customers' loyalty and deepen relationships.
- Enhances the enterprise image.

- Cost saving by marketing the services or products on the Internet can be less expensive than using conventional printing and document-delivery methods.

2.1.2 Electronic Commerce System Architecture

2.1.2.1 System Architecture Characteristic

System architecture is important in developing e-commerce applications. E-commerce is a business solution, not one specific product. Therefore, e-commerce must included several components and features for maximum effectiveness and they are:

- Flexibility and Scalability – The e-commerce design and infrastructure must be able to adjust and expand. Software in the e-commerce environment must be able to interpret different data formats and transform these formats into a universal format that can be recognized by multiple applications. In addition, the software must be able to fine-tune its response to various clients and business partners.
- Security – Authentication, encryption and restricted access must be anticipated carefully in the applications. In e-commerce applications, various trading partners may receive different security levels, depending on the degree of trust and volume of business in each relationship.
- Communication – Communication link service require flexibility because a typical e-commerce application has multiple communication requirements.
- Web support - Software modules in an e-commerce system must support Web capability.
- Data storage – Data must be regularly saved in archive storage for appropriate transaction management. Such management provides the capability to track every transaction almost in real time.
- User support – E-commerce design and operations personnel must continuously support users. Quality user support generally results in a system that can be more easily achieve peak performance.

2.1.2.2 System Core Components

In general, there are four functional components associated with e-commerce operations:

- A client (or customer) who uses a computer (usually a personal computer) to access the Internet and initiate purchases – The actual physical connection may be direct via on Internet Service Provider (ISP) or indirect – through a connection to an in-house network.
- A merchant and accompanying computer system – This system store electronic catalog information for use by potential buyers.
- An order processing system – used after an actual purchases is made. It performs many duties, including general record keeping, payment processing and inventory management.
- Payment processing – whether by invoicing or payment cards, a merchant must be paid. This process can involve interface to payment card networks for payer validation, authorization and settlement.

E-commerce architecture uses these components in different ways. They remain independent entities or may be combined in a logical grouping computer system and supporting networks.

2.1.3 Electronic Commerce Security Issues

Most vendors and analysts argue that transactions are less dangerous in cyberspace than in the physical world. E-commerce systems remove temptation of credit card fraud by encrypting the numbers on a server. For merchants, e-commerce is safer than opening a store that could be robbed, burned or flooded. Not all consumers really believe that e-commerce is safe, but experts say e-commerce transactions are safer than ordinary credit card purchases.

Transactions can nowadays be encrypted using Secure Sockets Layer (SSL), a protocol that creates a secure connection to the server, protecting the information as it

travels over the Internet. SSL uses public key encryption, one of the strongest encryption methods around. A way to tell that a web site is secured by SSL is when the URL begins with https:// (the s is for secure).

A newer security standard called Secure Electronic Transactions (SET) is on its way. SET encodes the credit card numbers that sits on the vendor's servers so only banks and credit card companies can read the numbers.

2.2 Existing System Review

2.2.1 Objectives

The objectives of the existing system review are:

- To avoid the same mistake occurred in the web page development by studying the weakness of the existing system.
- To put in the good features in the Web page design by studying the strengths of the existing system.

2.2.2 Studying the Existing Systems

2.2.2.1 Mid-Valley Megamall

URL : www.midvalley.com.my

Mid-Valley Megamall e-commerce web site is a comprehensive and richer info site, promoting all the stores and products available in this grant shopping mall. The web site provides useful information on stores in the shopping mall, secure online ordering system, user-friendly interfaces and many others related information to the users.

Mid-Valley provides a lot of valuable features to its customer such as:

- Shopping cart system. This section enables users to perform all the shopping cart function developed by the shopping mall.
- Users account registration and login. The system has developed in such a way that users can login, register, activate his/her account, view and edit user profile and other interesting features.

- Online merchant. This is a list of stores in the mall provide online ordering system. It enables users to make order through the Internet.
- Store directory. This is a detailed description on the stores in the shopping mall. All the stores situated in the mall will be showed and information of each store is been provided.
- Event list. This is a list of promotion events that will be held at the shopping mall.
- Special promotion. Web page displays the special promotion for certain products available in the mall.

2.2.2.2 WatchesPlanet.com

URL : www.watchesplanet.com

WatchesPlanet.com is one of the region 's earliest and most successful Businesses to Consumer web sites offering branded watches to global consumers over the Internet, ranking millions in revenue annually. The system was developed using Intershop technology together with advance e-commerce technology.

The interface design is simple and very easy to navigate. Users can browse through all the online selling watches by an easy clicking on the brand categorized categories that display on the left of the home page. Before any user place order, they must sign up a member account to be a valid member of the system.

WatshesPlanet.com provides a comprehensive ordering service for its users. The simplified and systematic shopping cart and ordering system enables users to purchase on-line easily. Furthermore, the interface design of the system is also very user friendly to its users.

Basically, there are some weaknesses of the WatchesPlanet.com system. Typically, there is no proper procedure for users to log on to the system because its poor interface design. Users can be confused when they want to log in to the system because the site does not provide the log in panel when the new users first visit to the sites.

Besides that, the products been promoted on the web are not sufficient to fulfill consumer 's need because most of the displayed product details do not contain long

description about the watches. It only displays some important details such as size measurement, model and series.

In conclusion, WatchesPlanet.com ordering system provides secure ordering system and quality services to the users. The system design is user friendly, systematic, tidy and easily understood by any users. It is a reliable and well-developed e-commerce business solution.

2.2.2.3 Amazon.com

URL : www.amazom.com

Amazon.com opened its virtual doors in July 1995 with a mission to use the Internet to transform book buying into the fastest, easiest, and most enjoyable shopping experience possible.

First of all, before any user place order, they must sign up a member account to be a valid member of the system. Generally, Amazon.com provided a comprehensive ordering system service for its users. Users can either add the items in their wishing list or in to the shopping cart. After user add the item in the shopping cart, the system will detect the similar item which is also selling online in the web sites. It will display a link below the shopping cart to provide a link for users to explore for these items.

Besides the ordering system, Amazon.com provide complete related information about the online selling products. For example, users who like to order a particular book. The system will display a full description about the book and even the reviews of the book by some experts.

However, there are some weaknesses of the Amazon ordering system. The web pages are too crowed with too many frame and navigation bar displayed on it. Many promotional offers is being displayed on the web sites. It will make users hard to locate their desired information when they first visit to the sites.

The login page is hard to find. But there is a good thing about the ordering system, once the users is log in, the pages will display the amount of the items in their shopping cart. So, users can easily track the order status while they can continue shopping.

2.3 Internet Review

2.3.1 Introduction

The Internet is a global network of computers. When you connect to the Internet, your computer becomes part of this worldwide network of computers. The World Wide Web, or the Web, is one of the Internet's most popular applications. It is a collection of interlinked documents that work together using a specific Internet protocol called HTTP (Hypertext Transfer Protocol, the protocol used to serve web pages.). In addition to an Internet connection, access to the Web requires a software program called a "browser." Netscape Navigator and Microsoft Internet Explorer are currently the two most common Web browsers. Web pages can be exchanged over the Internet because browsers and Web server both understand HTTP. All in all, the Internet is essentially about helping people communicate with each other.

2.3.2 Web server

Web server is a piece of software running on a computer that distributes Web pages to user on demand, and provides an area in which to store and organize the pages of a Web site. It runs all the time and waits for Web clients (such as Explorer or Navigator) to connect to it and request data, usually a file. It uses the client/server model and the World Wide Web 's Hypertext Transfer Protocol (HTTP), serves the files that form Web pages to Web users (whose computers contain HTTP clients that forward their requests).

Every computer on the Internet that contains a web site must have a Web server program or else the site files must be sent to a computer that has a Web server program. The most popular Web servers are Apache, a Web server for both 32-bit Windows and Unix-based operating system; Microsoft Internet Information Server (IIS), which comes with the Window NT Server; Microsoft Personal Web Server (PWS), which comes with the Window 98 Server; Netscape Enterprise Server, for Unix or for those operating in cross-platform environments and Novell Web Server (NWS) , for those running their LANs on NetWare.

Web servers often come as part of a large package of Internet – and Intranet- related programs for serving e-mail, downloading requests for FTP files, building and publishing Web pages. Consideration in choosing a Web server include how well it works with the operating system and other server; its ability to handle server-side programming; publishing, search engine and site building tools that may come with it.

2.3.3 Client Server

Client server has the following distinguishing characteristic:

- Scalability: Client server can be scaled horizontally or vertically. Horizontal scaling means adding or removing client workstations with only a slight performance impact. Vertical scaling means migrating to a larger and faster server machine or multi-servers.
- Service: Client server is primarily a relationship between processes running on separate machine, where the servers provide services to clients.
- Shared resources: A server can service many clients simultaneously and regulate their access to share resources.
- Integrity: The server code and server data is centrally maintained, which results in cheaper maintenance and the guarding of the shared data integrity. At the same time, the clients remain personal and independent.

2.3.4 Client Server Architecture

2.3.4.1 Two-Tier Architecture

On the basic level, this architecture involves the Graphical User Interface (GUI) and business logic directly accessing the database. The GUI can be on a client system and the database can be on the client system or on a server. Usually, the GUI is written in languages like C++, Visual Basic or Power Builder. The database systems typically are Microsoft Access, Lotus Approach or Sybase SQL anywhere.

2.3.4.2 Three-Tier Architecture

Most of the organizational and many of the departmental client sever application today follow the three-tier architecture where the GUI , business logic and the DBMS are logically in three layers. Here the GUI development tools still the same with two-tier architecture and the backend databases are like Oracle, Microsoft SQL Server or Sybase SQL Server. The three-tier concept gave rise to an era of database servers, application servers and GUI client machines. Operating system such as Unix, Windows NT and Solaris rule the application server and database server world. Client operating system likes Windows are popular for the GUI front-end.

2.3.4.3 Analysis

Three-tier architecture is chosen as the project system architecture because:

- The developers can develop each part concurrently.
- The middle tier server improves performance, flexibility, maintainability, reusability and scalability by centralizing process logic.

2.3.5 Web Client

The Web client is a Web browser such as Netscape Navigator or Microsoft Internet Explorer. The browser 's job is to contact Web server, receive HTML pages then interpret and display those pages. Web pages on an Internet are build using a page markup language called HTML (Hypertext Markup Language).

When one types in the URL, the Web browser looks at the URL and then determines which server to contact, which directory to ask for and what specific document in that directory is wanted.

An end user can spawn a database application through the web browser that communicates with the Web server through the Internet via Hypertext Transport Protocol (HTTP). In simple, HTTP is used to contact Web server.

2.3.6 Middle Ware

The middle ware is responsible for managing communication and providing application services between the web server and the database server. The middle ware software calls external programs or script that act as the transport and layout mechanism between the web server and the database server.

The script constructs the query, passes the query to the database, and formats the output as an HTML page. The web server then returns the HTML page to the web browser to display the information to the end user.

2.3.7 Server-Side Scripting

A script that is interpreted by the web server is called server-side script. A server side script is an instruction set that is processed by the server, and which generates HTML. The resulting HTML is sent as part of the HTTP response to the browser.

Server-side alternative

There are quite a number of scripting languages. All the server-side scripting allows the user to achieve the same end-result-that dynamic web application.
Taking into account the following questions

- Are they supported on the platform you use?
- Are they difficult to learn?
- Do they have extra capability?

2.3.7.1 Active Server Pages (ASP)

An Active Server Page (ASP) is an HTML page that includes one or more script (small embedded programs) that are processed on a Microsoft Web server before the page is sent to the user. An ASP is somewhat similar to a Server-side include or a common gateway interface CGI) application in that all involve programs that run on the server, usually tailoring a page for the user. Typically, the script in the Web page at the server uses

input received as the result of the user's request for the page to access data from a database and then builds or customizes the on the fly before sending it to the requestor.

ASP is a feature of the Microsoft Internet Information Server (IIS), but, since the server-side script is just building a regular HTML page, it can be delivered to almost any browser. The developers can create an ASP file by including a script written in VBScript or JScript in an HTML file or by using ActiveX Data Objects (ADOs) program statements in the HTML file. They name the HTML file with the ".asp" file suffix. Microsoft recommends the use of the server-side ASP rather than a client-side script, where there is actually a choice, because the server-side script will result in an easily displayable HTML page. Client-side scripts (for example, with JavaScript) may not work as intended on older browsers.

2.3.7.2 Common Gateway Interface (CGI)

The Common Gateway Interface is a mechanism for creating script on the server, which can then be used to create dynamic Web application. Nowadays, the majority of dynamically created pages on the Web are created using CGI and a scripting language. CGI allows the user to invoke another program (such as Perl script) on the Web server to create the dynamic web page, and the role of CGI is to pass the user-supplied data to the this program for processing. However, CGI likes other server-side scripting, it provides the same end-result – a dynamic Web application.

However, CGI has some severe shortcomings. The major one is that it adds an extra level to our browser-server model of interaction: namely, it is necessary to run a CGI program to create the dynamic page, before the page is processed on the server. Also, the format in which CGI receives and transmits data means that this data is not easily manipulated by many programming languages, so developers have to use a programming language that has good facilities for manipulating text and communicating with other software. The most able programming languages that can work on any operating system for doing this are C, C++ and Perl. Visual Basic does not offer sufficiently adequate text-handling facilities, and it is therefore rarely used with CGI.

2.3.7.3 ColdFusion

ColdFusion, developed by Allaire which has recently merged with Macromedia, is a popular and sophisticated set of products for building Web sites and serving pages to users. With ColdFusion, a company can build a content database using input templates and combine these with application programs to create a Web site in which pages are developed dynamically as they are served. ColdFusion consists of ColdFusion Studio, which is used to build a site, and ColdFusion Server, which serves the pages to users. ColdFusion Studio is described as "a complete integrated development environment (IDE)" and ColdFusion Server as "a deployment platform."

ColdFusion has its own page markup language, called ColdFusion Markup Language (CFML). CFML encompasses the Web's Hypertext Markup Language (HTML) and Extensible Markup Language (XML).

ColdFusion enables servers to access data as the server builds an HTML page. ColdFusion pages are readable to any browser. ColdFusion also utilizes a proprietary set of tags, which are processed by the ColdFusion Server software. This server software can run on multiple platforms, including Microsoft Personal Web Server, Microsoft IIS, Netscape Enterprise Server and Unix/Apache. ColdFusion sports its own set of solutions to common problems, including access to ADO functionality.

2.3.7.4 Java Server Pages (JSP)

Java Server Page (JSP) is a technology for controlling the content or appearance of Web pages through the use of servlet, small programs that are specified in the Web page and run on the Web server to modify the Web page before it is sent to the user who requested it. An HTML page that contains a link to a Java servlet is sometimes given the file name suffix of .JSP.

Java Server Pages is a new technology that allows you to combine markup (HTML or XML) with Java code to dynamically generate web pages. The JSP specification is implemented by several web servers, and plug-ins are available that allow the developers to use JSP with IIS 4.0. One of the main advantages of JSP is the portability of code between different servers. Java Server Page boast the ability to embed Java code into their web

pages using server-side tags, in the same way that ASP script can be embedded into web pages.

2.3.7.5 Personal Home Page (PHP)

Personal Home Page is a server-side, cross-platform embedded HTML scripting language. It is a new server-side scripting language for creating dynamic web pages. In Web programming, PHP is a script language and interpreter that is freely available and used primarily on Linux Web servers. PHP (the initials come from the earliest version of the program, which was called "Personal Home Page Tools") is an alternative to Microsoft's Active Server Page (ASP) technology. As with ASP, the PHP script is embedded within a Web page along with its HTML. When a visitor opens the page, the server processes the PHP commands and then sends the results to the visitor's browser, just as with ASP or ColdFusion. Unlilke ASP or ColdFusion, PHP is open-source and cross-platform. PHP runs on Windows NT and many Unix versions, and it can be built as an Apache module and as binary that can run as a CGI. An HTML page that includes a PHP script is typically given a file name suffix of ".php" ".php3," or ".phtml". Like ASP, PHP can be thought of as "dynamic HTML pages," since content will vary based on the results of interpreting the script.

In addition to manipulating the content of the Web page, PHP, like IIS, can also send HTTP headers. Developer can set cookies, manage authentication and redirect the users. It offers good connectivity to many database (and ODBC), and integration with various external library that let the developer do anything from generating PDF documents to parshing XML.

PHP 's language syntax is similar to C and Perl. This might prove a barrier to people with no prior programming experience, but if they have a background in either language then they might can use PHP easily. PHP also has some rudimentary object-oriented features, providing a helpful way to organize and encapsulate the code.

2.3.7.6 Analysis

PHP is chosen as the Web application development tools because it provides user-friendly web base development environment. Moreover, it is a free web development tool. Details on the reasons why PHP is used will be explained in the later chapter 4.

2.3.8 Client-Side Scripting

A script that is interpreted by the browser is called client-side script. A client-side script is also an instruction set, but is not processed by the server. When a Web page source contains a client-side script, it does not attempt to process the script; instead, it simply downloads the script to the browser as part of the HTTP response, and assumes that the browser will know how to deal with it. When the browser receives the HTTP response, it needs to process the HTML contained within, which describe how it is to display the page. The browser must also take care of the client-side scripts that were downloaded as part of the page.

Advantages of client-side scripting:

- Allow the developer to create more functional, interactive Web pages.
- The response times are often quick, because the script is interpreted on the browser machine so there is no network involved. This is a big advantage for repeated calculations because there is no round trip to ask the server to calculate things.
- Executing script on the browser means that there is less script to be executed on the Web server. Reducing the Web server 's workload can be advantageous if lots of people use your Web site.

2.3.8.1 JavaScript

JavaScript is an interpreted programming or script language from Netscape. It is somewhat similar in capability to Microsoft's Visual Basic. In general, script languages are easier and faster to code in than the more structured and compiler languages such as C and

C++. Script languages generally take longer to process than compiled languages, but are very useful for shorter programs.

JavaScript is used in Web site development to do such things as:

- Automatically change a formatted date on a Web page.
- Cause a linked-to page to appear in a popup window.
- Cause text or a graphic image to change during a mouse rollover.

JavaScript uses some of the same ideas found in Java, the compiled object-oriented programming language derived from C++. JavaScript code can be imbedded in HTML pages and interpreted by the Web browser (or client). JavaScript can also be run at the server before the page is sent to the requestor. Both Microsoft and Netscape browsers support JavaScript, but sometimes in slightly different ways.

2.3.9 Web Programming Languages

2.3.9.1 Hypertext Markup Language (HTML)

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

HTML is a formal Recommendation by the World Wide Web Consortium (W3C) and is generally adhered to by the major browsers, Microsoft's Internet Explorer and Netscape's Navigator, which also provide some additional non-standard codes. The current version of HTML is HTML 4.0. However, both Internet Explorer and Netscape implement some features differently and provide non-standard extensions. Web developers using the more advanced features of HTML 4 may have to design pages for both browsers and send out the appropriate version to a user. Significant features in HTML 4 are sometimes

described in general as dynamic HTML. What is sometimes referred to as HTML 5 is an extensible form of HTML called Extensible Hypertext Markup Language (XHTML).

2.3.9.2 Analysis

HTML and JavaScript are chosen to be the programming language and the client-side scripting language for developing the Online Shopping Cart & Ordering System due to the speed in retrieving documents from the server compared to others language. Moreover, they are easy to learn too.

2.3.10 Web Server

2.3.10.1 Apache

Apache is a freely available Web server that is distributed under an "open source" license. Apache version 2.0 runs on most UNIX-based operating systems (such as Linux, Solaris, Digital UNIX, and AIX), on other UNIX/POSIX-derived systems (such as Rhapsody, BeOS, and BS2000/OSD), on AmigaOS, and on Windows 2000. According to the Netcraft (www.netcraft.com) Web server survey in February 2001, 60% of all Web sites on the Internet are using Apache (62% including Apache derivatives), making Apache more widely used than all other Web servers combined.

Apache complies with the newest level of the Hypertext Transport Protocol, HTTP 1.1. Free support is provided through a bug reporting system and several Usenet newsgroups.

2.3.10.2 Microsoft Internet Information Server (IIS)

Internet Information Server (IIS) is a group of Internet servers (including a Web Hypertext Transfer Protocol server and a File Transfer Protocol server) with additional capabilities for Microsoft's Windows NT and Windows 2000 Server operating systems. With IIS, Microsoft includes a set of programs for building and administering Web sites, a search engine, and support for writing Web-based applications that access databases.

Microsoft points out that IIS is tightly integrated with the Windows NT and 2000 Servers in a number of ways, resulting in faster Web page serving.

A typical company that buys IIS can create pages for Web sites using Microsoft's Front Page product (with its WYSIWYG user interface). Web developers can use Microsoft's Active Server Page (ASP) technology, which means that applications - including ActiveX controls - can be imbedded in Web pages that modify the content sent back to users. Developers can also write programs that filter requests and get the correct Web pages for different users by using Microsoft's Internet Server Application Program Interface (ISAPI) interface. ASPs and ISAPI programs run more efficiently than common gateway interface (CGI) and server-side include (SSI) programs, two current technologies.

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

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

2.3.10.3 Microsoft Personal Web Server (PWS)

PWS, an abbreviation for Personal Web Server, is Microsoft's version of a Web server program for individual PC users who want to share Web pages and other files from their hard drive. PWS is a scaled-down version of Microsoft's more robust Web server, Internet Information Server IIS. PWS can be used with a full-time Internet connection to serve Web pages for a Web site with limited traffic. It can also be used for testing a Web site offline or from a "staging" site before putting it on a main Web site that is exposed to larger traffic.

PWS can be used together with Microsoft's FrontPage, a Web site design product, to upload Web pages from a remote location or to the local hard drive; to check for dead links; to create directories; and to set permissions. PWS is frequently used as part of the trend toward peer-to-peer exchange and publishing. The equivalent program for the Macintosh is called Personal Web Sharing.

2.3.10.4 Analysis

Currently, PHP is chosen for server-side scripting. PHP is an application that runs on a web server. Therefore, Apache Web Server is chosen because it integrates easily with MySQL database to host PHP application. Futhermore, PHP compiled faster in Apache . The detailed analysis will be included in Chapter 4 – System Design.

2.3.11 Database

A database is a collection of data that is organized so that its contents can easily be accessed, managed, and updated. The most prevalent type of database is the relational database, a tabular database in which data is defined so that it can be reorganized and accessed in a number of different ways. A distributed database is one that can be dispersed or replicated among different points in a network. An object-oriented programming database is one that is congruent with the data defined in object classes and subclasses.

Databases contain aggregations of data records or files, such as sales transactions, product catalogs and inventories, and customer profiles. Typically, a database manager provides users the capabilities of controlling read/write access, specifying report generation, and analyzing usage. Databases and database managers are prevalent in large mainframe systems, but are also present in smaller distributed workstation and mid-range systems such as the AS/400 and on personal computers. Structured Query Language is a standard language for making interactive queries from and updating a database such as IBM's DB2, Microsoft's Access, and database products from Oracle, Sybase, and Computer Associates.

2.3.11.1 Microsoft SQL Server

A SQL server database is organized into logical objects that are visible to the user, such as tables, indexes, and stored procedures. Microsoft SQL Server is a scalable, high performance database management system designed specifically for distributed client/server computing. Microsoft SQL Server provides tight integration with Windows and Windows-based applications, helping reduce the cost and complexity of deploying sophiscated applications. SQL server is an ideal database engine for powering Web sites. Through tight integration with IIS, SQL Server can be queried and updated via popular Web browser. SQL Server 's native ODBC lets it inter-operate smoothly with the Internet Database Connector interface included IIS.

2.3.11.2 Microsoft Access

Microsoft Access 2000 is a Window-based database management system. It is one of the programs in the Microsoft Office. It runs under the Window 95/98/2000/NT operating system. With Access, the developer can enter, store and manipulate their personal or company data in a variety of ways. They can use Access to query a database for information that meets specified criteria as well as summarize and produce reports (including charts) based on their data in the database.

With Access, developers can manipulate and perform calculation on the data. It also can perform financial, mathematical and statistical calculations. They also can design forms for data entry and/or browsing the data in a table/database with Access. Besides this, developers who use Access can design queries for retrieving information in a database and/or performing calculation with it.

2.3.11.3 MySQL

MySQL is an open source relational database management system (RDBMS) that uses Structured Query Language (SQL), the most popular language for adding, accessing, and processing data in a database. Because it is open source, anyone can download MySQL and tailor it to their needs in accordance with the general public license. MySQL is noted

mainly for its speed, reliability, and flexibility. Most agree, however, that it works best when managing content and not executing transactions.

The MySQL relational database system was first released in January 1998. It is fully multi-threaded using kernel threads, provides application program interfaces (APIs) for C, C++, Eiffel, Java, Perl, PHP, Python, and Tcl, allows for many column types, and offers full operator and function support in the SELECT and WHERE parts of queries.

MySQL currently runs on the Linux, UNIX, and Windows platforms. Many Internet startups have been especially interested in MySQL as an alternative to the proprietary database systems from Oracle, IBM, and Informix. Yahoo's news site uses MySQL. However, MySQL is not entirely freeware.

2.3.11.4 Analysis

MySQL is chosen because it is easy-to-use, scalability and high performance.

2.3.12 Operating System

An operating system (sometimes abbreviated as "OS") is the program that, after being initially loaded into the computer by a boot program, manages all the other programs in a computer. The other programs are called applications or application programs. The application programs make use of the operating system by making requests for services through a defined application program interface (API). In addition, users can interact directly with the operating system through a user interface such as a command language or a graphical user interface (GUI). An operating system performs these services for applications:

In a multitasking operating system where multiple programs can be running at the same time, the operating system determines which applications should run in what order and how much time should be allowed for each application before giving another application a turn.

- It manages the sharing of internal memory among multiple applications.

- It handles input and output to and from attached hardware devices, such as hard disks, printers, and dial-up ports.
- It sends messages to each application or interactive user (or to a system operator) about the status of operation and any errors that may have occurred.
- It can offload the management of what are called batch jobs (for example, printing) so that the initiating application is freed from this work.

On computers that can provide parallel processing, an operating system can manage how to divide the program so that it runs on more than one processor at a time.

All major computer platforms (hardware and software) require and sometimes include an operating system. Linux, Windows 2000, VMS, OS/400, AIX, ,and z/OS are all examples of operating systems.

2.3.12.1 LINUX

Linux (often pronounced LIH-nuhks with a short "i") is an UNIX-like operating system that was designed to provide personal computer users a free or very low-cost operating system comparable to traditional and usually more expensive UNIX systems. Linux has a reputation as a very efficient and fast-performing system. Linux is a remarkably complete operating system, including a graphical user interface, an X Window System, TCP/IP, the Emacs editor, and other components usually found in a comprehensive UNIX system.

Unlike Windows and other proprietary systems, Linux is publicly open and extendible by contributors. Because it conforms to the Portable Operating System Interface standard user and programming interfaces, developers can write programs that can be ported to other operating systems. Linux comes in versions for all the major microprocessor platforms including the Intel, PowerPC, Sparc, and Alpha platforms. It's also available on IBM's S/390.

2.3.12.2 Window NT

Windows NT is a Microsoft Windows personal computer operating system designed for users and businesses needing advanced capability. NT's technology is the base

for the Microsoft successor operating system, Windows 2000. Windows NT is actually two products: Microsoft NT Workstation and Microsoft NT Server. The Workstation is designed for users, especially business users, who need faster performance and a system a little more fail-safe than Windows 95 and Windows 98. The Server is designed for business machines that need to provide services for network-attached computers. The Server is required, together with an Internet server such as Microsoft's Internet Information Server (IIS), for a Windows system that plans to serve Web pages.

2.3.12.3 Window 98

Windows 98 (called "Memphis" during development and previously called "Windows 97" based on an earlier schedule) is a widely-installed product in Microsoft's evolution of the Windows operating system for personal computers. In Windows 98, Microsoft's Internet Explorer is an integral part of the operating system. Using the Active Desktop of Windows 98, you can view and access desktop objects that reside on the World Wide Web as well as local files and applications. The Windows 98 desktop is, in fact, a Web page with HTML links and features that exploit Microsoft's ActiveX control.

2.3.12.4 Analysis

Generally, Window 98 is one of the most suitable operating system for developing and administrating the Online shopping Cart & Ordering System. Window 98 is chosen because it is easy to install and easy to use too.

SYSTEM ANALYSIS

3.0 System Analysis

System analysis is the phase to analyze the system needs that involve the following stages:

(a) Information Gathering

An integrated technique of information sought has been used to gather the related information.

(b) Technology Consideration

The suitable technology and language to develop the system is identified.

3.1 Methodology

Waterfall model is implemented to develop the Online Shopping Cart & Ordering System. This model is chosen because it presents comprehensives steps on what happens during the development circle and it suggests to the developers the sequence of the event they should expect to deal with. The model is simple to use and understand. It enables organization to track project progress more accurately and discover possible problems at early stages of the product life cycle, especially for large or huge projects. (Please refer to Appendix A for waterfall model 's figure). Some of the main advantages of the waterfall model are:

- Make sure that developer building the right system according to the specification and verification checks the quality of the implementation.
- Easy to associate and identity each milestones with its deliverer.
- Suitable for the system that has many uncertainties in the earlier stages of system development.
- Prototyping enables developers to develop a more accurate system according to the user's direction. This helps developers to learn about the system and gain better understanding of the entire system as it is developed.
- This model is much more flexible. The development process can be easily verified and if there were any errors or additional aspects to add in into the phase before it, the development process can be reserved easily.

- Make large software projects more manageable and delivered on time without cost overrun.

3.2 Fact Finding Technique

Before developing the project, a detailed system analysis will be conducted. System analysis is a process of finding out what a system does and what is need are. The process involves understanding the requirement of the system that is going to be developed, collecting information and considering the alternative solutions to the problem within the constraints and feasibility of the solution.

System analysis starts with data collection. In order to start with the system development cycle, useful information, advice and recommendations are really important to the developers. Therefore, during the development cycle, I have applied 2 technologies to gather information related to the system that is going to be developed. Among the techniques used are:

3.2.1 Information Gathering

All the research work is approached from the point of view of this system, which involves reviewing academic materials that contain relevant information, especially on some existing technical work. Information is collected through reviewing reference books from library, faculty document room. Furthermore, information is also gathered from magazines, newspaper and journals.

3.2.2 Internet Surfing

Surfing net is indeed a good way of fast finding information. The information about E-commerce, ordering system and knowledge on Web development also collected through browsing the Web. Feedback from some Frequently Ask Questions (FAQ) sessions and joining the E-commerce related newsgroup helped the developer to clear up misconceptions or erroneous . Existing online system also help a lot in giving ideas and guidance on the features of the system that is going to be developed.

3.3 Requirement Specification

Requirement specification is a process to identify general 's requirement regarding the system that is going to be developed. This process can be divided into 2 sections which are functional requirements and non- functional requirements. Serious consideration is also made to choose and evaluate a set of development tools for the system.

3.3.1 Functional Requirements

Functional requirements are set of statement what the system will provide, how the system should react the particular input and how the system should perform to provide services to users. Basically, the functional requirement for Online Shopping Cart & Ordering System can be divided into 2 modules which are customer/storefront module and administrator/backend module.

3.3.1.1 Customer/Storefront Module

3.3.1.1.1 User Login/Verification

System will allow authorized user, who has registered and a valid member of the system to login to the store. User verification will be based on user identification and password.

3.3.1.1.2 Viewing & Updating Customer/Member Profile

Customer who is an authorized or registered user will be able to view and update their profile as any changes occur.

3.3.1.1.3 Process Customer Ordering

Users should be able to access to the shopping ordering system by selecting the desired catalog of products after log on to the system. Users will then be able to browse through the available products, ready to make order with the selected items and place the order over the Internet.

3.3.1.1.4 Shopping Cart

System will display lists of user's selected items and calculate the total value of the selected items. Users are allowed to modify the order information including adding new items, changing item's quantity, removing ordered items and updating order quantity whenever they like. System will be specially designed to recalculate the subtotal and the total value of the selected items.

3.3.1.2 Administration Module

3.3.1.2.1 Maintaining Customer Profile

System will enable administrator to manipulate authorized users ' profile.

3.3.1.2.2 Maintaining Order Record

System will enable administrator to manipulate order's records.

3.3.2 Non- Functional Requirements

Non-functional requirements are definitions for system constraints under which a system must operate. The non-functional requirements for Online Shopping Cart & Ordering System are summarized as below:

3.3.2.1 Correctness

Correctness is the extent to which a program satisfies its specification and fulfills user 's requirements and objectives.

3.3.2.2 Reliability

The system should be developed in a way that is reliable and should not cause any unnecessary failure at the overall operation. System should not cause any technical or costly failures when it is used in a reasonable manner. Any information displayed should be risk-free.

3.3.2.3 Robustness

Robustness refers to the quality that causes a system to be able to handle unexpected error and echo back with proper responses.

3.3.2.4 User Friendliness

The system interface design must be attractive, user friendly and easily understood by any users. Every interface design must be systematic, logical and tidy.

3.3.2.5 Response Tine

The response time to retrieve information such as customer profiles, product available in the store and shopping cart should be within a reasonable interval time. Users should not be kept waiting for a long time for the system to respond.

3.3.2.6 Accuracy

The system should be precise on computations and control. Online Shopping Cart & Ordering System should be able to allow the system to calculate, remove, delete and recalculate customer 's selected items precisely without any errors. Data transmission should also be as accurate as possible to avoid redundancy.

3.3.2.7 Expandability

The system is capable to expand its module, functionality and the volume of the product in the coming future.

3.3.2.8 Multi-User

The system should support not only a single user but also a large amount of concurrent users to access to the system.

3.4 Technology Consideration

3.4.1 System Architecture

Three-tier Software Architecture will be employed in the Online Shopping Cart & Ordering System. The reasons three-tier software architecture is chosen are:

- It provides the flexibility for modification. For E-commerce, evolution properly will occur to enhance the existing system toward a mere secure and complete system. Therefore, the three-tier software architecture is important to provide rapid evolution in whatever changes will be occurred in the future.
- The architecture can deliver greater application scalability. The added modularity makes it easier to modify or replace one tier without affecting the other tier.
- Enable developers to enhance the network security. This is to avoid fraud and interception on the order and payment information.
- Separation of application functions form the database functions make the system easier to implement load balancing.

3.4.2 Operating System

Basically, Window 98 is the most suitable platform for developing and hosting Online Shopping Cart & Ordering System. The reason why Window 98 is chosen are:

- It may enhance the overall system performance.
- Robustness. If a transaction happens to fail, the other transaction would not be affected. This advantage will help to enforce the reliability of the system.

3.4.3 Web Server

Web server is a piece of software running on a computer that distributes Web pages to user on demand, and provides an area in which to store and organize the pages of a Web site. Apache Web Server is chosen for hosting the PHP application in this Online Shopping Cart & Ordering System. The reasons why Apache is chosen are:

- It integrates easily with PHP technology. Hosting PHP application can be easy as possible.

- Apache is also available on the Windows platform and PHP is supported for this combination.
- It is tightly integrated with Window 98 in a number a ways, resulting in faster Web page serving.
- Apache has no problem with redirect of images. In Apache, this works: Header ("Location: imgs/1dot.gif"). However, this does not seem to work with PWS. The web developers have to read the image file into memory and echo it for PWS. There are no problems with redirecting non-image files.

3.4.4 Database

Database is one of the most important elements in Online Shopping Cart & Ordering System because it will be used to store product information, customers ' profiles, ordering records, administrators ' profiles and other related information. As a result, MySQL is chosen because of the reasons stated below:

- It is an easy-to-use and easy to manage database management system.
- It does pretty well in terms of searching database to service web-based queries.
- There are lots of PHP tools to manage and maintain MySQL databases. The feature set is complete compared to other databases. There are some very useful functions like mysql_insert_id and mysql_affected_rows which are not available for other database products.
- Most Web sites serve thousands of Web pages a day, but perform fewer data updates. A typical data transaction is simple single table update for user logins or forum posts. So a database with speedy SELECTs and lousy INSERTs and UPDATEs like MySQL is a good trade-off in this environment.

When I compare MySQL with other databases, Microsoft Access is much slower than MySQL. SQL Server 7 and Oracle are nearly as fast, but much too expensive if the developed web site does not need the transaction support. All in all, PHP's integration with MySQL is simply fantastic.

3.4.5 Web Languages & Technology

3.4.5.1 Development Tool

PHP is a server-side, cross-platform, HTML-embedded scripting language. Currently there are over half a million domains running PHP and it is freely available for download online from http://www.php.net/. Much of PHP's syntax is borrowed from C, Java and Perl with a couple of unique PHP-specific features thrown in. The goal of the language is to allow web developers to write dynamically generated pages quickly. PHP eliminates the need for numerous small cgi programs by allowing you to place simple scripts directly in your HTML files. It also makes it easier to manage large web sites by placing all components of a web page in a single html file.

The PHP scripting language is a hybrid of Perl, Java, and C. Most web developers are fairly familiar with at least one of these languages, so it makes PHP a quick language to learn. As for me I am familiar with C programming, so I can have a quick learning about PHP because the syntax structure is very similar to C. PHP also has good support for modular programming in classes. Usage of classes is still rare in VBScript because of its heritage. PHP's common heritage with Java and C++ ensures a large body of programmers who uses classes all the time.

With PHP, one application can be used to generate all the pages required to display items from a database in the proper pages, in the right locations, and with the appropriate related content. This eliminates redundant page generation, simplifying maintenance. PHP also reduces the site down to a handful of template pages, with scripts that generate the rest of the site.

PHP is an excellent alternative to such similar programming solutions as Microsoft's proprietary scripting engine ASP and Allaire's rather expensive ColdFusion. As mentioned before, PHP is a cross-platform language. This doesn't stop with the core PHP code but can be extended to all of PHP's libraries and all code written in PHP. Neither ASP nor ColdFusion can make this claim. PHP has a large feature set which includes built-in support for numerous databases (including Access, LDAP, Oracle, and MSSQL), networking support, zip archiving ,and an excellent set of built-in functions. Furthermore,

due in part to it being open source and freely available for download on the web, the language enjoys an active developing environment. Since the syntax structure borrows heavily from C, it is easy for even the novice programmer to learn the language. PHP is also the oldest HTML-embeded scripting language, giving it a head start on all the others.

When you create a PHP application, you create PHP script files which are plain text files comprising a combination of standard HTML code and script commands. While web servers normally send HTML files directly to the client's web browser in response to HTTP (HyperText Transfer Protocol) requests, the web server first processes the content of PHP scripts before sending output to clients. Within a PHP script, standard HTML code is sent directly to the browser, while script commands are executed locally on the web server. The script output can then be sent to the browser as standard HTML.

The reason why PHP is used is:

- Speed and robustness. PHP sites rarely, slow down the server because of the heavy loads (unless the server is already under-powered in general).
- Cross-platform. If you're a Linux, FreeBSD, Solaris, Windows NT, IRIX, HP-UX., or Amiga user, you'll find a distribution of PHP. Meanwhile, the other server-side languages have a relatively limited platform selection.
- Ease of use. PHP uses a very simple and friendly style of code. The fact that PHP code can be inserted directly alongside HTML makes the language all the more convenient.
- Free. PHP is totally free to use.
- Database-friendly. It can connect to Sybase, MySQL, mSQL, Oracle, Generic ODBC, PostgreSQL and many others (including most ODBC-compliant databases). Database connectivity is as uncomplicated as using Active Server Pages or Cold Fusion.

- With PHP, the developer can perform sophisticated mathematical calculations, provides network information, offers mail and regular expression capabilities, and much more.
- The PHP scripting language is a hybrid of Perl, Java, and C. Most web developers are fairly familiar with at least one of these languages, so it makes PHP a quick language to learn.
- PHP has comprehensive file system support.

3.4.5.2 Programming Language

3.4.5.2.1 HTML

HTML is used to define the structure and to some extent, the layout and design of a Web page. In others word, HTML is used to determine how that content will be displayed. As for this project, HTML is used in files that PHP code is embedded in standard HTML and then processed by the Apache web server to generate complete Web pages to be displayed in users ' browsers. HTML is tag-based languages that usually have beginning and ending tags.

The reason why HTML is used is:

- Its flexibility. The developers do not have to create different HTML documents for different types of computer. Any computer that has a web browser installed can display web pages, including computers running a Unix, Window or Macintosh operating system.

3.4.5.2.2 JavaScript

As for this project, JavaScript code will be embedded in the HTML pages in the client-side interfaces to perform simple functions such as clearing form fields and make the client interfaces more presentable. Only simple JavaScript coding will be included in the client-side scripting and it is not chosen as the server-side scripting. The reason why this scripting language is used is:

- JavaScript enables developers to create interactive web applications. Even if the Internet connection is slow, it can speed up the response time because the interaction does not need to involve the server but can take place in users own browser. Moreover, JavaScript has the capability to enhance user's interface and make it more "intelligent" and presentable.

3.4.6 Authoring Tools

3.4.6.1 Adobe Photoshop

Adobe Photoshop is arguably the most comprehensive photo editor. For the project, the software is going to be used to design and manipulate the graphic image, graphic text and screen layout that are going to be inserted in the Web pages. Using this graphic editor software, high quality graphic object can be created easily.

3.4.6.2 Macromedia Flash

Flash is the foremost authoring software for creating scalable, interactive animation for the web. For the project, the software is going to be used to design and manipulate the animated icons, web site navigation control and short-form animation. Macromedia Flash provides greatly enhanced capabilities for creating interactivity animation using ActionScript. It also is an ideal medium for the developer own creativity.

3.5 Project Software Configuration

Software	Description
Apache	Web server host
MySQL	Server database
Window 98	Client operating system
PHP	Server-side scripting & it is a web development tool
JavaScript	Client-side scripting
HTML	Web programming languages
Notepad	Coding for HTML document
EditPlus Text Editor	Coding for PHP & HTML document
Adobe Photoshop	Image design and manipulation
Macromedia Flash	Image Design and manipulation
Netscape Navigator	Client web server
Microsoft Internet Explorer	Client web server

Table 3.1 Project Software Configurations

3.6 System Requirements

The choice of hardware and software used in a system development is very important. It has a profound impact on the cost, quality and productivity of the system.

3.6.1 Hardware Requirements

The has the following minimum hardware requirements:

- 200 MHz processor or higher running Windows (95, 98, NT, 2000, ME), Mac, and OS/2.
- 64M+ RAM
- Network connection through existing network configuration or modem at least 28 KB.

3.6.2 Software Requirements

The recommended software requirements are listed as following:

- Web server service – Apache 1.3.12
- Database - MySQL v3.22.32.
- Operating System - Window 98
- Development Tool – PHP 4.0.3
- Web Technologies – HTML 4.01
- Programming Technologies & Languages – JavaScript
- Text Editor – EditPlus v2.10, Notepad
- Authoring Tools - Adobe Photoshop 6.0, Macromedia Flash 5.0
- Web Browser - Microsoft Internet Explorer 4.0 and above or Netscape Navigator 4.0 and above

3.7 Software Background for MySQL + Apache + PHP

This proposed project is running at the Apache web server with MySQL as the database backend, PHP as the server-side scripting language on a Window 98 system. This combination is the most ideal and the best combination to developed a large-scale web sites.

Apache is web server software. It is responsible for listening on a particular port (usually 80, 8000, 8080, or equivalent) for incoming requests for files (usually by a Web browser such as Netscape or Mosaic). Upon receiving a request for a file, Apache returns its contents to the Web browser, which is responsible for displaying the hypertext mark-up language (HTML) document contents (images, media, and so forth).

PHP is a hypertext preprocessor. When integrated with web server software, Apache, it becomes a powerful mechanism for adding intelligent scripts inside of HTML documents. Certain pages (whose file name typically ends in .php, .php3, or .phtml) requested from the web browser are passed through the PHP engine before being returned to the web browser. The PHP engine examines the page for PHP script, executes the script,

and returns an HTML document to the browser. The power of the scripting language stems from its tight integration with major databases, MySQL.

MySQL is an open source relational database management system (RDBMS) that uses Structured Query Language (SQL), the most popular language for adding, accessing, and processing data in a database.

SYSTEM DESIGN

4.0 System Design

Design phase is the stage of system development where the requirements for the system are translated into the system characteristics to meet the user requirement and satisfaction.

4.1 Online Shopping Cart & Ordering System Architecture

Online Shopping Cart & Ordering System is designed to leverages the traditional client/server architecture and extend it to the Web. Basically, it can be divided into 3 distinct tiers user application, business application and database application.

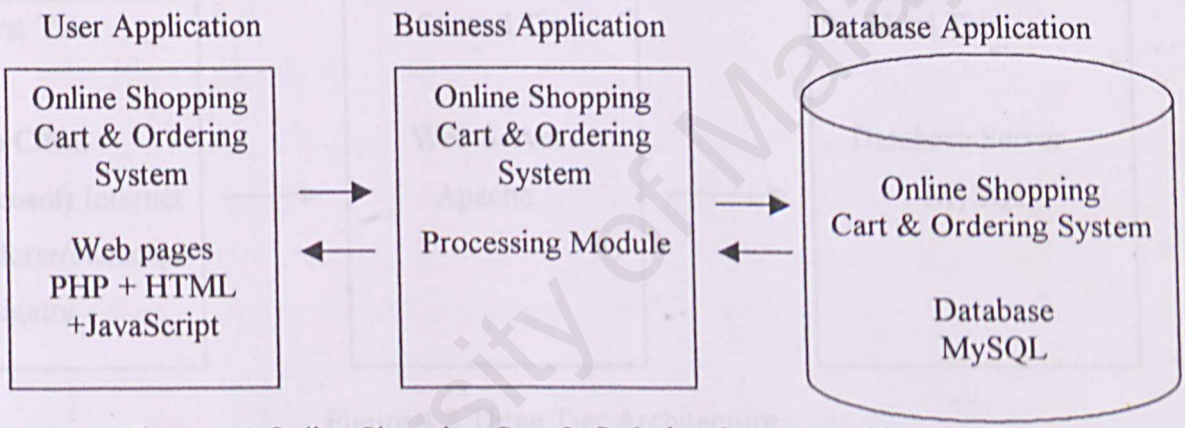

Figure 4.1 Online Shopping Cart & Ordering System Architecture

4.1.1 User Application

User Application level is the level that will interact directly with users. This is the level where all the input will be collected from the user and formatted through HTML, PHP and JavaScript code before being sent to the next tier for processing. The processed data later is sent back to this level and display the results to the user. PHP will be used in this application.

4.1.2 Business Application

All the function and procedures that deal manipulation of database calculation will be placed in this level. A request for application is initiated at the User Application level and will be sent to this level to be processed and interact with the database for create, update and delete purposes.

4.1.3 Database Application

At the database application level, a repository of the relevant data stored in the MySQL database, is available to support the work performed at the previous level. All the database manipulation tasks will be perform in this level.

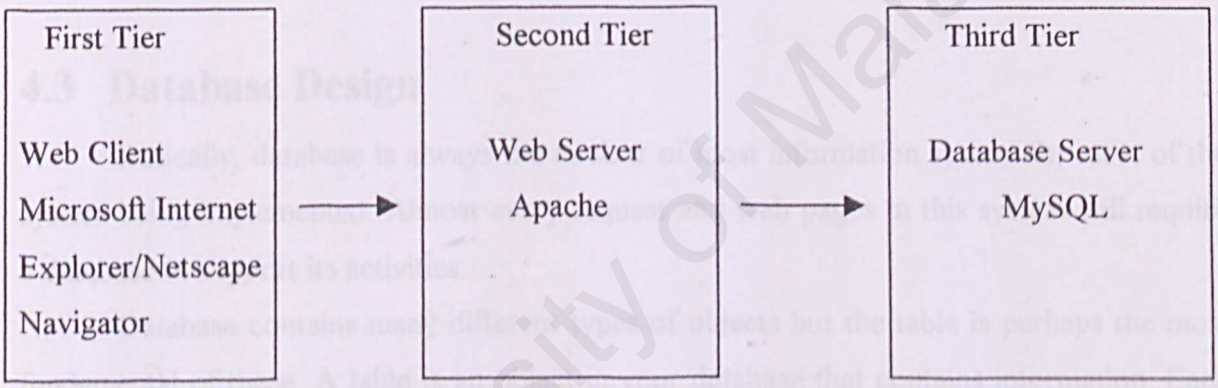

Figure 4.2 Three Tier Architecture

4.2 Three Tier Architecture

Generally, the system architecture of Online Shopping Cart & Ordering System is a three-tier software architecture. There are three layer or tier in this architecture and they are first-tier (Web client), second-tier (Web server such as Apache) and third-tier (Database server such as MySQL).

As for the Web client side, users will be equipped with the Web browser to view the information displayed on the screen, receive data or information from the application server and make request to the server to process data.

As mentioned in the section above, business object of the system will be used to encapsulate the system business logic. They will be responsible for manipulating the data in the system to provide the user with the proper information.

If user requests data which resides in the database server (MySQL), the program/business object will connect to the database server and retrieve the required records from the database. The data will be then be presented to the user through Web pages.

During the process of retrieving information, the business object will do additional tasks such as validation and conversion that are transparent to the user. The user will not directly update the database. Instead, it sends updating requests to the application server and the business object in the transaction server will handle the updating.

4.3 Database Design

Basically, database is always the nuclear of most information system for most of the system being implemented. Almost every request and web pages in this system will require a database to support its activities.

Database contains many different types of objects but the table is perhaps the most fundamental of these. A table is an object in your database that contains information. Each table that you define is made up of columns and rows. Each column represents an attribute about the information that is stored in your table. Collectively, the columns form a row in your table that represents a single occurrence of the information that the table represents.

For Online Shopping Cart & Ordering System, relational database model is chosen since it enables data stored in a way that minimizes duplicated data and eliminates certain types of processing errors that can occur when data are stored in other ways. Each table in the system is stored in rows and columns form. However, not all relations are equally desirable. For some relations, changing the data can have undesirable consequences, called modification anomalies, is considered and emphasized during database design.

4.4 E-R Model

The logical representation of data can be presented by assign an E-R model. Roughly, this model describe the relationship between entities that are involved in the project and the attributes of both the entities and their relationship in E-R diagram, we have:

- Rectangle, which refers to entity sets.
- Line, which links entity sets to relationship sets.
- Diamond, which refers to relationship sets.

E-R Diagram

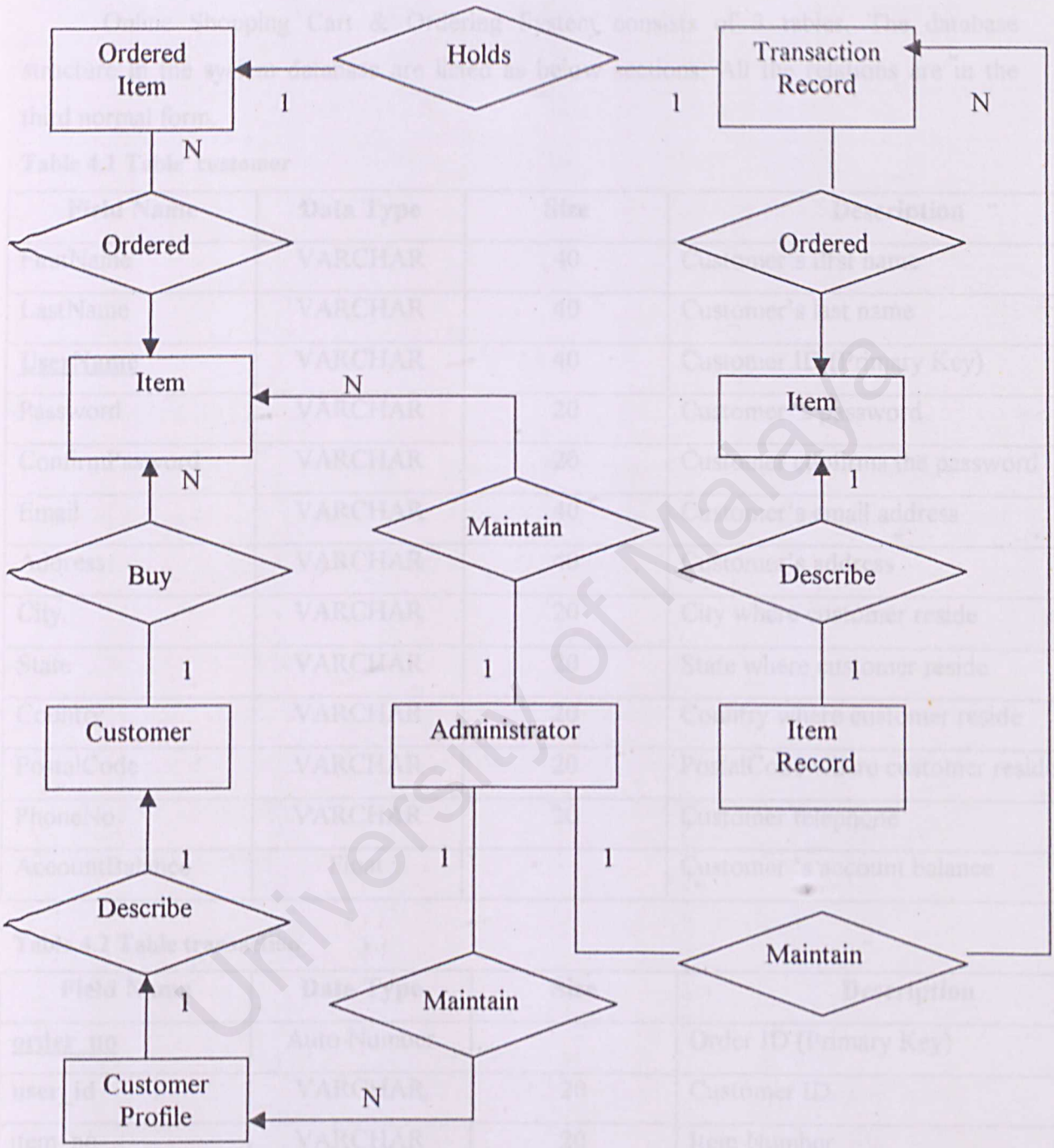

Figure 4.3 E-R Diagram of Online Shopping Cart & Ordering System

4.5 Data Dictionary

Online Shopping Cart & Ordering System consists of 3 tables. The database structure in the system database are listed as below sections. All the relations are in the third normal form.

Table 4.1 Table customer

Field Name	Data Type	Size	Description
FirstName	VARCHAR	40	Customer's first name
LastName	VARCHAR	40	Customer's last name
UserName	VARCHAR	40	Customer ID (Primary Key)
Password	VARCHAR	20	Customer 's password
ConfirmPasword	VARCHAR	20	Customer confirms the password
Email	VARCHAR	40	Customer's email address
Address	VARCHAR	40	Customer's address
City	VARCHAR	20	City where customer reside
State	VARCHAR	20	State where customer reside
Country	VARCHAR	20	Country where customer reside
PostalCode	VARCHAR	20	PostalCode where customer reside
PhoneNo	VARCHAR	20	Customer telephone
AccountBalance	Float		Customer 's account balance

Table 4.2 Table transaction

Field Name	Data Type	Size	Description
order_no	Auto Number		Order ID (Primary Key)
user_id	VARCHAR	20	Customer ID
item_no	VARCHAR	20	Item Number
item_name	VARCHAR	60	Item Name
quantity	Int	11	Item 's quantity
date	Date		Date of transaction
status	VARCHAR	20	Status of transaction

Table 4.3 Table item

Field Name	Data Type	Size	Description
item_no	VARCHAR	20	Item ID (Primary Key)
item_name	VARCHAR	60	Item 's name
item_type	VARCHAR	60	Item 's type
model	VARCHAR	60	Item 's model
price	Float		Item 's price

4.6 Program Design

Program design is a process to transfer the system requirement to system function. Online Shopping Cart & Ordering System will be designed based on the data flow oriented design, which divide the system modules and sub modules.

4.6.1 Structure Chart

Generally, Online Shopping Cart & Ordering System can be divided into 2 modules, which are customer/storefront module and administrator/backend module. Each main module can be further defined into several sub modules. Details on these 2 modules are as depicted as the following:

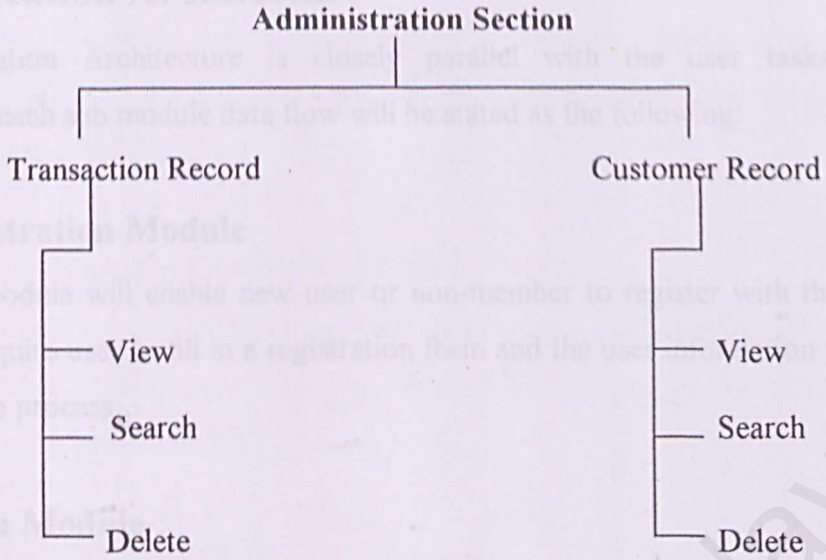

Figure 4.4 Administration Section Structure Chart

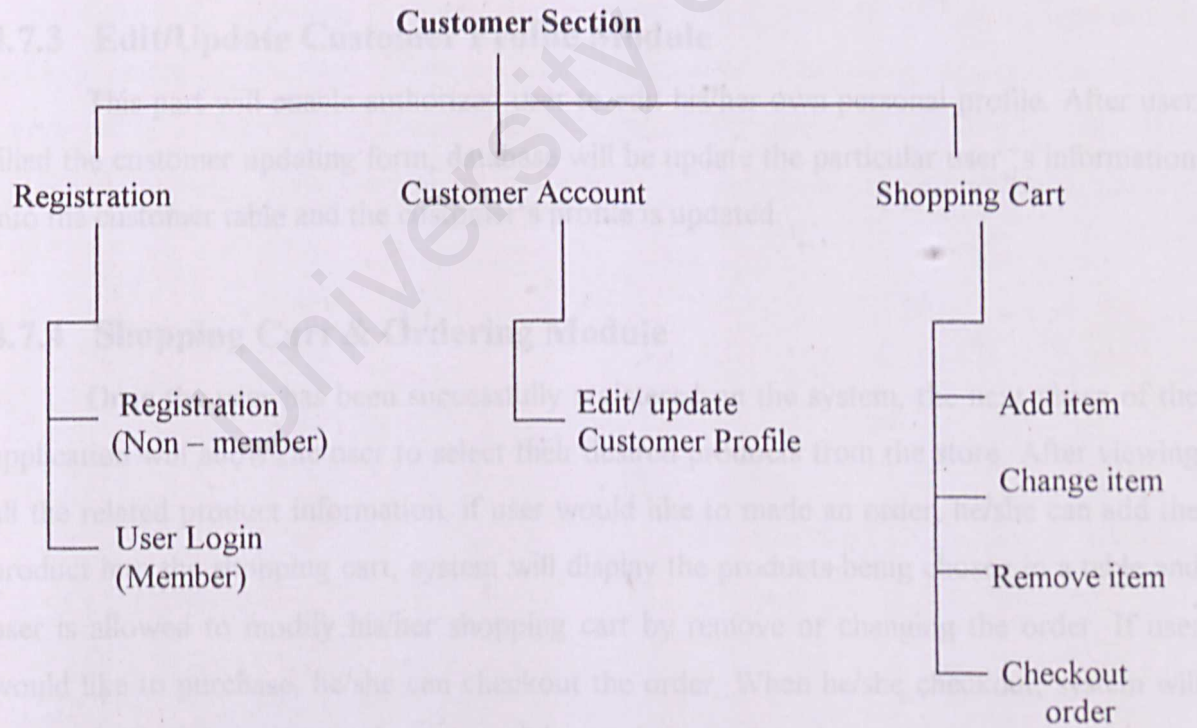

Figure 4.5 Customer Section Structure Chart

4.7 Application Architecture

Application Architecture is closely parallel with the user tasks flows. The description of each sub module data flow will be stated as the following:

4.7.1 Registration Module

This module will enable new user or non-member to register with the system. The system will require user to fill in a registration form and the user information will be kept in the database to process.

4.7.2 Login Module

This module is responsible for allowing user to identify them to the system. If user is a valid user or authorized member of Online Shopping Cart & Ordering System, then user is allowed to log on into the system and continue browsing through the Web pages and make order.

4.7.3 Edit/Update Customer Profile Module

This part will enable authorized user to edit his/her own personal profile. After user filled the customer updating form, database will be update the particular user 's information into the customer table and the customer's profile is updated.

4.7.4 Shopping Cart & Ordering Module

Once the user has been successfully registered on the system, the next phase of the application will allow the user to select their desired products from the store. After viewing all the related product information, if user would like to made an order, he/she can add the Product into the shopping cart, system will display the products being chosen in a table and User is allowed to modify his/her shopping cart by remove or changing the order. If user Would like to purchase, he/she can checkout the order. When he/she checkout, system will automatically sum up the total amount of the products in shopping cart.

4.7.5 Administrator – Order Module

This module enables administrator to search, view and delete order records in the database. After administrator log on to the system, order profile can be viewed and deleted from the order records.

4.7.6 Administrator – Customer Module

This module enables administrator to search, view and delete customer records in the database. After administrator log on to the system, customer profile can be viewed and deleted from the customer records.

4.8 Data Flow Diagram

Data flow diagram is a graphical characterization to illustrate how data flow in a system. By representing system process with data flow diagram, system could be easily understood by non-technical people.

Generally, most data flow modeling methods use 4 types of symbols to represent 4 types of system components, which are process, data flow, data storage and entities. In this report, entity is depicted by named rectangle; process is depicted by named circle; data storage is illustrated by single line without arrow; and data flow are written beside the line with arrow.

Registration Module

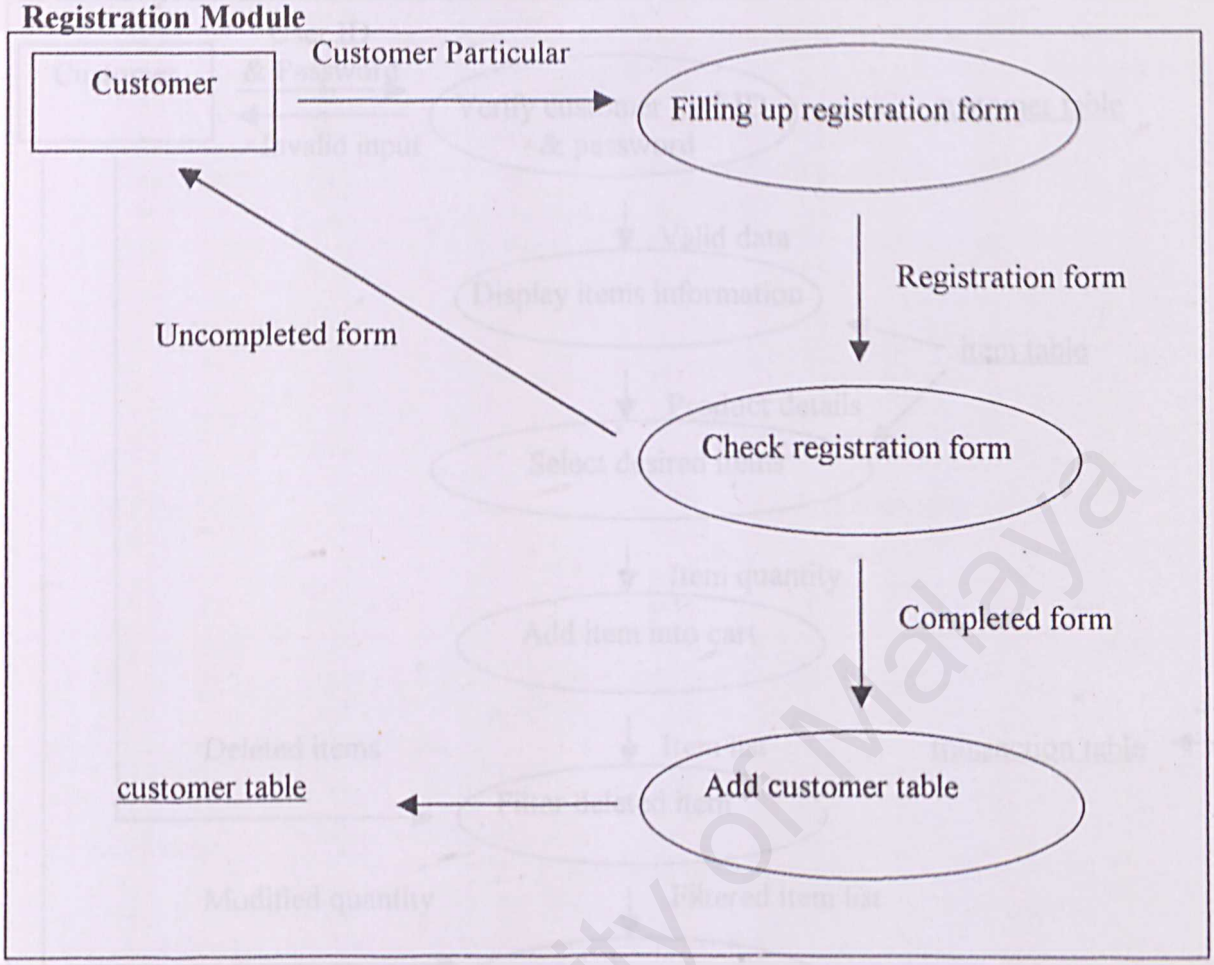

Figure 4.6 Registration Module

Login Module

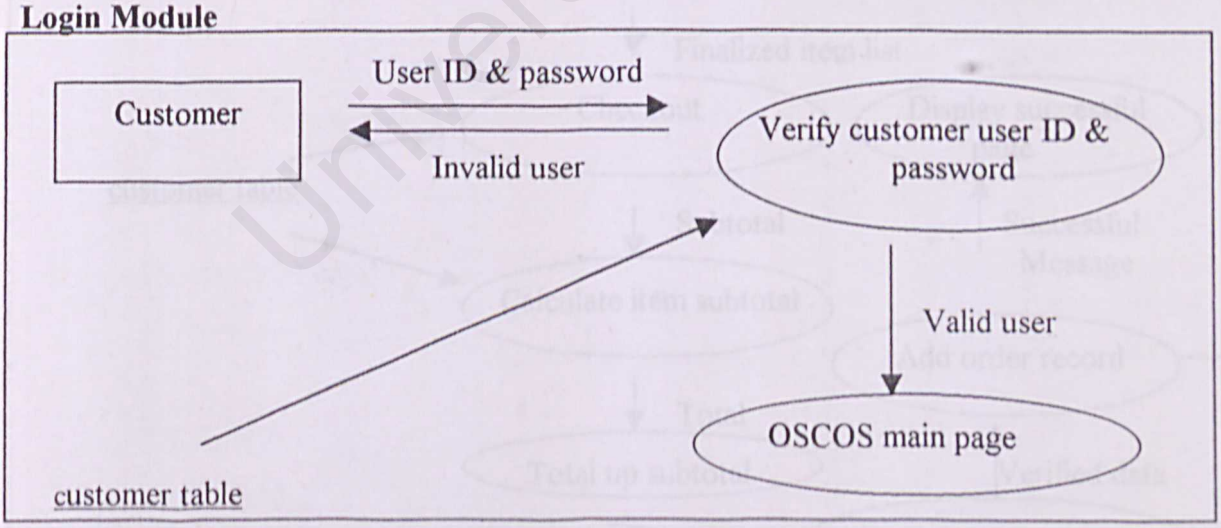

Figure 4.7 Login Module

Shopping Cart & Ordering Module

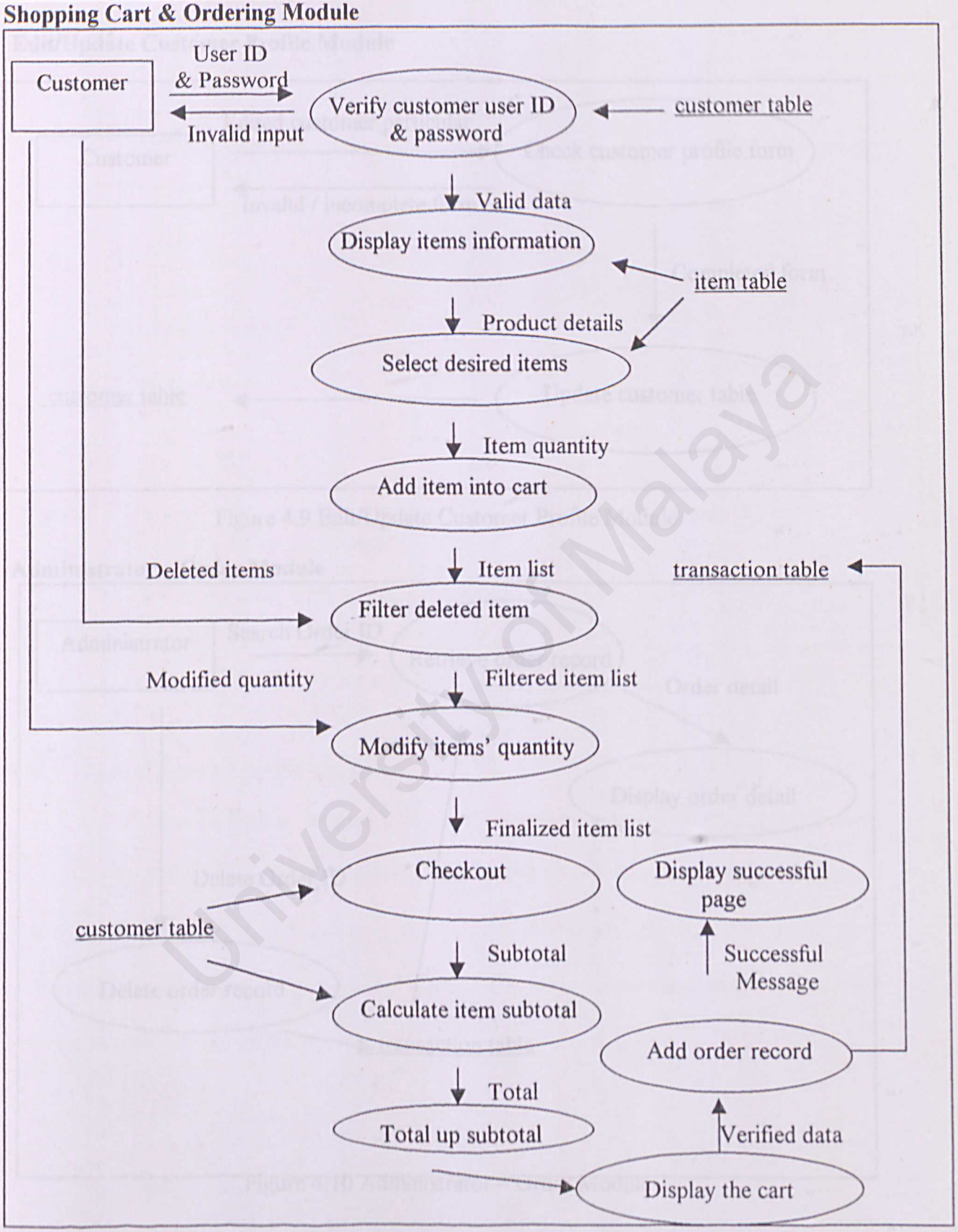

Figure 4.8 Shopping Cart & Ordering Module

Edit/Update Customer Profile Module

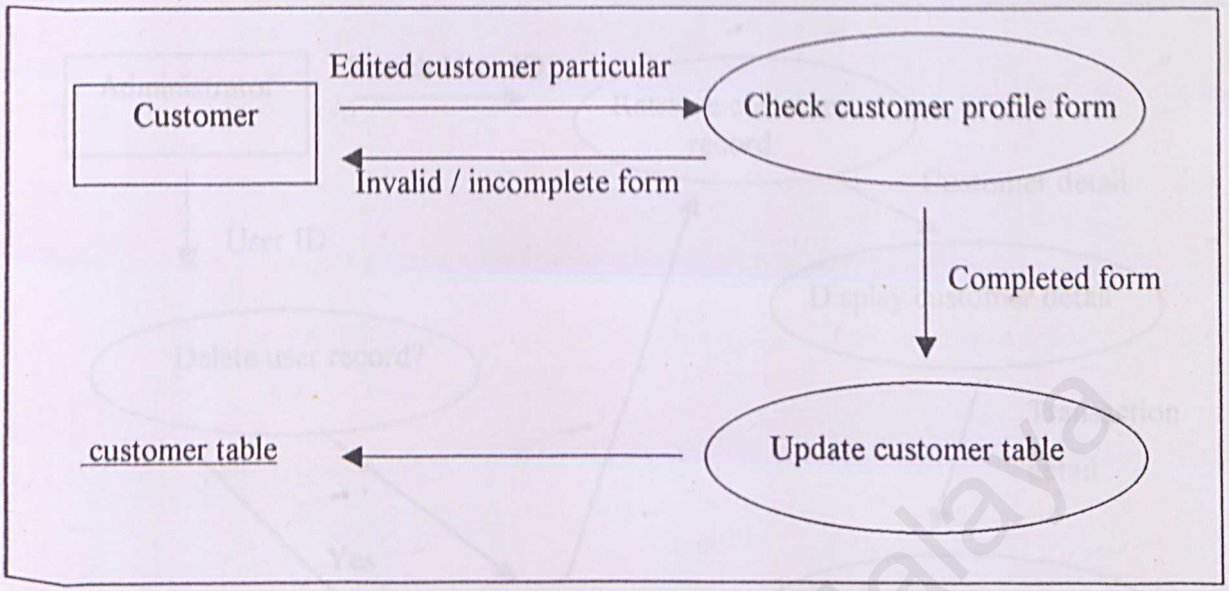

Figure 4.9 Edit/Update Customer Profile Module

Administrator – Order Module

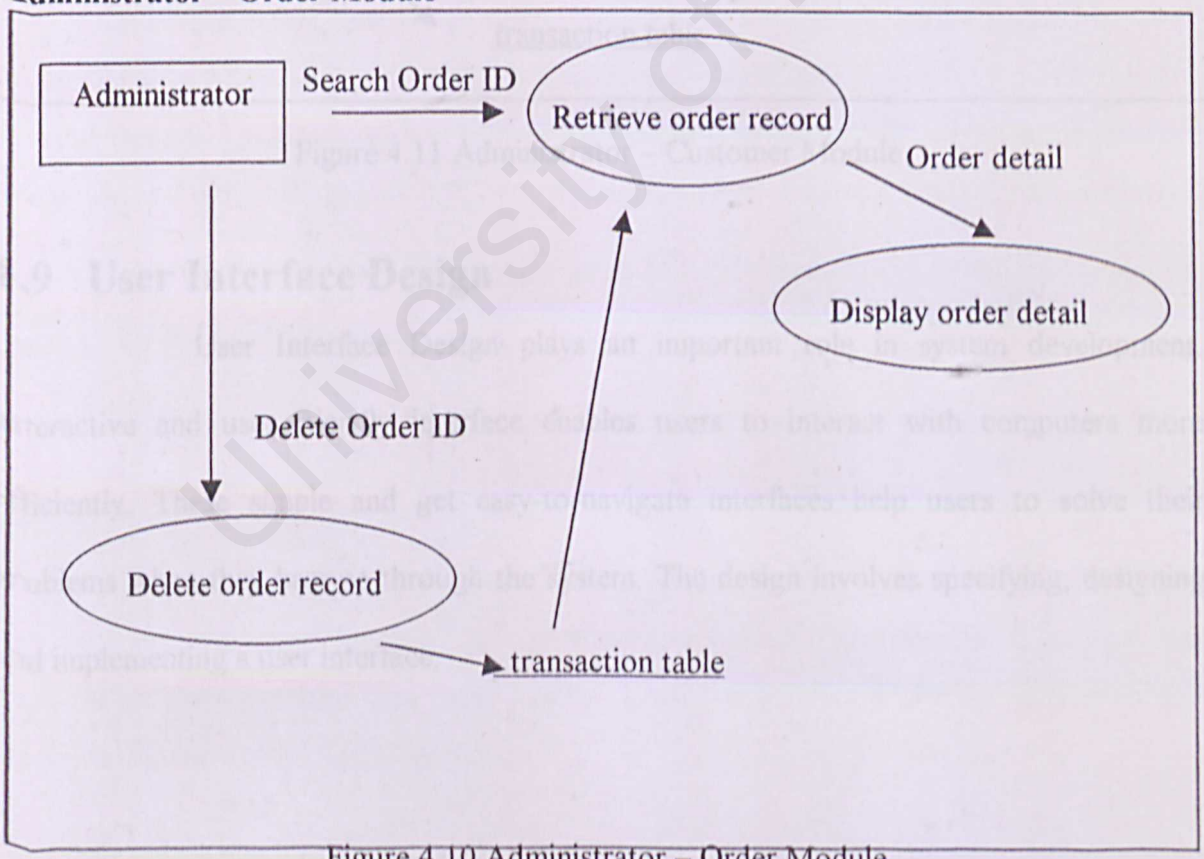

Figure 4.10 Administrator – Order Module

Administrator – Customer Module

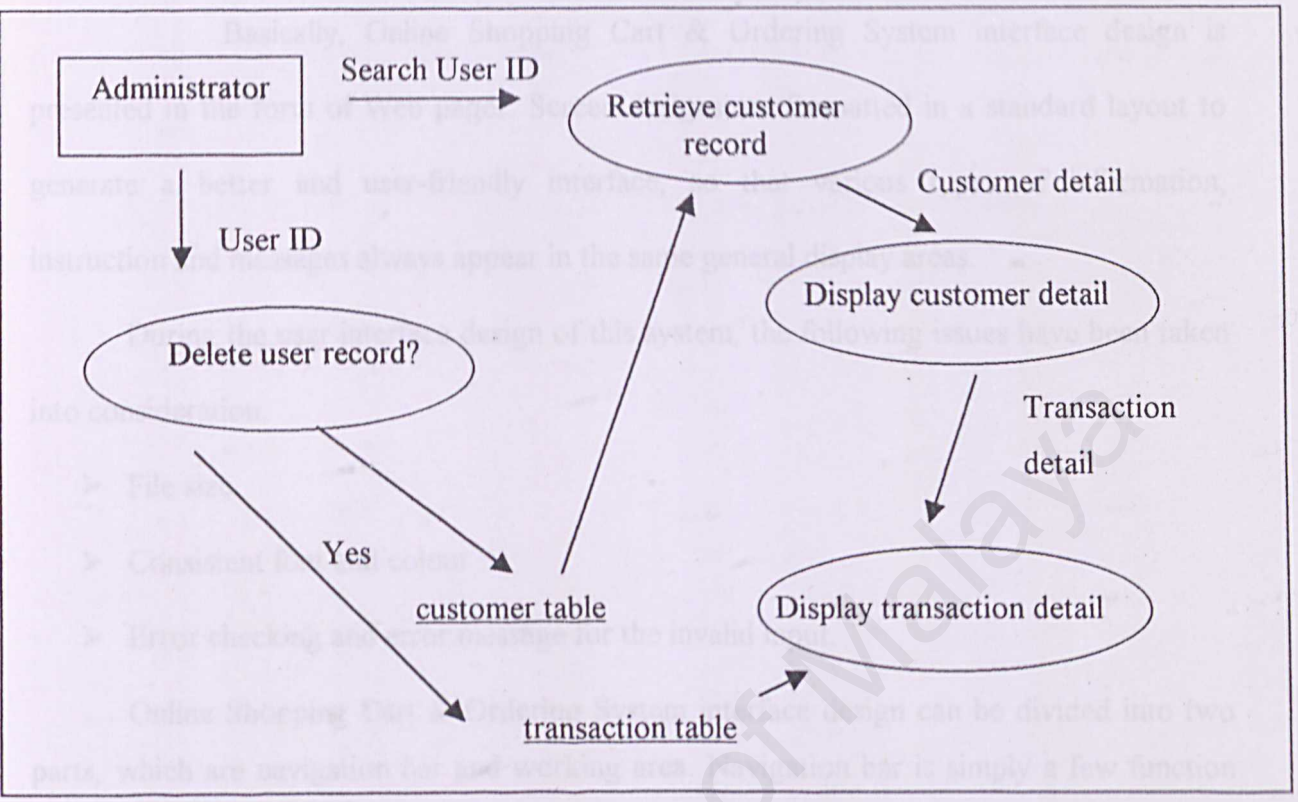

Figure 4.11 Administrator – Customer Module

4.9 User Interface Design

User Interface Design plays an important role in system development. Interactive and user friendly interface enables users to interact with computers more efficiently. These simple and get easy-to-navigate interfaces help users to solve their problems when they browse through the system. The design involves specifying, designing and implementing a user interface.

4.9.1 Online Shopping Cart & Ordering System Screen Design

Basically, Online Shopping Cart & Ordering System interface design is presented in the form of Web pages. Screen designs are formatted in a standard layout to generate a better and user-friendly interface, so that various types of information, instruction and messages always appear in the same general display areas.

During the user interface design of this system, the following issues have been taken into consideration.

- File size
- Consistent font and colour
- Error checking and error message for the invalid input.

Online Shopping Cart & Ordering System interface design can be divided into two parts, which are navigation bar and working area. Navigation bar is simply a few function buttons that will guide the users to browse through the significant Web pages in the system easily. As for the working area is a part of the Web pages that will interact with user input and it also provides a place to display results and information. The standard layout can teach users how to use the system effectively and let users familiar with the system. Page layout features are kept strictly consistent to maintain a site wide characteristic look and feel.

There are 2 interfaces section in Online Shopping Cart & Ordering System which are customer/storefront section and administrator/backend section. Each section will perform its own functions and these interfaces will resigned in a interesting way to gain users' satisfaction towards the system.

Since this web page is purposed to providing a shopping cart and ordering system, thus content of the shopping cart is displayed in a table form so that the reader at one glance can grasp it.

Please kindly refer to the user manual for the user interface in this system.

SYSTEM IMPLEMANTATION

5.0 System Implementation

The implementation phase takes place after the system design phase. System implementation is a process that convert the system requirements and design into program codes. This phase at time involves some modifications to the previous design.

5.1 Development Environment

The development environment is crucial for the rapid development of Web-based Online shopping Cart & Ordering System. Development environment consists of hardware and software configurations. Using the suitable hardware and software is an important factor to determine the successful of a project.

5.1.1 Hardware Configurations

The following hardware specifications have been used to develop this system:

- Intel Pentium(III) 450Mhz processor
- 256MB SD RAM
- 6.4 GB Hard Disk
- 15" 256-colour monitor capable of 800 x 600 resolution
- 1.44 MB Floppy Drive
- 52X CD-ROM Drive
- Speaker
- Other standard computer peripherals

5.1.2 Software Configurations

The software tools used for system development are vital to the successful implementation of Online Shopping Cart & Ordering System. The software specifications used in the development of this project are illustrated in Table 5.1.

Software	Usage	Description
Microsoft Windows 98	System Development	Operating System
PHPTriad 2.11	System Requirements	Apache web server, PHP & MySQL
EditPlus v2.10	System Development	PHP editor
Microsoft Internet Explorer 5.0 and above	System Requirements	Web browser
Adobe Photoshop 6.0	System Development	Graphics Editor
Adobe ImageReady 2.0	System Development	Graphics Editor
Macromedia Dreamweaver 3.0	System Development	HTML editing
Microsoft Word	System Development	Documentation
Notepad	System Development	HTML editing

Table 5.1 Software Configurations

5.2 Project Development

The design must be translated into the form that can be understood by the machine. The development of the web-based information system basically including 3 stages, which is data preparation, database connection and Coding for functions.

5.2.1 Data Preparation

5.2.1.1 Still Images

Still images, mainly are buttons, are included in the various pages within the web application, with the primary objective being to provide the user with links to the related web pages. These still images are GIF89A (.gif) interleaved graphic format. All of the images are created and edited using graphics editor such as Adobe Photoshop 6.0 and Adobe ImageReady 2.0. These images have optimized file size for faster web delivery.

5.2.2 Database Connection

We use MySQL database for Online Shopping Cart & Ordering System. It is created using PHPMyAdmin in PHPTriad. By using this, creation and modification can be made easily. It is an important step to do before the coding of web pages that involve process of data input by user that involve the database.

5.2.3 Coding

The design must be translated into the form that can be understood by the machine. The code generation step performs this task. Since this is a web-based ordering system, the scripts are coded using HTML, server side script and client side script that should support and enhance the web application.

5.2.3.1 HTML

HTML is mainly coded with using Macromedia Dreamweaver 3.0, a great HTML editor that provides many drag-and drop functions and user-friendly interface. Web page is designed easily by using Dreamweaver. Some codes are written using Notepad.

5.2.3.2 Java Script

JavaScript used as a client-side script for prompt up an alert window when the user input data is invalid.

5.2.3.3 Server-Side Scripts

A script that is interpreted by the web server is called a server-side script. A server-side script is an instruction set that is processed by the server, and which generates HTML. The resulting HTML is sent as part of the HTTP response to the browser.

5.2.3.3.1 Personal Home Page (PHP)

PHP is coded using EditPlus. It is a server-side scripting language used for creating dynamic web pages. In this project, all the server-side scripting is written for process that involves the database.

5.2.3.4 Coding Principles

Several principles are applied during the development of this system to ensure that the quality and the proper structure in the code generation.

I. Readability

Codes should be easy to read and understandable. It is very important when it comes to the enhancement of the system in the future by other people. In addition, the meaningful variable names and statement labels will also be helpful in reading and understanding the code.

II. Maintainability

Codes should be easy to read, corrected and revised. Codes that perform functions for a module should be grouped together. Besides this, the codes should be tried as simple as possible with doing in separate module. It is called loose coupling.

III. Robustness

Robustness refers to the quality that causes a system to be able to handle unexpected error and echo back with proper responses. Errors handling should be done to increase the robustness of the system. Appropriate errors message should be displayed response to user's input. System failure should be minimized or avoid it to be happened.

5.3 Example PHP Coding

```
<?php
$db_server = "localhost";          //database server
$db_login = "shop";                //database login
$db_password = "shop";             //database password
$db = "shop";                      //database containing the tables
$http_host = "localhost";          //HTTP host
$docroot = "siangschee";           //Path, where application is installed

?>
```

Figure 5.1 Example PHP coding (common.php)

This example file is called common.*php* file. It is included in every *php file in the system. Every database connection requires the name of the database, database server, database login id and database password. As the *$docroot* is the name of the folder where all the files is stored. HTTP (Hypertext Transfer Protocol) is the protocol your web browser users when you access the web sites. Since this system is applied as intranet, so the *$http_host* is "localhost".

```
header("Location:http://$http_host/$docroot/shop.php");
```

Figure 5.2 Example PHP coding of sending HTTP header statement

The header function is to direct the browser to another page. It includes the name of the file and the path where application is installed.

```
// Open a persistent connection with the MySQl server
if (!($link = mysql_pconnect ($db_server,$db_login, $db_password))) {
//  DisplayErrMsg(sprintf("internal error %d:%s\n",
//    mysql_errno(), mysql_error()));
  DisplayErrMsg(sprintf("internal error %s %s %s %d:%s\n",$db_server, $db_login,
$db_password,
    mysql_errno(), mysql_error()));
  return 0 ;
}

// Do the user/password authentication
if (!($result = mysql_db_query("$db", "select * from customer where
          UserName='$user'"))) {
  DisplayErrMsg(sprintf("internal error %d:%s\n",
    mysql_errno(), mysql_error()));
  return 0 ;
}
```

Figure 5.3 Example PHP coding of MySQL server connection statement and SQL command

Every *.php file will open a database connection with the MySQL server. *Mysql_pconnect* will create a persistent connection to a MySQL server. This connection will remain open, even after the PHP program that opened the connection has exited. Next time the PHP program can use the previous open connection. Then the next statement is to execute SQL commands. This statement is called data manipulation statements such as INSERT, DELETE, SELECT, UPDATE and REPLACE.

```
<?php
require 'common.php';

// Display error messages
function DisplayErrMsg( $message )
{
printf("<blockquote><blockquote><blockquote><h3><font color=\"#cc0000\">
      %s</font></h3></blockquote></blockquote></blockquote>\n", $message);
}

function authenticateUser($user, $password)
{
global $db_server, $http_host, $db_login, $db_password, $db, $docroot;

// Open a persistent connection with the MySQl server
if (!($link = mysql_pconnect ($db_server,$db_login, $db_password))) {
//   DisplayErrMsg(sprintf("internal error %d:%s\n",
 //     mysql_errno(), mysql_error()));
  DisplayErrMsg(sprintf("internal error %s %s %s %d:%s\n",$db_server, $db_login,
$db_password,
     mysql_errno(), mysql_error()));
  return 0 ;
 }

 // Do the user/password authentication
 if (!($result = mysql_db_query("$db", "select * from customer where
           UserName='$user'"))) {
   DisplayErrMsg(sprintf("internal error %d:%s\n",
     mysql_errno(), mysql_error()));
   return 0 ;
 }

 if (($row = mysql_fetch_array($result)) && ($password == $row["Password"]
           && $password != ""))
   return 1 ;
 else
   return 0 ;
 }

 function deleteCookies()
 {
 // delete all the old cookies
 for($I=0; $I<$total_items; $I++)
 {
```

```
setcookie("items_tray[$I]", "");
  setcookie("quantity[$I]", "");
}
setcookie("items_tray", "");
setcookie("total_items", "");
setcookie("quantity", "") ;

}
?>
```

Figure 5.4 Example of PHP coding (function.php)

This example file is called *function.php* file. It is included in every *php file in the system. It provided display error message function, user/password authentication function and delete cookies function. PHP coding must written between the statement "*<?php*" and "*?>*".

```
<?php
require 'function.php';

function checkEmail($address) {
        if(ereg( "^.+@.+\\..+$",$address)){
                return 1;
        }
        else {
                return 0;
        }
}

// Check if all the form entries are entered, if any form entry
// is missing then send, error message page

if ( (trim($FirstName)=="") || (trim($LastName)=="") ||
     (trim($UserName)=="") || (trim($Password)=="") ||
     (trim($ConfirmPassword)=="") || (trim($Email)=="") ||
     (trim($Address)=="") || (trim($City)=="") ||
     (trim($State)=="") || (trim($Country)==")" ||
     (trim($PostalCode)=="") || (trim($PhoneNo)==""))) {
   header("Location:http://$http_host/$docroot/error2.html");
```

```
 exit();

 } else if ($Password != $ConfirmPassword) {


// If both the passwords are not the same then generate error message
  header("Location:http://$http_host/$docroot/error3.html");
  exit();

 } else if (!checkEmail($Email)) {
   header("Location:http://$http_host/$docroot/error4.html");
        exit();
}

else {
// Open a persistent connection with the Database
  if (!($link = mysql_pconnect ($db_server, $db_login, $db_password))) {
    DisplayErrMsg(sprintf("internal error %d:%s\n",
      mysql_errno(), mysql_error()));
    exit() ;
  }


// Create the user record
$balance = 0.00;
  if (!($newresult = mysql_db_query($db, "INSERT INTO customer
       (FirstName,LastName,UserName,Password,ConfirmPassword,Email,Address,City,
                        State,Country,PostalCode,PhoneNo,AccountBalance) VALUES
       ('$FirstName','$LastName','$UserName','$Password','$ConfirmPassword',
'$Email','$Address','$City','$State', '$Country','$PostalCode','$PhoneNo','$balance')"))) {
    DisplayErrMsg(sprintf("internal error %d:%s\n",
                    mysql_errno(), mysql_error()));
    exit() ;
  }

   /* If Registration Successful, then display, else display error msg */
 header("Location:http://$http_host/$docroot/registration_success.html");

 exit();
}

?>
```

Figure 5.5 Another Example of PHP coding (register.php)

SYSTEM TESTING

6.0 System Testing

6.1 Introduction

No matter how good we written programs, it is obvious that from the variety of environments which are possible, we should check to ensure that our modules have functioned correctly.

System testing is a critical phase that ensures the system fulfills user requirements. Testing is performed to detect the existence of faults and then try to correct it. Therefore, a systematically test procedure is need to make sure the system is tested thoroughly and completely.

First, each module or program unit is tested separately. Such testing is called unit testing. Then, integration testing is conducted to verify that the program units work together as designed. Each module contains functions and procedures that must be checked and tested carefully. Finally, overall system testing used to test the overall system.

6.2 Unit Testing

The unit testing was conducted throughout the implementation once a new unit was successfully built up. Each unit is tested independently to ensure that it operates correctly. Functions and procedures in each module are examined carefully for errors.

For this system, every module is tested separately. It is to ensure that every function in the module is performed as desire.

For page that process user's input data such as registration function for new member, user input validation is tested in this stage to ensure proper entry for very fields in the registration form.

6.3 Integration Testing

After integration, the system as a whole is tested again. Integration testing is carried out to test the system that proved to work correctly and meet the objectives. In this stage of testing, each module contains functions and procedures is checked and tested carefully. These sub-functions may call other sub-functions and tests are carried out to ensure all possible paths are tested. Besides, all links in the web pages are tested. It is to ensure that every one of the hyperlink can lead to an existing and correct destination page.

6.4 Sub-system Testing

The system testing was done by first browsing the web application without login, then register, login. Records are ensured have been added or updated into the database.

6.5 Overall system Testing

System testing is actually a series of being carried out to fully exercise parallel in the system. This testing is used to ensure that all the components or modules of the system are functioning properly.

6.6 Acceptance Testing

The acceptance testing commences when the system is ready to be used. The usability testing is done and performed by the users. Users involved in this stage to make sure the system meets their understanding of the requirements, which may be different from the developer. Finally, the users can be assured that the system has fulfilled all the

requirements specification at the early stage of the system development. During the test, besides the functionality of shopping cart is demonstrated to the users, the users may also experience online shopping and placing order on the Web.

Some page and function have been added and improved base on the users' comment after they test the system:

- For page that manipulate the quantity of item in the user 's shopping cart, user's entry to modify the item quantity is tested to ensure that only number or integer is entered for the quantity field. An alert window is prompt out for every invalid entry.
- For page that retrieve and display the available record at the database such as display customer record function and transaction of the day function at store back site, if the table of customer and transaction is empty, the function will display a message to tell the user that is no record found.
- For page that display the shopping cart table, the system will prompt out the message to tell the user that their shopping cart is empty if they delete all their previous selected item in the cart.

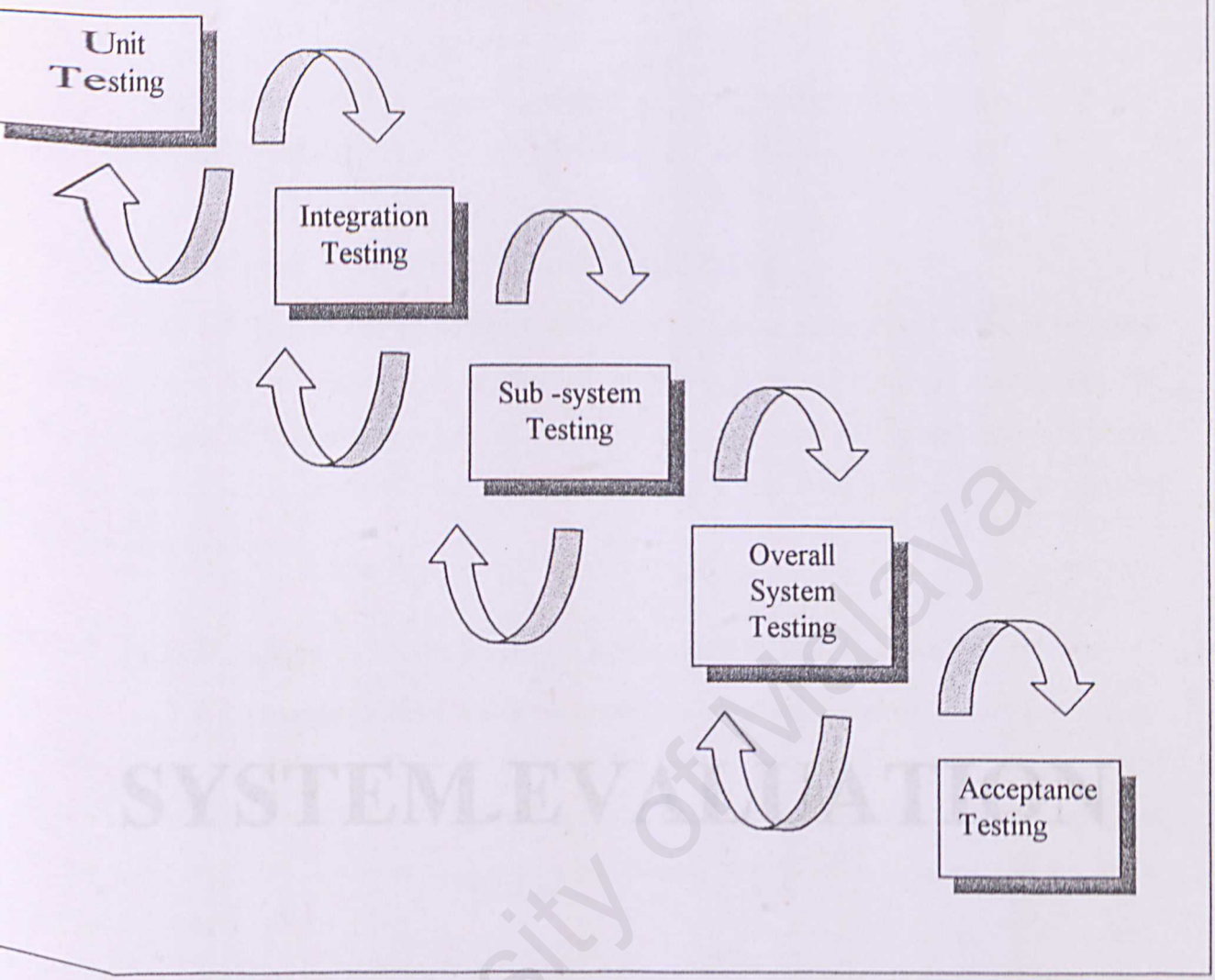

Figure 6.1 The Process of System Testing

SYSTEM EVALUATION

7.0 System Evaluation

In this phase, Online Shopping Cart & Ordering System was evaluated to identify its strengths, limitations, and proposals were made for the future enhancements.

7.1 Problems Encountered and Solutions

As this project has to be done within a short span of time and a lot of technical issues need to be resolved, a number of problems were encountered throughout the development of this system. Solutions have been sought during testing and reference check with course mates. Encountering with these problems has been proven to be a valuable learning experience.

7.1.1 Difficulties In Determining The Scope Of The System

It is impossible to build a full-scale complete system within the short time frame. Not all the ordering alternatives are put into the system. The project supervisor gave some advices and opinions for me to outline the scope of the project during the initial stages. On the other hand, the results of studying on the existing system have given an outlook of the system scope.

7.1.2 Problems In Choosing Tools And Language

There are quite a number of scripting languages. All the scripting language and tools allows the user to achieve the same end-result-that dynamic web application. Thus, it is difficult to determine the most appropriate language and tools for the development of Online Shopping Cart & Ordering System.

To gain more information of web-based and determine the most appropriate approach to use, in depth studies and research on the web based programming language was carried out in the earlier stage of the development.

These activities include Internet surfing, reading topic related magazine and reference books and studying the existing system. Besides, discussions with group

members and course mates engaging in similar project were conducted to collect their opinions and ideas.

7.1.3 Lack Of Knowledge In The Languages And Tools

As there is no prior knowledge in programming in a web-based environment, a lot of studies need to be done. Due to the time constraint, learning and developing process was done in parallel. New programming languages like PHP and HTML need to be learnt within a short time span. During the development of the system, a lot of time spent in looking for solutions to solve the problems that were occurred during the time.

Without a strong base of the PHP language, a lot of time has been taken to self-studies to improve my knowledge about PHP. Besides, lack of experience with using Dreamweaver and Adobe Photoshop, an authoring software that has much different with the software ever used, a lot of time is consumed to learn it while creating a new image.

These problems were tried to be solved through the Internet surfing by downloading tutorial notes and finding solution in forums such as newsgroup.

7.2 System Strengths

There are several advantages of this system as listed below:

7.2.1 User Friendliness

The system interface design is attractive, user friendly and easily understood by any users. It tells the users how to work with this system. Users have the controls of the system function flow by just click on the button. It incorporates a standard homepage with a consistent environment.

7.2.2 Easy Accessible

This system is a web-based application and can be accessed easily using the web browser such as Microsoft Internet Explorer 5.0 or Netscape Navigator 4.7, which both are the domain web browser in the market at the moment.

7.2.3 Ease To Use

This system is very easy to use. The commands and the layouts are simple, logical, tidy and well organized. Therefore, it is easy to learn up, use and understandable.

7.2.4 Password Protected Administrator Site

This Web-based Administrator Storeback for Online Shopping Cart & Ordering System, is a password-protected site. Giving authorized administrator ID and password prohibit unauthorized administrators prohibited from accessing his or her company records stored in the database. This also prevents intruders from intentionally or unintentionally causing vast damages to the system.

7.2.5 System Transparency

System transparency refers to the condition where the users do not need to know where the database resides, how is the system structure, its database management system and anything related to the system built. Users are just required to know how to communicate with the user interface.

7.2.6 Relatively Fast Response In Document Retrieval from Server

Each web page is designed to be lightweight. The response time to retrieve information such as customer profiles, product available in the store and shopping cart is within a reasonable interval time to ensure users need not wait too long to view the pages. Heavy graphics is avoided.

7.2.7 Reliable System with Effective Errors Handling

Data input of user is validated and verified to prevent errors caused by the invalid input. If there is an input failure, an error message is prompted to inform the user about the error. For example, there is an error message prompted for retry login when user input the invalid login ID or password and also for the invalid entry in the new member registration form.

7.2.8 Accuracy on Calculation

The system is precise on computations and control. Online Shopping Cart & Ordering System is designed to calculate, remove, delete and recalculate customer 's selected items precisely without any errors.

7.3 System Limitations

However, there are limitations in this system that are not resolved yet.

7.3.1 Limited Functionality

This system provides only a few functions to user. Shopping for placing product in the wishing list does not exist in this system. On the other hand, the Storeback Office does not provide a print out function generate any printed reports for the management. Even though above-mentioned functionality is out of the scope of this system, it is an advantage to enhance the system.

7.3.2 Web Browser Limitations

These web pages are developed by using Microsoft Internet Explorer 5.0. It is not fully tested in all web browser such as Netscape Navigator or latest version of Microsoft Internet Explorer. Thus, it may not display correctly by using other web browser except Microsoft Internet Explorer 5.0.

7.3.3 Email Facilities Not Integrated

The email server is not integrated. If the administrator wants to reply to users, he/she will have to use other mail facilities.

7.4 Future Enhancements

The system should be maintained throughout the lifetime of the system because the user requirements might vary from times to times. Enhancement in the future will extend the usability of this system. Moreover, the system limitations should be improved to enhance functionality.

Here are some suggestions and possible future enhancements:

7.4.1 Provide a Print Out and Email function For Management

It is recommended that a print out function to be added so that the administrator can have any transaction record to be printed out. Besides, The current system is not completed with a mail server service. In future a mail server can be incorporated into this system where is allows the administrator to maintain the records through the administrator module. With this mailing capability, every user can be reached, by the administrator.

7.4.2 Enhance User Interface

User interface should enhance from time to time. Multimedia elements such as animated graphics and Flash movies should be added to increase its attractiveness, impressive and interactive.

7.4.3 More Functionality Added

More ordering alternatives such as placing an order in a wishing list before checkout should be added to provide more interactivity. A web site that has more functionality provides more flexibility and interactivity to users.

7.4.4 Develop For Other Platform

The web page should be designed to enable it to be viewed properly in other browser such as Netscape Navigator. It is because not every Internet User using Microsoft Internet Explorer 5.0 or higher.

CONCLUSION

8.0 CONCLUSION

In conclusion, this system has fulfilled its objectives and requirements. The aim of this project is to develop Online Shopping Cart & Ordering System for a company provides a free e-commerce development package for the dealer. With this project, dealers can build their own e-store free to sell their products online to its customers. Therefore, this project has been proposed to develop and to apply with the initiative, idea and motivation toward realizing the objectives of the system.

This project is very important and beneficial. In the process of developing the system, a lot of useful knowledge and valuable experience were gained. These include knowledge in setting up PHPTriad, Internet technologies, and concepts in coding, programming in HTML, PHP , MySQL and others are valuable experiences.

Besides, experience in graphic editing using Adobe Photoshop and Adobe ImageReady also provides me a great chance to learn these tools.

The most important is, I have learned a lot of how to find out the solution whenever I encountered problems about developing an application.

Finally, there are many individual skills can learn from this project. Mainly it is the communication skills with people for asking opinions, advices, guidance and help. Besides, this project has given me a profound impact in management. All the problems faced and experience gained during the system development would be useful in my future career since era is now moving towards Internet technology that requires decent technical and practical knowledge in development of web application. In conclusion, involving in e-commerce system development is a valuable experience for me.

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GLOSSARY

GLOSSARY

ActiveX Data Objects (ADO) : an application program interface from Microsoft that lets programmers writing Windows applications get access to a relational or nonrelational database from both Microsoft and other database providers.

Apache : this is a web server that used to handling PHP

Application program interface (API) : the specific method prescribed by a computer operating system or by application program by which a programmer writing an application program can make requests of the operating system or another application.

Client/server : describes the relationship between two computer programs in which one program, the client, makes a service request from another program, the server, which fulfills the request.

Database : a collection of related data that can serve multiple purpose, support multiple users and designed to meet the information needs of an organization.

EDI (Electronic Data Interchange) : a standard format for exchanging business data.

Entity-Relationship Diagram (ER-Diagram) : a data modeling technique that creates a graphical representation of the entities, and the relationships between entities, within an information system.

Flash : a popular authoring software developed by Macromedia. First introduced in 1996.

FTP (File Transfer Protocol) : this is a standard Internet protocol which is the simplest way to exchange files between computers on the Internet. FTP is commonly used download programs and other files from other servers.

Graphical User Interface (GUI) : a graphical (rather than purely textual) user interface to a computer, which let you interact by using a mouse rather than by having to type in keyboard commands.

HTTP (Hypertext Transfer Protocol) : The behind-the-scene Internet protocol that delivers information by way of the World Wide Web. The protocol makes it possible for a user to use a client program to enter a URL (or click a hyperlink) and receive text, graphic, sound and other digital information from a web server.

IDE (Integrated Drive Electronics) : a standard electronic interface used between a computer motherboard's data paths or bus and the computer's disk storage devices.

Internet : a loose association of thousands of networks and millions computers across the world that all work together to share information. It was created in 1969.

ISP (Internet service provider) : a company that provides individuals and other companies access to the Internet and other related services such as Web site building and virtual hosting.

JavaScript : a scripting language that is a special kind of programming language used to tie other components together or to accept user input.

ODBC (Open Database Connectivity) : A standard protocol for accessing information in SQL database servers, such as MySQL. ODBC drivers enable MySQL to connect to these SQL database servers and access data in the SQL database.

Relational Database Management System (RDBMS) : a program that lets you create, update, and administer a relational database. An RDBMS takes Structured Query Language (SQL) statements entered by a user or contained in an application program and creates, updates, or provides access to the database.

Secure Sockets Layer (SSL) : a commonly-used protocol for managing the security of a message transmission on the Internet.

SET (Secure Electronic Transaction) : a system for ensuring the security of financial transactions on the Internet.

SQL (Structured Query Language) : a standard interactive and programming language for getting information from and updating a database. Queries take the form of a command language that lets you select, insert, update, find out the location of data, and so forth.

Text Editor : a computer program that lets a user enter, change, store, and usually print text (characters and numbers, each encoded by the computer and its input and output devices, arranged to have meaning to users or to other programs).

Transmission Control Protocol/Internet Protocol (TCP/IP) : the basic communication language or protocol of the Internet. When you are set up with direct access to the Internet, your computer is provided with a copy of the TCP/IP program just as every other computer that you may send messages to or get information from also has a copy of TCP/IP.

URL (Uniform Resource Locator) : a compact representation of the location and access method for a resource available via the Internet. It used to specified Web locations by URLs of files on web servers begin with http://.

W3C (The World Wide Web Consortium) : W3C sets the standard for HTML an other specifies of the web.

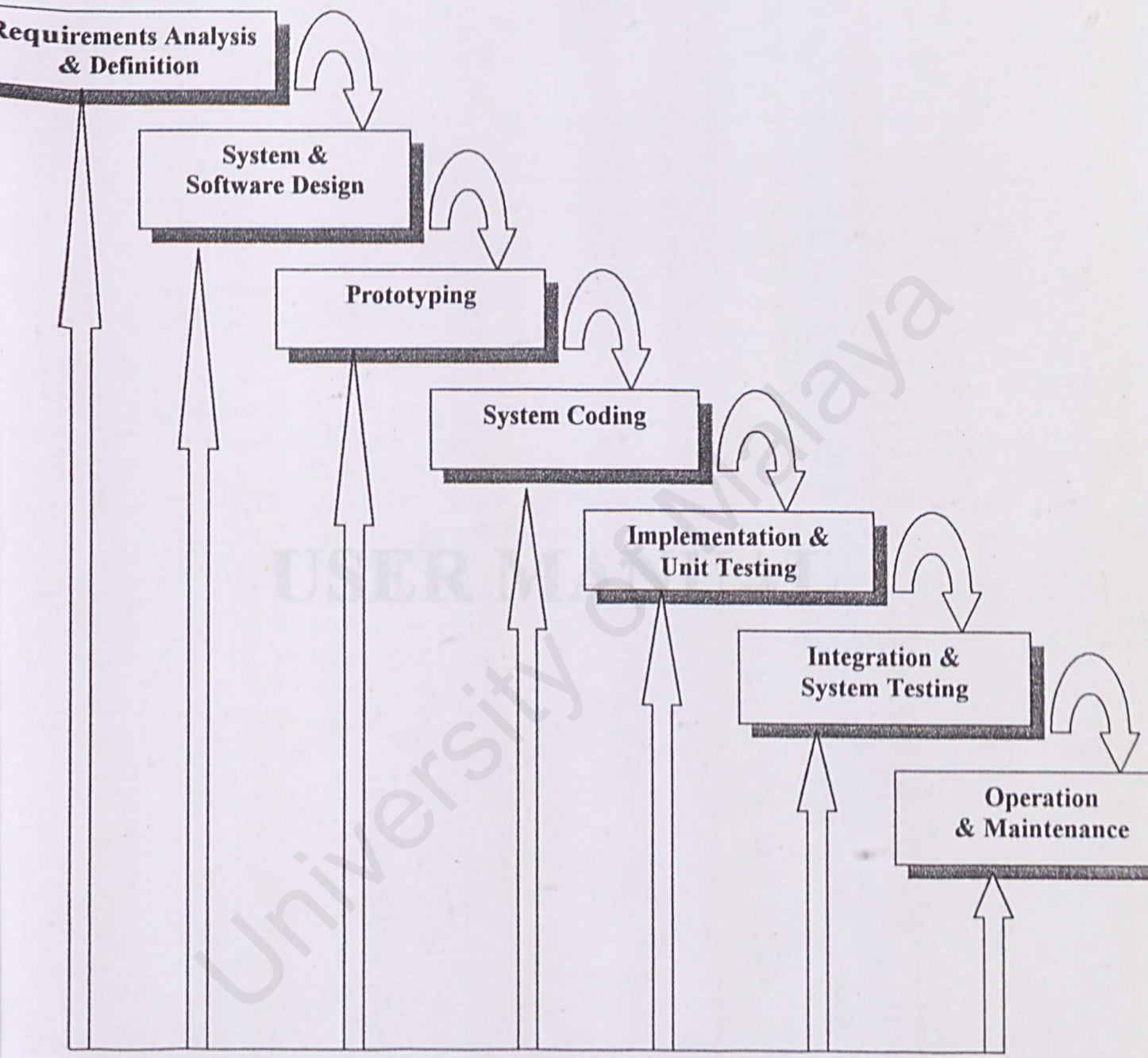
Web Browser : it is able to read the HTML language on a page and translate it to a displayable image. Microsoft Internet Explorer and Netscape Navigator are popular web browser.

Web Server : a program that using client/server model and the WWW 's HTTP, serves the files that from web pages to web users.

WWW (World Wide Web) : WWW is subset of the Net. It is a collection of interlinked documents that work together using specific Internet protocol called HTTP. The Web began in 1989.

APPENDIX A

APPENDIX



USER MANUAL

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1.0 PHP Triad

1.1 Installtion instructions

1. Browse the CD and click on the PHPTriad set up to start the set up of PHPTriad into your PC.
2. After the set up process is complete, open the folder named "*apache*" in the directory where you install PHPTriad.
3. In the "*apache*" folder, open the folder named "*mysql*", next continue by open the folder named "*bin*", click on the "*winmysqladmin.exe*" icon as shown below:

4. Then, it will prompt a window named WinMySQLadmin 1.0 and user is required to enter the user name and password for the MySQL database server.

   Warning: The same username and password has to be appear in the $db_login and $db_password in file named "common.php" in "shoppingcart" folder.

   $db_login = user

   $db_password = password

5. After configure the MySQL, user has to copy the folder named "*shoppingcart*" in the CD into the folder named "*htdocs*" under the "*apache*" folder. This folder includes all the PHP files and HTML files which is used in the system.

   Warning: The same folder name "shoppingcart" has to be appear in the $docroot in file named "common.php". If you change the folder name, you also has to change the value assigned for $docroot as well.

6. Next, copy the folder named "*shop*" in the CD into the folder named "*data*" under the "*mysql*" folder in "*apache*" folder. This "*shop*" folder contains the database data in my system. So, now PHPTriad will create a database named "*shop*" for you.

1.2 Start Apache

1. Start the Apache Webserver. Now run the server by selecting start menu, Program, PHPTriad. (Repeat this step for everytime before you want to browse my system.)

   Start Menu ⟶ Programs ⟶ PHPTriad ⟶ Start Apache

2. Open the file in your browser.

   Start Menu ⟶ Programs ⟶ PHPTriad ⟶ Launch Site

   In the address field of the browser, open file by enter **"http://$http_host/$docroot/file name"**

   a. For Customer Section (Storefront)

      Enter : http://localhost/shoppingcart/home.html

   b. For Administration Section (Storeback)

      Enter : http://localhost/shoppingcart/store_back.html

      The default admin id and password is : admin & admin.

3. If you want to access to the database of the shopping cart & ordering system, open the PHPMyAdmin in your browser.

   Start Menu ⟶ Programs ⟶ PHPTriad ⟶ PHPMyAdmin

   Select the database named "shop" in the left menu of the PHPMyAdmin. It will display the tables available in the database. You can browse the content of the tables by clicking the hyperlink text "Browse" on the corresponding table.

4. If you want to check your database username and password, you can open the WinMySQLadmin 1.0 which appear at the startup menu ("right conner bottom at the screen and it look like a traffic light"), right hand click and choose "show me".

   Under the "*my.ini Setup*" tab in WinMySQLadmin 1.0, it will show the database server username and password. After that, click button named "*Hide me*" under the "*Environment*" tab.

5. After browse through the shopping cart & ordering system, close the Apache Server by Ctrl-C.

2.0 Introduction

Basically, the Shopping Cart and Ordering System can be divided into 2 sections: Customer Section (Storefront) and Administrator Section (Store back).

The customer section is designed to function as an online catalogue, which displays all the products available at the web page. Users can add the related products available in the store in their shopping cart. The shopping cart system will keep track of users ordering information and enable users to manipulate their orders.

For the administrator section, the system administrators are granted to access the system to manipulate customer profile and order records.

OSCOS system is very easy to use and understood by any users. All the functions in the system can be easily executed by a simple click on the link or button.

This user manual provides the instruction on how to use this system.

2.1 Hardware Requirements

Personal computer with

- At least 32 MB of RAM
- At least 100MB of free space in Hard disk.
- 256-color monitor capable of resolution 800 X 600 pixels

2.2 Software Requirements

- Windows 95/98 or Win NT/2000
- PHPTriad 2.11
- Microsoft Internet Explorer 5.0 or Netscape Navigator 4.7

3.0 Getting Started

3.1 Customer Section

Customer Section is a series of web pages that will allow customers from browsing the content of the web site to making order through the ordering system and updating their own profile.

3.1.1 Log in & New Member Registration

The system will provide a login system for authorized members to shop on-line. Figure 3.1 illustrates the login panel for the member. Authorized member of Online Shopping Cart & Ordering System can enter the user identification (user id) and password to login into the system. Errors handling take place too. If user has failed to login, user will prompt to login again. After user has login, on the top frame of the page will display the user 's name.

As for the new visitors who wish to register themselves as authorized members, just click on the "Register Here" text with link to another page which will display a registration form for them to register. Figure 3.2 illustrates the registration form for the new member. As this page will process user's input data in registration function, so user input validation is tested in this stage to ensure proper entry for very fields in the registration form. An error message page will displayed to inform the user to re-enter the missing data field and invalid data field such as invalid email address and inconsistent entry for password.

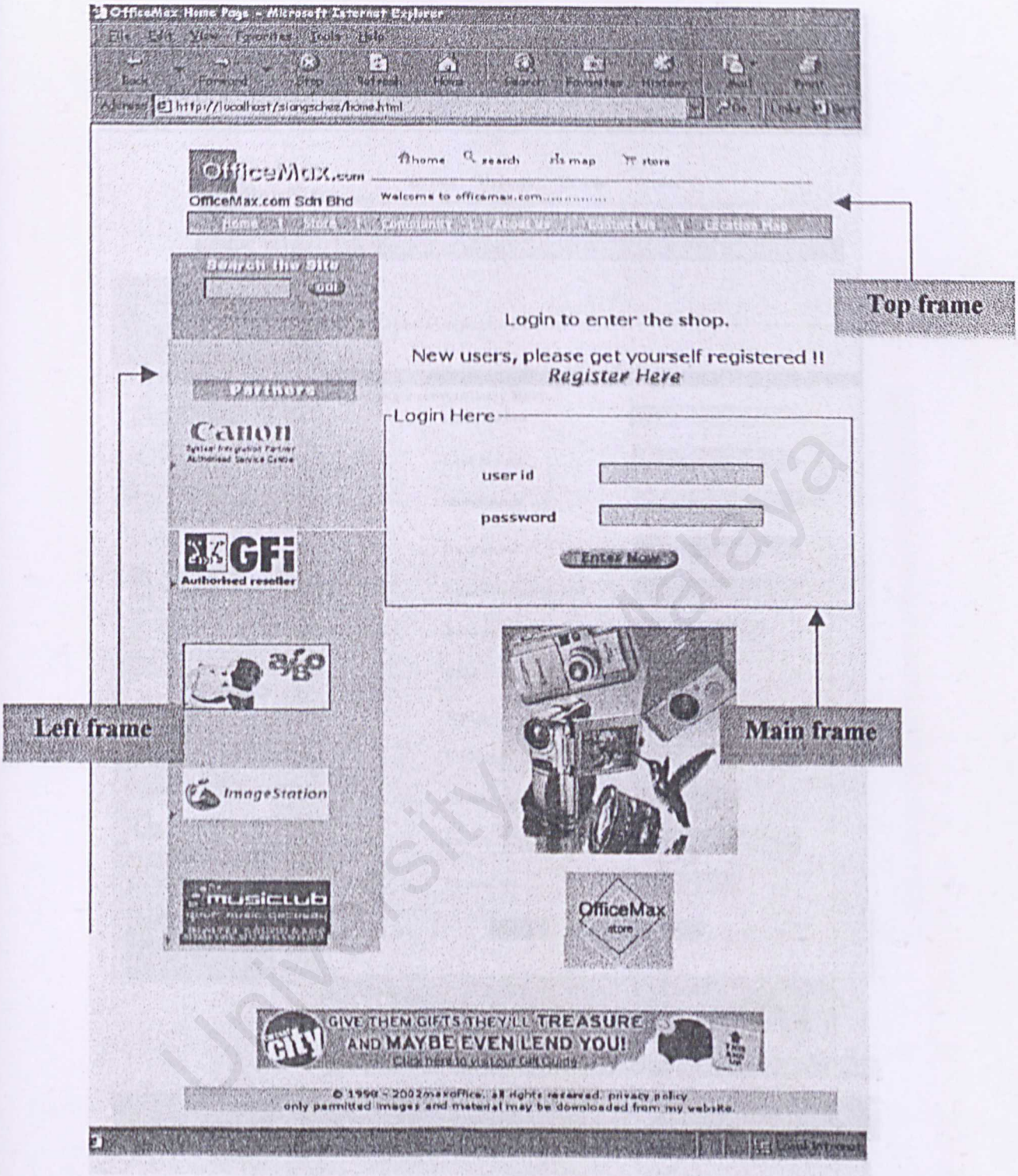

Figure 3.1 Homepage of Shopping Cart & Ordering System- Login Panel

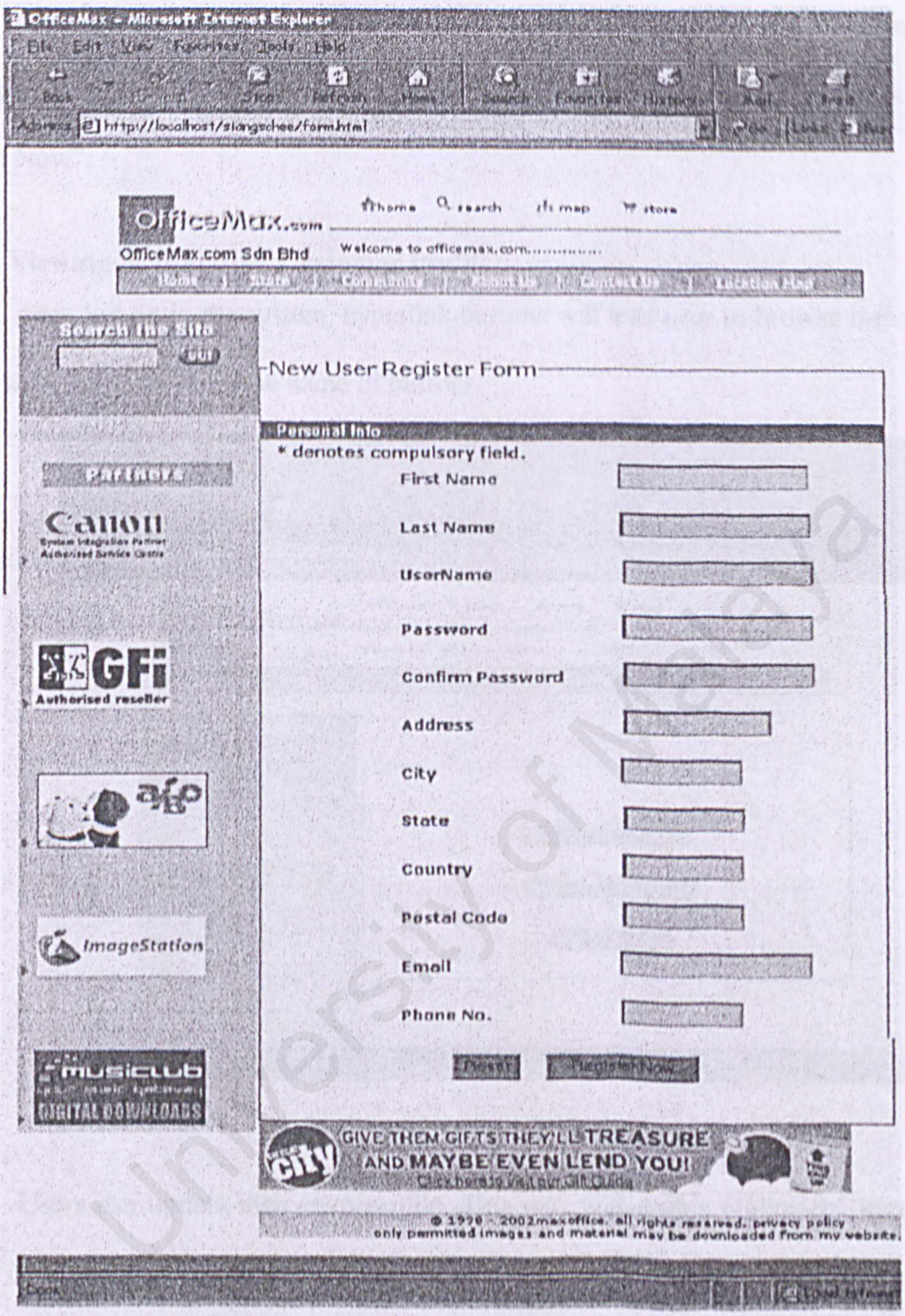

Figure 3.2 Registration Form for New Member

After they are successfully registered to the system, a successful message would be displayed and they will take back to the login panel by click on the hyperlink button "Login Now".

3.1.2 Viewing & Updating Customer Profile

After log on to the system, hyperlink buttons will lead user to browse the contents of the web page according the name of buttons.

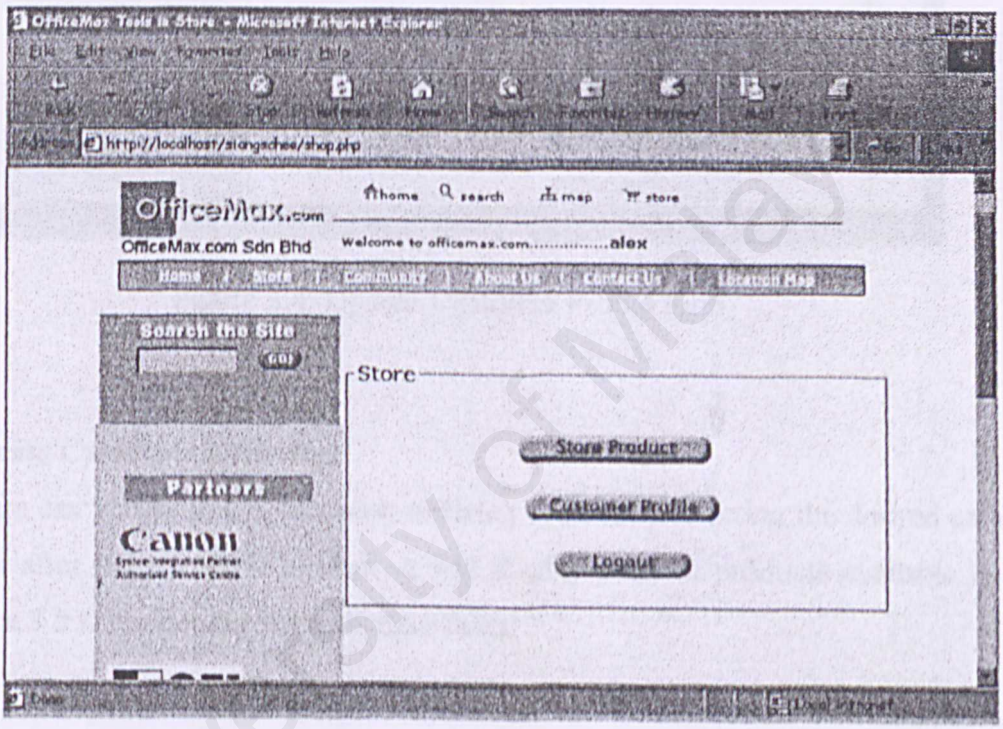

Figure 3.3 Content of the Store

Users can update their own profile. This part will enable authorized user to edit his/her own personal profile as any changes occur. After user filled the customer updating form, database will be update the particular user 's information into the customer table and the user 's profile is updated. Then, users can continue shopping or update their profile by clicking on the hyperlink text "Continue Shopping" and "Update Profile".

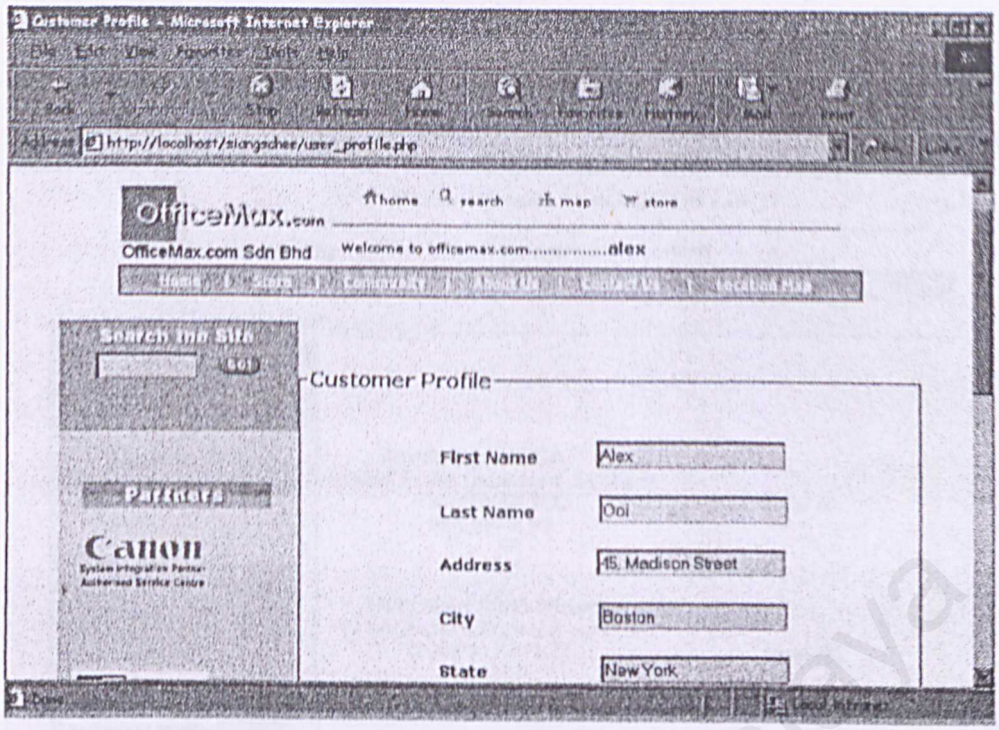

Figure 3.4 Update Customer Profile form

3.1.3 Process Customer Ordering

Users can access to the shopping ordering system by selecting the desired catalog of products after log on to the system. It will display a list of products available in the store. Figure 3.5 illustrates the list of the products.

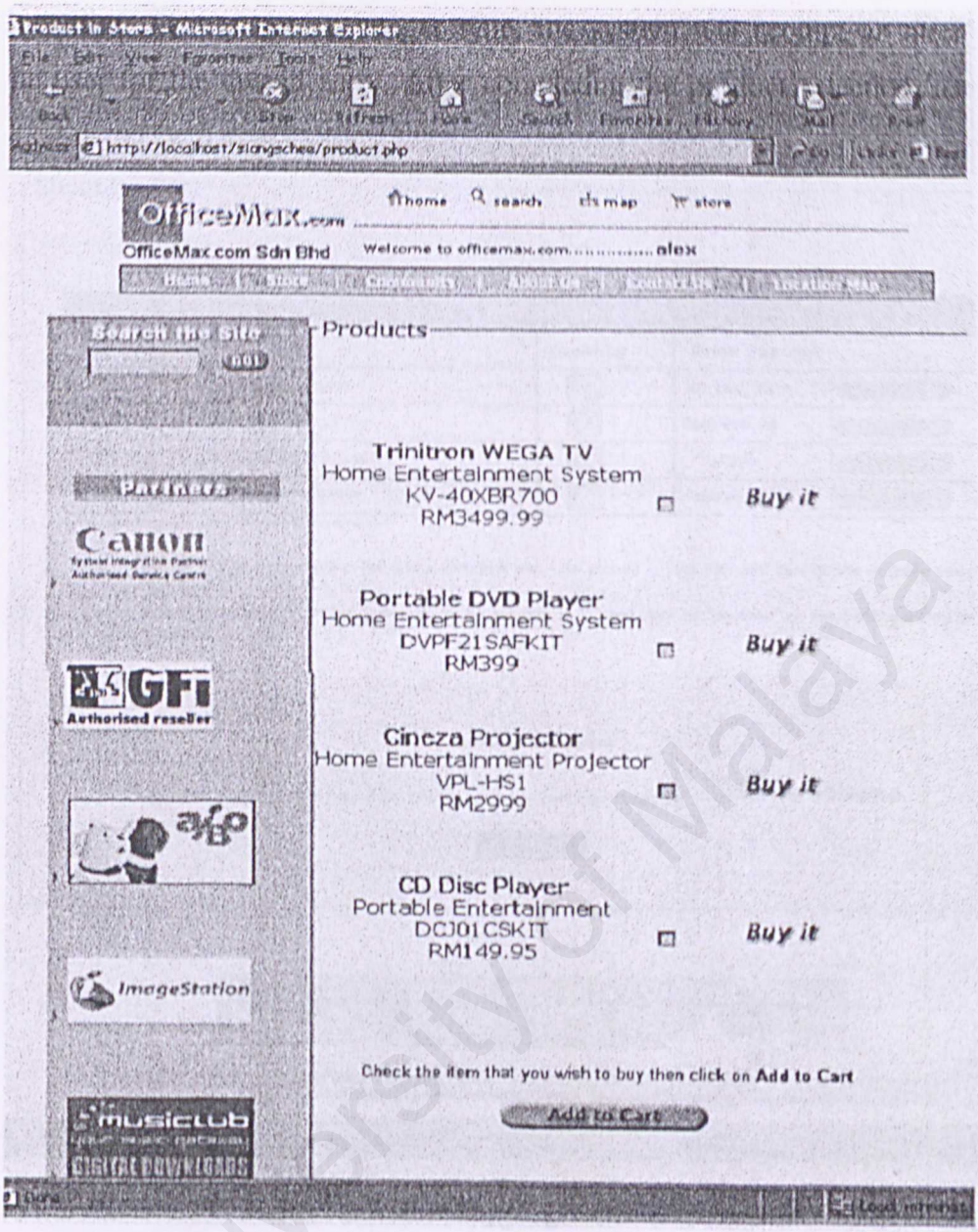

Figure 3.5 List of Products in the Store

They can select more than one product at one time by checking the checkbox that is displayed on the right side of each product description. After select their desired products, they can add their product in the shopping cart by click on the hyperlink text "Add to cart". Then, the selected product will display in the user 's shopping cart. Figure 3.6 illustrates the shopping cart table.

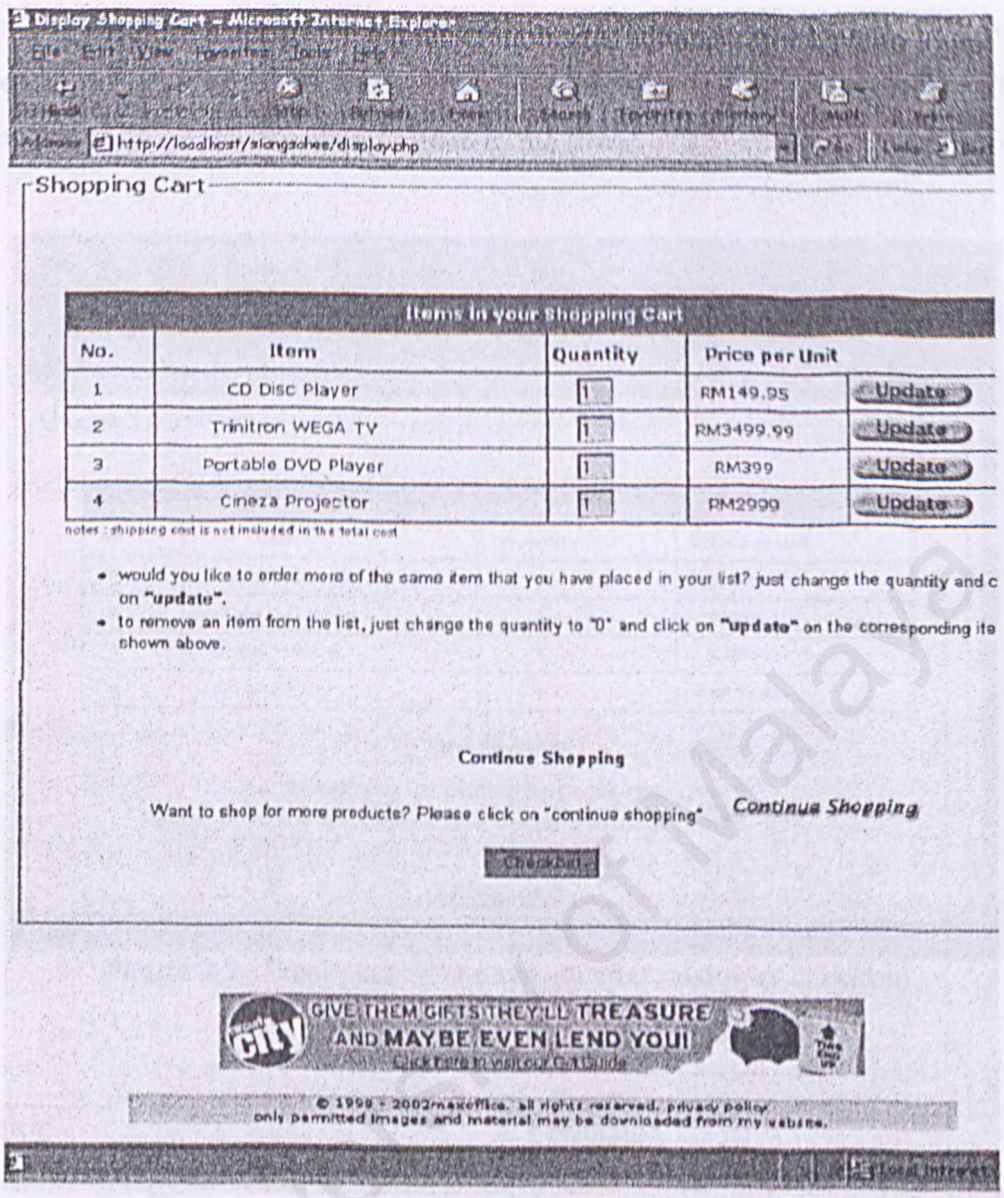

Figure 3.6 Shopping Cart Table

The shopping cart system will keep track of users ordering information and enable users to manipulate their orders. Users are allowed to modify the order information including adding new items, changing item's quantity, removing ordered items and updating order quantity whenever they like. If the users want to order more of the same item that they have placed in the cart, they can just change the quantity and click on "update" button. On the other hand, to remove an item from the cart, just change the quantity to "0" and click on "update" button on the corresponding item. If the input data in the "Quantity" field is not an integer type, the system will prompt an alert box to inform the user for the invalid entry. After completing the product selection, users may

checkout to proceed to the payment system. The system will calculate the total value of the selected items. Figure 3.7 illustrates the final stage of the Shopping Cart and Ordering System which will display the total balance of the order.

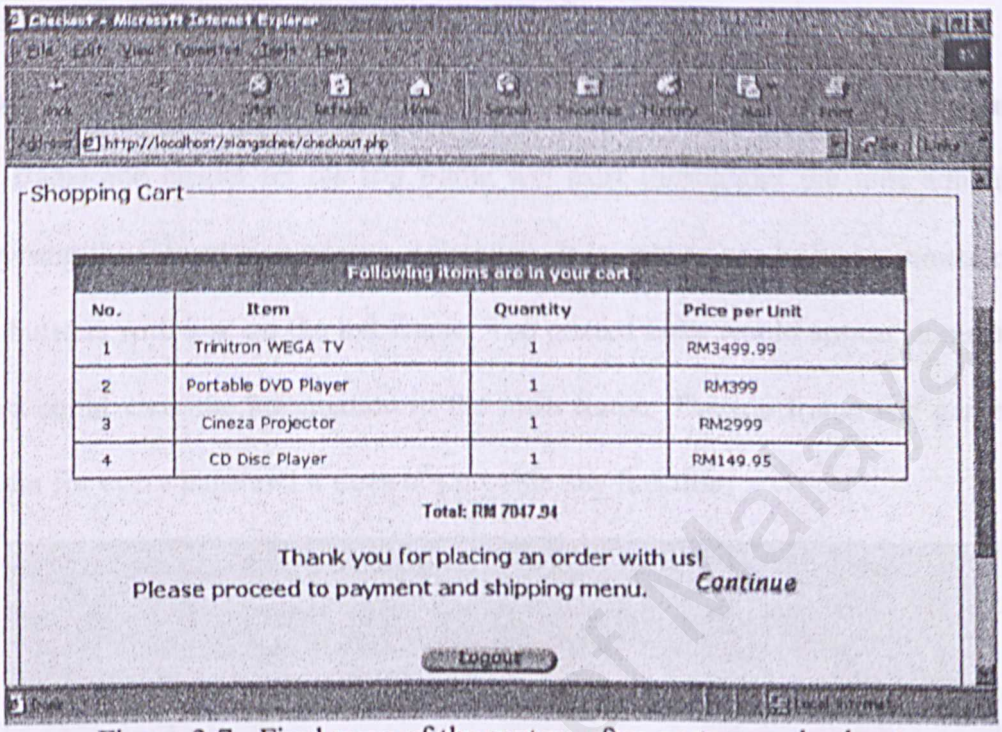

Figure 3.7 Final page of the system after customer checkout

Button	Function
Customer Profile	View/update the user 's profile
Store Product	Let user start shopping and ordering the product in the store
Logout	Let user logout from the system

Table 3.1 Functions Provided in Customer Section (Store Front)

3.2 Administration Section

Before enter to the administration site, administrator have to login into the system. Here I set a default admin identification (admin id) – "admin" and password -

"admin". . Figure 3.8 illustrates the login panel for the administrator. After log on to the system, a main page of admin site will display five hyperlinks buttons lead administrator to visit the web page according the name of buttons. Figure 3.9 illustrates the main page of the store back site. Every page displayed in the administration section will be divided into three frames. Both the navigation bar at the left frame and header on the top frame will exist throughout the time administrator browsing the information or uses a function. It is easy to use by just a mouse click on the buttons with link on the left frame. The related links would appear in main frame, users could view the information in the main frame. The top frame will generate the header for every page and it does not provide any function.

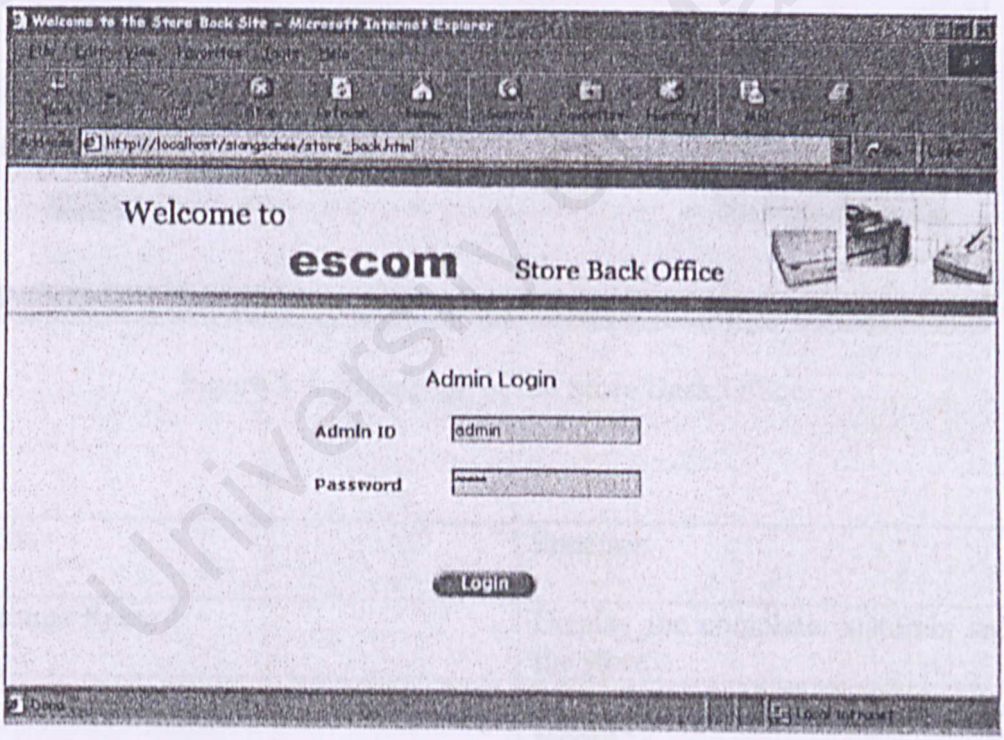

Figure 3.8 Home page of Store Back Office

Administrator authentication	
Admin identification (admin id)	admin
Admin password	admin

Table 3.2 Administrator Authentication

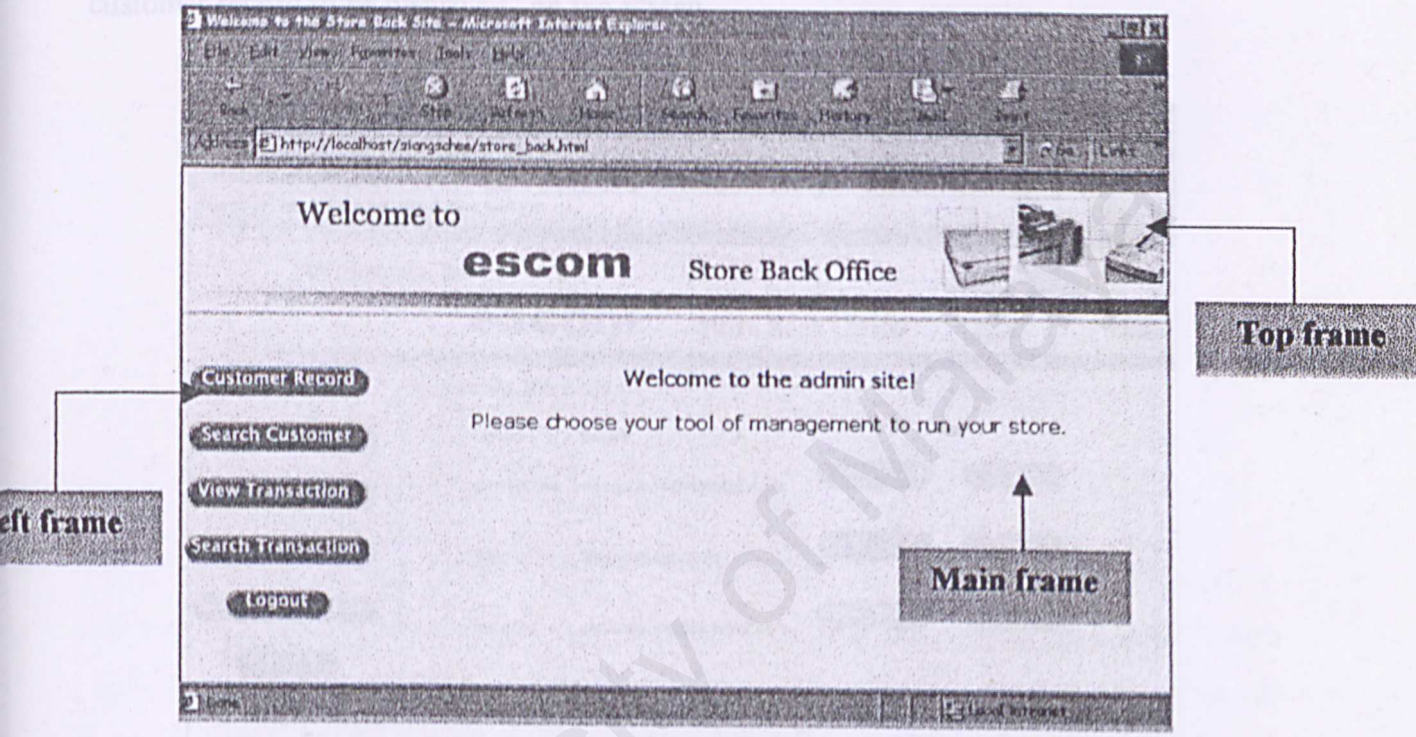

Figure 3.9 Main page of the Store Back Office

Button	Function
Customer Record	Display the complete customer record in the store
Search Customer	Let administrator search the customer record
View Transaction	Display the daily transaction record
Search Transaction	Let administrator search the transaction record
Logout	Let administrator logout from the system

Table 3.3 Functions Provided in Administration Section (Store Back)

3.2.1 Customer Record

System will enable administrator to manipulate authorized users ' profile. It will display a list of authorized member for the store. Administrator can delete the user or view his/her profile by click on "Delete" or "View Detail" buttons on the corresponding user. From view detail page, administrator can also view the transaction record of the user. If there is no customer record in the database, system will display a message "No customer record to be displayed" on the screen.

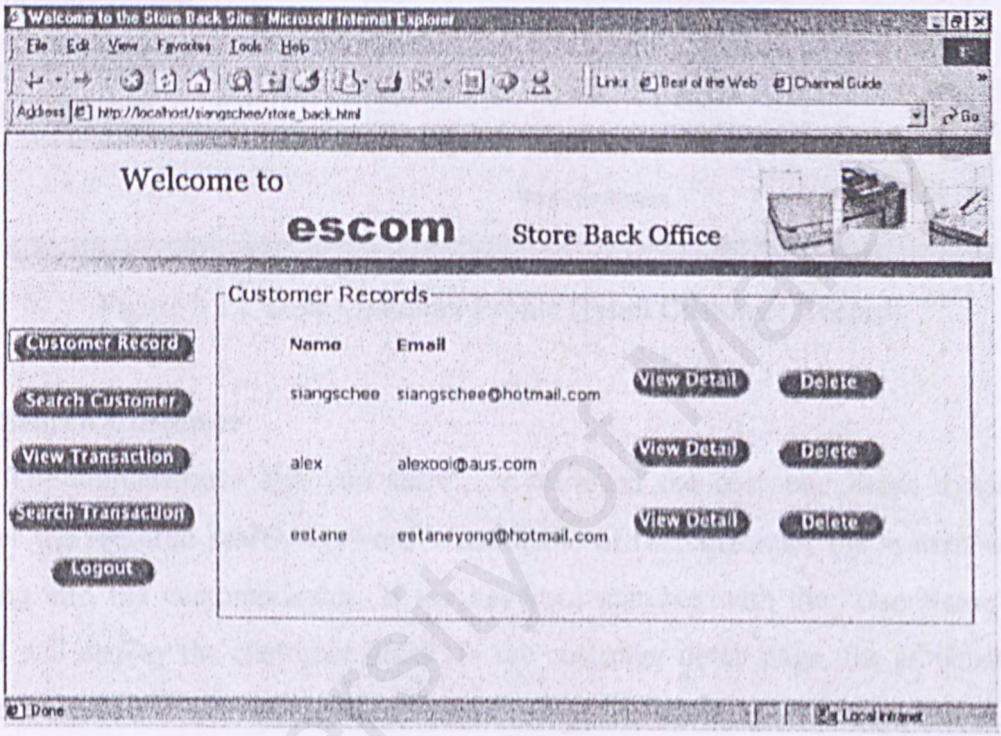

Figure 3.10 Customer Record

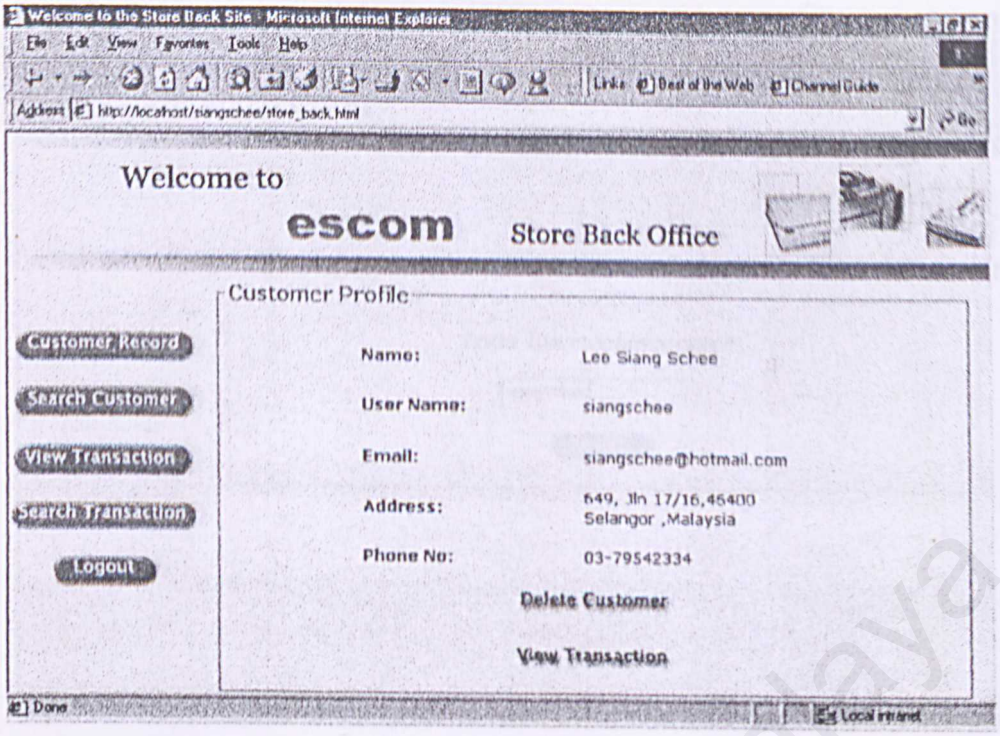

Figure 3.11 View Customer Profile (From Customer Record)

3.2.2 Search Customer

The administrator also can search or retrieved the customer detail dynamically. By enter the required search keyword – username of the customer, the system will start searching into the customer table. If the keyword matches with the "UserName" in the table, it will display the customer detail. In the customer detail page, the administrator is given option to delete the user record or view the transaction record of that user. Meanwhile, if no record found, the system will require the administrator to re-enter the keyword to continue the searching process.

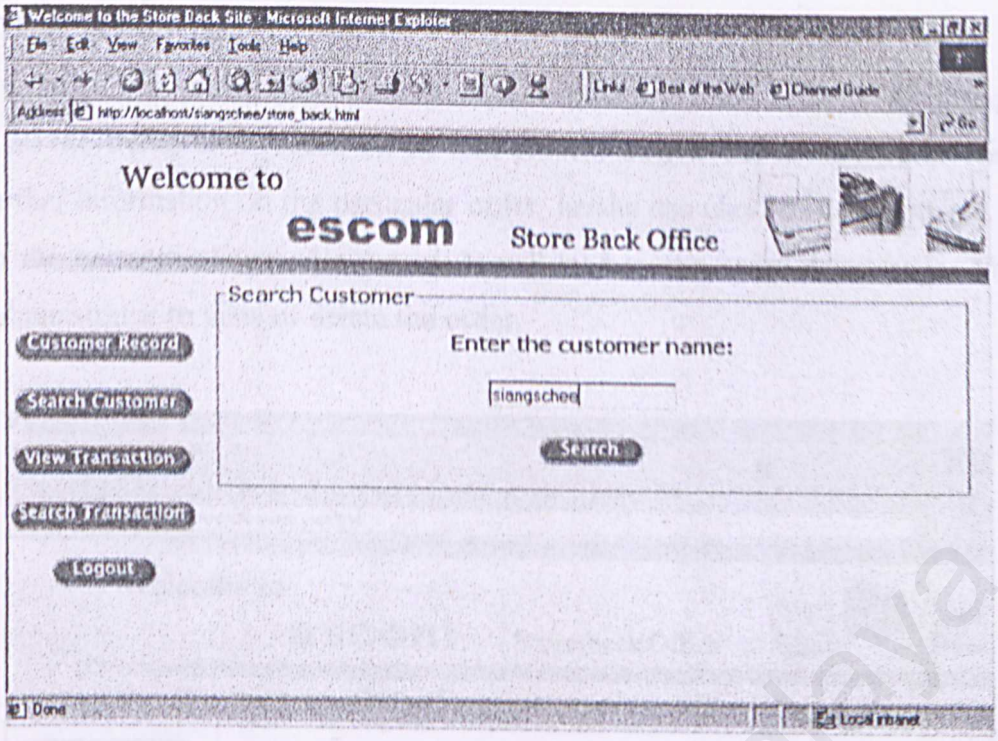

Figure 3.12 Search Customer Panel

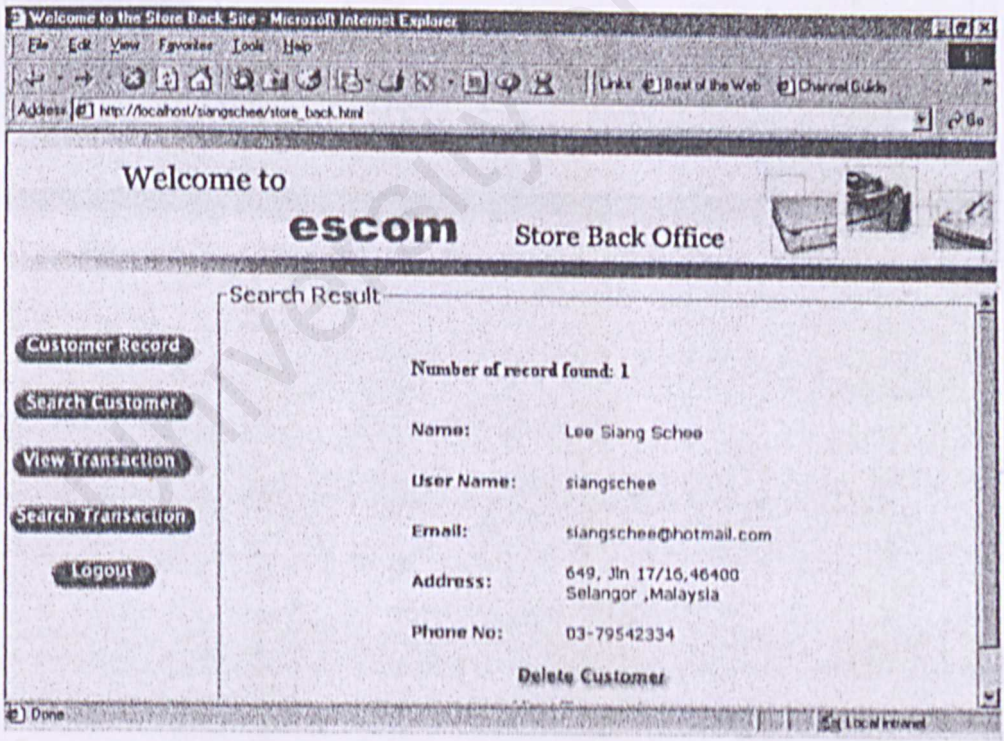

Figure 3.13 Customer Profile (From Search Customer Result)

3.2.3 View Transaction

System will enable administrator to manipulate order's records. This page will display all the transaction record on by that present day. If the administrator wishes to view further information on the particular order, he/she can click on the hyperlink "Order No" on the corresponding order record. It will lead to the order detail page. This part allow administrator to view or delete the order.

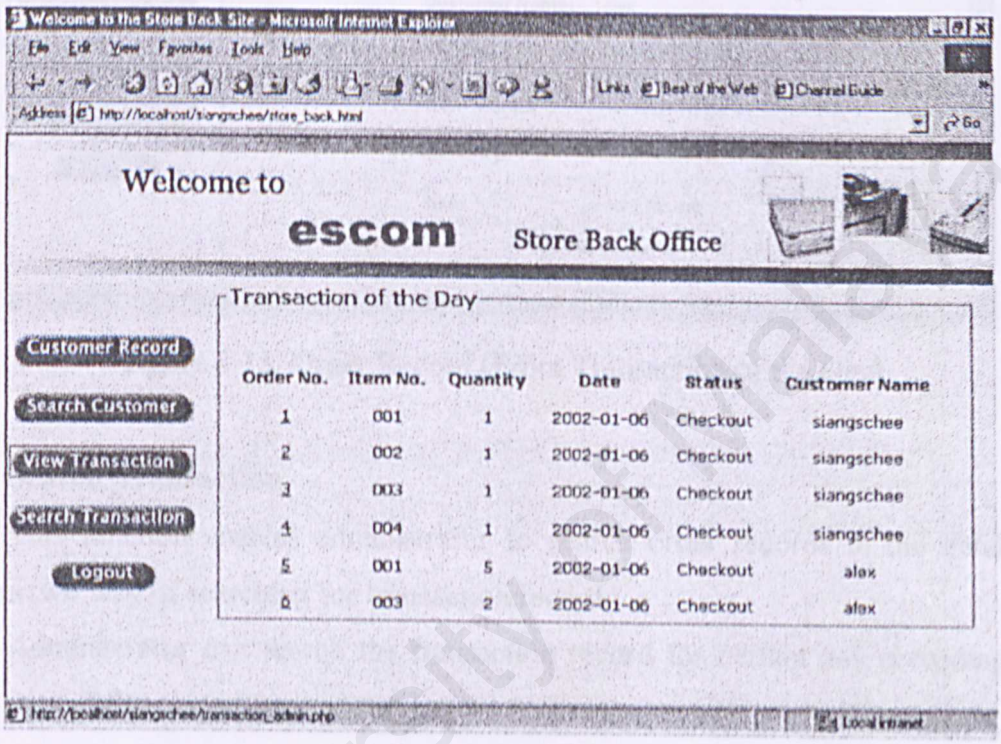

Figure 3.14 Transaction of the Day

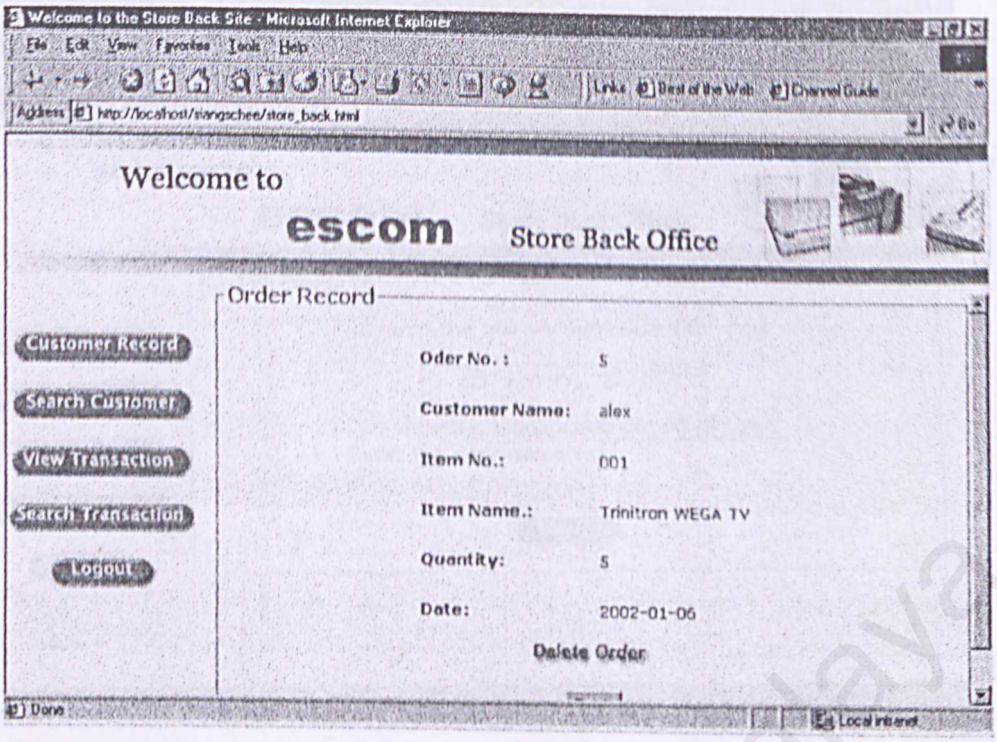

Figure 3.15 Order Record (From Transaction of the Day)

3.2.4 Search Transaction

This function enables administrator to search order records in the database. It provides two way of searching for transaction record:

- Administrator can search the transaction record for certain day according to the date of the transaction.
- Or search the transaction record for user by entering the user 's UserName as the keyword for searching.

The former way will display a list of the transaction record and administrator can view the order detail by mouse click on the order 's hyperlink text, OderNo. Then, in the order record, he/she can choose to delete the order record in the database.

If no record is found, the system will prompt the administrator to search again.

The latter way will display a list of the transaction record of the corresponding user. If no record is found, the system will prompt the administrator to search again.

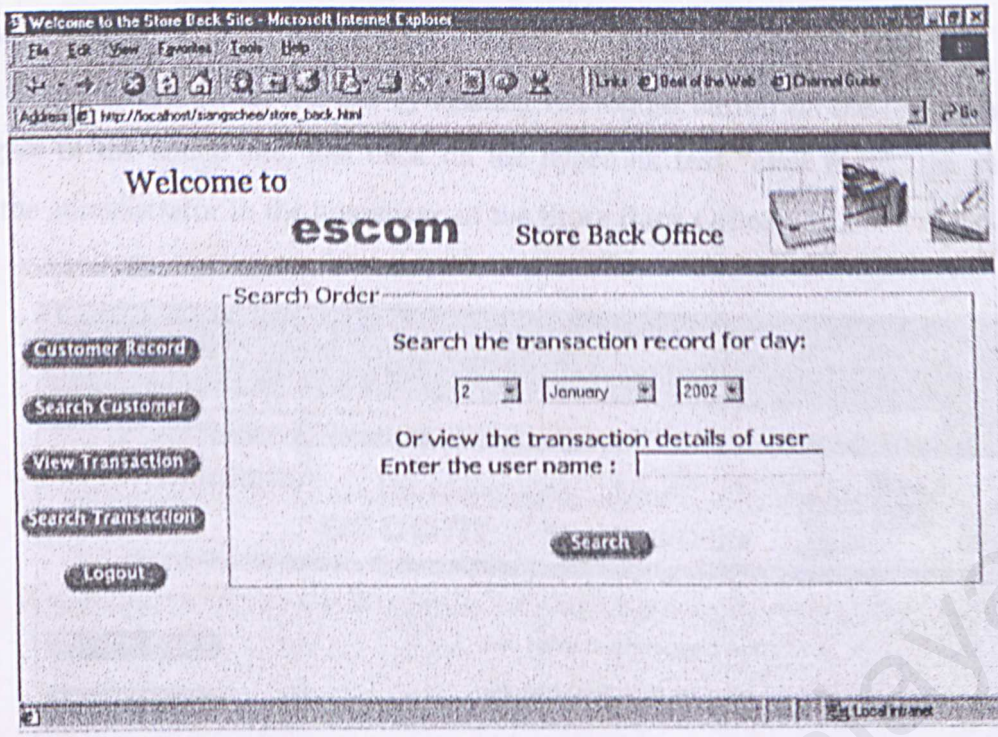

Figure 3.16 Search Order Panel

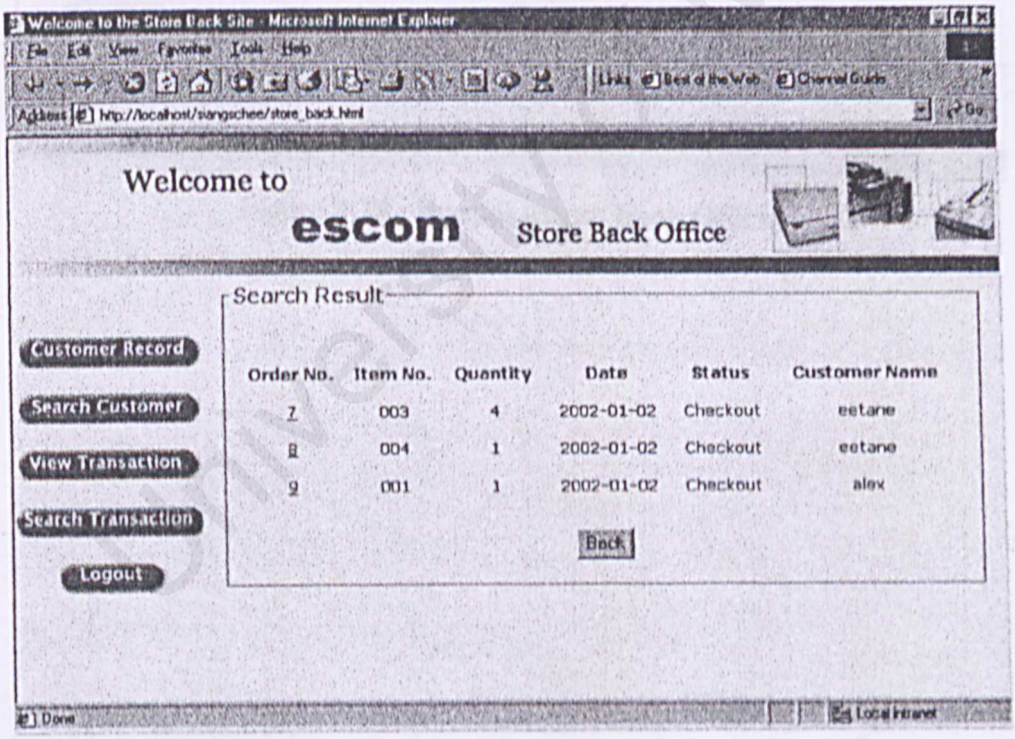

Figure 3.17 Order Record (Search Transaction Result)

3.2.5 Logout

Administrator can log out by clicking the logout button on the left frame. To log in again to the admin site, just click on the hyperlink text "*click here*", the system will lead the administrator to the homepage of the Store Back Office.

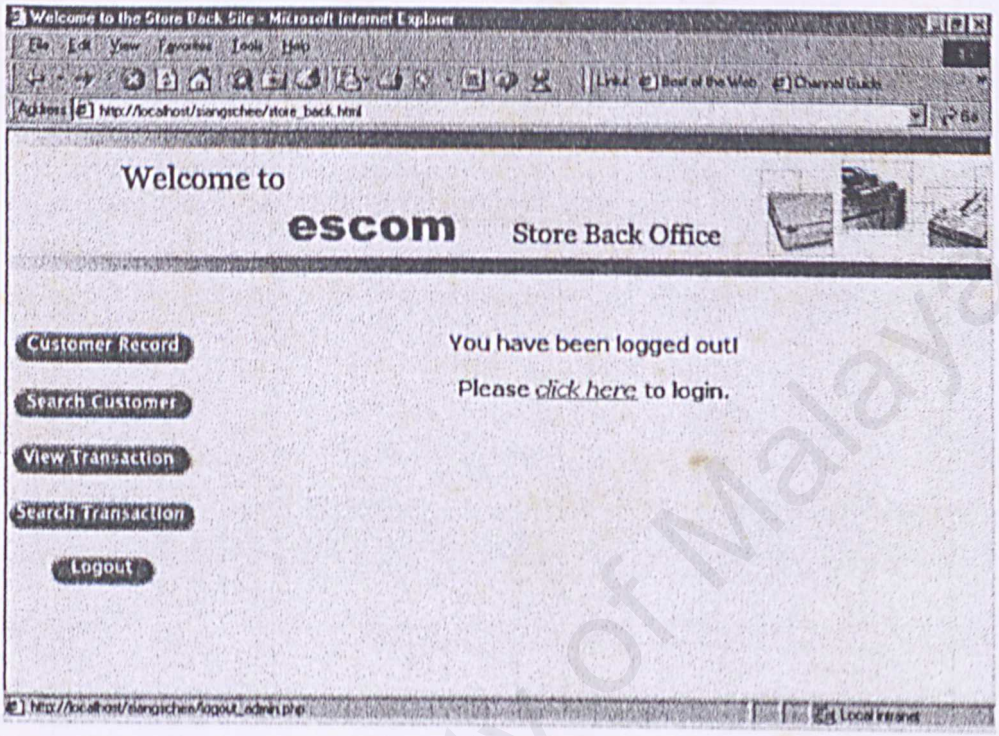

Figure 3.18 Logout (Store Back Office)