UNIVERSITY OF MALAYA

Course Info Center (CIC)
(Training Center Administrator Subsystem)

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(SESSION 2001/2002)

Final Year Project

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This project is submitted to the Faculty of Computer Science and
Information Technology, University of Malaya in partial
fulfillment of the requirement for the Degree of Bachelor of
Computer Science.

ABSTRACT

Course Info Center (CIC) is a web-based system that bring out an easiest way for company's staff to find the information about the training courses search by their training's need. Chapter one of the report is showing out the introduction, objective, scope, and the reason why we build out the CIC system. The overview of the project in this chapter is considering the whole system's introduction. For the specific part, it can be found in Chapter Three and Chapter Four which are including the system analysis and system design. Before we make the decision to choose the development tools and determine the functional requirement, we have made a research by using different media and all the finding information can be found in Chapter two --- Literature Review.

In this project, CIC system is constructed by a collection of independent but interacting subsystem --- the first part is considered about how a company sign in the system and how the system help the company's staff to search the training courses according to their training needs. In the another part, the part which is discussed in this report, is considered about how a training center sign in the system, how the system help the training center to provide the service of registering courses by company's staff, and what are the convenient that have been provided by the system to enhance the performance of the training center.

The sub-topic in Chapter Three, Functional Requirement will discuss the functions that have been provided by the specific part of this system. The system not only provides the general functions like sign in and log in the system, keep the courses data in the database, and maintain the database, but it also including some functions for special requirements that can make the training center more easy to implement their task like provide online registration, calculate the payment and generate the invoice for the company, and analyze the most popular courses that have been registered by the company's staff. The precise

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of the system design about the architecture design, database design, process design, and interface design will describe in Chapter Four.

CIC system is the combination of a company and training center. Through the system, the company's staff no need to waste their time in searching the training courses through the internet or another media by themselves. The training center will key in their information into the system and let the staff register courses directly. With the establishing of this system, training center just need to press a button to look through all the registration form from the company and process it. After that, the system will help them to calculate the payment that need to pay by the company after considering all the discount from the training center. These types of services automatically save a lot of time for the training center.

ACKNOWLEDGEMENT

First of all, I would like to express my heartiest gratitude to my supervisor, Prof Madya Raja Nor Ainon Raja Zainal Abidin for giving me to join this project and provide me the fully equipment. Secondly, I would like to thank her for her constructive advice, generous guidance, encouragement, support and supervision along the project. Her hardworking and kindness in helping me throughout the project is deeply appreciated.

Thanks to Dr. Ow Siew Hock, as the project moderator who contributed suggestions and ideas to further enhance value of this project. She also gave some advices to me about the problems that occurred in my project's scope.

Besides, my appreciation goes to Ms. Goh Sok Ming, my project partner who have help me a lot in this project. We discussed the whole system by sharing ideas and experience in the development tools. She gave me a lot of appreciated ideas and support within these few months.

Special thanks are also due to the Manager of IT Department in company Infineon Technology Sdn. Bhd. and the receptionist of the New Horizons. With their cooperation in the interviewing, they helped towards my understanding for the management of a company and training center. Because of them, we finally can complete our project successfully.

Lastly but no least, I wish to thanks the people who dedicated their precious time for answering the questionnaire.

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Project Introduction

CHAPTER 1 : Project Introduction

1.1 Project Overview

In recent year, developers have witnessed an explosion of the new web-related technologies hitting the commercial marketplace as well as being offered freely at numerous web sites. To ride with the technology, a web-based system is an important communication and information tool that is accessible to just any one with a computer.

The Course Info Center (CIC) provides comprehensive information on various higher educational institutions (private colleges, private universities, public universities and polytechnics), the courses they offer, education financing, updated news on education, significant individuals in the education industry as well as other valuable information on study opportunities for students in the company.

Traditional company's system that to search training courses for their staffs usually are using the manual system or just keep the course information in the company's database, then the staff can search it from the fail or database. The mediums such as personal contacts, advertisements, and direct mail campaign or placement agencies do not help the company's staff to search easily on training courses that they want precisely. It was because these two methods have not provide the connection with the training center and so the system not as powerful as a web-based system in some functional requirement.

The system developed in this project is an online web-based application that allows a company's staff to search the information about training courses according to their training needs from the database. For a company that which is interesting in sending their staff for undergo a course can assign into the system. Then keep all the staff's details including staff's training needs and training history into the system database. Every staff in the company have their own ID to access into the database to update their own details or they also can search for the information about the training courses from the training center that which have signed in into the system. The system have direct connection with

the training center, so the staff can directly online register the course that fulfill their needs.

Not only the company's staff will get the benefits from the system but the training center also can promote their courses through the system. After a training center register as a new training center in the system, the administrator of the training center will input their course's details and they also can update it time to time. Besides, it provides an online register for the staff and the training center can straight away to reply the applicant. This system also provides the service for the training center to calculate the total of payment that need to pay by the company and then the system will send an invoice to the company. In the other hand, the training center also can get the information about the top ten list of the most popular courses that have been registered by the company's staff from the graph analysis that generate by the system. This can help the training center to make decision for whether they need to increase the size of the class for the course or not.

1.2 Objective

- To achieve this via a simple and user-friendly system, that will be carefully implemented in order to draw all level of users (company's staff and the administrator of training center) to easily use the web site, even the first time.

- To investigate into the techniques and skills to publish and disseminate information on the web-based environment and produce a research document on web design techniques.

- Provide a systematic system for a company to allow their staff to search for the course information

1.3 Scope

The scope of this project have separate into two category, one is general scope and another one is specific scope. For the general scope, it consider the whole system. But for the specific scope, it just consider the part that which is in my responsibility.

- **General**
  - ➤ Develop a database system to house all data pertaining to the system
  - ➤ Develop a collection of interactive web pages as interface of web-based system for a company and training center.
  - ➤ The administrator can maintain the site anywhere either in the office or at home

- **Specific**
  - ➤ Training center can assign as a member in the training center's list of the company.
  - ➤ Let the authorized training center's administrator to login the system and allow them to change their password when necessary.
  - ➤ The authorized training center can update their course information by time to time
  - ➤ Provide the online register.
  - ➤ Send the notification mail for the company staff to confirm their application.
  - ➤ Help the training center to calculate the total of payment from company and then generate the invoice to the company
  - ➤ Analysis the top ten list of the most popular courses that which have been registered by the company's staff and generate a graph for this analysis.
  - ➤ Let the training center to upload their course's notes or tutorial into net server.

1.4 Problem Definition

Every time clients from business companies, corporate clients, individual clients or even students want to register for training courses, they force to approach the particular training center or go through their homepage to find out the courses offered. Then manually register for the training courses which will take time to process.

Even though the company keep all the course information in the fail systematically, the staff still facing a big problem in selecting the relevant course that match with their

training needs. By using the CIC system, staff just need to key in their training needs and then only press a button to select all the relevant courses search by the training needs. They can easily find out the information. And also, the staff also met a lot of problem in process registration. They need to waste the time to take the registration form at the training center. By this way, the company also did not have a direct way to store the staff's data about their course that have been registered.

1.5 Research Conducted

Research has been conducted for the following topics:

- The World Wide Web and the Internet.
- Web application and Web application development.
- Dynamic and Interactive Web site.
- Information system, the evolution and web-based information system.
- Web database, incorporating database into a web-based information system, and also the web-database connecting technology.
- Client/server computer system, 2-tier, 3-tier, n-tier client/server architecture, client/server database system and relational databases.
- Web servers, Web browsers and other related components.
- Web authoring and publishing tools, 3D modeling and animating tool, databases and database servers.
- Review of the existing Web-based real estate information system. Perceive the system's strengths and weaknesses in order to help in determining the system's requirements.
- Review of some design methodologies, organization of information, Web design and modular programming.

1.6 Initiating A System Project

There are several reasons why an organization may need a new (computer-based) information system:

1. It is a newly established organization may needs an information system to manage its business operations more efficiently and effectively.
2. It has a manual system that is inefficient and ineffective and therefore does not meet its current business needs.
3. It has a computer-based system that is inefficient and ineffective and therefore does not meet its current business needs.
4. Its needs a new information system for strategic reasons so that it can seize a new business opportunity or to provide new services.

A system project is a collaborative (joint) effort. It requires the cooperation and participation of several people management, users, business and system analysts, and programmers. It also requires resources such as personnel, computer facilities, tools, time and money.

A system project is initiated when a formal request to develop a system is made by user or customer (sponsor). A project team consisting of a select group of system analysts and programmers is formed to handle the task. The team works very closely with the users of the system because it needs the users' inputs.

1.7 System Development Phases

The development of an information system comprises of the following phases:

1. System analysis and requirements specifications.
2. System design
3. Implementation
   - Coding
   - Testing

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- Documentation and training
- Conversion
- Evaluation

1.7.1 System Analysis & Requirements Specification

In this phase we study and analyze the current system (whether manual or computer based system) to gain an in-depth understanding of the system and assess its strengths and weaknesses in meeting current and future requirements. There are several techniques that one can use to collect information about the system such as examining existing documents, conducting interviews, using questionnaires and observing people as they perform the various tasks. These techniques will help us to obtain answers to questions such as: *what task are being done* (and what data are needed*), who does them, why they are done, how they are done, when there are done and where they are done.* This exercise will give the project team an in-depth knowledge of the functions and the data requirements. It also reveals the processes, data requirements and data flows, as well as input to and output from the system.

Techniques such as Data Flow Diagram (DFD), Entity Relationship Diagram (ERD), Structure Charts (SC), Entity Life History (ELH) and State Transition Diagram (STD) may be used to graphically understand the system and its behavior.

Using these tools, the system analyst can seek to understand the current system-data and process requirements, and how it behaves. One of the main purposes of analysis ID to determine the requirements of users such as user interface (e.g., menus, dialog boxes, windows) data entry screens and reports and security. In this phase the system analyst (with the help of users) must capture both the functional non-functional and requirements of the system, i.e., the system requirements. This step is extremely important as errors in this step can propagate to subsequent steps. Thus capturing customer's requirements accurately and completely is vitally important to successful information systems development.

1.7.2 System Design

Using the information obtained in the analysis phase, the project team proposes a new system that will solve the problem inherent in the system as well as take care of new requirements. The system design phase is concerned with synthesizing or putting all the parts together into a viable, workable system.

The design will include the functions (processes) that the system must perform as well as how they will be integrated. It will also include database design, user interface design (menus, tollbars, icons, etc), data entry forms, queries, reports ans file storage.

Techniques such as DFD (Data Flow Diagram), Process Specification, ERD (Entity-Relation Diagram) to design the new system. The two approaches used for designing systems are the function-based approach and the object-based approach. The function-based or decomposition approach is a top-down approach. It decomposes a system into a hierarchy of modules such that the higher-level modules describe the system in general terms while the lower-level modules describe the system in specific terms. The characteristics of a good design are modularity, high cohesion and low coupling. Coupling refers to the degree of dependence between modules. Two modules are coupled if each depends on the other for its proper functioning. That means is that a bug in one module can infect the other module.

One way to improve the system design is to subject it to a review. The review team consists of users, system analysts and programmers. In the review meeting the module designer presents his or her modules, and the peers evaluate them.

1.6.3 Implementation

System implementation includes coding, testing, and documenting the system as well as training the end users and system administrators.

Coding

The process specifications produced at the design stage are coded using a suitable computer language such as C++, Visual Basic, FoxPro or Java. For ease of maintenance, the program modules must be properly structured. A program module is said to structured

if it has exactly one entry point and one exit point. This can be accomplished by using the structured constructs: sequence, selection and repetition (or iteration). The use of GOTO is usually not recommended as it usually leads to unstructured code. Unstructured modules are difficult to understand, code, debug, and maintain.

Testing

Developers of software should strive for zero defects. The purpose of testing is to uncover software errors (e.g., errors in logic, precision, and timing). Proper testing will minimize the number of errors before release to the customers. This will improve the quality of software delivered.

Software is usually tested in stages. First each module is tested separately and errors (bugs) are removed. This is called module or unit testing. The individually tested modules are then integrated and tested to make sure that the interfaces are working properly. This is called integration testing. The system (software) is then tested for functionality to ensure that it performs the required business functions. This is called functional testing. The system is then tested for performance. This is called performance testing. Customers may perform acceptance testing before they formally accept the system. If the customer's and developer's environment are different, it is also necessary to perform an installation testing.

1.7.4 Documentation & Training

Before the system is finally delivered to the customer, the system developer must provide the necessary training and documentation to all those who will use, operate and maintain the system. Thus users, operators and maintenance personnel must be given appropriate training. The training can take the form of online help, instruction manuals and tutorials. Documentation must also be provided in the form of user and operator manuals as well as system documentation.

1.8 Schedule

Below is the project schedule that list out the date and the duration according to the project task.

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

Figure 1.1   Project Schedule

1.8 Report Summary

This project documentation is divided into 4 chapter in first part (course WXES 3181) and 4 chapter in second part (course WXES 3182). There are,

Part 1:

Chapter 1   Gives a brief introduction about this project.

Chapter 2   Describes the requirement gathering process, research and analysis strategies.

Chapter 3   Describes the system functional and non-functional requirements.

Chapter 4   Cover on system design, that includes user interface and database design.

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Part 2:

Chapter 5   Focuses on system implementation on the web server.

Chapter 6   Describes the system testing that had been done.

Chapter 7   Focuses on the problems encountered during the project development and the solutions taken to remedy problem.

Chapter 8   Discuss the system strengths, limitations and future enhancement for the system followed by knowledge I gained in this project and conclusion.

Chapter 2

Literature Review

CHAPTER 2 : LITERATURE REVIEW

2.1 Web Browser

A web browser is a soft program that knows how to contact a Web server (using the HTTP protocol), requesting a document from that web server, and display that document returned by the server to the client.

There are many different type of browsers, the most popular ones are Netscape Navigator and Microsoft Internet Explorer. The appearance of the document varies from browser to browser dependency on the capability of each browser, system and preference.

2.1.1 Netscape Navigator

Advantages:

- *Available for wide variety of platforms.*
- *Large installed base*
- *Code released into public domain*
- *Available free to everyone*

Disadvantages:

- Does not intergrate with Windows 98
- Does not have Operating System revenue to support development costs

2.1.2 Internet Explorer

Advantages:

- *Available free to everyone*

Disadvantages:

- *Available only on specific platform, e.g.:Windows and Macintosh*

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2.2   Client / Server Software Architecture

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

A client is defined as a requester of services and a server is defined as the provider of services. A single machine can be both a client and a server depending on the software configuration. There are a few client / server software architecture that are available currently, which are mainframe architecture, file-sharing architecture and client/server architecture.

2.2.1 Web Client / Server Architectures

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

2.2.2 Web Client / Server Communication

The division of labor between Web clients and Web servers is quite distinct. The Web Client - computer at the office or home – requests information form a particular Web server on a distant computer. Using the Internet as the transportation medium, the request is formulated into an HTTP request and sent to the target computer - the server. A moment later, when the target server receives the request, it retrieves the pages or other information that the server requested, formulates it as an HTML-formatted page, and sends it back to the requester client via the Internet. When the requested information, an

HTML page in this instance, arrives at the client computer, the Web browser software determines that the information is an HTML page. It display then page on the client machine according to the directions laid out in the page's HTML code.   [1]

2.2.2.1 Two-Tier Client/Server

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

1. User System Interface (such as session, text input, dialog, and display management services)

2. Processing Management (such as process development, process enactment, process monitoring, and process resource services)

3. Database Management (such as data and file services)
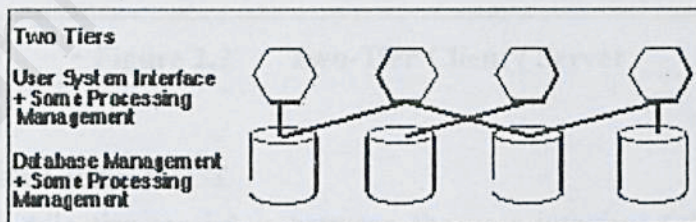
Figure 2.1: Two-Tier Client Server Architecture Design

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The database management server usually provides the portion of the processing related to accessing data (often implemented in store procedures). As compared to the file server software architecture (that also supports distributed systems), the two-tier architecture improves flexibility and scalability by allocating the two tiers over the computer network. The two-tier improves usability (compared to the file sever software architecture) because it makes it easier to provide a customized user system interface.

Two tier software architectures are used extensively in non-time critical information processing where management and operations of the system are not complex. This design is used frequently in decision support systems where the transaction load is light. Two tier software architectures require minimal operator intervention.
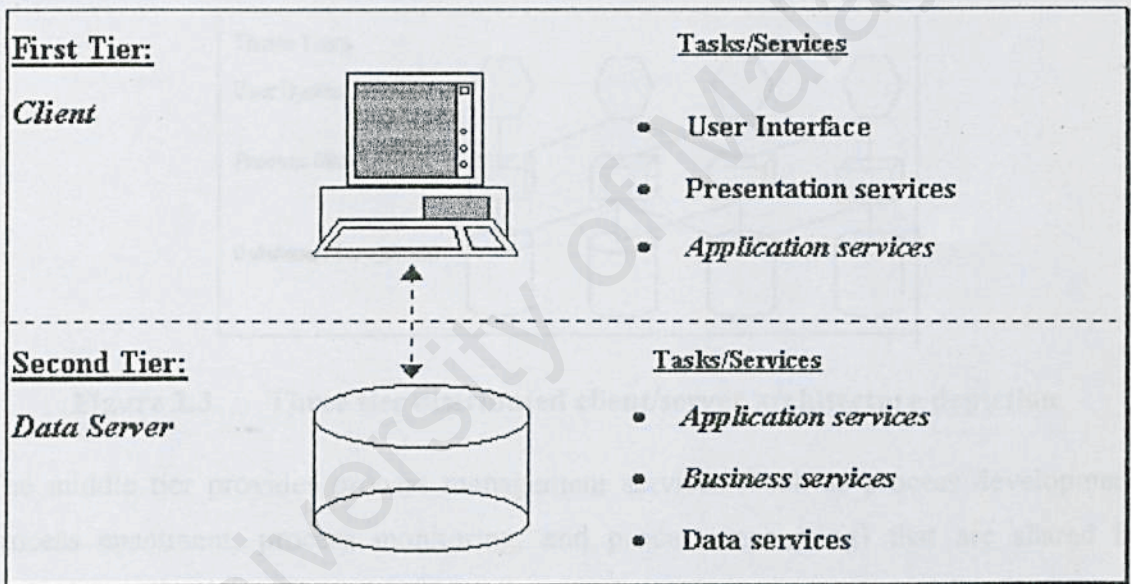
Figure 2.2   Two-Tier Client / Server

2.2.2.2 Three-Tier Client/Server

The third tier (middle tier server) is between the user interface (client) and the data management (server) components. This middle tier provides process management where business logic and rules are executed and can accommodate hundreds of users (as compared to only 100 users with the two tier architecture) by providing functions such as queuing, application execution, and database staging. The three tier architecture is used

when an effective distributed client/server design is needed that provides (when compared to the two tier) increased performance, flexibility, maintainability, reusability, scalability, while hiding the complexity of distributed processing from the user.

The three tier architecture is used when an effective distributed client/server design is needed that provides (when compared to the two tier) increased performance, flexibility, maintainability, reusability, and scalability, while hiding the complexity of distributed processing from the user.

A three tier distributed client/server architecture (as shown in Figure 2.2) includes a user system interface top tier where user services (such as session, text input, dialog, and display management) reside.
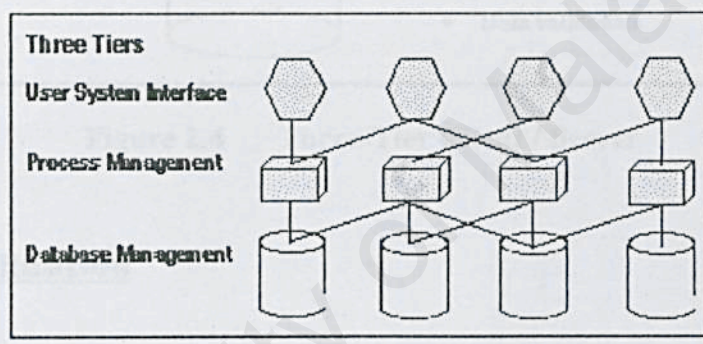
Figure 2.3   Three tier distributed client/server architecture depiction

The middle tier provides process management services (such as process development, process enactment, process monitoring, and process resourcing) that are shared by multiple applications. The middle tier server (also referred to as the application server) improves performance, flexibility, maintainability, reusability, and scalability by centralizing process logic.
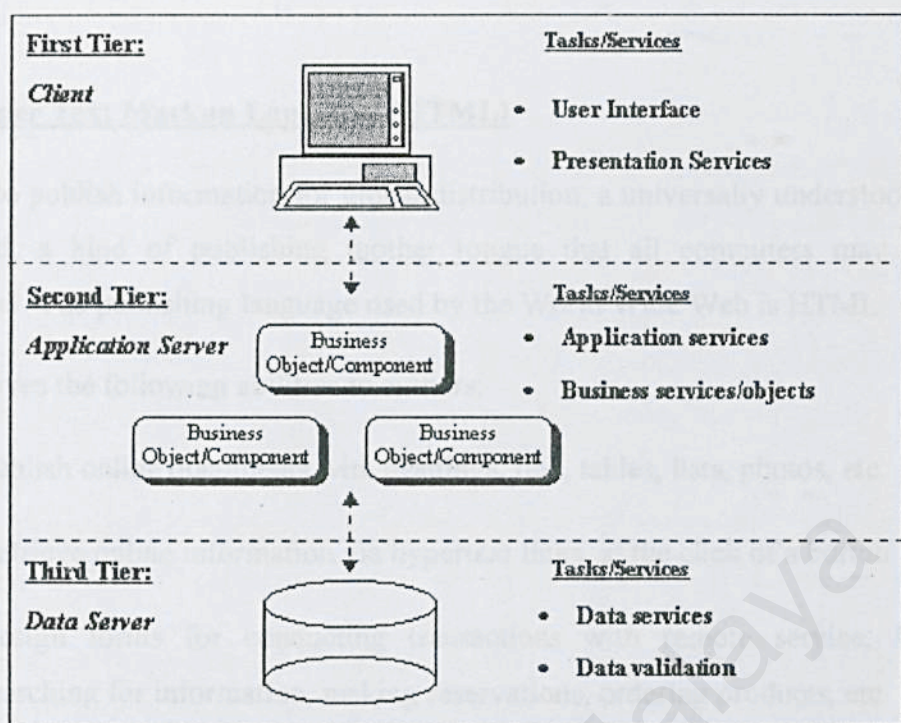
Figure 2.4   Three-Tier Client / Server

2.3 Web Application

2.3.1 Uniform Resource Locators(URL)

URLs, or Uniform Resource Locators, are the method by which documents or data are addressed in the World Wide Web. The URL contains the following information:

- the internet name of the site containing the resource (document or data)

- the *type* of service the resource is served by (e.g., HTTP, Gopher, WAIS)

- the Internet *port number* of the service. If this is omitted the browser assumes a commonly accepted default value.

- the location of the resource in the directory structure of the server.

2.3.2 Hyper Text Markup Language (HTML)

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

HTML gives the following abilities to authors:

- Publish online documents with headings, text, tables, lists, photos, etc.

- Retrieve online information via hypertext links, at the click of a button.

- Design forms for conducting transactions with remote service, for use in searching for information, making reservations, ordering products, etc.

- Include spreadsheets, video clips, sound clips, and other applications directly in their document.

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

Different Version of HTML

HTML is an evolving language, and each new version is given a number. The first definitive version was HTML 2.0 -- this had most of the elements we know and love, but was missing some of the Netscape/Microsoft extensions, and did not support tables, or ALIGN attributes.

HTML 3 (late 1995) was an ambitious effort on the part of Dave Raggett to upgrade the features and utility of HTML. However, it was never completed or implemented, although many features were integrated in the next "official" version of HTML, known as HTML 3.2.

HTML 3.2 was the next official version, integrating support for TABLES, image, heading and other element ALIGN attributes, and a few other finicky details. HTML 3.2 is the current "universal" dialect -- essentially all browsers understand HTML 3.2. IT was, however, missing some of the Netscape/Microsoft extensions, such as FRAMEs, EMBED and APPLET. Support for these (after a fashion) came in **HTML 4.0**

HTML 4.01 is the current official standard. It includes support for most of the proprietary extensions, plus support for extra features (Internationalized documents, support for Cascading Style Sheets, extra TABLE, FORM, and JavaScript enhancements), that are not universally supported. Some of these enhancements are not discussed in these online notes. They are discussed in detail in The HTML 4.0 Sourcebook, available in most bookstores.

However, the evolution of HTML has now ceased -- HTML 4.01 is the last version of HTML. For the future, HTML is being replaced by a new language, called *X*HTML -- for the eXtensible HyperText Markup Language.

However, HTML and XHTML are very similar, *The XHTML 1.0 Language and Design Sourcebook*, explains in details these differences and how to use the new XHTML language.   [2]

2.3.3 XHTML

The evolution of HTML has essentially stopped. Instead, HTML is being replaced by a new language, called XHTML. XHTML is in many ways similar to HTML, but is designed to work with the new extensible Markup Language, or XML, that will soon

serve as the core language for designing all sorts of new Web applications, in which XHTML will be only one of many "languages." But, XHTML is designed to work with these other language, so that different documents, in different languages, can be easily mixed together.

2.3.4 Active Server Pages (ASP)

Active Server Pages is Microsoft's technology for creating dynamic Web sites. Some of the largest Web sites on the Internet were built using Active Server Pages. Some examples of these sites are:

- Barnes and Noble (http://www.bn.com/)

- Dell Online (http://www.dell.com/)

- MonsterBoard (http://www.monsterboard.com/)

- Microsoft.com (http://www.microsoft.com/)

Active Server Pages can also be used to create Web applications for company Intranets. For example, you can use Active Server Pages to track and report on customer orders, display a company directory, or build an internal job site.

Active Server Pages is one of the most popular methods of building Web sites (Microsoft claims that there are now more Active Server Pages developers creating Web sites than Java developers). Why is Active Server Pages such a popular technology? Here are some of the technology's key benefits:

- **Active Server Pages Are Browser Independent**
  An Active Server Page is executed on a Web server and not within a browser. This means that an Active Server Page is not dependent on the capabilities of a browser. Unlike Javascript, Active Server Pages can be written so they work with any browser.

- **Active Server Pages Use Scripting Languages**

  An Active Server Pages is written using scripts. This means that an Active Server Page is easy to modify. If you discover a bug in an Active Server Page, you can open the page with notepad and make a quick modification without recompiling your application.

- **Active Server Pages Provide Easy Database Access**

  You can easily perform complex database tasks within an Active Server Page. You can also use the same database access technology in an Active Server Page as you would within Visual Basic or Visual C++ (the ActiveX Data Objects).

Active Server Pages works with the following operating systems:

- **Windows 2000 Server**

  ASP 3.0 and IIS 5.0 are included with Windows 2000 Server

- **Windows NT Server**

  ASP 2.0 and IIS 4.0 are included with Windows NT Server

- **Windows 95/98**

  You can use ASP 2.0 with Windows 95/98 if you download the Personal Web Server (PWS) from Microsoft.com

- **Any Other Operating System**

  You can use Active Server Pages with almost any other operating system by using a third-party product called ChiliSoft (www.chilisoft.com).

How ASP Work

The best way to understand how an Active Server Page works is to compare an Active Server Page to a normal HTML page. Imagine that you request a normal HTML page located at http://superexpert.com/hello.html. The following steps occur:

1. You type http://superexpert.com/hello.html into the address bar of your Web browser

2. Your browser sends a request to the Web server for the page

3. The Web server grabs the page from the hard drive (or memory) and sends it to the browser

This is a pretty simple process. The Web server simply satisfies user requests for Web pages by fetching the appropriate Web page and sending it to the browser.

There is an extra, but very important step, involved in requesting an Active Server Page. Active Server Pages typically end with the extension .asp. Suppose that you request an Active Server Page located at http://superexpert.com/hello.asp:

1. You type http://superexpert.com/hello.asp into the address bar of your Web browser

2. Your browser sends a request to the Web server for the page

3. The Web server grabs the page from the hard drive (or memory)

4. The page is processed by the Web server from top to bottom and any scripts in the page are executed

5. The HTML page that results from executing the scripts in the Active Server Page is sent to the browser

The important extra step is step 4. When an Active Server Page is requested, all the scripts in the Active Server Page are executed. Notice, however, that a normal HTML page is sent to the browser (from the browser's perspective, it has received a normal HTML page). [3]

2.3.5 Common Gateway Interface (CGI)

The Common Gateway Interface (CGI) is a standard way for a web server to pass a web user's request to an application program and to receive data back to forward to the user. When the user requests a web pages, the server sends back the requested page. However, when a user fills out a form on a web page and sends it in, it usually needs to be processed by an application program. The web server typically passes the form information to a small application program that processes the data and may send back a confirmation message. This method or convention for passing data back and forth between the server and the application is called the Common Gateway Interface (CGI). It is part of the web's HTTP protocol.

2.4 Web Server

You need to "publish" your Web site before other people can see it on the Internet.

While you were creating your site, you saved your Web documents on your own computer. To "publish" your site means to transfer these same documents onto a Web server. A Web server is a high-powered computer that places Web site files onto the Internet. Once your files are on the Web server, other computers can 'connect' to the Web server and retrieve your files for viewing.

Your Computer   Web Server

Other Computers
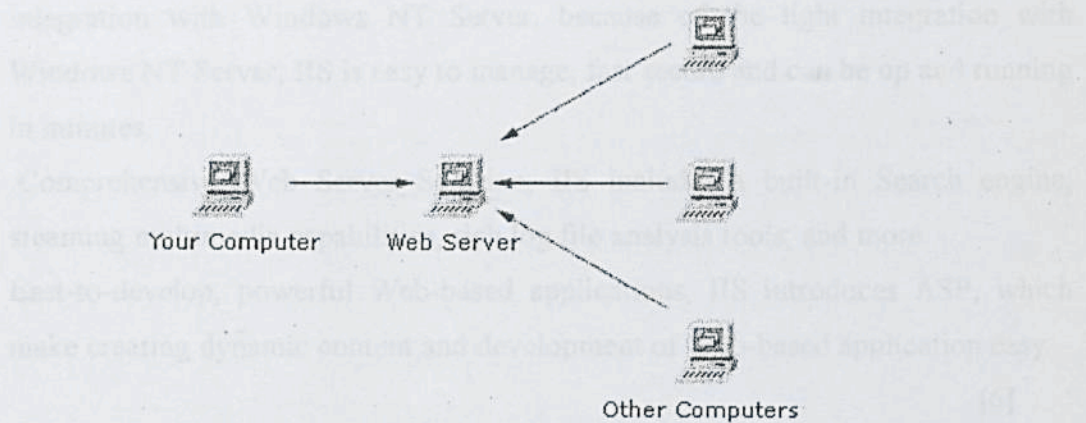
Figure 2.5   Web Server

Publishing your Web site not only allows you to share it with the public, but it also lets you check out how your forms and databases work.

2.4.1 Internet Information Server 4.0 (IIS)

Internet Information Server 4.0 consolidates the Microsoft Transaction Server, Active Server Pages, HTTP, FTP, and Gopher Servers, the certificate server, the News and Mail Servers, and advanced web site management into one manageable interface. Of course, with no bias, one of the most existing aspects of IIS 43.0 is the increased real-world functionality needed for ASP. IIS includes transactional-based script, the capability to run ASP applications in their own memory space, and the capability to activate client-end server-side script debugging capabilities, which finally provides a well rounded framework needed to build mission-critical applications.

Internet Information Server 4.0 provides a centralized network management tool called the Microsoft Management Console (MMC). From the Management Console, we can mange and configure the HTTP,FTP, and Gopher Servers, the Transaction Server, the certificated server, and the News and Mail Servers.

Here are some of the benefits in IIS:

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- integration with Windows NT Server, because of the tight integration with Windows NT Server, IIS is easy to manage, fast secure and can be up and running in minutes.

- .Comprehensive Web Server Solution, IIS includes a built-in Search engine, steaming multimedia capabilities, rich log file analysis tools, and more.

- East-to-develop, powerful Web-based applications, IIS introduces ASP, which make creating dynamic content and development of Web-based application easy.

[6]

2.4.2 Personal Web Server (PWS)

PWS is Microsoft's slimmed-down web server, which provides a basis of which to develop corporate networked applications. PWS for Windows 95/98 turns any Windows 95/98 computer into a web server and enables easy publication of personal web pages. Easy to install and administer, PWS simplifies sharing information on their corporate Intranets or Internet for all users. PWS is ideal for developing; testing and staging web applications, as well as peer-to-peer publishing with its support for sharing files over HTTP and FTP protocols. Just like Microsoft IIS, PWS support all ISAPI extensions and CGI scripts. PWS has been optimized for interactive workstation use, and does not have the system requirement of a full web server such as IIS. [7]

2.5 Web Database

2.5.1 Introduction

Like any regular database management system, a Web database is a data store or information repository that can be accessed via a query language or programming API. Unlike conventional database system, however, access to Web databases

typically is not achieved by typing instructions at a command line or by using interfaces that are custom designed for use on a specific computer platform.

Web databases are databases accessed via other Web applications—specifically, forms developed using standard (almost) HTML. Using facilities available in HTML, applications programs on the Web server are accessed through a server-side mechanism known as the Common Gateway Interface (CGI). This interface enables you to create applications that integrate database functionality and provide access to organizational data repositories on behalf of Web clients (a user and browser).

2.5.2 Web Database Application Design Issues

When you design a Web site, you are likely to encounter myriad of problems, obstacles, and technical challenges. It is difficult to offer a blanket of solutions to these problems.

Designing a Web based database is very similar to designing a database prior to the advent of the Internet. However, there are several issues that must be considered when designing Web-based databases. The following is a brief list of issues relating to that:

- **Performance** – Internet user do not want to have to wait for their queries to process. Any queries that take more than a couple of seconds will probably frustrate that user and possibly cause him or her not use your Web site. Therefore, you may need to use a demoralized design to achieve acceptable performance.

- **Backup** – The Internet is available 24 hours a day, 7 days a week. Your Web site must be continuously available. This can complicate your backup strategy, which can impact your database design. If you choose to denormalized your design, you may increase the physical size of your database.

- **Language** – The Internet is worldwide, which means that your Web site may be viewed in foreign countries. If you need to support multiple languages, this

can impact your database design because you need to track data in different languages.

2.6 Web Application Development Tool

2.6.1 Dreamweaver

Macromedia Dreamweaver 4 has everything you need to develop a professional Web site. Now you can build Macromedia Flash graphics directly in Dreamweaver. Whether you use Dreamweaver's visual layout tools or its text-editing environment, the intuitive Macromedia User Interface makes it easy.Dreamweaver is a professional visual editor for creating and managing Web sites and pages. With Dreamweaver, it's easy to create and edit cross-platform, cross-browser pages.

Dreamweaver provides advanced design and layout tools, well as making it easy to use Dynamic HTML features such as animated layers and behaviors without writing a line of code. Browser-targeting checks your work for potential problems on all popular platforms and browsers. Macromedia's Roundtrip HTML technology imports HTML documents without reformat HTML when you want to.

Dreamweaver is fully customizable. You can create your own objects and commands, modify menus and keyboard shortcuts, and even write JavaScript code to extend Dreamweaver with new behaviors and property inspectors.   [8]

2.6.2 FrontPage

FrontPage is one example of a breed of software called Web authoring or Web publishing programs. Web publishing programs put the power of Web site creation in everyone's hands, including those who don't want or have the time to learn HTML.

FrontPage enables you to create Web pages using a familiar word-processing-like interface: You add and format text, pictures, and other page content using menus and toolbar buttons, and FrontPage generates the corresponding HTML tags in the background. FrontPage not only helps you create Web pages, it also helps you maintain the constantly changing structure and content of your site as a whole.

FrontPage can shoulder such a big job because it divides the work among several components. Each component is responsible for different aspects of the Web publishing process:

- FrontPage Explorer: The Explorer opens when you first launch FrontPage. Using the Explorer, you can create a new Web site, import existing sites you want to maintain using FrontPage, and perform other site management tasks.

- FrontPage Editor: You can use the Editor to work with the content and design of the site's individual Web pages.

- Personal Web Server for Windows 95, Peer Web Services for Windows NT, or FrontPage Web Server: FrontPage works in conjunction with its own Web server program. This feature enables you to build and test your site on your own computer without first having to publish the site on your ISP or company's Web server.   [9]

2.6.3 Interdev ASP

An Active Server Page (ASP) file is a text file that's interpreted at run time by the Active Scripting engine of Microsoft Internet Information Server (IIS). How you choose to create that text file is up to you. If you're a die-hard fan of the ever-versatile development tool Notepad, you'll be disappointed by the simplicity of the techniques presented by this article. But if you're looking for an easy, quick start on building your dynamic Web site, reach for Microsoft Visual InterDev instead.

You can think of Visual InterDev as an integrated development environment (IDE) for creating dynamic Web sites. Like most other IDEs, Visual InterDev combines a number

of tools into a single package to simplify your development chores. There is support for project management, syntax highlighting of different types of Web files (such as ASP or HTML), automatic synchronization of local files with Web server files, and integrated database access.   [10]

2.7 Scripting Language

2.7.1 JavaScript

JavaScript is a scripting language that allows truly interactive Internet applications to be constructed. It can be thought of as an extension to HTML which allows authors to incorporate some functionality in their web pages. It is meant to complement, and not necessarily to replace the current standard for World Wide Web interactivity, CGI. JavaScript is most popularly used to check variables in input boxes. It verifies that all of the input boxes on a given form are filled and contain valid data range. So now, whenever the user presses the SUBMIT button, you don't necessarily have to invoke a CGI script to do the processing. If it is something simple, you can do the processing locally using JavaScript and give back the results. JavaScript can also be used in a number of ways to spice up your page.

Although easier than Perl and CGI scripting, JavaScript also has its limitations. The most import of which is that JavaScript cannot write a file to the web server's hard disk. Thus, CGI must still be used to create interactive forms that append data to a file. Another disadvantage of JavaScript is that there is not any compiliant database. Data are stored in arrays as a replacement to database file.   [4]

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2.7.2 VBScript

VBScript is a member of Microsoft's Visual Basic family of development products. It is a scripting language for HTML pages on the World Wide Web and corporate Intranets. It brings active scripting to a wide variety of environments, including Web client scripting in Microsoft Internet Explorer and Web server scripting in Microsoft Internet Information server.

In many ways of VBScript program is like JavaScript program, at least in terms of how it fits in an HTML file. Procedures, defined as discreet blocks of code that have been assigned a name, are placed in the header, the section between the tags. Other non-procedure code is placed in the file body. VBScript code must be enclosed in HTML comment tags to prevent it from being displayed in browser that do not support VBScript. VBScript is a subset of Visual Basic.

Nearly everything in VBScript is part of Visual Basic. The major different lies in what is lost: a significant number of things included in Visual Basic are not a part of VBScript. Potentially dangerous operations that can be done in Visual Basic have been removed from VBScript, including the capability to access dynamic link libraries directly and to access the file system on the client machine.   [5]

2.8 Database Access Method

2.8.1 Microsoft Access

Access is a database management system (DBMS).Like other products in this category, Access stores and retrieves data, presents information, and automates repetitive task (such as maintaining accounts, performing inventory control, and scheduling).

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Access is also a powerful windows application probably the best end user/developer product ever written. Microsoft Access brings the productivity of database management to the usability and consistency of Microsoft Windows. Because both Windows and Access are from Microsoft, the two products work very well together.

Access runs on the windows 95,98 or NT platforms, so all the advantages of Windows are available in Access.

The objects give the end-user the capability of creating table, queries, forms and reports easily. You can perform simple processing by using Expressions, also known as function, to validation data, enforce a business rule.

2.8.2 Structured Query Language (SQL)

SQL is the query language that enables database programmers to retrieve data from, to modify data in, and to manage most relational databases. Although there are some differences in the way SQL is supported among the various database vendors, the language is standard enough that after the user are learned it for one product, user will be able to use it with any other database product that support SQL. SQL consists of only a few types of statements, and it is easy to learn well enough to perform basic queries.

One of the nicest things about SQL is that it encourages experimentation. The queries for retrieving data are completely separate from those used to modify data, so you can enter any type of data retrieval query you like without fear of damaging

the data within your database. SQL also encourages experimentation because nearly all queries consist of a single statement, so they're easy to write. Most databases provide interactive programs that enable user to enter queries and immediately view the results, so the user can rapidly write and modify your queries until they retrieve exactly the data they are looking for. When the user's queries are perfected, they can transfer them into their applications.   [11]

2.8.3 Oracle

Like most high-end database, Oracle stores all its configuration information within tables stored in the database. All the user information, the schema of all the tables in the databases, and all the other configuration is stored within the system tables.

To provide access to all this information, several views are included with Oracle that allow you to see the contents of these tables.

Basically, three major groups of system views reside in an Oracle database: ALL views, DBA views, and USER views. Other views also exist that don't fall into these groups, but the vast majority of them do. All three of the groups contain the same basic views; the only difference between them is the subset of rows from the database that they include.

2.9 Information About The Training Center

Before we start our project, we need to select all the information about the three training centers (Informatics, Hewlett Packard, New Horizons) that we choose. The information can find out from the catalogs, internet and some magazines.

The information included:

- Background of the training center
- Courses that are provided (CAD, programming, operating systems)
- The location of the training center
- Courses schedule (start date and end date)
- Fees of the course
- Contact number, address, E-mail address of the training center

2.9.1 Informatics

In 1984, INFORMATICS was set up with a mission to be a centre of excellence for training and education in Information Technology in the region. Today, through the support of our dedicated staff, we have accomplished what we set out to achieve.

Growing by leaps and bounds from its humble beginning a single centre in 1984, Informatics now operates 20 CitiCampuses in 20 locations in Malaysia. Informatics offers courses covering Information Technology and engineering, and ranging from evening classes for computer application packages to degree twinning programmers.

Informatics has allied itself with International software developers through appointments as the **Authorized Training Center for AutoDesk** and many others. As a result of these alliances, Informatics is able to provide the latest software and courses to benefit students from the general public and corporations.

Executive Training

- Xpac

  Xpac series highly enhance office and home computer users competency in the Microsoft office applications. This series is suitable for student, clerical, teacher, databasem administrator.

- XPacPlus

  XpacPlus series is the IT training package for executives. These packages are offered at discounted prices with the same quality and commitment by Informatics. These training targeted at web content developer, programmer, internet administrator, student, etc.

- XPacPro

  XpacPro series is the high-end training package for IT professionals such as solution developer, systems administrator, software engineer, etc.   [12]

2.9.2 New Horizons
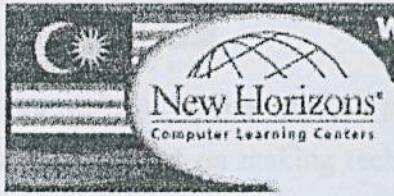
New Horizons is the leader in information technology training in Malaysia. With locations nationwide in **Kuala Lumpur, Petaling Jaya, Penang, Ipoh, Kuantan, Malacca, Seremban, Johor Bahru and Kuching**, you can choose your preferred location to pursue your course. This training center can bring their proven training system to your doorstep.

New Horizons offers one of the world's largest networks for Microsoft, Novell, Lotus, Sun, A+, Internet Professional and other technical certification courses.

Example for schedule of some courses:

Microsoft BizTalk™ Server 2000 (14 - 15 March 2001)

- o   Time: 9:00 a.m. to 5:00p.m

- o   Venue: New Horizons (Nota Asia)

- o   Fees: RM 500 per person

Topics covered: BizTalk Business Landscape, BizTalk Editor & Mapper, BizTalk Messaging, BizTalk Administration, Orchestration Business Process, Orchestration Implementation, Transaction Handling, Security, Application Integration Components and Pipeline Components, BizTalk Deployment. [13]

2.9.3 Hewlett Packard

Hewlett-Packard Company -- a leading global provider of computing and imaging solutions and services -- is focused on making technology and its benefits accessible to individuals and businesses through simple appliances, useful e-services and an Internet infrastructure that's always on. The HP Certified courses is based on a restructured curriculum that helps IT professionals perform more effectively in job roles such as that of system administrators. By focusing on the real-life requirements of job roles rather than specific product features, the HP Certified courses offers IT professionals better problem-solving skills. IT managers will in turn benefit from the improved service quality and increased staff productivity. HP has 86,000 employees worldwide and had total revenue from continuing operations of $42.4 billion in its 1999 fiscal year. Information about HP and its products can be found on the World Wide Web at http://www.hp.com. Hewlett-Packard today announced a partnership with **Computer Systems Advisers Malaysia Berhad (CSA)** where CSA will train IT professionals for the HP Certified courses. [14]

About CSA Malaysia

Established in 1971, Computer Systems Advisers (M) Berhad is one of Malaysia's leading Systems Integrators. It provides quality assured Total Integrated Solutions for multinational corporations and small-medium enterprises. CSA Malaysia is a member of the Computer Sciences Corp. (CSC), a Fortune 500 company which today has 60,000 employees in more than 800 offices worldwide with a revenue of USD9.4 billion for fiscal year ended 31st March 2000.

In April 1997, CSA Malaysia was officially public listed in the Kuala Lumpur Stock Exchange, 2nd Board. CSA Malaysia provides a broad range of IT solutions and services, specializing in software design and development, systems and network integration and engineering services. CSA Malaysia is the first IT Company in Malaysia to have earned the prestigious MS ISO 9001 Quality Management and Assurance Standard Award for its entire business operations. The training and educational services has since grown from strength to strength and today is an independent business unit by itself. At CSA Training Center, they offer a wide range of IT courses from basic awareness to highly specialized training for IT professionals. Their courses are structured to meet the needs of IT executives as well as end-users.

Popular courses such as:

- Desktop Applications (MS Office, MS Outlook),

- Internet / Intranet subject (Web Development & Publishing),

- Operating System (Novell Netware, Sun Solaris, Windows 95, Windows NT),

- Groupware Application

- Netscape

- Novell Groupwise and

- Java programming

In addition to the above, we also offer specialized courses in project management, LAN / WAN connectivity, switches, routers, internet security and others.

Training Centers and Facilities

CSA Training Center is registered with the Human Resource Development Council (HRDC). As such, organization which have contributed to the HRD levy for a period of 6

months are eligible to claim up to 80% subsidy for course enrolled under the PROLUS or PERLA scheme. Currently, most of their courses are Approved Training Programmes under the PROLUS and PERLA schemes by the HRDC.

The training centers at **Petaling Jaya, Penang and Kota Kinabalu** are equipped with state-of-the-art IT equipment which include Pentium processors and advance visual aids. More of such centres will be set-up in the near future to meet the increasing demand for IT education.

<u>**Customized Training**</u>

CSA can customize any of their offerings according to your organization's needs and specifications.

It is usually more economical if a group of people is trained. Sensitive issues can be openly discussed because there are no "outsiders".   [15]

2.10 Comparison with Existing System

2.10.1 Current Manual System

Manual system relies heavily on paper and pencil technology. Now a days, many company have send their employee to undergo for training or attend courses to enhance their knowledge in some field. But many of these company using manual system to collect the training center information from catalog, newspaper, magazines or where else. That's mean they just put it into fail and haven't make it computerized.

Common sense, we all realize that there will be a lot of problems if we use manual system to implement a task. For example, using manual system to collect the data or information from the staff and training center are not systematic. The data were keep in

numerous of fail, this will cause the user to waste their time to figure out their needs. Reliability of the information also very low by using manual system because the data maybe didn't be update or some data maybe lost without realizing. In this case, the staff are required to select the training courses according to their training needs. They expect to choose a most suitable training center or courses, if the data are not reliability, then many of processing error will occur.

CIC system provide a systematic database for the user. User can easily search for the information that they need and also can update their information at any time by themselves. These will reduce the manpower and time-consuming. Besides, less processing error will be found by using CIC system.

2.10.2 Existing System in Market (QA System)

QA system is a system that provides the services for individual user but for a company to search the information about training center. The system just provide a single user environment, it never connect to the training center. The system similar same like a search engine for information about training center. The administrator of the system will collect the information from training center then keep it into database. If who are interested in searching courses, they can sign in into the system, then get the information. But the service of the system is ended just by that, it did not provide the online register or any function that can connect to training center. Because of the reason, the data in the system are less reliability. As a user, we do not know that the information that we get are latest information or not.

Compare with CIC system, CIC system is specifying provided for a company and not for an individual user. The user must be the staff of the authority company. The system also can let the training center to keep their data in the database. Then the administrator of training center can update the latest information at any time. It can increase the reliability of the system. The user can select the courses that they want, then directly register online.

User no need to rush to get the register form. It will save the processing time and reduce the manpower.

2.10.3 Senior Thesis Project

After have the research for the existing system from the senior thesis project, I found that have two senior project almost same like my thesis project (for my part).

1. *A Web based System for an IT Training Company* by Kalwant kaur A/P Balbir Singh

2. *Web-based Management Information System for a Training & Consulting Company* by Anusiaah Anthonysamy

Both of these project just have the connection with the training center, it similar like a system that provide a web page for the training center to promote their courses. Both system just provide the function in accessing database and selecting the data for showing out. These systems did not provide the service for helping the training center to count out the total of payment that have been paid by the company and generate a receipt to the company. Besides, from their system, the training center also cannot get an analysis from the system about the most popular courses that have been registered by people. The analysis requirement is needed because it can help the training center to make a decision for adding or canceling a course. CIC system provides all of the benefits that have been mentioned.

Chapter 3

Methodology & System Analysis

CHAPTER 3 : METHODOLOGY & SYSTEM ANALYSIS

3.1 Methodology

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

Reasons why we need the methodology:

- Helpful in helping the developer lay out what to do.
- Provides the potential to change the system design at the early stage to closely addresses user's needs.
- Provides the opportunity to explore other alternative strategies and techniques. The developer would become more creative and innovative.
- Easy to associate each milestone with its deliver.

3.1.1 Prototyping model

A prototype is a partially developed produce that enables customers and developers to examine some aspect of proposed system and decide if it is suitable or appropriate for the finished product. In other words, prototyping means building a small version of system, usually with limited functionality, that can be used to help the user or customer identity the key requirement of a system and demonstrate feasibility of a design or approach.

Prototyping is often used to design a good user interface; the part of the system with which the user interacts. Since the prototyping model allows all or part of a system to be constructed quickly to understand or clarify issues, it has the same objective as engineering prototype, where requirement, or design require repeated investigation to ensure that the developer, user, and the customer have a common understanding both

of what is needed and what is proposed. One or more of the loops for prototyping requirements, design or the system may be eliminated, depending on the goals of the prototyping. However, the overall goal remains the same; reducing risk and uncertainly in development. Application prototyping, the process of developing and using the prototype has 5 characteristics:

- the prototype is a live, working application
- the purpose of prototyping is to test out assumptions made by analysts and users about required system features.
- Prototypes are created quickly.
- Prototypes evolve through an iterative process.
- Prototypes are relatively in expensive to build.

Application prototyping has two primary users. On the other hand, it is an effective device for clarifying user requirements. Written specifications are typically created as a vehicle for describing application features and the requirements that must be met. Developing and actually using a prototyping can be a very effective way of identifying and clarifying the requirement on application must meet

A second use of application prototyping is to verify the feasibility of a system design. Analyst can experiment with different application characteristics, evaluating user reaction and response.

Purpose

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

A part from that, the review of literature also enables the developer to do comparison on the past-developed projects and study the strength and weakness of it. It will also give an overview of how to improve the weakness and fulfill the requirements needed.

3.1.2 Waterfall Model

The waterfall model was the first put forward by Royce in 1970. A modified version of the model is shown in Figure 3.1. In this model, first the system requirements are determined and checked by the customers, system developers and the software quality assurance (SQA) group. Then the specifications for the software are drawn up. That is, a document is produced stating what the software is expected to do. This phase is complete once the client and the SQA group approve the software specification. Once the client has signed off the specification document, the planning phase commences and a detailed timetable for developing the software is drawn. This plan is also checked for correctness by the SQA group. After the client has approved the developer's duration and cost estimates for the software, the design phase begins. The software spercification document tells what the software must do while the design document tells how the software will do it.
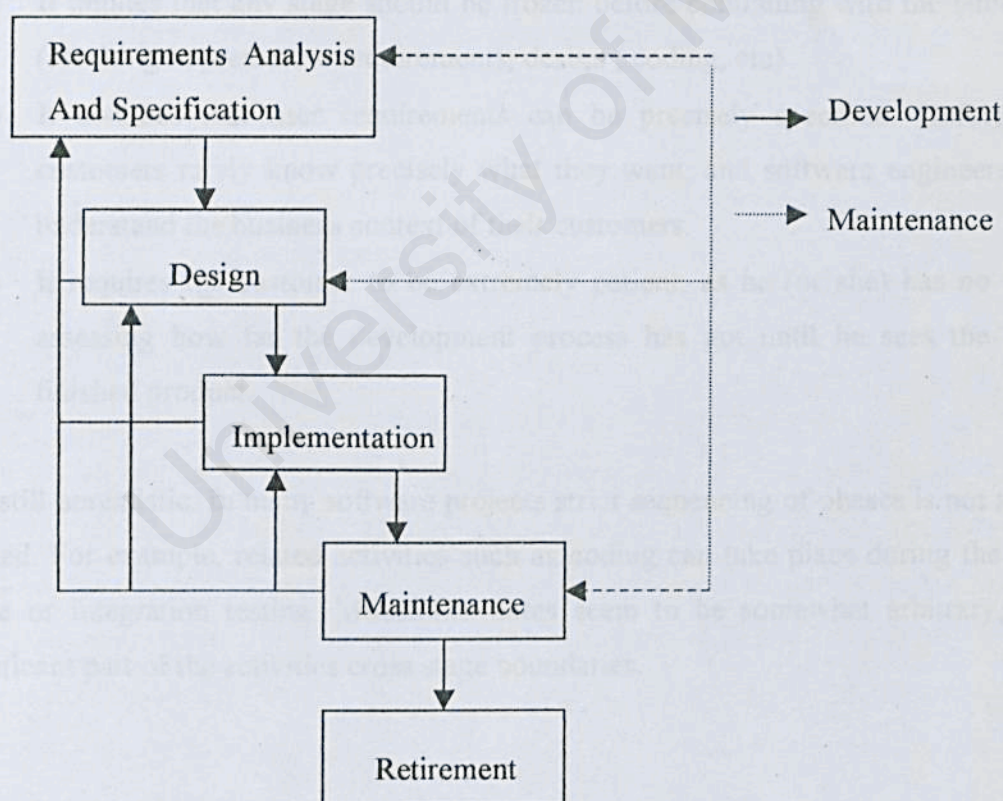
Figure 3.1 : Waterfall Model

This model recognizes the important of backtracking (feedback) and iteration in the software process. From each stage, the system developer can go back to the previous stages should there be any errors. For example, during implementation, errors in specification may surface requiring backtracking. The model allows the developer to go back to the requirements and specifications stage to fix those errors, then redesign the system, and then implement it. It is obvious that errors detected late are the most expensive to correct. Therefore, each stage should be properly verified and validated (against user requirements) to avoid expensive iterations.

The waterfall model has the following main advantages:

- It is easy to identify milestones.
- It is easy to separate one stage from another.

The waterfall model has the following main disadvantages:

- It implies that any stage should be frozen before continuing with the later stages (resulting in premature requirements, design , coding, etc)
- It assumes that user requirements can be precisely specified. Unfortunately customers rarely know precisely what they want, and software engineers rarely understand the business context of their customers.
- It requires the customer to be extremely patient, as he (or she) has no way of assessing how far the development process has got until he sees the nearly-finished product.

It is still unrealistic. In many software projects strict sequencing of phases is not actually obeyed. For example, related activities such as coding can take place during the design phase or integration testing. Milestones dates seem to be somewhat arbitrary, and a significant part of the activities cross stage boundaries.

3.2 System Analysis

System analysis is a most important phase in a software life cycle. It is the process of defining a problem, gathering pertinent information, developing alternative solutions and choosing these solutions.

The purpose of this analysis phase are:

- The acquire knowledge on how does an inventory control system work.
- To survey how available system of this type had been developed and how does it working.
- Research on how this system can be developed using current or maybe latest new emerging technologies.
- To gain an overall understanding of the system data flow and system process.
- To identity the major components to be included in the system.
- To analyze and plan control features to develop a robust and reliable system.

3.2.1 Fact Finding

Several fact-finding techniques have been used to obtain basic requirement and expectation to develop the system :

i.   **Research**

Collecting the printed documents such as the registration form, catalogs, handbill and the receipt from the colleges. From these such of mediums, we can use for a reference. This fact-finding also includes searching through the Internet, reading computer trade journals, periodicals and books to obtain information and news about trends and technologies. Internet acts as a very good resource for seeking information needed in the various online registration's system available for colleges or university. There will show out all the course information that provide by their colleges.

ii.   **Interview**

Interviews are the most often used fact-finding technique. Interview is a planned meeting where the system analyst will be the interview, who organizes and conducts the interview, and the system user, or advisor is the interview, who will be providing the needed information, through the series of questions and answer.

In our project, I interviewed a few persons who are in charge in the company and training center to get some opinion from them. From the interview, we also can consider about the status of training center and what they need in the system.

iii.   **Observations**

In this technique, we observe how the tasks are performed. The technique allows us to gather information about the system – the people who are involved, who does what, when, where, how and why. By actually seeing or participating in the system's operations, it helps us to understand the system better and it might provide additional perspectives about the current system.

iv.   **Questionnaire**

Because of the limited time, we cannot have the interview with many people who are related in this case, but there is not enough for the information to create a new system, so we forced to set up a questionnaire for collecting the opinion from the different types of people. This is the best technique to collect data from a large group of people.

Analysis from the questionnaire

1. Advantages that using the company's existing system.

   (From question 3 in the questionnaire)
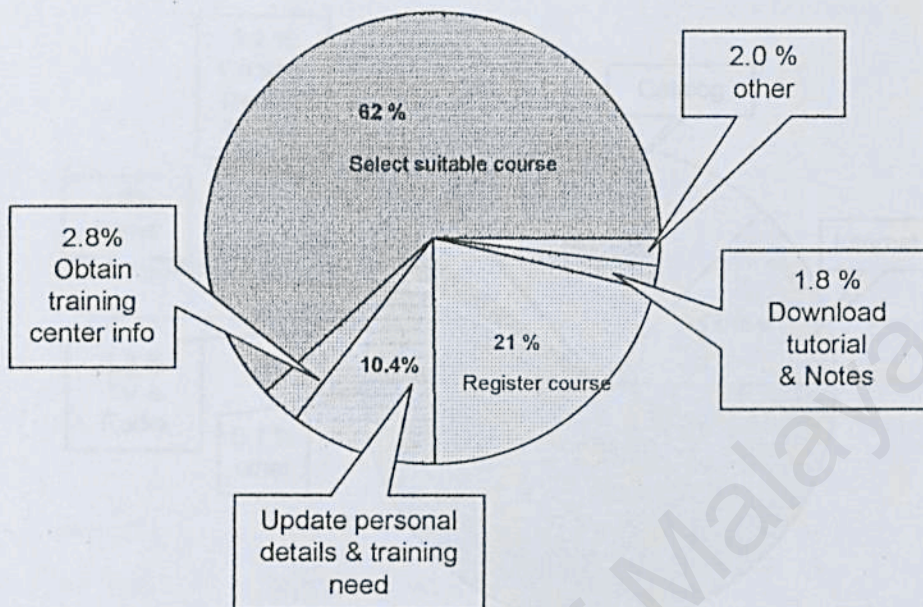
2. Disadvantages that using the company's existing system.

   (From question 4 in the questionnaire)
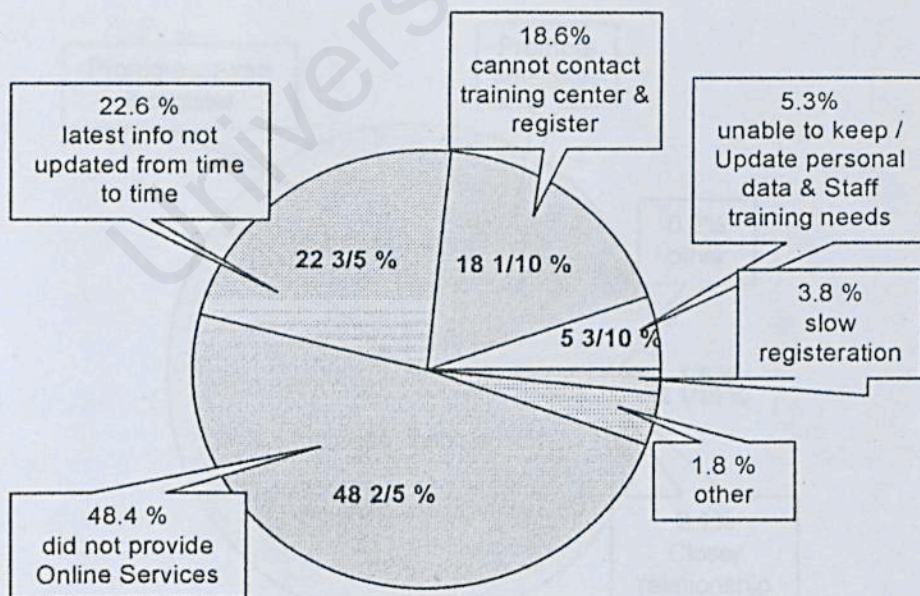
3. Searching media that have been used to search the training courses'
   information for the company that have not the similar system .
   (From question 1 in Company part B)
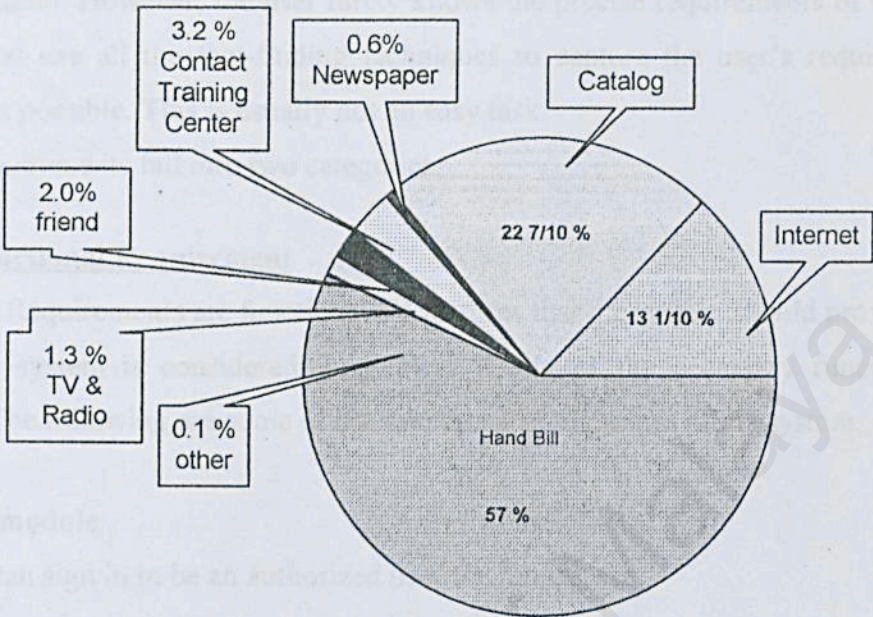
4. The benefits that are gained by the training center if they sign in the
   System CIC. (From question 4 Training Center part B)
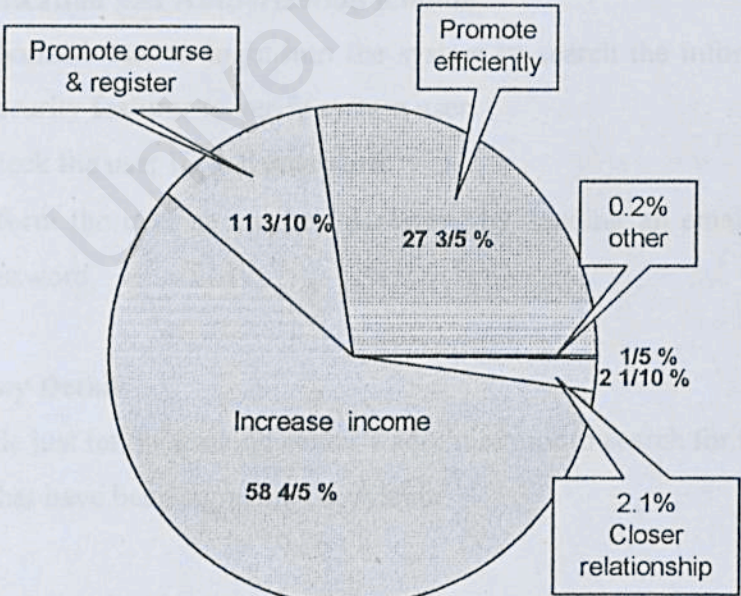
3.2.2 Requirement Specification

When a user requests for a new system, the user has some knowledge of what should go into the system. However, the user rarely knows the precise requirements of the system. So we must use all the fact-finding techniques to capture the user's requirements as precisely as possible. This is usually not an easy task.

System requirements fall into two categories:

3.2.2.1 Functional Requirement

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

a) Sign in module

New user can sign in to be an authorized user for future.

- Let user to fill up the registration form.
- Check the validation and verification of the value that the user had filled in into the form before they submit the form.

b) Authentication and Authorization module

To let authorized user to login into the system to search the information. This module provides security features to verify system user.

- Check the user ID and password.
- Inform the user about their password by sending an email if they forgot their password.

c) Company Details

This module just let the training center's administrator to search for the details of the company that have been signed in the system.

d) Training Center Details

- *History about the training center*

  To let the user more understanding with the background of the training center. The background can include :

  - when the center have been set up
  - what the services that are provided
  - the qualification of the training center's need

- *Network of training center*

  List all the location for the branch of the training center that in the database. The data include:

  - post address / e-mail address
  - telephone number
  - contact's person

- *Search Course module*

  Can let user to search the courses that are provided by the training center according to the course area or course title.

  - using the keyword to search the courses.
  - using the option to search courses.

- *Schedule of courses*

  For different class of the course, the schedule of courses are definitely different. So the time table of every course have be listed according to the branch.

e) Update module

This module is important for the training center because all the information in the training center such as courses detail, training center detail or administrator's info also need to

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update from time to time. These are make sure that the user can get the latest information of the training center.

f) Registration module

User can directly register online when they have selected their course. This module has the capabilities of validating the registration data upon submission by the user. From the system, the administrator can process the registration form and make decision to accept or reject it. Either the application is accepted or rejected, the administrator will send an email for the applicant to inform them.

g) Payment Processing module

After processing the registration form, the system will help the training center to calculate the total of payment that need to pay by the company and then the system will auto-generate an invoice for the company.

h) Course analyze module

Analyses the courses which have been registered by the company's staff then generate a graph about the most popular courses (top ten list).

3.2.2.2 Non-Functional Requirement

A non-functional or constraint describes a restriction the system that limits our choices for constructing a solution to the problem. These requirement are very subjective but are as important as the functional requirements.

Inter-operability

Applications and computer from different suppliers will have the capability to work together on a network and to connect to each other, share data and processes as appropriate.

Reliability

A system is said to have reliability if it does not produce dangerous. Or costly failures when it is used in a reasonable manner, that is, in a manner that a typical user expects is normal. This definition recognizes that a system may not always be need in the ways that the3 designer expects.

Accuracy

Accuracy refers to the precision of computations and control. CIC provides various accuracy measures. For instance, sign up page is able to eliminate duplicate records such as user name and ID, therefore always maintaining an accurate database.

Maintainability and Expandability

Maintainability may be defined quantitatively as the ease with which software can be understood, corrected, adapted and enhanced. Maintainability is the degree to which architectural data or procedural design can be extended. CIC is design to be expandable in the future.

Security

The security features built in prevents unauthorized access into the full-text of the CIC, user must log in with correct ID and password in order to access the full text of the CIC. Authorized user can change their password desired.

Efficiency

Efficiency in computer terminology means a procedure that can be called or accessed in an unlimited number of times to produce similar outcomes or output at a credible pace or speed.

3.3 Technology Consideration

3.3.1 ASP Vs CGI

For ASP:
Advantages:

1. Can easily run on Window NT IIS.
2. Has very good database capabilities, can link with Microsoft's powerful ODBC more easy.
3. Since ASP is specifically designed for Windows NT, it can have a very high level of integration with the opening system and its capabilities.
4. ASP faster language than Java. It is not tied to a particular browser, and requires no specific browser. All scripting code runs on the server, and the browser just receives the resultant HTML so the receiving browser needs no special capability.

Disadvantage:

1. Lack of speed.
2. Still slower than typical compiled language (although this slow-down is not a factor on small scale web servers).
3. Has to be compiled and error checked by the server each time it's runs.

ASP Vs CGI

In this project, ASP is used due to the reasons of the comparisons between ASP and CGI. ASP provides all of the functionality of CGI application in an easier-to-use and more robust environment. ASP is an easier way for your server to access information in a form not readable by the client and then act as a gateway between the two to produce information that the client can view and use.

With CGI, the server creates as many processes as the number of client requests received. The more concurrent requests there are, the more concurrent processes created by the

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server. However, creating a process for every request is time-consuming and requires large amounts of server RAM. In addition, this can restrict the resources available for sharing from the server application itself, slowing down performance and increasing wait times on the web.

ASP instead runs in the same process as the web server, more handling client requests faster and more efficiently. It is much easier to develop dynamic content and web applications with ASP. Besides, ASP also does better than other web applications tools. ASP leverages your existing skills and knowledge, data sources, components, and applications to quickly bring them to the web. Other tools create either static HTML, or lock you into a non-standard programming model or language. ASP is based upon the leading industry standard, making it easy to build, maintain, and evolve powerful interactive web applications.

3.3.2 VBScript Vs JavaScript

How VBScript and JavaScript are similar

VBScript and JavaScript share a core of strengths that make them much more similar that you might expect. In fact, the most noticeable difference between the two scripting language is the syntax of the language elements themselves. That is, the set of command words and punctuation that you use to actually write the program. Let's first explore how VBScript and JavaScript are similar:

- Both are object-based
  JavaScript and VBScript take on some of the syntax of object-oriented language; since their features resemble this type of language, we call them object-oriented. When you use VBScript and JavaScript, you take advantage of some of the benefits of an object-oriented language.

- No need extra tools to create either
  VBScript and JavaScript are interpreted, so there are no compiling involved. As a result, all you need to create VBScript and JavaScript program is a regular old

word processor and a scripts browser or a Web page authoring tool like FrontPage.

- Both create scripts that are Client-side

  VBScript and JavaScript are client-side applications. The user only communicates once with the server to get the initial Web page. Contained on this initial page is the VBScript or JavaScript program, which is actually run on the user's computer. Because the user doesn't have to send the data back to the server to get the results, the response is much, much quicker. And, as we all know, the faster your Web pages appear, the better.

VBScript is used because:

- We have Visual Basic programmers on hand. VBScript will be very familiar to many Windows programmers because it is subset of Visual Basic.
- Various capabilities of VBScript can be used to develop richly interactive web pages that respond to user input in an intelligent manner. For example, when user submits the registration form, a VBScript subroutine can be triggered to verify that the form is properly in with valid values.
- VBScript code is lightweight, fast and has been optimized to be transmitted to users browsing a web site.
- VBScript support any language that enables objects to be compiled as ActiveX controls.
- VBScript is tied to Microsoft technologies and our project is using Microsoft Front Page to develop.

3.3.3 SQL Server 7.0 Vs Microsoft Access 2000

SQL server 7.0 have been choose because it is the best database solution to be used with Windows NT server. It can handle more concurrent users as compared with Microsoft Access. As this project is designed to handle large amount of data, therefore, SQL server

is most viable solution to accommodate the vast storage requirement. If we using the Microsoft Access, there maybe some error will be occurred because Microsoft Access cannot support a large database. SQL server show the higher performance such as it have up to Gbytes of RAM/multiple terabytes.

3.4 System Requirement

Hardware and Software Requirement

Table 3.1   Hardware and Software Requirement

	Development Environment	Runtime Environment
Hardware Requirements	• Pentium III 866 Mhz PCs • 256 MB RAM • 20.4 GB Hard Disk • Standard input and output devices	• Pentium II and above computer. • 64MB RAM and above. • 6.4 GB Hard Disk and above. • Standard input and output devices.

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Software Requirements	• Windows 98 • Ms SQL Server 7.0 • PWS • Ms Visual Interdev 6.0 • IE 4.0 • Netscape Navigator 4.6 • Macromedia Dreamweaver Ultradev 4.0 • Macromedia Firework 4.0 • Macromedia Extreme 3D • Macromedia Flash 5.0 • Adobe Photoshop 6.0	• Windows 2000 • IIS 4.0 • Ms SQL Server 7.0 • IE 4.0 • Netscape Navigator 4.6 • Ms Visual Interdev 6.0

3.5 Problem Encountered

As usual, problems always occur during system development and it has been no exception in this project. Throughout the planning stage of this project, many problems have kept unfolding one after another as development work progressed due to many reasons. Since there was no prior experience in developing a system, it was hard to determine to which extend to define the scope of the system so that it can be completed within the time the given time frame. Actually these problems can overcome by interviewing more people, but because of time constraint and incorporation from some people, we just successfully interviewed 2 person . However, these were overcome by analyzing and studying all of the capabilities that Microsoft FrontPage, Visual Basic and ASP technology can do before determining the scope of the system.

During the assign phase, there was not enough time to study and produce the best design. Mainly, this was due to inexperience and insufficient knowledge of designing a system.

The best way to learn is to read as many approaches used in previous students' report documentation.

Problems were also encountered during the database setup. The connection between the client and server has not been set up yet. Due to the time constraints, we need to try it out as a team.

Chapter 4

System Design

CHAPTER 4 : SYSTEM DESIGN

4.1 Introduction

System design is a process through which requirements are translate into a model or representation of the software. System design is a very important factor in a system development as it determines the success of a system. The system specification describes the features of a system, the components or elements of a system and their appearance to users.

4.2 Principles of System Design

The following are the design principles from the aspect software engineering to achieve a good design and software quality for our CIC system:

➢ **Modularity**

A system is modular when each activity of the system is performed by exactly one component and the inputs of each component are well defined. Each system should consist of hierarchy of modules. Lower level modules are generally smaller in scope and size compared to higher level modules are serve to partition processes into separate functions. A modular design, which is a parallel development of different parts of a system, is encourages.

➢ **Coupling**

This is a measure of interconnection among modules in a software structure. A good design should have as 10W coupling as possible between modules. Sections that are inter-related within a module should be inter-linked. The interconnections between loosely coupled components are weak.

➢ **Cohesion**

A cohesion module performs a single processing function and requires little interaction with other procedures being performed in other parts of the program.

In other words, a component is cohesion if all elements of the component are directed toward and essential for performing the same task.

➢ **Shared use**

The same function should not be duplicated in separate modules but established in a single module that can be invoked by any other module when needed.

➢ **Span of control**

Modules should interact with and manage the functions of a limited number of lower-level modules. Sub-modules within a module should be accessed from the main module and these sub-modules should be inter-linked.

➢ **Size**

The number of instructions and functions contained in a module should be limited so that module size generally small.

4.3 Architecture Design

4.3.1 Introduction

CIC is a system that can be divided into several subsystem. These subsystems provide some related set of services. Architecture design is the design process which initially identify the subsystem. A framework is built to control the subsystem and allow them to communicate with each other. Application architecture specifies the technologies to be used to implement one information system in terms of DATA, PROCESS, INTERFACE, and how these component interact and communicate across a network. It serves as an outline for detailed design, construction, and implementation.

A three tier distributed client/server architecture (as shown in Figure 4.1) includes a user system interface top tier where user services (such as session, text input, dialog, and display management) reside. The middle tier provides process management services (such as process development, process enactment, process monitoring, and process resourcing) that are shared by multiple applications. The third tier provides database

management functionality and is dedicated to data and file services that can be optimized without using any proprietary database management system languages.
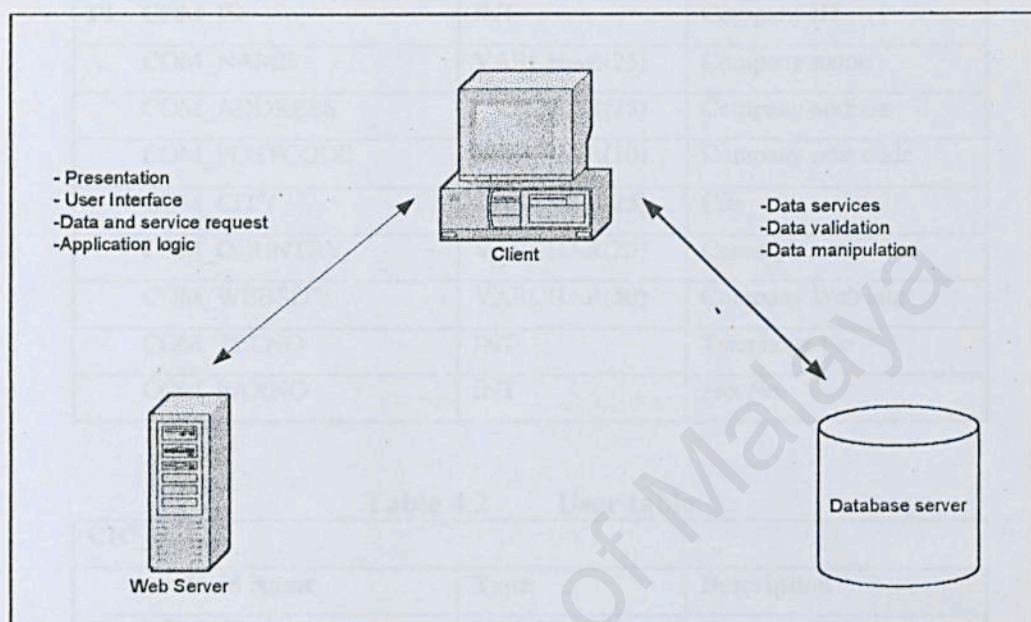
Figure 4.1   **Architecture Design**

4.4 Database Design

A database is a collection of interrelated files. The key word is interrelated. A database is not merely a collection of files. The records in each file must allow for relationships to the record in other files.

The control center of a database architecture is its database management system (DBMS). A DBMS is specialized computer software available from computer vendors that is used to create, access, control, and manage the database. The core of the DBMS is often called its database engine. The engine responds to specific commands to create database structure and then to r\create, read, update, and delete records in the database.

4.4.1 Data Dictionary

Table 4.1   Company table

CIC_COMPANY

	Field Name	Type	Description
PI	COM_ID	INT	Company ID
	COM_NAME	VARCHAR(25)	Company name
	COM_ADDRESS	VARCHAR(25)	Company address
	COM_POSTCODE	VARCHAR(10)	Company post code
	COM_CITY	VARCHAR(25)	City
	COM_COUNTRY	VARCHAR(25)	Country
	COM_WEBSITE	VARCHAR(50)	Company Web site
	COM_TELNO	INT	Telephone No
	COM_FAXNO	INT	Fax No

Table 4.2   User table

CIC_USER

	Field Name	Type	Description
PI	USER_ID	VARCHAR(6)	User's staff id
	USER_PASSWORD	VARCHAR(25)	User's login password
	USER_NAME	VARCHAR(25)	User's name
	USER_CATEGORY	VARCHAR(1)	User's category
	USER_GROUPID	VARCHAR(1)	User's group
	USER_DEPTID	VARCHAR(6)	User's department ID
	USER_EMAIL	VARCHAR(50)	User's email address
	USER_LASTMODIFIED	DATE	Last modification date
	USER_COMID	INT	Company ID

Table 4.3   Department table

CIC_DEPARTMENT

	Field Name	Type	Description
PI	DEPT_ID	NUMBER	Department ID

DEPT_NAME	VARCHAR(9)	Department Name
DEPT_HEAD	VARCHAR(9)	Department Head

Table 4.4   Staff's training need table

CIC_TRAINEEDS

	Field Name	Type	Description
PI	TNED_USERID	VARCHAR(6)	User's staff ID
PI	TNED_COURSEID	NUMBER(4)	Course ID
	TNED_ENDLEVELID	VARCHAR(1)	End level
	TNED_STARTLEVELID	VARCHAR(1)	Start level
	TNED_REMARK	VARCHAR(50)	Remark
	TNED_LASTMODIFIED	DATE	Last modification date
	TNED_COMID	INT	Company ID

Table 4.5   Category table

CIC_CATEGORY

	Field Name	Type	Description
PI	CAT_ID	VARCHAR(1)	Category ID
	CAT_DESC	VARCHAR(50)	Description

Table 4.6   Staff's group table

CIC_GROUP

	Field Name	Type	Description
PI	GRP_ID	VARCHAR(1)	Group ID
	GRP_NAME	VARCHAR(25)	Group Name
	GRP_LEADER	VARCHAR(25)	Group Leader's Name
	GRP_LEADEREMAIL	VARCHAR(50)	Email address of Group Leader

Table 4.7   Staff's training history table

CIC_TRAINHIS

	Field Name	Type	Description
PI	THIS_USERID	VARCHAR(6)	User ID
PI	THIS_COURSEID	NUMBER	Course ID
PI	THIS_LEVELID	VARCHAR(1)	Level ID
	THIS_STARTDATE	DATE	Start Date

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THIS_ENDDATE	DATE	End Date
THIS_CURRENCY	VARCHAR(5)	Currency
THIS_COST	NUMBER	Cost
THIS_TCENID	NUMBER	Vendor ID
THIS_LOCATION	VARCHAR(25)	Training Location
THIS_REMARK	VARCHAR(50)	Remark
TNED_COMID	INT	Company ID

Table 4.8   Training center table

CIC_TCENTER

	Field Name	Type	Description
PI	TCEN_ID	NUMBER	Training Center's ID
	TCEN_USERID	VARCHAR(25)	Admin's ID
	TCEN_PASSWORD	VARCHAR(25)	Login Password
	TCEN_NAME	VARCHAR(5)	Training Center's Name
	TCEN_ADDRESS	VARCHAR(225)	Training Center's Address
	TCEN_WEBSITE	VARCHAR(50)	Training Center's Web site
	TCEN_TELNO	VARCHAR(25)	Tel No
	TCEN_FAXNO	VARCHAR(20)	Fax No
	TCEN_INFO	NTEXT	Information about training center.

Table 4.9   Information for person to contact table

CIC_TCPIC

	Field Name	Type	Description
PI	TCPIC_NAME	VARCHAR(25)	Name
	TCPIC_TCENID	NUMBER	Training Center's ID
	TCPIC_TELNO	VARCHAR(25)	Tel No
	TCPIC_EMAIL	VARCHAR(50)	Email Address

Table 4.10   Course table

CIC_COURSE

	Field Name	Type	Description
PI	CRS_ID	NUMBER	Course ID
	CRS_TITLE	VARCHAR(50)	Course Title
	CRS_AREAID	VARCHAR(2)	Area ID

	CRS_TCENID	INT	Training Center's ID

Table 4.11   Course detail table

CIC_COURSEDETAIL			
	Field Name	**Type**	**Description**
PI	CDTL_COURSEID	NUMBER	Course ID
PI	CDTL_LEVELID	VARCHAR(1)	Level ID
PI	CDTL_TCENID	NUMBER	Training Center ID
	CDTL_DURATION	NUMBER	Duration of Course
	CDTL_CURRENCY	VARCHAR(5)	Currency
	CDTL_COST	NUMBER	Cost
	CDTL_SCHEDULEREF	VARCHAR(9)	Schedule reference
	CDTL_DETAILLINK	VARCHAR(50)	Soft link of course details
	CDTL_COMDIS	NUMBER	Discount for company
	CDTL_COUDIS	NUMBER	Discount for the course

Table 4.12   Type of courses table

CIC_AREA			
	Field Name	**Type**	**Description**
PI	AREA_ID	VARCHAR(1)	Area ID
	AREA_DESC	VARCHAR(25)	Description

Table 4.13   Level of course table

CIC_LEVEL			
	Field Name	**Type**	**Description**
PI	LEVEL_ID	VARCHAR(1)	Level ID
	LEVEL_DESC	VARCHAR(25)	Description

Table 4.14   Course schedule table

CIC_SCHEDULE			
	Field Name	**Type**	**Description**
PI	SCH_ID	NUMBER	Schedule ID

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	VARCHAR(9)	Schedule reference
SCH_REF	VARCHAR(9)	Schedule reference
SCH_STARTDATE	DATE	Start Date
SCH_ENDDATE	DATE	End Date
SCH_TIME1	VARCHAR(25)	Day/Time for class 1
SCH_TIME2	VARCHAR(25)	Day/Time for class 2
SCH_TIME3	VARCHAR(25)	Day/Time for class 3

Table 4.15   Form register table

CIC_REGISTRATION

	Field Name	Type	Description
PI	REG_ID	NUMBER	Registrator ID
	REG_CRSID	NUMBER	Course ID
	REG_USERID	NUMBER	User ID
	REG_TCENID	NUMBER	Training Center ID
	REG_SCHID	INT	Schedule ID
	REG_COURSEID	INT	Course Detail ID
	REG_DATE	DATE	Date for sending the registration form.

Table 4.16   Record for Accepting Registration Form table

CIC_COURSE

	Field Name	Type	Description
PI	ACC_ID	INT	Record ID
	ACC_USERID	INT	Applicant staff ID
	ACC_SCHID	INT	Schedule ID for the class that the applicant applied.
	ACC_REGID	INT	Registration ID

Table 4.17   Area Counter table

CIC_COUNTER

	Field Name	Type	Description
PI	CNT_AREA	VARCHAR(25)	Area description
	CNT_AMOUNT	INT	Number of person who registered the area.
	CNT_TCENID	INT	Training center ID

Table 4.18   Course Counter table

CIC_COUNTER1			
	Field Name	**Type**	**Description**
PI	CNT1_ID	INT	Counter ID
	CNT1_COURSE	VARCHAR(50)	Course title
	CNT1_AMOUNT	INT	Number of person who registered the course.
	CNT1_TCENID	INT	Training center ID.

Table 4.19   Company Counter table

CIC_COUNTER2			
	Field Name	**Type**	**Description**
PI	CNT2_COMPANYID	INT	Company ID
	CNT2_COMPANY	VARCHAR(50)	Company name
	CNT2_AMOUNT	INT	Number of registered person who are from the company.
	CNT2_TCENID	INT	Training center ID.

Table 4.20   Company Payment table

CIC_PAYMENT			
	Field Name	**Type**	**Description**
PI	PAY_ID	INT	Payment ID
	PAY_REGID	INT	Register ID
	PAY_AMOUNT	NUMBER	Total amount of payment that need to pay by the company.
	PAY_TCENID	INT	Training center ID.
	PAY_COMPANYID	INT	Company ID.
	PAY_CRSID	INT	Course ID.
	PAY_REF	INT	Schedule reference ID.

Table 4.21   Temporary table

CIC_TEMP			
	Field Name	**Type**	**Description**
PI	TEMP_ID	INT	Table ID
	TEMP_AREA	VARCHAR(25)	Area Description

4.4.2 Relational Database

Relational databases implement data in a series of two-dimensional tables that are "related" to one another via foreign keys. Each table (sometimes called a relation) consists of named columns (which are fields or attributes) and any number of unnamed rows (which correspond to record).

4.5 Process Design

4.5.1 Flow Chart
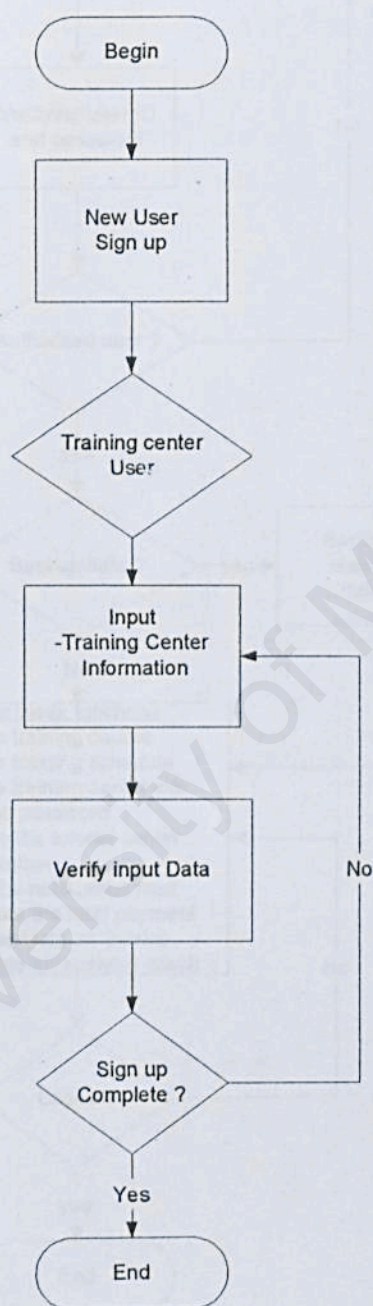
Figure 4.2   Flow Chart for new administrator to sign up

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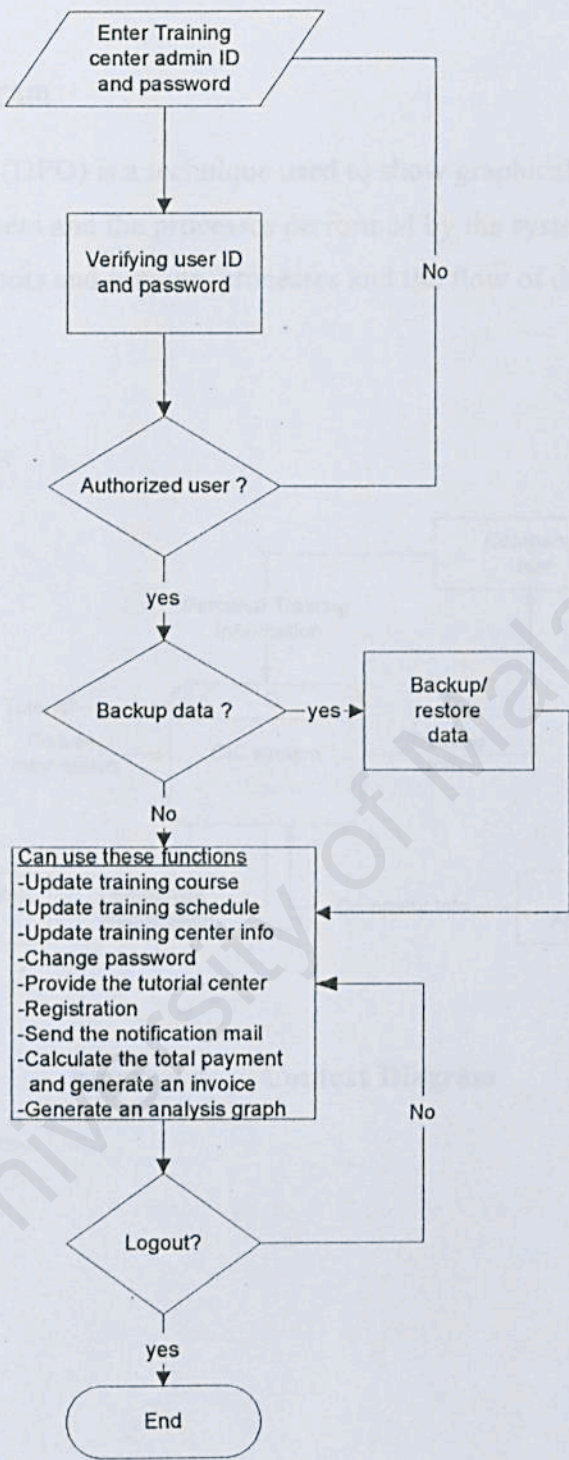
Figure 4.3   Flow Chart for System Process

4.5.2 Data Flow Diagram

A Data Flow Diagram (DFD) is a technique used to show graphically the flow of data through a business system and the processes performed by the system. The DFD gives an overview of system inputs and outputs, processes and the flow of data through each process.
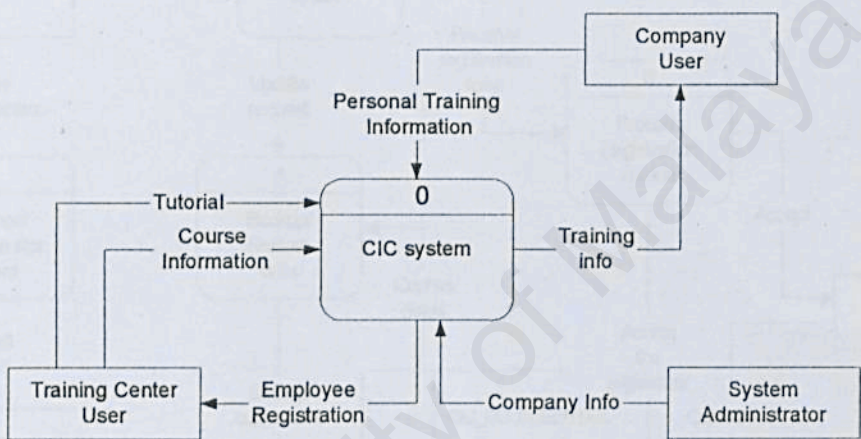
Figure 4.4   Context Diagram
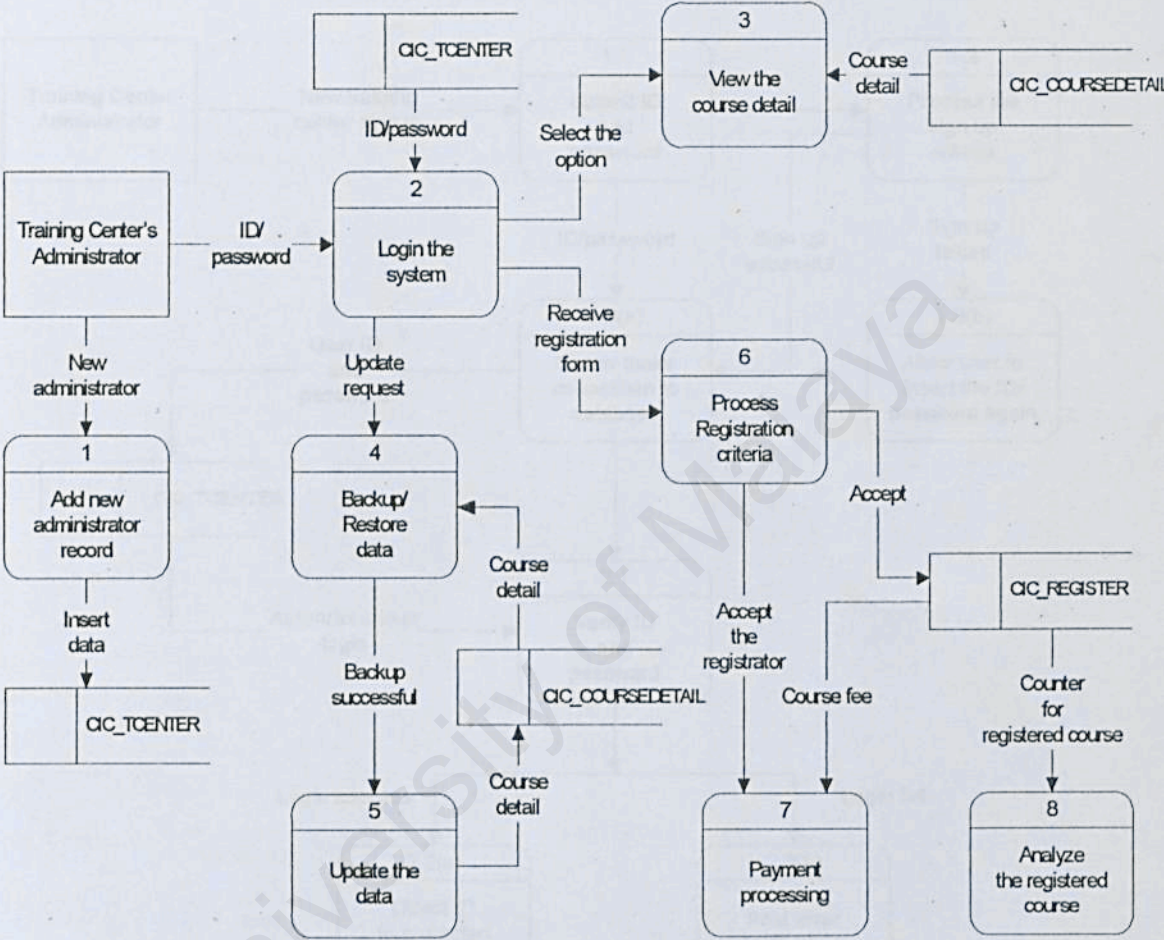
Figure 4.5   DFD Level 0
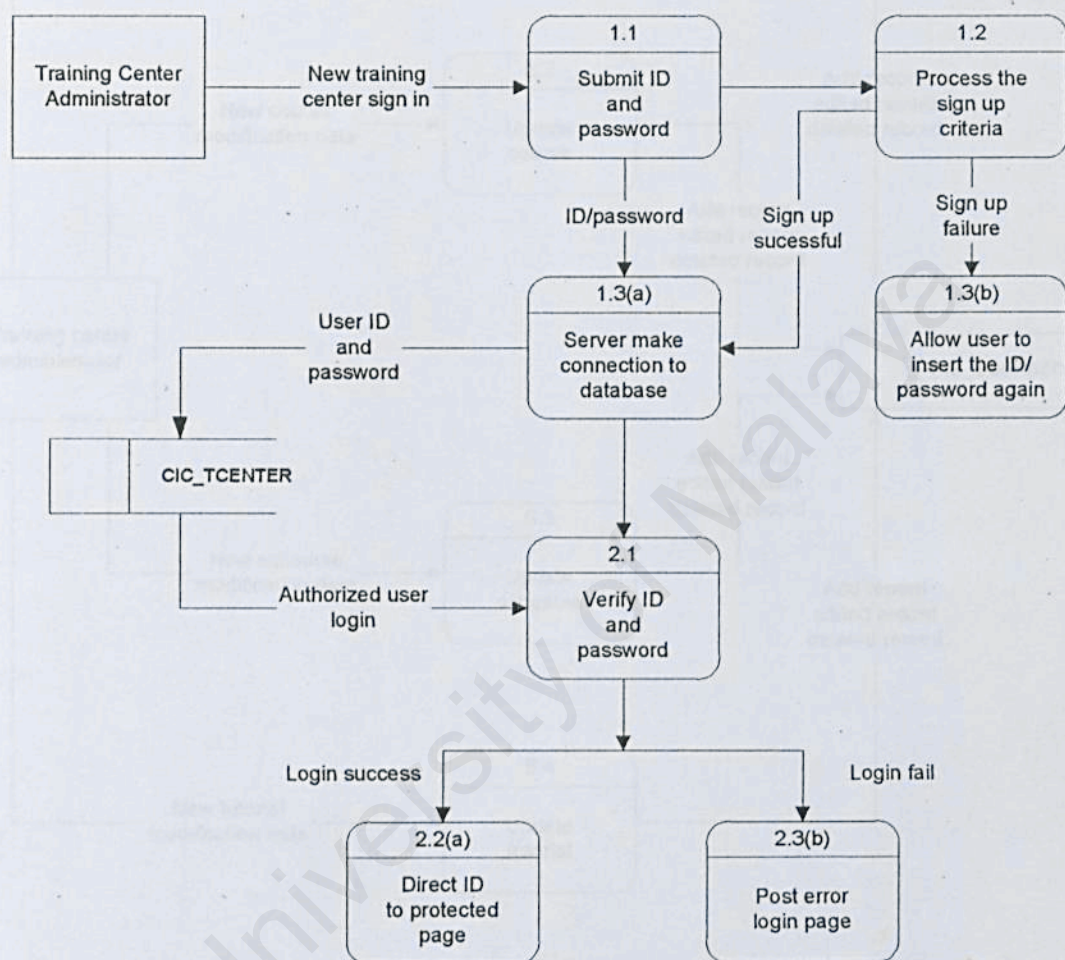
Figure 4.6   DFD Level 1 (Login Module)
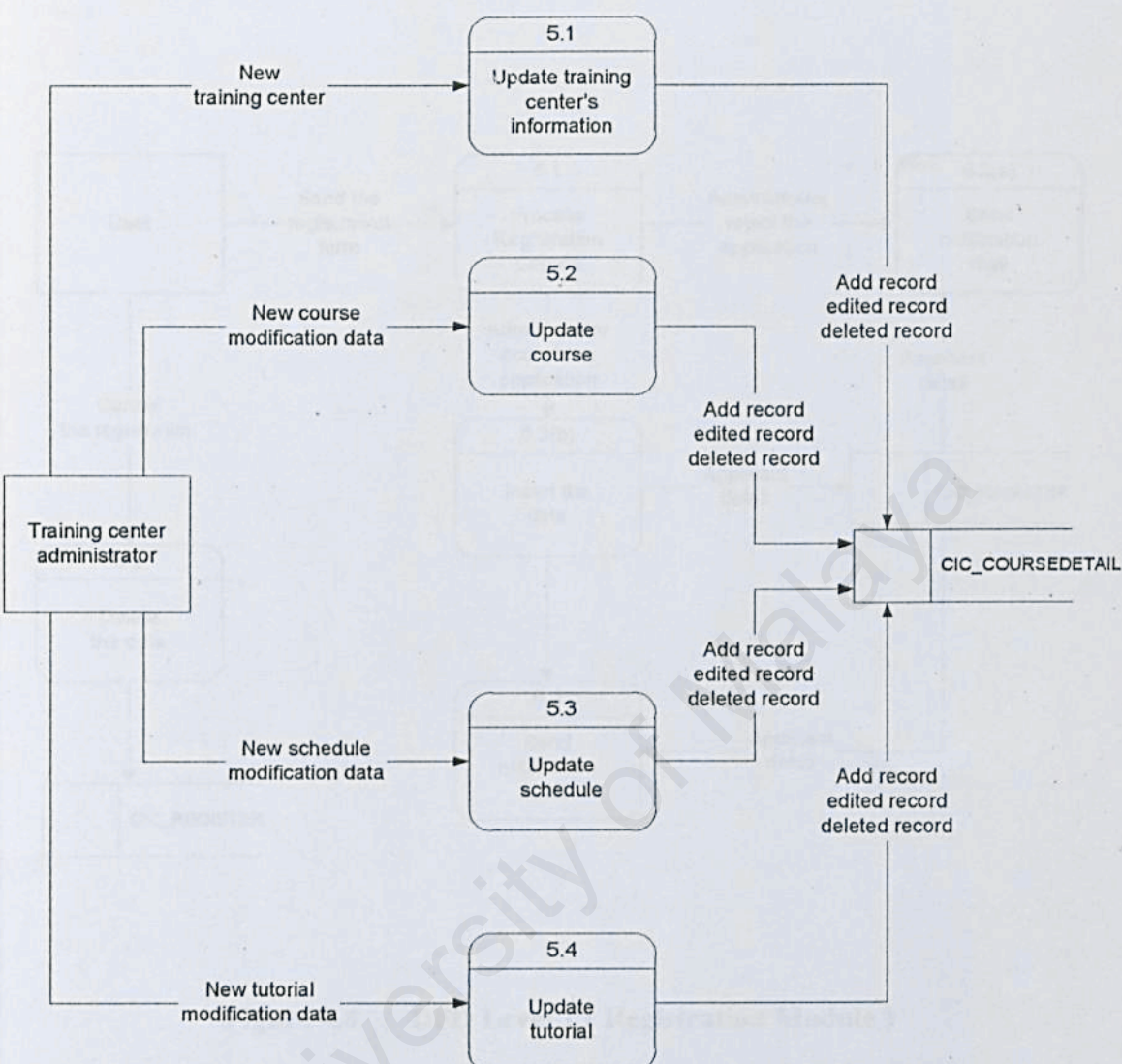
Figure 4.7   DFD Level 1 (Update Module)
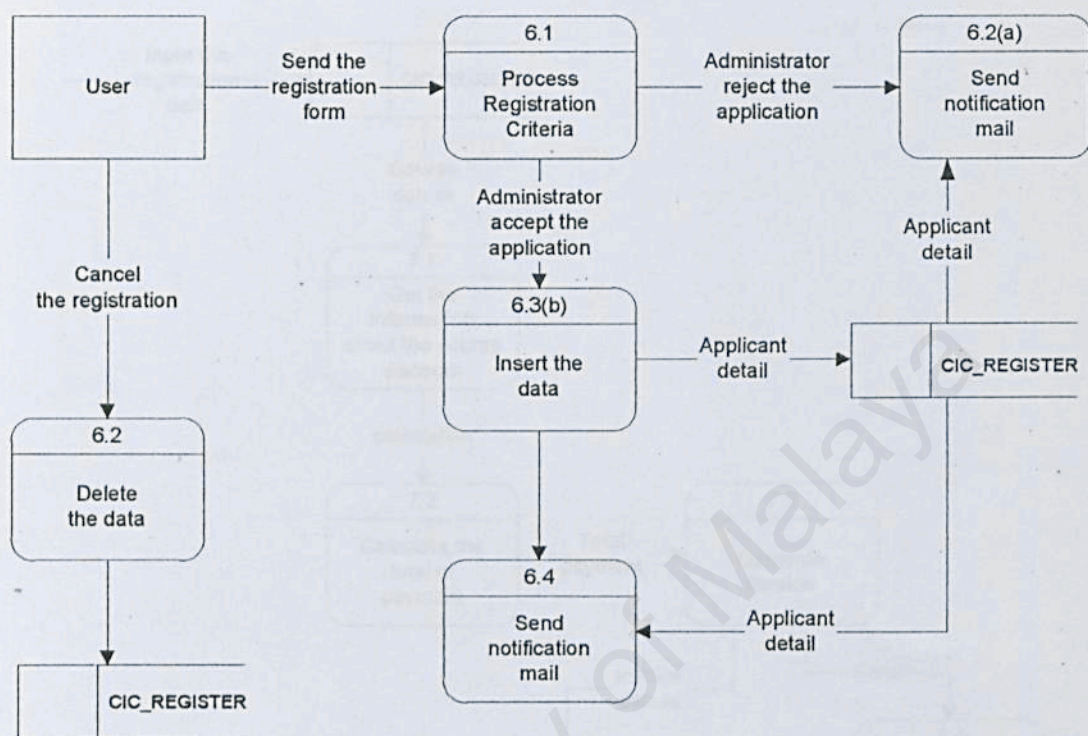
Figure 4.8   DFD Level 1 (Registration Module)
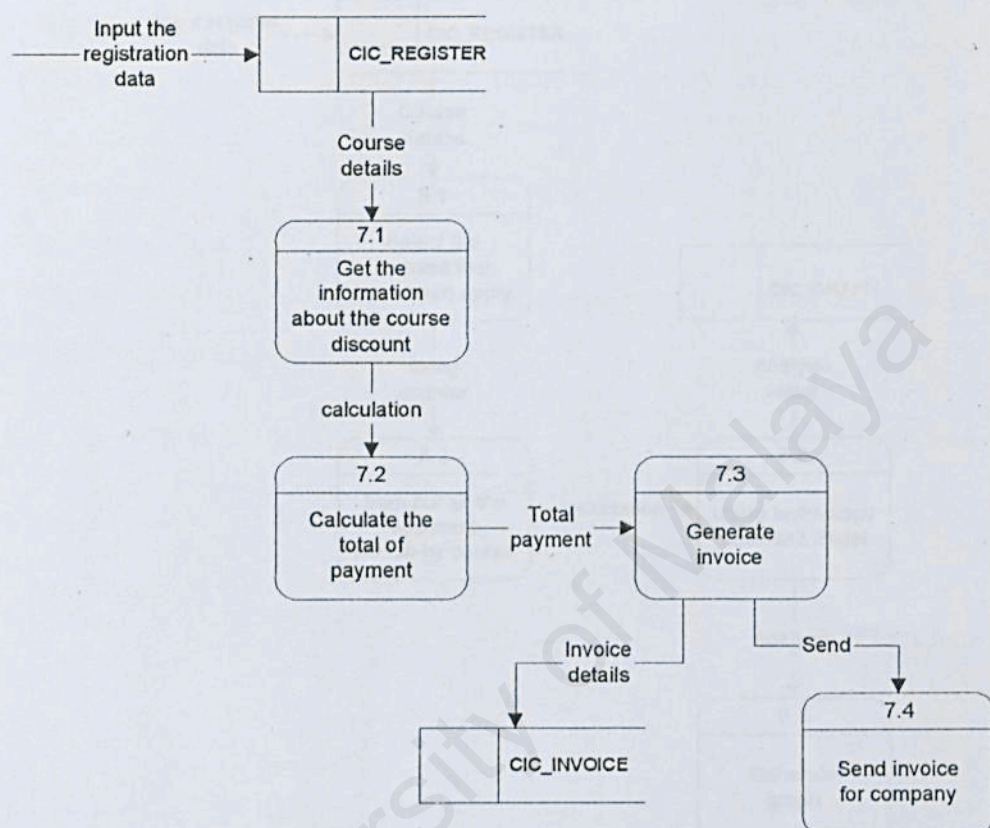
Figure 4.9   **DFD Level 1 (Payment Processing)**

Figure 4.10   DFD Level 1 (Generate Graph)

4.6 User Interface Design

The GUI design must fulfill four main objective[30]:

i.   Effectiveness in allowing users to access the system in a way that is congruent with their individual needs.

ii.   Efficiency in increasing the speed of data entry and reduce the number of errors that occur.

iii.   User considerations by providing the appropriate and useful information as a feedback to user.

iv.   The productivity as measured by ergonomically sound principles to design for user interface and workspaces.

Figure 4.11   Interface for user to login

Figure 4.12   Interface for new user to sign in

Figure 4.13   Interface for displaying the training center information
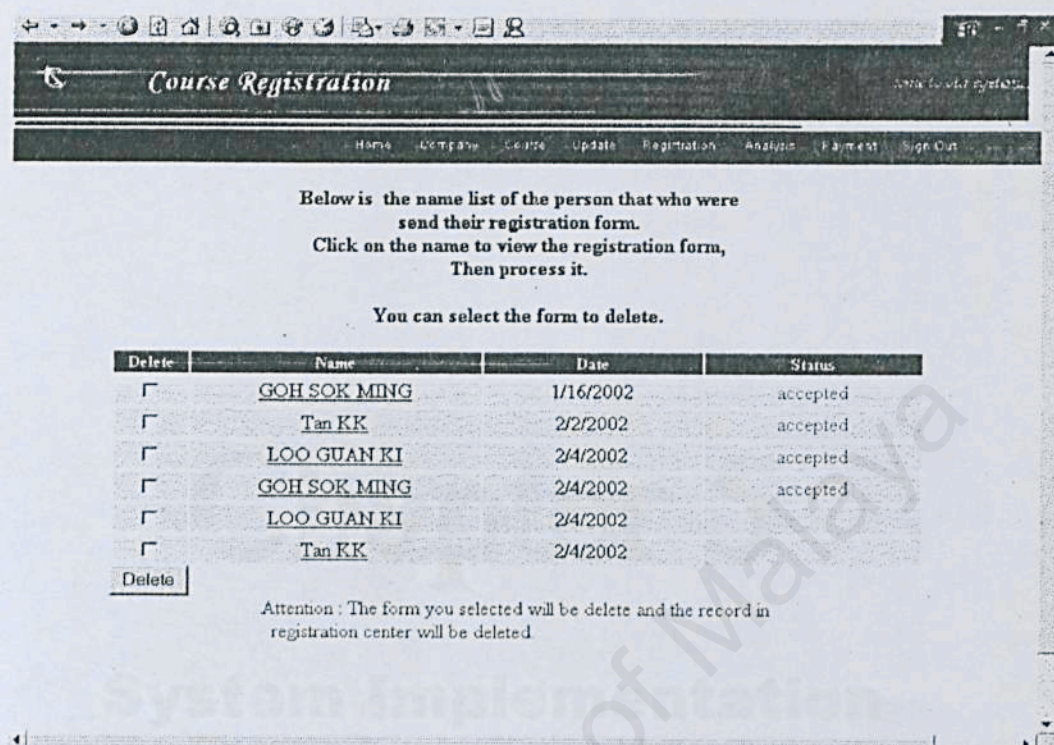

Figure 4.14   Interface for Update data

Figure 4.15   Interface for registration form

Chapter 5

System Implementation

Chapter 5 : System implementation

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

5.1 Development Environment

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

Hardware Requirements :

- Pentium III 866 Mhz PCs
- 256 MB RAM
- 20 GB Hard Disk
- Other standard PC components

Software Requirements :

Table 5.1   Software used

Software	Purpose	Description
Microsoft Windows 2000	System Requirement	Operating System. [Final Stage]
Microsoft Windows 98	System Requirement	Operating System . [Earlier Stage]
Internet Information Server 4.0 (IIS 4.0)	System Requirement	Web Server host [Final Stage]
Microsoft Personal Web	System Requirement	Web Server host

Server (PWS)		[Earlier Stage]
Internet Explorer 4.0	System Development	Web browser.
Microsoft SQL Server 7.0	System Development	Database Server (Build the database to store and manipulate data).
Microsoft Notepad	System Development	System file creation. Example : *.inc
Microsoft Visual Interdev 6.0	System Development	Coding web pages
Microsoft FrontPages 98	System Development	Coding web pages & interface design.
Macromedia Dreamweaver Ultradev 4.0	System Development	Coding web pages , interface design & layout design.
Macromedia Flash 5.0	System Development	Animation design & creation.
Adobe Photoshop 6.0	System Development	Image design & creation.

5.2   System Development

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

5.2.1   Server-side Scripting

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

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

There are two types of scripting which are client-side and server-side scripting. For the client-side scripting, they must be delimited by the *<SCRIPT>...</SCRIPT>* tags. On the other hand, server-side scripting required the *RUNAT* attribute set to server so that the script will be executed on the server rather that the client (browser). Another easiest way for server-side scripting is using the script delimiters *<%* and *%>*.

Include File

We can also easily include one file in another Active Server Page by using a server-side INCLUDE directive. Including one file in another is useful. For example, it's not uncommon for every page at a Web site to have the same database connection. Instead of repeating the same code over and over, we can simply include the database connection string as part of every page. For example;

```
<!--include file = "Clssfd.asp"-->
```
This include file actually consists of the database connection string .

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

Example 1 : Checking function (Using JavaScript)

```
<SCRIPT language="JavaScript">
<!--
  function VerifyData()
  {
      if (document.frmPerson.Name.value == "" )

      {
              alert ("Please enter name for contact person");
```

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```
        return false;
    }
  if (isNaN(document.frmPerson.TelNo.value)){
    alert ("Please enter a valid telephone number");
      return false;
    }
  if (document.frmPerson.Email.value == "" ||
(document.frmPerson.Email.value.indexOf("@",0) == -
1||document.frmPerson.Email.value.indexOf(".",0) == -1)) {
    alert ("Please enter a valid email address");
      return false;
  }
    else
      return true;
  }
-->
</SCRIPT>
```

Example 2 : Sending an email (Using NewMail Object)

```
<%
Dim rscenter, dbcenter, pw
sql = "SELECT * FROM CIC_TCENTER WHERE TCEN_ID=" & tcenid & ";"
rscenter.Open dbcenter, objConn
pw=rscenter("TCEN_PASSWORD")

'grab the password from the database
'call the SendPW subroutine passing the email address and the password
'as arguments
Call SendPW(email, password)
Response.Write "<p><br><br><br><center>Your Password has been
sent!</center>"

Rs.Close
rscenter.Close
Set Rs = Nothing
Set rscenter = Nothing
```

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```
End If
End If

'here is the subroutine that actually sends the email using CDONTS.
Sub SendPW(email, password)
Set cdoMail = Server.CreateObject("CDONTS.NewMail")
cdoMail.From = "webmaster@yourdomain.com"
cdoMail.To = email
cdoMail.Subject = "Your requested password."
cdoMail.Body = password & vbcrlf & vbcrlf & vbcrlf _
& "*** THIS MESSAGE HAS BEEN AUTOMATICALLY GENERATED ***"

cdoMail.Send
Set cdoMail = Nothing
End Sub
%>
```

The NewMail object provides the quickest method of mail-enabling a web page and allows us to send a message in just three or four lines of code. In its simplest format we can send a message using the NewMail object.

Example 3 : Upload a file (Using MapPath method and CreateObject function)

```
<%
dim FileCount          'Number of files uploaded
dim FieldCount         'Number of fields uploaded
dim Path               'Path to store files in
dim Dict               'pointer to a Scripting.Dictionary object with form
data

Path          = Server.mappath(".") & "\upload\"
FileCount     = 0
FieldCount    = 0
Dict          = Null
%>
```

The MapPath method maps the specified relative or virtual path to the corresponding physical directory on the server.

```
<%
Function saveAs( sHTMLFormField, sNewFile)

If Dict.Exists(sHTMLFormField)And Len(getFileName(sHTMLFormField))>0
Then

        binData = Dict.Item( sHTMLFormField).Item("Value")
        binData = getString( binData)

        Dim sFilePath
        sFilePath = Path & getFileName(sHTMLFormField)
        If Len( sNewFile) <> 0 Then sFilePath = sNewFile

        Set oFSO = Server.CreateObject( "Scripting.FileSystemObject")
'- create the transfer file using Scripting.FileSystemObject ...
        Set oTextStream = oFSO.CreateTextFile( sFilePath, True)
'- create a file binary write
        oTextStream.Write(binData)
'- write binData to the file
        oTextStream.Close
'- close the file
        saveAs = True
    Else
    Response.Write( "File associated with HTML &lt;FORM&gt; field
    name &lt;INPUT NAME=" & sHTMLFormField & "&gt; not found!")
        saveAs = False

    End If
End Function
%>
```

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The function takes the uploaded file and saves it with the selected file name and path parameters.

5.2.2   Database Connection

ActiveX Data Objects (ADO) is used to store and retrieve data from a database. ADO is a group of objects designed to provide a simple programming interface to database. To make the database available to Active Server Pages, there must be an ODBC DSN to point to the database location.

All communication with a database takes place through an open connection. Before any information can be inserted into or retrieved from a database, a connection with the database must be opened . The ADO Connection object serves the purpose. To access the database, a SQL statement will be used. Below are the few steps to follow in order to open a database connection and execute a SQL statement.

1. Create an instance of the connection object to open a connection with the database.
2. Call the open method of the connection object to actually open the connection.
3. Call the Execute method of the connection object to execute a SQL statement.

Example :

```
<%
   Dim objConn
   Set objConn=Server.CreateObject("ADODB.Connection")
   objConn.Open "Provider=SQLOLEDB;" & _
                "Initial Catalog=CIC;" & _
                "Initial File Name=C:\MSSQL7\Data\CIC_Data.mdf;" & _
                "User ID=sa"
%>
```

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5.2.3   Database Security

For some private data like the user password, we need to use some technique to make it more secure to avoid from hacking by somebody. One of the powerful technique is using encrypt function. This function will change the character or numbers in the password into another code by using some formula to change the value of the character (ASCI code) to another value.

```
<%
        'Crypt and encrypt password
        Function cryptpassword(Pwd)

        Dim Temp, PwdChr, EncryptKey

        EncryptKey = Int(Sqr(Len(Pwd) * 81)) + 23
        For PwdChr = 1 To Len(Pwd) step PwdChr
            Temp = Temp + Chr(Asc(Mid(Pwd, PwdChr, 1)) Xor EncryptKey)
               Next
               cryptpassword = Temp

        End Function
%>
```

5.2.3   Web-Based Development Tools

Microsoft Visual InterDev 6.0

Visual InterDev 6.0 provides a rapid application development (RAD) environment that lets developers design, build, debug, and deploy data-driven Web application faster.It is, in effect, just a development environment and collection of useful tools and utilities. One simple but very useful feature of Visual InterDev is the fact that it highlights all ASP code in yellow, which make it stand out from the HTML and normal client-side script.

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- **Software Requirement**

  Problem :

  The Operating System that was required to use is Microsoft Windows 2000 because it is stable to use to operate the network task, but because of using the 266MHz Pentium Processor, the processor support the operating system in very low speed if I using Ms Windows 2000.

  Solution :

  During the earlier stage, I developed my system by using the operating system Microsoft Windows 98 and using Personal Web Server (PWS). After that, I changed to use Microsoft Windows 2000 and IIS 4.0 when I uploaded my web base system to internet.

- **Coding Interrupted**

  Problem :

  Firstly the CIC project was developed in a local machine environment Ms Windows 98 and Ms Personal Web Server). After the CIC project is completed, it is deployed into the web server machine (Ms Windows 2000 and Ms IIS 4.0). Due to the different machine environment, there is a problem in writing code. ASP 3.0 is supported by IIS 4.0, so it had some error when running the system because of using PWS but not IIS 4.0. I was wasting a lot of time in checking these error and changing the codes.

  Solution :

  Mark down the errors then tested it again after change to use IIS 4.0 web server at final stage.

- **Determining Scope**

  Problem :

  The CIC system was developed in two separate part (Company part and Training Center part) by me and another partner. After we completed our own part, we need to integrate our scope into one system. Many errors were appeared during integration. We need to consider many situations in one scope.

  Solution :

  My partner and I used a lot of time in discussion and finding errors.

- **DSN Connection**

  Problem :

  Same source problem with problem code interrupted (different machine environment), there is a problem in setting the DSN connection. The DSN connection, which was set during project development, could not be used after project was deploying into web server.

  Solution :

  Troubleshooting the problem with my project partner and another course-mates.

Chapter 6

System Testing

Chapter 6 : System Testing

Testing is performed to ensure that the programs are executed correctly and conforms to the requirements specified. It provides a method to correct logic error and for testing system reliability and stability. It should be noted that there is a difference between the four basic concepts related to software testing. These are error detection, error removal, error tracking, regression testing. In developing CIC System, testing usually involved several stages: unit/module testing, integration testing and system testing.

6.1   Testing Strategies

To ensure the logic and functionality work probably, different type of testing strategies had been apply in the system testing for CIC System include :

White Box Testing: White box testing requires the intimate knowledge of program internals. By using white box testing methods, the test cases that can be derive are stated as the following:

1. Exercise all logical decision on CIC System True/False cases
2. Exercise all loops at their boundaries and within their operational bounds
3. Exercise internal data structure to ensure their validity
4. Guarantee that all independent paths within a module have been exercised at least one.

Table 6.1 Dynamic Analysis Tools

Type of Dynamic Analyser	Functionality of Tool
test coverage analysis	tests to which extent the code can be checked by glass box techniques
tracing	follows all paths used during program execution and provides e.g. values for all

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	variables etc.
tuning	measures resources used during program execution
simulator	simulates parts of systems, if e.g. the actual code or hardware are not available
assertion checking	tests whether certain conditions are given in complex logical constructs

Black Box Testing: Black box testing based solely on the knowledge of the system requirements. A set of input condition can be derived by black box testing. These conditions will fully exercise the entire functional requirement for CIC. Black box testing uses an approach to uncover the different class of error that white-box testing method. Black box testing attempt to find error in the following categories:

1. Interface error (cannot link to the page or button no linking)
2. Interface or missing functions (function error, etc. checking function)
3. Performance errors (images at the wrong path)
4. Initialize and termination error

Top-down Testing: Testing which start the most abstract components and works
downwards.

Bottom-up Testing: Testing which starts with the fundamental components and
work upwards.

6.2   Testing Process

Testing process for the CIC system consists of 5 stages as shown in figure 6.1 :
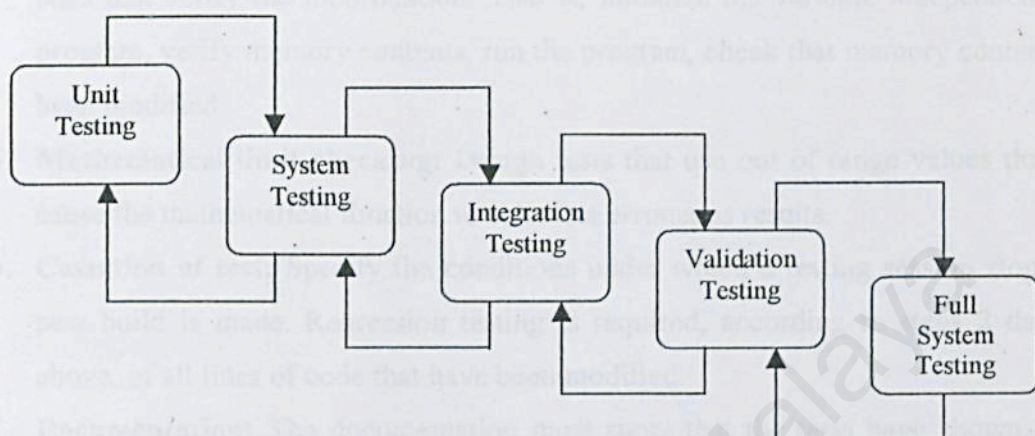
Figure 6.1   Testing Process

6.2.1   Unit Testing

All code will be unit tested to ensure that the individual unit (class) performs the required functions and outputs the proper results and data. Unit testing is typically white box testing and may require the use of software stubs and symbolic debuggers. This testing helps ensure proper operation of a module because tests are generated with knowledge of the internal workings of the module. Below are the topic of unit testing that I used to test my CIC system:

1. **Environment:** Specify testing environment. i.e. when stubs and drivers and/or other application routines, special hardware and/or conditions are to be used.

2. **Boundary Analysis:** Specify tests that will execute code using boundaries at *n-1, n, n+1*. This includes looping instructions, while and for loop.

3. **Error handling:** Design tests that verify the recording of all detected and reportable errors that a program is designed to find and report.

4. **Global parameter modification:** When a program modifies global variables, design tests that verify the modification. That is, initialize the variable independent of the program, verify memory contents, run the program, check that memory contents have been modified.

5. **Mathematical limit checking:** Design tests that use out of range values that could cause the mathematical function to calculate erroneous results.

6. **Cessation of test:** Specify the conditions under which a testing session stops and a new build is made. Regression testing is required, according to steps 2 through 5 above, of all lines of code that have been modified.

7. **Documentation:** The documentation must show that the tests have shown that the topics in items 2 through 6 above have been addressed.

Debugging strategies

These are some of the debugging strategies being use during the unit testing:-

i.   *Reviewing the algorithm used*

If a program is running well, but the information is not what as intended, then maybe a logic or database error have occurred. Reviewing algorithms and computation for their correctness and efficiency is needed efficiency of the program will be increased. for this problem. Sometimes, by using different algorithms the efficiency of the program will be increased.

ii.   *Display on screen the passing value*

One of the possibility of wrong information being retrieves ids that the wrong value is being passed from one page to another page that will do the processing. To ensure that right value has been passed to the next program for processing, the passing value is display on screen for viewing.

iii.   *Using Query Analyzer provided by SQL Server 7.0*

When the database transaction error occurred, the error message will be displayed and most of the time, it is cause by incorrect syntax in SQL statement. Therefore, SQL statement being used to execute the transaction will be test using Query Analyzer provided by SQL Server 7.0 that will provide more information on the error. Other than that, Query Analyzer is used to correct the SQL statement when wrong information is being retrieved although the SQL statement being used return no errors.

6.2.2   Integration Testing

This type of testing addresses the issues associated with the dual problems of verification and program construction. Integration is a systematic technique for constructing the program structure while at the same time conducting tests to uncover errors associated with interfacing. The objective is to take unit tested modules and build a program structure that has been dictated by design. The following topics are addressed in my system testing:

1. **Critical module definition:** Decide which modules contain critical control operations. These modules should be unit tested as soon as possible and not wait for subordinate class/object completion. Use of program stubs may be necessary.

2. **Object grouping:** Decide what modules comprise an integration group by use of scenarios and appropriate architecture diagrams. It is desirable to integrate at low levels to make bug definition easier. Choose objects that are related to a specific function like command uplink.

3. **Depth vs. breadth testing:** Decide how to test a group of objects/classes It is suggested that breadth testing be used when interfacing with the hardware. Use stubs, if required, to test dispatcher control modules. Use depth testing when a

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function is well defined and can be demonstrated, e.g. and application mode like timed exposure.

4. **Regression testing:** Integration regression testing is required whenever an interface attribute has been changed, e.g. the value of a passed parameter.

5. **Top down vs. bottom up:** Use top down testing to verify major control or decision points. Use bottom up to test hardware driver type programs.

6.2.3   System testing

System testing is actually a series of different tests whose primary purpose is to fully exercise the computer-based system. Each test may have a different purpose, but all work to expose system limitations. System testing begins when sufficient hardware and software has been integrated that enable the operation and functions of the integrated CIC system. The purpose of system (stress) testing is to identify the operational envelope of the instrument. System testing will follow formal test procedures based on hardware, software and science requirements.

6.2.4   Validation Testing

The purpose of validation is to prove that the CIC instrument performs as specified in the requirements documents .

1. Validation tests/procedures will identify a testing method and pass/fail criteria.

2. When ranges are specified in the requirements, tests cases will include boundary values at $n-1$, n, $n+1$ where possible. For example, the module of generate graph in CIC system : the graph just draw out the top ten record of the most popular .

3. courses, the most popular area of course or the company that have most staff to register the course in the training center.

4. When the value limits are specified, the measured value should be recorded. For example, when the user filled in the registration form, the user ID or password have their own limited value length.

6.2.5   User Testing

The final step of testing process is the system testing by end user. In my project, the end user is the administrator of the training center. Because of the constraint of time, I just can invite one of my friend who working at training center Informatic as a secretary to test my system. Below were the problems that appeared while she was testing the system:

1. error message pop up when there are empty data in the database.
2. invalid expression in the query statement.
3. images loading problem : images not found in the path.
4. record cannot be retrieved from the database because :
   - the difference of data type cannot be match.
   - inconsistence of the data in difference table which have relationship.
5. inflexible of the graph scale.

From the testing, I can find out a lot of problems that I never considered before. So, I can solved it early.

Chapter 7

System Evaluation and
Conclusion

Chapter 7 : System Evaluation and Conclusion

7.1   Introduction

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

7.2   System Evaluation

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

7.2.1   System Strengths

➢ Online update function

CIC System does on-line content update function for training center's administrator to enter up-to-date information about the courses for the web site. Thus it is a dynamic web site which can provides later information for the company staff.

➢ Easy Accessibility

CIC System is a web-based application. Therefore, it can be accessed easily using the web browser. Beside, It also using the client server approach that allows

processing load to be shared between the client and the server, thus reducing the burden on the server and better service could be provided.

➤ Consistency User Interface and Available User Guidance

The interface is consistent in that comparable operations should be activated in this same way. For example, a message is rounded by a rectangle box and the main module buttons are located at the top of each page.

➤ Custom Password System

Creating a custom password-authentication system prevents unauthorized users from viewing pages that they don't have permission to access. More importantly, unauthorized users are prohibited from accessing records stored in the database.

➤ Security

The important data like password, we used the encrypt function to encrypt the data in the database so that it cannot be hack by somebody. Although the hacker can hack into my database, but he/she also cannot see the encrypt password.

➤ Validation of the Input Field

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

➤ Reliable System with Effective Error Recovery

This is a reliable system as it caters for almost any possible errors encountered. Server-side scripting will generate appropriate feedback to user when error occurs. For example, if the user forgot their login password, our system will send their password for them through the email.

➢ Relatively Fast Response Time

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

7.2.2   System Constraint

➢ Browser Support

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

➢ Inflexible of the system

Most of the codes consists in the system are hard code, that means the user cannot choose the content that they like, for example in the auto-send mail function, the content of the mail was fixed by the system already, the user can not change the content of the mail.

7.3   Future Enhancements

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

➢ Support Other Browsers

As stated, this system requires Microsoft Internet Explorer 4.0 and above for execution. In future, it can be turned to fulfill other browser requirement such as

Netscape Communicator or Operas for execution. This is because Netscape has a sizeable share in the browser besides Internet Explorer.

➢ Error Detection Features

This system actually needs a more comprehensive error detection feature to ensure that only valid input is being passed to the server and it is done through client-side scripting. This is important in ensuring that the Internet system is robust and easy to maintain the reliability of the system.

➢ Enhance the graph generation

The performance of the system can be improved by changing the technique of drawing graph. In my project, the graph has been drawn by using VBScript, but it will be more flexible if using the technique of adding component Microsoft to the ASP code.

➢ Feedback Function

Feedback function can let the user to give their response or comment for the system. From the comment, we can improve the system according to the requirement and suggestion from the user.

➢ Provide Online Payment Service

It will more effective if the system have provide the service for online payment. So, the company can easily to pay their course fees using credit card.

7.4   Knowledge Gained

A lot of knowledge had been gained through the entire development of the CIC System. The following are some of the knowledge that has been gained throughout this project.

7.4.1   Setting up different kind of server

An opportunity for setting up the Windows 2000 and IIS 5.0 could be experienced through the development of the project. Besides that, a better understanding on how to manipulate the SQL Server 7.0 also has been achieved. Several discussions have been held in solving the difficulties.

7.4.2   Additional knowledge of Using Software Tools

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

7.5   Conclusion

Overall, Course Info Center System (CIC) has achieved and fulfills the objectives and requirements as a web based system that provide effective and efficient services for both company or training center in searching the information of courses and promote courses through a direct online system to the company.

However the system still need a lot of enhancement before it can be used in the market. More survey and interviewing were need to improve the system functional requirements. Because of the CIC system is developed in two separate part (Company part and Training Center part) by my partner Goh Sok Ming and I, so have many different idea such as the interface design and database design. We must co-ordinate all the function and make the system always keep in the right track.

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

Reference

[1]   Client/server Software Architectures
      http://www.sei.cmu.edu/str/description

[2]   *http://www.utoronto.ca/webdocs/HTMLdocs/HTML_spec/html.html*

[3]   David Buser, John Kauffman, Juan T.Llibre, Brian Francis, David Sussman, Chris
      Ullman, Jon Duckett, *Beginning Active Server Pages 3.0*, wrox, UK, 1999.

[4]   JavaScript
      http://whatis.techtarget.com/definition/0,289893,sid_gci212418,00.html

[5]   VBScript
      http://whatis.techtarget.com/definition/0,289893,sid_gci213279,00.html

[6]   Mueller, John Paul, *Microsoft Internet Information Server 4*, Osborne, 1998.

[7]   Personal Web Server for Windows
      http://www.Microsoft.com/windows/ie/pws/default.htm

[8]   Macromedia - Dreamweaver
      http://www.macromedia.com/software/dreamweaver

[9]   Microsoft Office FrontPage Home
      http://www.microsoft.com/frontpage/

[10] *http://msdn.Microsoft.com/library/default.asp?URL=/library/techart*

[11] Rafe Colburn, *Special Edition Using SQL*, Que, USA, 1999.

[12] Informatics Smart-Tech Citicampus
      http://www.informatics.edu.my

[13] New Horizons - Welcome
      http://www.newhorizons.com.my

[14] hp, Hewlett-Packard : leader in computing and imaging
      http://www.hp.com

[15] CSC : Global Home

    http://www.csc.com

Robert Vieira. "Professional SQL Server 7.0 Programming". Wrox Press Ltd, 1999.

Kendall & Kendall. "Systems Analysis And Design". Prentice Hall, Inc 1999.

Reference Complete

INVOICE

Hewlett Packard
Address : 47-B, Jalan Puchong, 47000, Selangor
Tel No. : 035090900
Fax No. : 45693008

Sold by : KIKI

Attention :
Date : 17/3/02 time 50 EGI

Staff ID	Staff Name	Course	Amount(RM)
112	HSW	prof. Adnan	450
113	OSW	prof.	450
121			450
		Total :	RM 7650

All cheques should be crossed and made payable
to Hewlett Packard

Authorised Signature

Received By

Invoice used by Hewlett Packard
Print (0303)

INVOICE

Hewlett Packard

Address : 47-B, Jalan Puchong, 47800, Selangor
Tel No. : 0388958844
Fax No. : 45555888

Received by : KIKI
dfja

No   :
Attention :
Date   : 1/25/02 2:06:50 PM

No	Staff ID	Staff Name	Course	Amount(RM)
1	112	HSW	java (Advance)	450
2	111	GSM	ppkk (Advance)	450
3	113	GSH	java (Advance)	450
			Total :	RM 1350

Notes :
1. All cheques should be crossed and made payable
   to Hewlett Packard

Authorized Signature

Received By

Questionnaire:

Description :

CIC (Course Info Center) is a system that provided for a company to store the employee's details (include the training needs) and collect the training information from training center. This system provide an online services. That's mean the staff in the company can directly register through the system.

For Company:

1. Did your company has a system that almost same like CIC system?
   - ☐ Yes   (go to part A)
   - ☐ No   (go to part B)

Part A

1. The scope that provided by the system is for _____
   - ☐ Whole company
   - ☐ Department
   - ☐ Group

2. How your company's system get the training information from training center?
   - ☐ Training center sign in into the system, then the training center responsible to update it
   - ☐ Training center send the catalog or email to the company, then the company's administrator update the information
   - ☐ The company administrator search the information from different media (internet, newspaper, or catalog)

3. What are the advantages of your company's system?
   - ☐ Easily obtain the information about training center
   - ☐ Can store user's own personal details and can update their training's needs
   - ☐ Can select their courses in suitable training center from database
   - ☐ Can directly register courses from the system
   - ☐ Can download the notes/tutorial that provided by training center
   - Other
   _____

4. What are the disadvantages of your company's system?
   - ☐ Cannot store/update the personal details and staff's training need
   - ☐ User cannot directly contact or register with the training center
   - ☐ The latest information from training center always haven been updated in time
   - ☐ Slow respond from training center when the registration's form is passed up

5. Would you satisfied with the system?
   - ☐ Yes
   - ☐ Not very satisfied
   - ☐ Not
   - ☐ No opinion
   - ☐ Disappointed

Part B

1. How you search the training courses that you need?
   - ☐ Internet
   - ☐ Catalog
   - ☐ Handbill
   - ☐ Newspaper
   - ☐ Contact the Training Center
   - ☐ Friend
   - ☐ Television/Radio
   - Other _____

2. What is your opinion about searching training courses manually?
   - ☐ Efficient
   - ☐ Easy to search the training courses that I need
   - ☐ Sometimes I cannot find the courses I need
   - ☐ Time-consuming
   - ☐ Deficient
   - Other _____

3. Do you think is it necessary your company need a system to search the training courses?
   - ☐ Yes
   - ☐ Is better to have this kind of system
   - ☐ Not necessary, but if have this kind of system, is OK
   - ☐ Don't even need
   - Other _____

4. If your company wants to have a search training courses system, what type of function should provided in the system?
   - ☐ View / update employee personal
   - ☐ View / update Training Needs
   - ☐ View / update Training History
   - ☐ Search training course from different view
   - ☐ Contact with Training Center
   - ☐ User name and Password
   - Other _____

5. How you contact Training Center in order to do the registration?
   - ☐ E- mail
   - ☐ Telephone

□ **Straight away go to Training Center**
□ **Letter**
Other_____

6. **Where your company stores the employee's training history?**
   □ **In file**
   □ **Another system**
   □ **Never store employee's training history**
   Other_____

For Training Center:

1. Have your training center cooperates with any company for providing courses to the company's staff?
   - ☐ Yes (go to part A)
   - ☐ No (go to part B)

Part A

1. Isn't the system an online service system?
   - ☐ Yes
   - ☐ No

2. What information of your training center that are required by the company to input into the system's database?
   - ☐ History of training center
   - ☐ Course provided
   - ☐ Fees of the course
   - ☐ Schedule of the course
   - ☐ Location for the branch of your training center

   Other

   _____

3. Have your training center prepare an online tutorial class for the company's staff to download?
   - ☐ Yes
   - ☐ No

4. How the staff of the company register course?
   - ☐ Online register
   - ☐ Send back the manual registration form to training center
   - ☐ Directly contact your training center

   Other _____

5. What are the offers that your training center provided for the company?
   - ☐ Course's fees discount provided
   - ☐ Free tutorial download
   - ☐ Extend the course's duration
   - ☐ Free text book

   Other

   _____

   - ☐ No offer provided

6. What's types of payment service do your training center provide for the company?
   - ☐ Credit card
   - ☐ Cash
   - ☐ Postal order
   - ☐ Check

  ❑ Bank draft
Other
_____

Part B

1. **What media do your training center use to promote their training information?**
  ❑ Internet
  ❑ Catalog
  ❑ Newspaper
  ❑ Television
  ❑ Radio
 Other
_____

2. **Have your training center met any problem when it want to update the information?**
  ❑ Yes
_____
  ❑ No

3. **How the staff of the company check the latest information of your training center?**
  ❑ Catalog that send by your training center
  ❑ The web site of your training center
  ❑ E-mail from your training center
 Other
_____

4. **What is the benefits for your training center if a company use the system like CIC system?**
  ❑ Can efficiently promote the courses
  ❑ Can promote the course and do the registration process in one time
  ❑
  ❑ Can build a closer relationship between training center and company
 Other
_____

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Chapter1 Introduction

1.1 Welcome

Welcome to CIC (Course Info Center) system .This system is a web-based system that bring out an easiest way for company's staff to find out the information about the training courses search by their training's need and the system also benefit to the training center promoting their offer courses online. All the function in this system can be easily be executed by a simple action of point and click on the available hyperlink and function button.

1.2 About this manual

This CIC system was separated into two parts. One is for company and another is for training center. This user manual will guide you (*as a training center's administrator*) through all the functions available in the system. This system is then subdivided into 7 sub-module.

1.3 Conventions

To help you locate and interpret information easily, this user manual uses consistent typographic. These conventions are explained as following:

- ❑ *<Button>* indicates a button in this subsystem.
- ❑ Menu/Option indicates menu bar in this subsystem
- ❑ *Hyperlink* indicates a hyperlinks in this subsystem
- ❑ *<Form>* indicates the particular form.

1.4   Standard Coding

For the CIC System, there are some data which are fixed and not allow to modify except you change it in the database. Those data are listed in the table below.

Subject	Code	Description
Course Area	AD	Audit
	AP	Application
	DB	Database Management System
	EI	Equipment Interface
	FC	FASTech Components
	FK	CIM Fundamental
	IP	IT Policy
	MD	Methodology
	MW	Middleware
	OS	Operating System
	PG	Programming
	PL	Production Logistic
	SS	Soft Skills Development
Level	B	Basic
	I	Intermediate
	A	Advance

1.5   Accessing to CIC Administration System

The login page will be displayed on the Internet Browser after the correct URL was being requested (http://localhost/CIC/newLogin.asp).

Chapter 2   Hardware and Software Requirements

The following list is all the requirements needed in order to run the CIC system effectively.

2.1   Hardware Requirements

- ❑ Pentium II 233 MHz computer

- ❑ 32 MB RAM

- ❑ 4 GB Hard Disk

- ❑ Network interface Card (NIC) or other Network card to support LAN connection

- ❑ Other standard PC component

2.2   Software Requirements

- ❑ Microsoft Window NT (or Microsoft Window 2000)

- ❑ Microsoft SQL Server7 (Enterprise Version)

- ❑ Microsoft Internet Information Server (IIS)

- ❑ Internet Explorer 4.0 or later

Chapter 3   Getting Start -- CIC system (Training Center part)

CIC system for training center part is decomposed into another 7 module, there are Authentication and Authorization Module, Company and Courses Searching Module, Uploading tutorial and Downloading software, Update record, Processing course registration task, Analysis record and Accounting module.

3.1   Authentication and Authorization / General Module (Home Page)

Figure 3.1 shows the CIC System home page. The target user for this interface are the Administrator of a training center (i). The system will track on the Username they entered and then direct link to corresponded pages (the main page of the training center that including the information of the center).

General module here consists of new user sign in function and forgets password function in which system will retrieve password for relevant user and send to them through e-mail. For a new training center which want to register as a new user in the system, they need to sign up to this system through the *New User?* Hyperlink. Both the lecturer/staff/student and the Administrator/Super Administrator are allowed to performed their tasks on the *Forget your password?* hyperlink which will be explained deeper later.
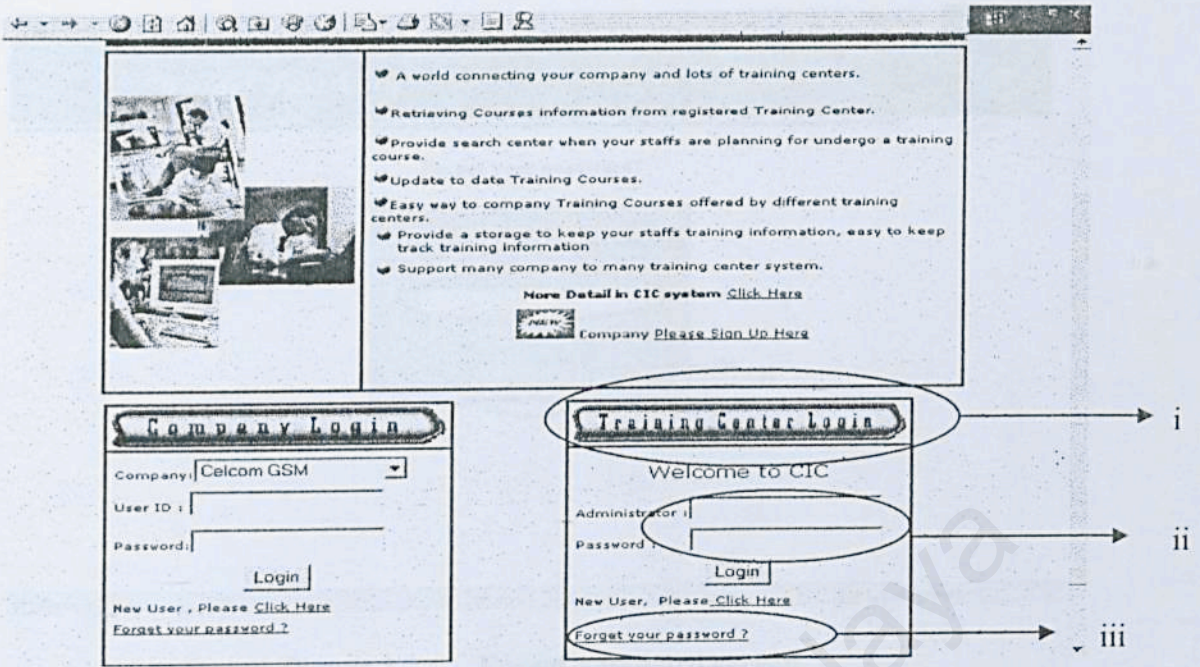
Figure 3.1   Login screen(e-Forms System Home page)

(i)   Administrator needs to login to CIC system using valid login username and a

        valid password (ii).

(ii)   *<Login >* – Allow the system to process the verification.

(iii)   For user who forgets their password to login to the system, they may click on

        Forget your password (iii). Input their email address (i) and click the *<Submit>*

        (ii) as shown in (i) in Figure 3.2, their corresponded password will be sent back

        to their email account later.
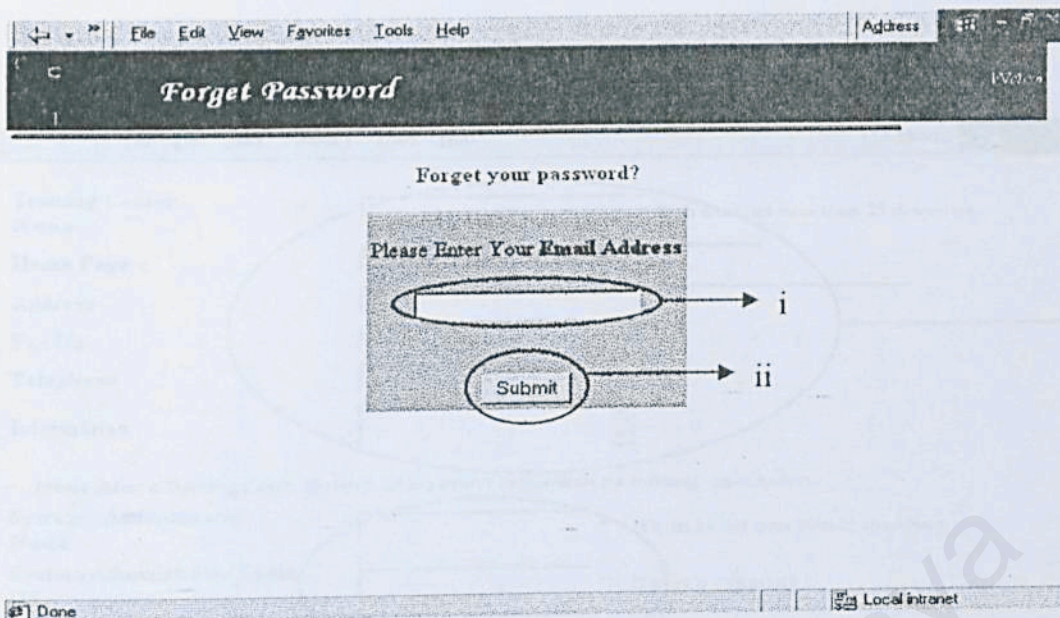
Figure 3.2   Forget password screen

(iv)   New user (Training Center's Administrator) needs to proceed to registration

section (Figure 3.3) in order to login to this system. They need to provide all the

personal information requested there (i), then new user also has been requested to

enter their Administrator ID (same as user ID) , password and confirm password

(ii). Click on the *<Submit>* will allowed them to submit their personal

information and the *<Reset>* will clear all the text field in (i).

Remark : - Admin ID must between 4-6 character.

- Password must between 6-25 character or number.

Figure 3.3   Registration screen

3.2   Training Center Administration's Home

After the authorized user (training center administrator) login the system, it will bring you to the *Home* of the training center (Figure 3.4). This page will show you about the information of your training center. The another 6 module will show in this page. There is a horizontal menu (blue in color) in which each option represents 4 modules respectively in this subsystem. There are *Company, Course, Update, Registration, Analysis* and *Payment* button represents the 5 modules (i).

The another module is *Upload tutorial and Download software* which is represented at (ii).

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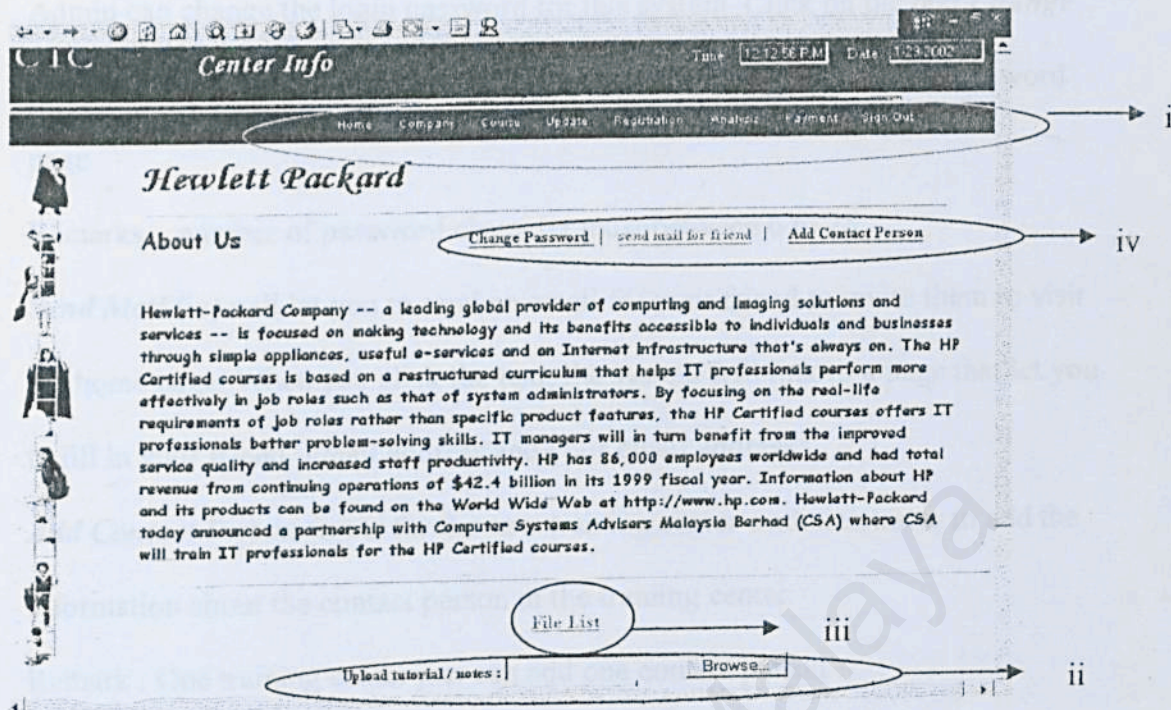
Figure 3.4   Admin's home page

The link for *File List* (iii) will link to the page (Figure 3.5) that which are listing out the

tutorial or notes that let you to download and some URL for the software download

homepage

This menu will exist in each page in this subsystem to ease the navigation flow. For some

of the module that is subdivided into another sub-module, there is another horizontal

menu (grey in color (iv)) exist.

(i)   This is the home page that act as welcome page after Admin successfully login to

the system. It will display some information about the training center that

registered to the CIC System.

(ii)   Admin can change the login password for this system. Click on the *text Change Password* which is grey in color (iv). Then you will go to the Change Password page.

        Remarks : number of password character must between 6 to 25.

(iii)   *Send Mail* (iv) will let you to send an email for your friend to invite them to visit the home page. When you click the text, the system will link to a page that let you to fill in your friend' email address and your email address.

(iv)   *Add Contact Person* (iv) is for the new training center's administrator to add the information about the contact person in the training center.

        Remark : One training center just can add one contact person.

3.2.1   Company and Course Searching Module

Click on the *Company* button or *Course* button will direct Admin to this module. This module allows all the Administrator of the training center to search the registered company and the courses information that have been input by the admin before that.

Company Button

After you click on this button, the system will show you the list (i) of the company that which had signed in the system (Figure 3.5). At the list of company name, there have a link that can bring you to the company details page.

After the company list table, have a form that let you to set the discount that your training center will offer for the company which you have chosen (ii).
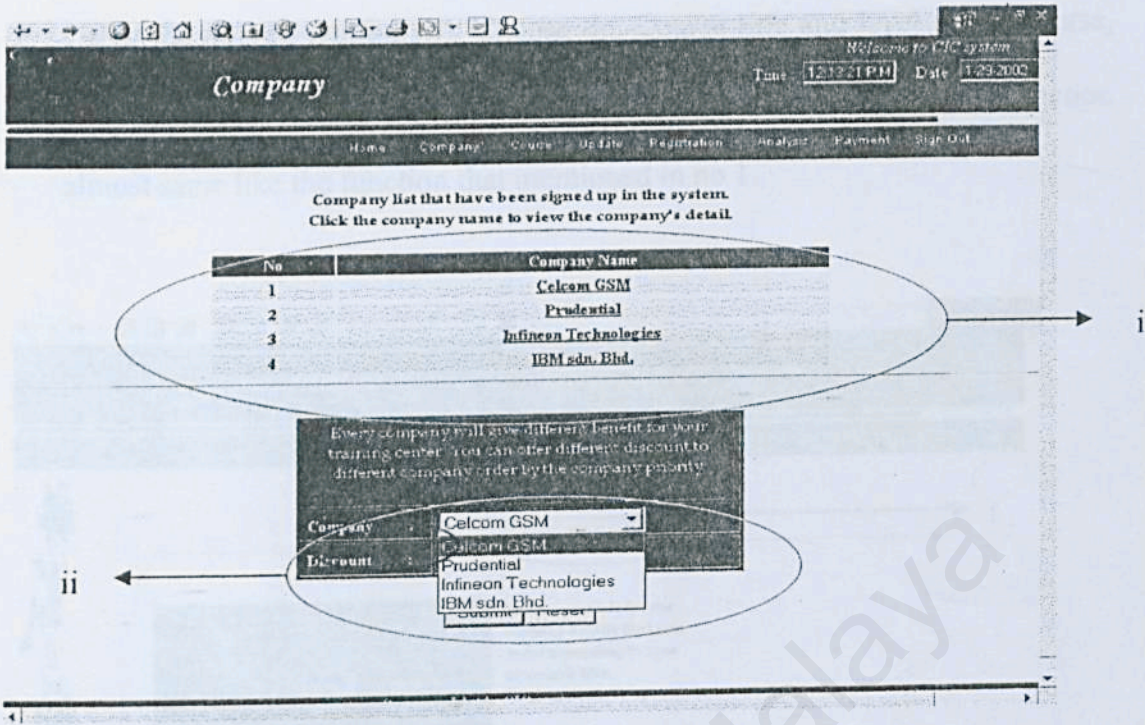
Figure 3.5

Course Button

From this page, you can search for the training courses order by the course area or the course title (Figure 3.6).

If you choose the course area, the system will retrieve all the course area in a table and let you to choose which one you want and so on (Figure 3.7).

If you choose the course title, the system was prepare a search engine for you to search the related courses that you need (Figure 3.8). You have two ways to use to search the courses:

1. Using the *Search Keyword* box (i). Enter your subject keyword, then search. From the following page (Figure 3.8) you continue to search the course schedule and the information of the course.

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2. Using the *Search Option* (ii). Choose the Course title and level of the course, then the system will retrieve the related courses. The following page's function almost same like the function that mentioned in no 1.
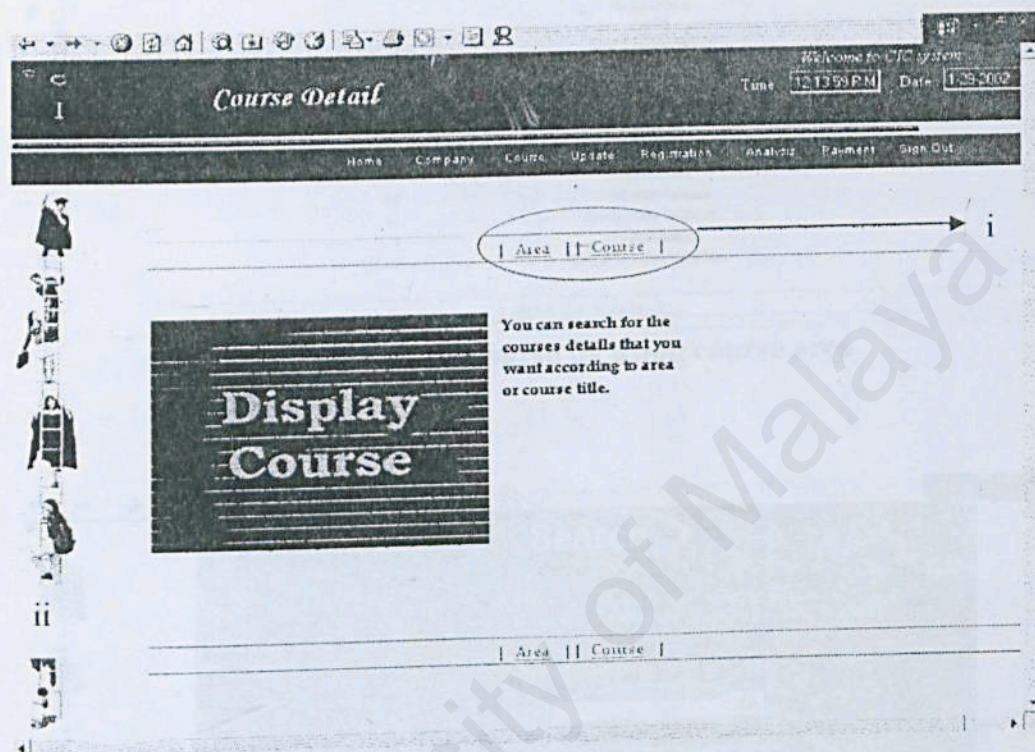
Figure 3.6　　Search Course
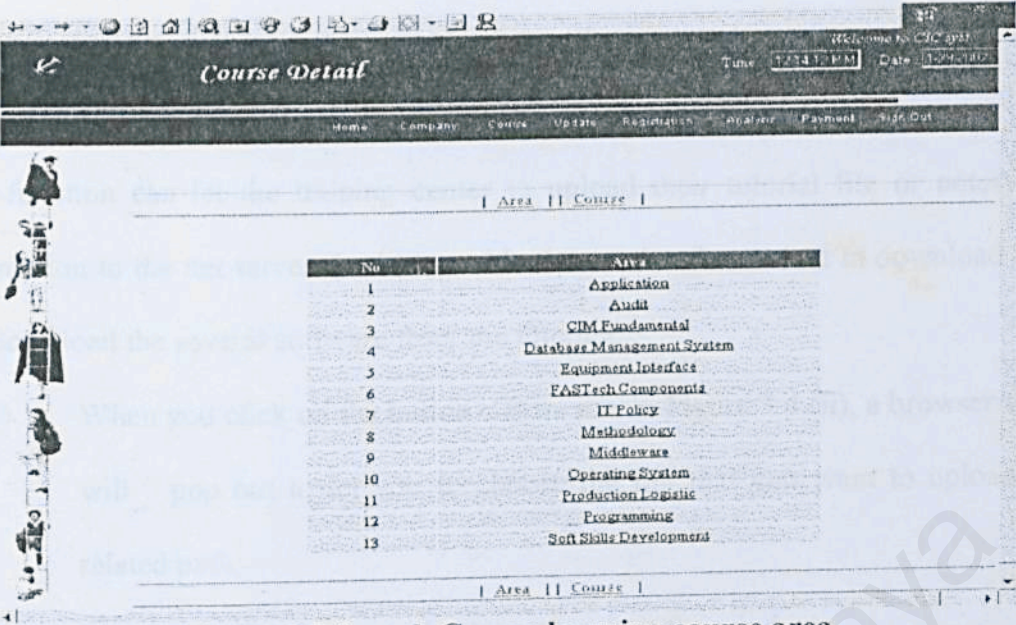
Figure 3.7 Search Course by using course area
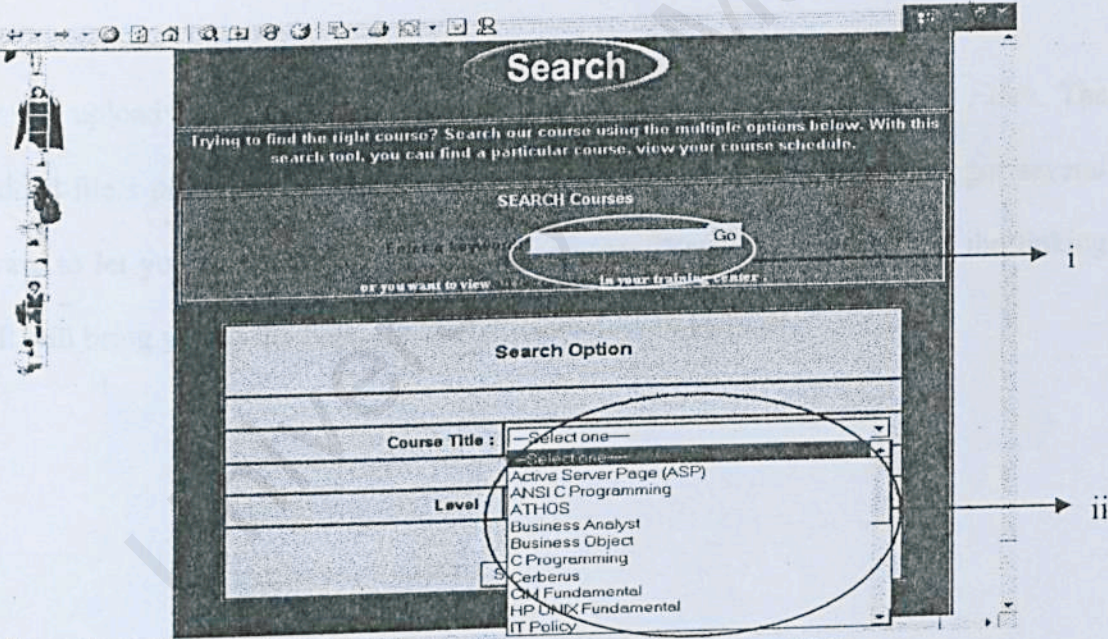
Figure 3.8 Search Course by using course title

3.3   Upload File and Download File

This function can let the training center to upload their tutorial file or notes or any information to the net server. It also provide the service for student to download the file and download the several software from the internet.

   (i)   When you click on the button *<Browse>* in Figure 3.4 (ii), a browser window will   pop out to let you to choose the file that you want to upload in the related path.

   (ii)   Choose the file then press button *<Open>* at the window.

   (iii)   Click the button <Submit> to upload the file.

After you upload the file, you can download it by clicking the linking *<List File>*. The download file's page will list out all the file you uploaded before and there got several software to let you to download into your computer. You can just click on the linking box. It will bring you to the URL for the software download page.

3.4   Update module

<u>**Update Button**</u>

When you click the button, you will come to the update page (Figure 3.9). In this page,

there have tree sub-button (Course, Training Center Info, Contact Person) (i).

For button *Course* , you can update the course details. There have tree function for you to

update the information :

- Add New Record – Enter the related data, then press the button *<Add new record>*

  to add it.

- Edit – You can change the data of the course information, then press the button

  <Edit> .

- Delete – you will delete all the data in the course that you have selected.

No	Course Title	Area	Update Details	Delete
1	Active Server Page (ASP)	Operating System	Details	Delete
2	ANSI C Programming	Programming	Details	Delete
3	ATHOS	Application	Details	Delete
4	Business Analyst	Audit	Details	Delete
5	Business Object	Application	Details	Delete
6	C Programming	Programming	Details	Delete
7	Cerberus	Application	Details	Delete
8	CIM Fundamental	CIM Fundamental	Details	Delete
9	HP UNIX Fundamental	CIM Fundamental	Details	Delete
10	IT Policy	IT Policy	Details	Delete
11	Logical Process Modeling	IT Policy	Details	Delete
12	Logistic Concept/Product Process Master Data	Production Logistic	Details	Delete
13	Oracle Basic	CIM Fundamental	Details	Delete
14	PCS+	Application	Details	Delete
15	POSIX Shell Programming	Programming	Details	Delete

Figure 3.9   Update

For button ***Training Center Info*** , user is allowed to change the information of the training center. You just need to change it in the related text box and then submit it.

For button ***Contact Person*** , the personal data of the contact person can be change by the way same like in updating the training center info.

3.5   Registration

This module let you to progress the registration process – accept or reject the application, delete the form, send the confirmation mail to the applicant.

i.   When you go inside to the registration section, you will see the company list that let you to choose one of it.

ii.   After that, the page Figure show you the staff name in the company you choose just now who had registered course with your training center and the status of the registration form (accepted or not (Figure 3.10)).

iii.   Click on the link, then the system will show you the registration form (Figure 3.11)

iv.   If you tick on the checkbox, and press button *<Delete>*, you will delete the registration record.

v.   In this page , you can progress the registration form by checking the courses and the schedule they apply.

vi.   The link for text "*Search History*" will let you to refer the training history of the staff . From the record, you can know whether the applicant is qualified to take the course or not.

vii. After process it, you can choose *<Accept>* or *<Reject>*. After that, the system
will send a confirmation email for the application.
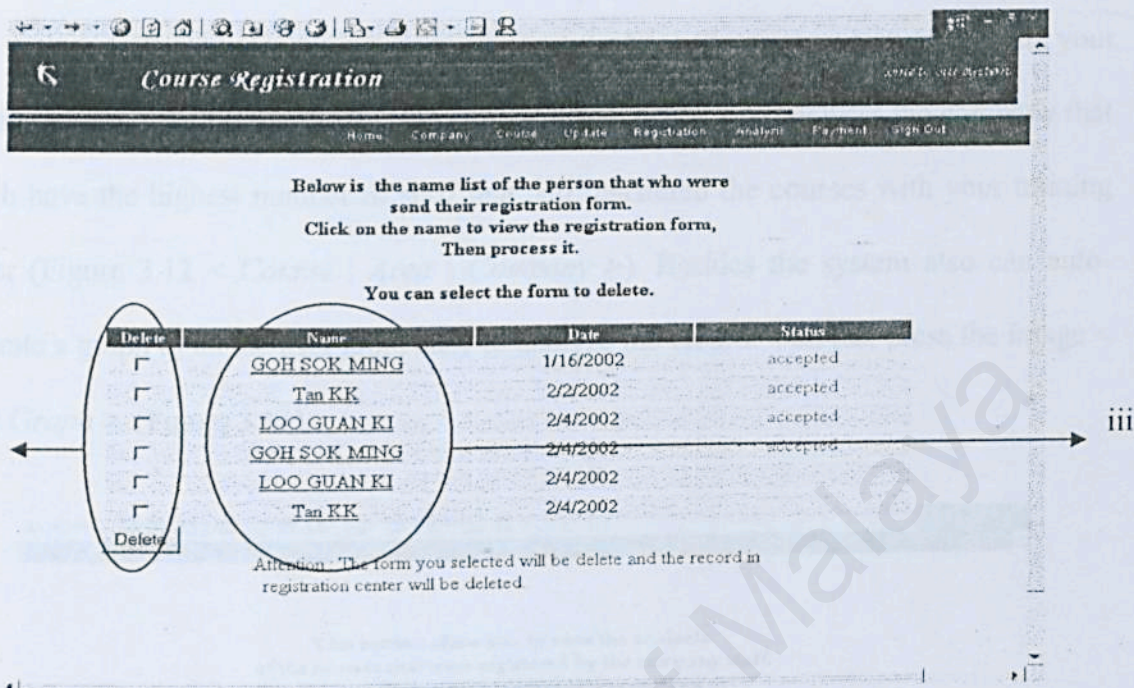
Figure 3.10   Registration

Figure 3.11   Registration Form

3.6   Analysis

The system will analysis the number of person who had registered courses with your training center order by the course title or course area and it also analyses the company that which have the highest number of staff that had registered the courses with your training center (Figure 3.12 < *Course | Area | Company* >). Besides the system also can auto-generate a graph to let the user more easy to analyze the record. You just press the image < *View Graph* > (Figure 3.13).

Figure 3.12   Analysis

Below is the graph that show out the top 10 of
courses which had the highest number of people registered for it.

POSIX Shell Programming [4]	
ANSI C Programming [2]	
Visual Basic 6 Programming [2]	
Active Server Page (ASP) [1]	
CIM Fundamental [0]	
IT Policy [0]	
PGS+ [0]	
WSO - User Functionality [0]	
SPC [0]	
Cerberus [0]	
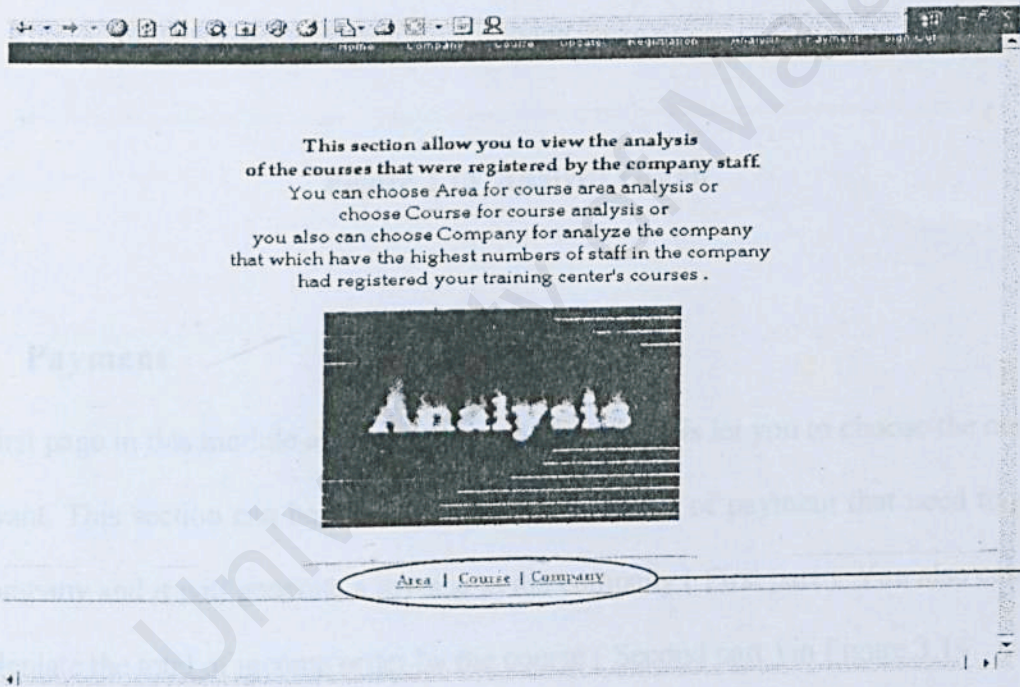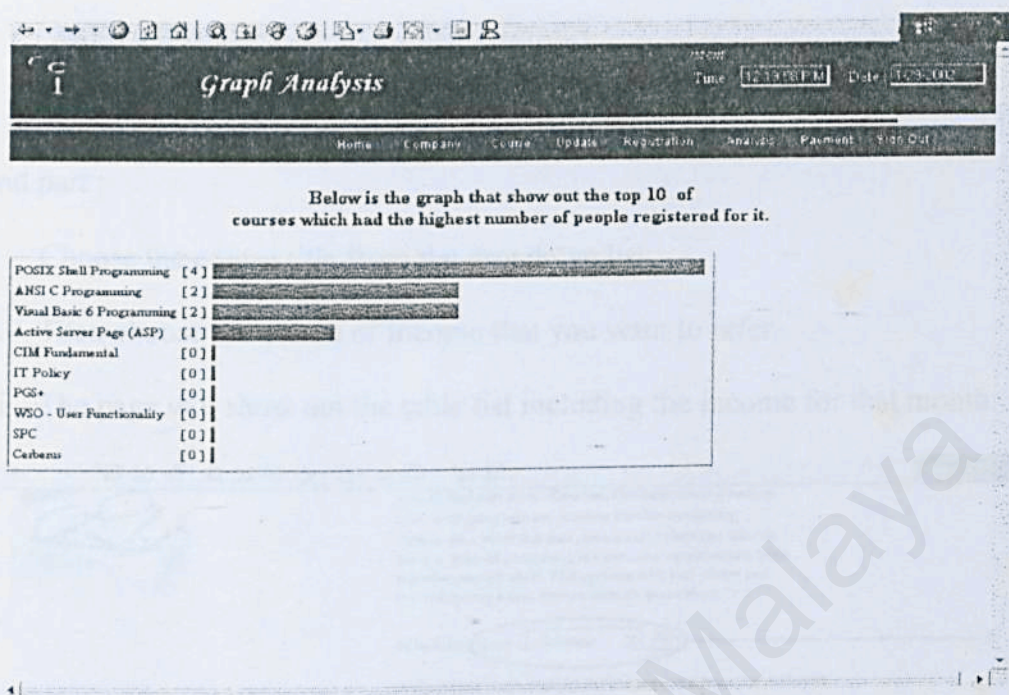
Figure 3.13 Analysis Graph

3.7   Payment

The first page in this module also same like another, there is let you to choose the company you want. This section can help you to calculate the total of payment that need to pay by the company and it will generate a invoice to the company (First part). You also can apply for calculate the total of income order by the course (Second part) in Figure 3.14

First part :

i.   Choose the month for the payment that you want to generate the invoice, then the payment list will show out at the bottom of the page.

ii. Click the link < *Invoice* > to show out the invoice.

iii. At the invoice, you can click on the < *Print* > at the bottom of the invoice to print

out the invoice.

Second part :

i. Choose the course title from the dropdown list.

ii. Then choose the month of income that you want to refer.

iii. The page will show out the table list including the income for that month.

Figure 3.14   Payment

Figure 3.15   Invoice

3.8   Sign Out

Click the button < *Sign Out* >to sign out the system.