

ABSTRACT

The web based Online CD Library Management System (OCDLib) is a web based system which serves as a platform to assist user, such as student, lecturer and administrator in using their library efficiently and effectively.

OCDLib consist of nine modules and is basically divided into 3 target users which are non-register member, register member and administrator. The module are login module, registration module, search and reserve module, user profile module, user guide module, loan module, return module, maintenance module and report module. Login module is provided to validate the user identity.

The methodology used in developing the OCDLib is incremental model. This methodology give a clear picture of what is going on during the development of the system which able to track the time limitation along the way of completing this system. A lot of backtracking and iteration occurred to ensured any error correction as the development progress.

The method used in collecting information for completing this proposed system are through library research, interview with Information System (IS) staff, internet research and survey.

OCDLib is developed using ASP .Net. The system runs on Window XP using Internet Information Server (IIS) as the web server and SQL server as the database management. The designing tools used include Adobe Photoshop and Macromedia Flash.

OCDLib coding is written using modular and top down approach. The system is written module by module to debug and trace error. External and internal documents are practiced to reduce coding error and facilitate coding maintenance. Unit testing, module testing, integration testing and system testing are applied to test the effectiveness and efficiency of OCDLib.

Toward the end of completion, OCDLib is evaluated system strength and weaknesses are identified and future enhancements are suggested. It can be concluded that OCDLib has achieved its requirement with additional function to meet the need of an informational system and as well as management information system.

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CHAPTER 1 INTRODUCTION

1.1 OVERVIEW

In today's fast moving world, every task is expected to be done on-time, efficiently and effectively. Thus, there is lots of information management system (IMS) created to assist us in managing our daily task. Furthermore, various online IMS are available and become more important and preferred as they can be accessed anytime and any where once the connection to the internet is establish and user are authenticated.

Traditionally, the compact disc (CD) borrowing procedures in Faculty Science Computer and Information Technology (FSCIT) are being done manually. The borrowing process can only be complete after many steps of procedures. It needs paper work too in completing the whole process of CD borrowing. Thus, a feasible and easy-to-navigate online IMS should be built to solve this problem and make the process more efficiently and effectively.

Online CD Library Management System (OCDLib) is proposed to bring convenience to the individuals who involved in the borrowing process and also to improve the management of the CD Library in FSCIT. OCDLib is an online information system that enables student and lecturer (borrower) and system administrator (Information System Room's staff) to log in and use the services and functions provided in order to complete the borrowing process and to manage the CD information. The OCDLib is a necessary tool for most institutes nowadays as the manual borrowing process is no longer the efficient way to manage the borrowing process. With the online system, the borrowing process can be easier, more systematic and efficient.

1.2 PROJECT MOTIVATION

In view of the current CD borrowing procedures adapted by our faculty, many problems faced by students and staffs. Due to the inefficiency of the manual CD lending registration and management of CD information, it motivates and gives me an idea to propose a solution to the current adapted system.

1.2.1 CURRENT SITUATION

In the current CD borrowing and management procedures, when new CDs being issued by Microsoft, all the CD will be kept in a cabinet without any recording. When a borrower wants to borrow CD, they may need to go to the IS Room. Then, the IS staffs need to search for the physical CD. If the CD is available for lending, the borrower need to sign a form to agree that they would not illegally copy the software, then record their transaction into log book and get the valid CD key from IS staffs. But if the CD is been borrowed by other people, and then they can choose to do a reservation on that particular CD.

1.2.2 PROBLEM WITH CURRENT MANUAL PROCESS

The problems faced in current procedures are the inefficiency of information delivery and it is a time consuming procedures. Borrower need to travel to library many times in order to check the software availability or information. The IS staffs need to spend some time to find out and check the CD availability by searching through the cabinet, piece by piece.

All the CDs and borrowers' information was not recorded properly, therefore, IS staff faced difficulties to know the actual quantity or type of CD in the collection and

finding borrower's information. Without proper CD and borrower's information management to monitor the lending procedures, many of the CDs in the collection may disappear in the confusion.

Paper work processes and waste of resources such as papers were also the problems of the current procedures. Additional resources to file the signed forms are needed to avoid the misplacing of these forms. Lots of paper, log book, file and cabinet also needed for IS staffs to keep all the signed forms and log books which records the loan information and to be used as future references.

IS staff also encountering problems in tracking borrowers' transaction. They may need to check manually from the log books for borrower's loan, reservation and overdue transaction. This is also a time consume process.

1.2.3 SOLUTION FOR THE CURRENT SITUATION

In order to rectify and reduce the problems in the manual CD borrowing procedures, an Online CD Library Management System (OCDLib) is proposed as a solution to replace the current system.

OCDLib is a web-based system which can benefits the staffs and students of FSCIT. By having this web-based system, user can register as the member of the CD library through the online registration in OCDLib to get a valid login password in order for them to loan, reserve a CD or view their personal profile. Through this online system, user can search and retrieve the CD information immediately. If the CD has been borrowed by other people, they can do a reservation for that CD.

The system maintenance allows IS staff to record all CDs and users' information into database in a systematic way. IS staff can view, add, edit and delete the records or information from database by using simple and user friendly interface. All the collection in the CD library can be tracked easily and fast, this able to reduce and avoid unnecessary losses of the CD in the library.

To ease the burden of IS staff workload and save the resources, a self-service loan system is included in OCDLib. Through this computerized system, lectures and students of FCSIT can do the CD loan by themselves in faster and systematic way. With this new propose self-service loan system, user record the transaction and execute the agreement in softcopy method through a computerized system. With this method, the use of papers, files and cabinet will be reduced and thus this will save the unnecessary resources as the computer manages all the procedures.

In order for IS staff to track the borrowers' transaction information, a report or record printing function is provided in OCDLib. IS staff can view or print the list of overdue borrower or other necessary reports easily and accurately.

A user guideline will be included in OCDLib. This provide new user with the illustration on how to use the system. Particularly the how use self-service loan, reservation and search for CD information.

1.3 PROJECT OBJECTIVE

This project is to develop an organized and systematic online system that is effective and efficient in handling the CD library information management for FSCIT and at the same time to create a consistent and easy-to-use interface at user skill level where no command or programming skill is needed to access the system. User can handle the system easily and as simple as clicking on button only.

Further more, user is able to search and retrieve the CD information from database through an easier and faster way. An easy and understandable user guide is provided to assist user on how to use the system to perform a specific task such as loan, reservation and searching process. As for the system administrator, they can generate various reports in order to keep track on all the borrowing matters.

By converting current CD borrowing process into a self-service loan system, it is able to reduce or ease the staff work load. At the same time to create a paperless environment as all the records are stored in the database.

1.4 PROJECT SCOPE

This system, OCDLib is specially developed for the use in FSCIT to monitor its CD library and replace the ineffective of current CD borrowing procedures. This is a web-based system and can be view by any internet browser such as Internet Explorer 4.0 and above or Netscape.

OCDLib is able to cater for public with different features depending on their access level. The target user of this system will be mainly focused on Information System Room's staff (IS staff) which as the system administrator of this system and student and lecturer in FSCIT which as user of the system.

The IS staff of FSCIT able to record and update the borrower and CD information in the OCDLib's database in more systematic way and able track the CD easily and effectively compare to previous manual system.

Through the internet facilities, students and lecturers of FCSIT can easily register as a member of CD library. Only registered members can loan and reserve a particular CD from OCDLib. Other wise public or non-registered member only can use the system to search for CD information and check the CD availability. A user guide is provided in order to help the user to use this system to perform transaction such as loan, reservation and searching.

1.5 EXPECTED OUTCOME

For system administrator, a maintenance module will be included to allow IS staff to record all CDs and users' information into database in a systematic way. A return module is used to record user return transaction and at the same time system will automatically send email notification to the user who had reserve that particular CD. Report or record printing function is provided in OCDLib in order for IS staff to track the borrowers' transaction information, IS staff can view or print the list of overdue borrower or other necessary reports easily and accurately.

For non register member, a register module is included for them to register as a member of CD library; they only can search and retrieve the CD information but cannot reserve the CD if the CD has been borrowed by other people. A user guideline will be included to provide new user with the illustration on how to use the system. Particularly the how use self-service loan, reservation and search for CD information.

For registered user, they can search and retrieve the CD information immediately. If the CD has been borrowed by other people, they can do a reservation for that CD. User profile will be included for registered user to edit their personal information or change their password and a loan module is for registered user to borrow CD. A user guideline also will be included.

Every day, system will automatically send email notification to users who has not returns their borrowed CD after the due date.

1.6 PROJECT SCHEDULE

The following is the project schedule for OCDLib.

	Task Name	Duration	Start	Finish	Predecessors
1	1. Propose topic to lecturer	1 day	Wed 7/13/05	Wed 7/13/05	
2	2. Research on articles related to thesis	14 days	Thu 7/14/05	Tue 8/2/05	1
3	3. Analysis articles and prepare article summary	2 days	Wed 8/3/05	Thu 8/4/05	2
4	4. Passup the articles and article summary	1 day	Fri 8/5/05	Fri 8/5/05	3
5	5. Research further on topic and proposal preparation	29 days	Mon 8/8/05	Thu 9/15/05	4
6	6. Passup proposal	1 day	Fri 9/16/05	Fri 9/16/05	5
7	7. Learn up on the basic of using the development tools	20 days	Mon 9/19/05	Fri 10/14/05	6
8	8. Prepare for VIVA	5 days	Mon 10/17/05	Fri 10/21/05	7
9	9. System design and development	105 days	Mon 10/24/05	Fri 3/17/06	8
10	10. Documentation for system development	10 days	Mon 3/20/06	Fri 3/31/06	9
11	11. VIVA	5 days?	Mon 4/3/06	Fri 4/7/06	10

Figure 1-1: Project Schedule

1.7 SUMMARY

OCDLib is a web based computerized library system to enable more effective and efficient way in managing the CD information. This chapter introduces the project, explains why this project is undertaken and schedules the development of the project.

CHAPTER 2 REVIEW OF LITERATURE

2.1 LITERATURE REVIEW ON JOURNAL

2.1.1 ARTICLE 1: OH WHERE, OH WHERE HAS MY SOFTWARE GONE – NEW TECHNIQUES FOR MANAGING SOFTWARE LIBRARY

This article was written by Julia Anne O'Dell, a Computer Programmer Analyst of United States Naval Academy (USNA). The Academic Support branch of Computer Services has a Microcomputer Showroom which houses a collection of off-the-shelf microcomputer packages.

The current system use in this software library is a flat file DBMS on the Apple Macintosh held circulation information. Below are the steps of the current borrowing software process:

- Borrowers must fill out and signed the proper forms to agree that they would not illegally copy the software.
- The "Out" file contained the form for circulating software.
- When the software is return, the staff transferred the form to the "In" file.

Problems in the current system:

- Paperwork was not filed properly and new software was not added to the database in a systematic fashion.
- Record was not consistently updated in the database, difficult to know who accountable for an item and how many packages are actually in the collection.
- Many records were entered without version numbers and borrowers' names were type inconsistently
- Difficult to track the packages or software, some disappeared in the confusion.

Process of revamping the system:

- Take a complete physical inventory of the collection; collect all the collection from borrower.
- Transfer the records for the software to another new database.
- Temporary system was developed for the interim.
- Decide how to label each package in a consistent fashion.
- Pre-printed label was placed on the main system disk of the package.
- Determine the structure of all the files to create the most normalized database system
- Add package information to database

By having this new system:

- Can recreate the index files and generates an overdue list of late borrowers.
- Individual notices are printable at any time
- The system has a check package availability module which shows the packages that are not circulating.
- If they forgot their library card, they can search on the their name
- Can know the software held by a borrower
- The system is able to updates incorrect borrower information and adds new packages to the collection.
- Can print out numerous reports and listings of various databases.

2.1.2 ARTICLE 2: PAYROLL MADE EASY: DEVELOPING A WEB BASED SYSTEM FOR STUDENT EMPLOYEE PAYROLL

Le Moyne College has developed a payroll system for student staff using a custom developed web interface and Filemaker Pro 5.0. The system can be used for all those who are tired of spending hours to process the staff's payroll.

Current payroll process was processed by sign in sheets at each work location, calculated manually, and transferred to authorize time sheets for submission manually, and transferred to authorized time sheets for submission students took about 3.5 hours to complete. It seemed appropriate to develop a more efficient payroll system.

The Payroll Administrator and Information Technology (IT) staff established criteria for the redesigned payroll process. They determined that the new process should:

- Be automated, using the lab computers to calculate the time in and out for each shift;
- Be able to determine the location of the login;
- Be relatively "tamper proof";
- Automatically generate the required payroll form to submit each pay period.

The entire process of the new payroll system:

- Students swipe their card through the scanner;
- If the student lost their card, the "old" ID card was kept at their primary work location and having their peers swipes them in. When students are issued a new card by the ID office, Information Technology is automatically notified

and their card-issue number on the staff database is changed, enabling only the new card to authenticate to the system.

- If the student ID number is correct then their login time and date will store in database.
- If the student ID number is incorrect, then a warning page will be display.
- Using the same method to log out.

Other features in this payroll system:

- Generate the payroll report.
- Can check the total hours had worked during some previous pay period.

Problem solved

- It enables the payroll administrator to verify students are at their workstations at the start and end of their shifts.
- Provides accurate pay records based on computer-generated times.
- Eliminates transcription errors and errors generated as a result of illegible handwriting on payroll sign in sheets.
- Enables the payroll administrator to identify students who are chronically late or those that leave early for their shifts.
- Students do not have direct access to any of the payroll or staff databases.
- The payroll process now involves virtually no manual processing by IT staff.
- The entire process at the end of the pay period now takes about 15 minutes

Advantages of this system over the traditional “pen and paper” methods of processing payroll used by many institutions:

- It provides an accurate accounting of student hours. Login and out times are computer generated, not left up to the students to honestly log their hours;
- Processing payroll is a snap... about 5 minutes from start to finish. Pay period hours are exported to a “report database” with a layout mimicking the College’s payroll form. Payroll totals are automatically calculated and account information on the students pulled in directly from an employee database;
- It enables us to verify that students are actually at work where they say they are. The login/ logout sequence captures the IP address of the local machine, enabling verification of login location.

By computerizing the payroll process, Le Moyne has freed up valuable staff time, previously spent processing payroll, and provided the college with an accurate and efficient method to record student hours worked for the IT department.

2.1.3 ARTICLE 3: AN ELECTRONIC ONLINE ACCESS SHOWROOM FOR THE NEW ACQUISITIONS OF THE LIBRARY OF THE UNIVERSITY OF MACADONIA

An electronic online access showroom, which will be used to record and to announce the newly acquired books to the users of the library of the University of Macedonia, is already running in pilot phase. The online showroom includes a specially designed digital "exhibition area", which is accessible via the World Wide Web and which is periodically updated with the new book acquisitions of the Library.

The users of the library can browse the book catalog of this exhibition area directly from the Web with an ordinary Internet Browser. The catalog can be sorted by date, author, or title, according to the user's preference. Also, instead of browsing the book catalog, the users can execute a search on the stored records, by keyword, title, author, subject, ISBN, or publisher, in order to limit their search to the subset of records that mostly interest them.

Furthermore, from the central book catalog, or from their "search-results" list, users can retrieve more information concerning a specific book, simply by doing a mouse-click on the book title. The returned information includes the table of contents, the cover and the backside of the book, the classification number, the ISBN, the title and subtitle, up to two subject headings relevant to its content, the author name(s), the publisher and the year of publication.

Additionally, if they wish, they can make a reservation for one or more books, by filling in a simple form, with their full name, their e-mail address and their user code

number, in order to be notified as soon as the book(s) become available. This electronic browsing system is available in two languages, Greek and English. The user is able to change the language preference from any screen at anytime.

In addition, the online showroom comes with a separate online database management environment, which is also accessible via the Web but only by authorized users. This environment allows the management of the book records and of the authorized user accounts, including the insertion, deletion and editing of the records and users.

2.1.4 ARTICLE 4: BUILDING THE DIGITAL LIBRARY INFRASTRUCTURE: A PRIMER

This overview provides a framework for examining the complex infrastructure necessary to successfully implement the digital library. The information infrastructure is the most important aspect of planning the modern library.

The information infrastructure that supports the digital library consists of several elements, the fundamental to the infrastructure is the database. The structure of the library's database is dependent on the capabilities of the online system to manage the rich variety of information.

Obviously, a major component of the database remains the online public access catalog (OPAC). Many of the local systems now provide web browser for their online catalogs. This capability enables the local system emulate the searching strategies employed on the World Wide Web.

2.2 SOFTWARE ARCHITECTURE

There are a few types of software architectures such as client-server architecture, two-tier architecture and three-tier architecture. Each types of the architecture have its strengths and limitation. After review each of it, the software architecture that used in OCDLib is three-tier architecture. Below is the summary of types of software architecture that I research on in order to choose most suitable software architecture for OCDLib.

2.2.1 CLIENT-SERVER ARCHITECTURE

Client-server architecture is based on a simple premise: Different computers perform different tasks, and each computer can be optimized for a particular task. A large piece of applications can be divided and be executed in a few different computers. More powerful computer can be the 'server' where database and other related sever are stored. While the other computer and any operating system supported will be called 'client' where the application program is stored and executed there.

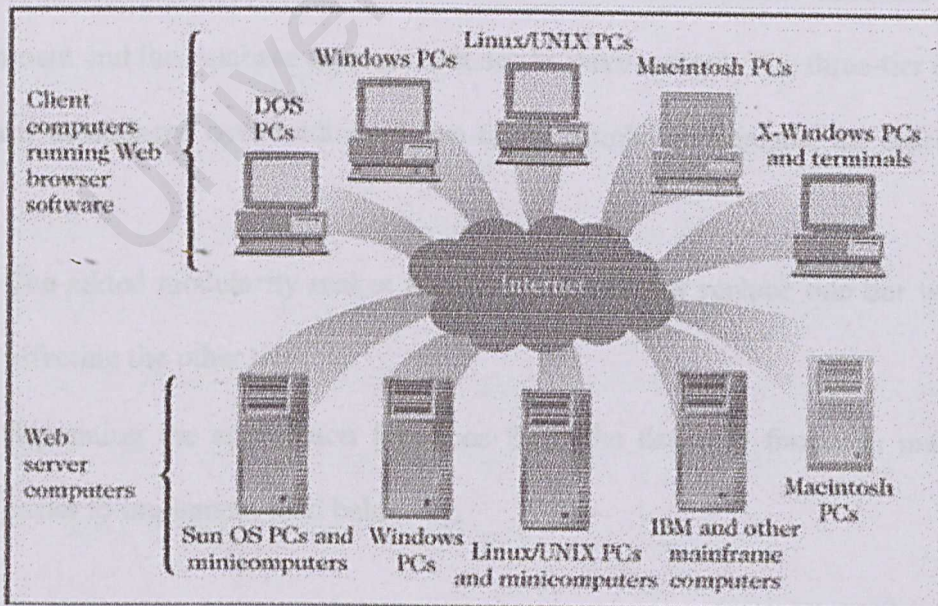


Figure 2-1: Client-Server Architecture

2.2.2 TWO-TIER ARCHITECTURE

2-tier architecture refers to client/server architectures in which the user interface runs on the client and the database is stored on the server. The actual application logic can run on either the client or the server. There are only the architecturally tiered data server and client.

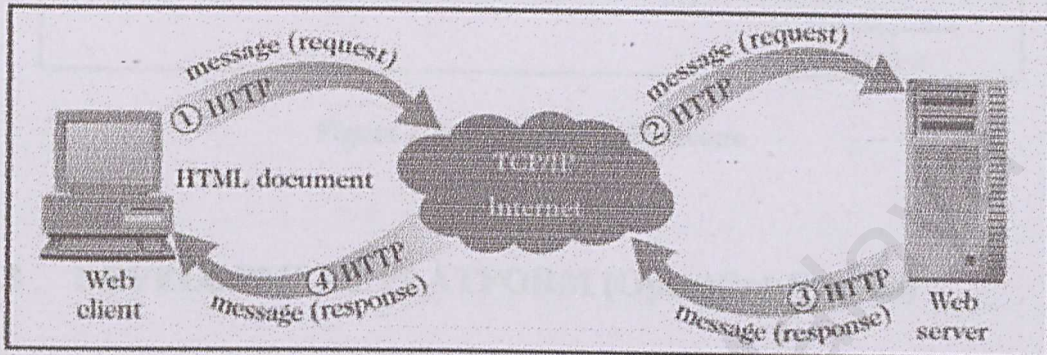


Figure 2-2: Two-Tier Architecture

2.2.3 THREE-TIER ARCHITECTURE

The three tier architecture emerged to overcome the limitations of the two tier architecture. A middle tier was added between the user system interface client environment and the database management server environment. The three-tier design has many advantages over traditional two-tier or single-tier designs, the chief ones being:

- The added modularity makes it easier to modify or replace one tier without affecting the other tiers.
- Separating the application functions from the database functions makes it easier to implement load balancing.

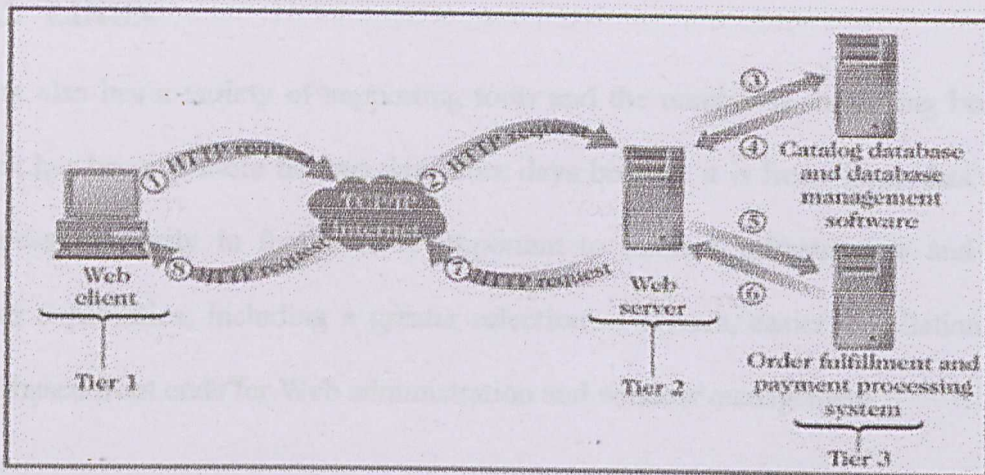


Figure 2-3: Three-Tier Architecture

2.3 DEVELOPMENT PLATFORM (Operating System)

Operating system (OS) is a platform that performs basic tasks. Several operating systems that available are Microsoft Window XP, Linux, UNIX and etc. The operating system used in the development of OCDLib is Microsoft Window XP. Below is the summary of types of development platform that I have done research on in order to choose the most suitable development platform for OCDLib.

2.3.1 MICROSOFT WINDOW XP

Windows XP is a multipurpose operating system with integrated support for client-server and peer-peer networks. It designed to increase reliability, deliver higher levels of systems availability, and provide for scalability from a small network to a large enterprise network. Windows XP incorporates technologies that reduce the total cost of ownership by allowing organizations to increase the value of their existing investment while lowering overall computing costs.

2.3.2 LINUX

Linux also has a variety of supporting tools and the number is increasing because Linux has become more famous days after days because it is free. Linux has made progress, primarily in functionality important to Internet infrastructure and Web server capabilities, including a greater selection of drivers, easier installation, and GUI-based front ends for Web administration and window management.

2.3.3 UNIX

UNIX was designed to be a small, flexible system used exclusively by programmers. It has many unique features. Like other operating system, the UNIX system is a control program for computers. It also has a family of utility programs and a set of tools that allows users to connect and user uses these utilities to build system and application. Due to its portability, flexibility, and power, UNIX has become the leading operating system for workstation. However, UNIX is more difficult to learn and isn't as widely supported as Microsoft Windows XP. Historically, it has been less popular in the personal computer market.

2.4 DEVELOPMENT SERVER

A Web server is a program that, serves the files that form Web pages to Web users. Every computer on the Internet that contains a Web site must have a Web server program. Types of web server are Microsoft Internet Information Server (IIS), Apache web server and etc. The web server used for OCDLib is IIS. Below is the summary of types of development server that I have done research on in order to choose most suitable development server for OCDLib.

2.4.1 MICROSOFT INTERNET INFORMATION SERVER

IIS comes bundled with Microsoft's Windows NT Server and XP operating systems. IIS is very user friendly because it is easy to configure and can be used alone as a Web Server. IIS also guarantees the same security, networking, and administration and user functionality because it inherits all Window NT features. IIS also can help administer secure Websites, and to develop and deploy server-intensive Web applications. Other than that, IIS can support a variety of applications such as Virtual Server, Connection to ODBC database, Common Gateway Interface (CGI), Active Server Pages (ASP) and Secure Socket Layer.

2.4.2 APACHE WEB SERVER

Apache Web Server is the famous and popular web server because of it's free license fee. Apache runs on many operating systems and the hardware that supports them. The original version of Apache was written for UNIX, but there are now versions that run under OS/2, Windows and other platforms. The keys to Apache's attractiveness and popularity lie instead in the qualities listed above and its extensibility, its freely distributed source code, and active user support for the server.

2.5 DATABASE SERVER

A database is a structured collection of data. To add, access, and process data stored in a computer database, a database server is needed. There are several database servers which are currently available such as Microsoft SQL Server, Oracle, MySQL and etc. The database server used in OCDLib is Microsoft SQL Server. Below is the

summary of types of database server that I have done research on in order to choose the most suitable database server for OCDLib.

2.5.1 MICROSOFT SQL SERVER 2000

Microsoft SQL Server is highly scalable and can use it to develop applications for everything from small networks to thousands of users. It is designed to meet requirement of a distributed client-server environment. The SQL Server driver enables application to access data in Microsoft SQL Server database through the Open Database Connectivity (ODBC) interface. Structured Query Language (SQL) is used to access data in a SQL server database.

2.5.2 ORACLE

Oracle server is a multi-user relational database management system (DBMS) that runs on numerous operating systems. Standards-based network architectures make it possible to introduce objects into mainstream enterprise environment. Its development environment allows users to ease into object-relational functionality while providing the industrial strength properties required by network-based applications.

2.5.3 MYSQL

MySQL is an open source relational database management system (RDMS) that uses Structured Query Language (SQL). Anybody can download MySQL from the Internet and use it without paying anything. Anybody can study the source code and change it to fit their needs. MySQL is a small, compact, easy to use database server, ideal for small and medium sized applications. It is client/server implementation that

consists of a server and many different client programs. It is available on a variety of UNIX platforms, Linux, Windows NT, Windows 95/98 and Windows 2000.

2.6 LANGUAGE

The high progression of computer language form third generation to four generation and until now, it become a popular knowledge to all although not an information technology person. There are several powerful and famous computer languages for developing a web base system such as Active Server Page (ASP), Active Server Page .Net (ASP .Net), JavaScript and etc. The languages that used to develop OCDLib are ASP .Net and some sub function is writing by using JavaScript. Below is the summary of types of the language that I research on in order to choose the suitable language for OCDLib.

2.6.1 ACTIVE SERVER PAGES (ASP)

ASP is a great tool for creating dynamic web pages. It is a server-side scripting technology. It works by providing users functionality of a programming language that will generate HTML for the web page dynamically. ASP combined HTML, scripting language such as VBScript, JScript or Perl and component to create powerful internet applications.

2.6.2 ACTIVE SERVER PAGES .NET (ASP .NET)

Active Server Page.NET, or ASP.NET, is Microsoft's latest version of its popular dynamic Web programming technology, ASP.NET however, is much more than a simple upgrade from classic ASP: A new programming model and plethora of brand-new tools are just two of the many new features of ASP.NET. ASP .Net takes an object-oriented programming approach to web page execution. The new features in

ASP.NET such as the power web controls provide useful functionality make designing dynamic Web pages quicker and easier than ever before.

2.6.3 JAVASCRIPT

JavaScript is an object-based scripting language designed to add programmatic capabilities and cross platform of events, objects and methods to web pages. It can interact with HTML source code, enabling Web authors to spice up their sites with dynamic content. Script languages generally take longer to process than compiled languages, but are very useful for shorter programs.

2.7 DEVELOPMENT AUTHORIZING TOOLS

With the assisting of authoring tools, the process of system development will become easier and faster. There is few development authoring tools which are used in developing OCDLib. There are Microsoft Visual Studio 2003, Macromedia Flash MX, Macromedia Captivate, and Adobe Photoshop 8.0. Below is the summary of types of the development tools that I have done research on in order to choose the suitable tools to develop OCDLib.

2.7.1 MICROSOFT VISUAL STUDIO 2003

Visual Studio .NET is a complete set of development tools for building ASP Web applications, XML Web services, desktop applications, and mobile applications. Visual Basic .NET, Visual C++ .NET, and Visual C# .NET all use the same integrated development environment (IDE), which allows to share tools and facilitates in the creation of mixed-language solutions. In addition, these languages leverage the functionality of the .NET Framework, which provides access to key

technologies that simplify the development of ASP Web applications and XML Web services.

2.7.2 MACROMEDIA FLASH MX

Macromedia Flash MX is the latest professional standard authoring tool for producing high-impact Web experiences. It is a power and flexible tools to create animated logos, web site navigation controls, long-form animations, entire Flash Web sites, or Web applications.

2.7.3 MACROMEDIA CAPTIVATE

Macromedia Captivate is automatically records all onscreen actions and instantly creates an interactive Flash simulation. Point and click to add text captions, narration, and e-learning interactions without any programming knowledge. Captivate can automatically generate text captions, allowing effortlessly to generate fully annotated simulations and demos.

2.7.4 ADOBE PHOTOSHOP

Adobe Photoshop is used for drawing, painting and designing purposes. Users can retouch an image, apply special effects, swap details between photos, introduce text and logos, adjust color balance, and even add color to a grayscale scan. All these functions are included under a set of user-friendly editing tools in Adobe Photoshop. It contains graphical icons to represent every functions of each button. Besides that, it also provides many shortcut keys that are easier and save time for users and for those who do not like to use mouse.

2.8 SUMMARY

This chapter gives a brief explanation on topics researched and studied that are relevant to the system that are to be developed. Review on journal that regarding to web based library management system has been carried out. Besides, doing research on the software architecture, development platform, development server, database server, development language, and development authoring tools also had been done in order to choose the most suitable technology for the development of OCDLib.

CHAPTER 3 METHODOLOGY

3.1 SYSTEM DEVELOPMENT LIFE CYCLE

System (software) development generally takes the form of a life cycle. We refer to this life cycle as the system development life cycle (SDLC). All systems go through the same generic stages in their lifetime. The stages are shown in the figure 3.1.

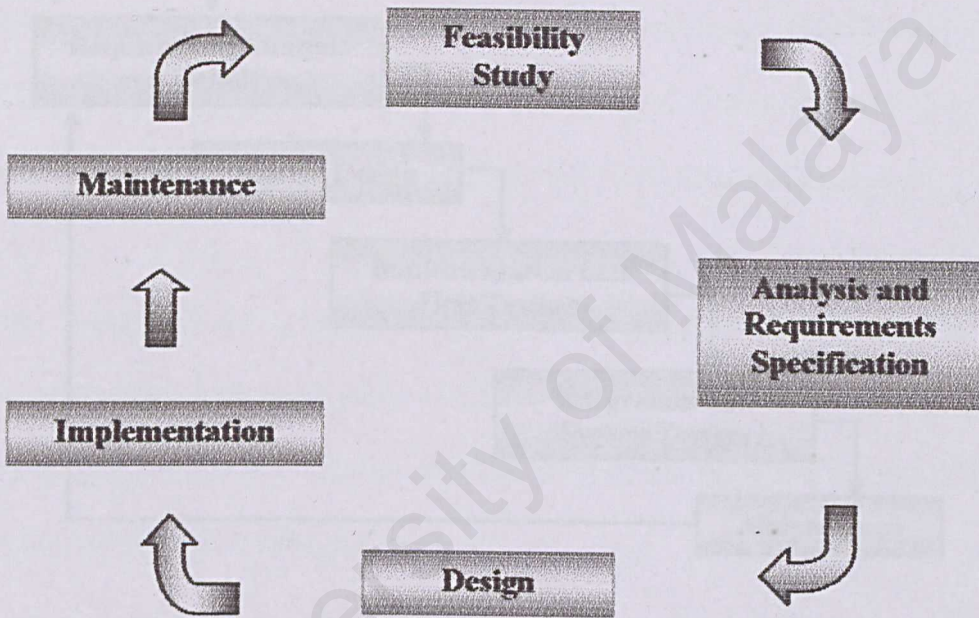


Figure 3-1: System development life cycle (SDLC) stages

The software engineering process consists of a set of steps that encompass methods, tools, and procedures. These steps are often referred to as software engineering paradigms or software life cycle models. A model chosen by the developers is based on the nature of the project and applications.

In this chapter, I will emphasize on incremental modal, which to be used in my project development process.

3.2 INCREMENTAL MODEL

In the process of developing the OCCLib, the system development methodology that will be use is the incremental modal. This is an intuitive approach to the waterfall model. Multiple development cycles take place here, making the life cycle a “multi-waterfall” cycle.

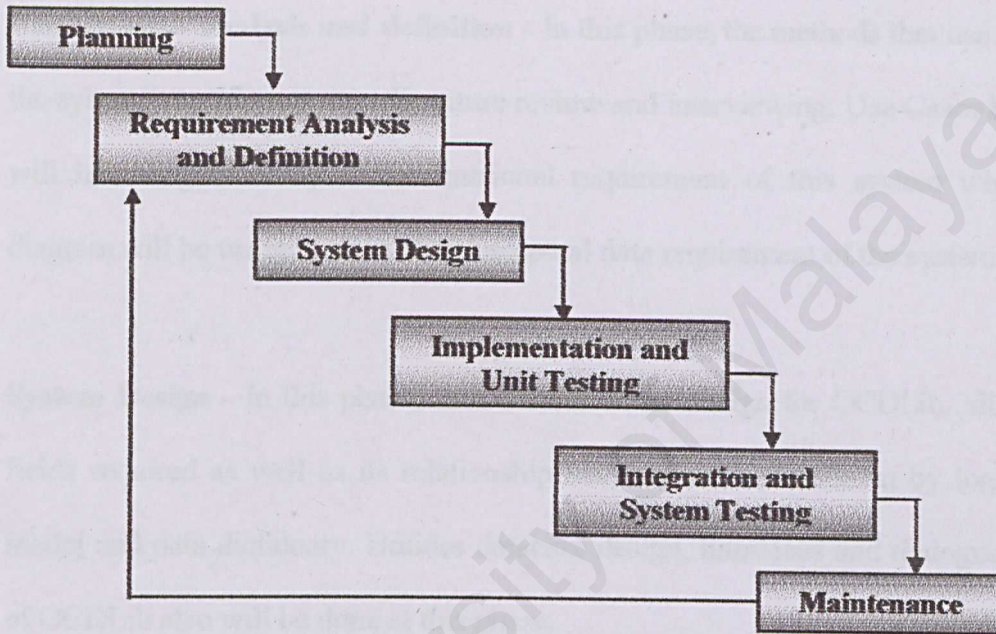


Figure 3-2: Incremental Model

The reason I choose this model is because this model more flexible, where sections of the project are created and tested separately and easy to find errors as the code is tested after it is written. It is easier to test and debug during a smaller iteration and to manage the milestone in the iteration. The detail description of each stage was explained below.

Planning - The first step is to identify the need for this new system, OCDLib. During this phase, the nature and scope of the proposed system is clearly identified and investigate the problems of current CD loan and management procedure then propose suitable solution for the problem and provide its justification. The objective and project plan for OCDLib also being done at this phase.

Requirement analysis and definition - In this phase, the methods that use in gather the system's requirement are literature review and interviewing. Use Cases Modeling will be using to analyze the functional requirement of this system while class diagram will be using to show the conceptual data requirement of the system.

System Design - In this phase, start with database design for OCDLib, all the data fields required as well as its relationship are described and shown by logical data model and data dictionary. Besides database design, interfaces and dialogues design of OCDLib also will be done at this phase.

Implementation and Unit Testing - During this phase, the deliverables from system design will serve as blueprint in constructing the system. All the program modules in OCDLib will start to code and after each module is produced, it will be tested individually and the individual program module will be documented in the user manual.

Integration and System Testing - All the modules will be integrated in this phase and the integrated system will be tested to evaluate its actual functionality in relation to expected or intended functionality. The testing methods that will be used are integration test, system test, function test and performance test. Direct installation will be used as the installation method. Then a complete and informative user manual will be prepared.

Maintenance - This phase will be carried out when anything happen during the rest of the software's life: changes, corrections, additions, move to a different computing platform and more. The method that will be use is depending on the errors that occur and changes requested by users.

3.3 TECHNIQUES USED TO DEFINE REQUIREMENT

Effective and appropriate techniques must be used to define and elicit user's requirements. Research methods that I have used in defining the requirement for OCDLib are library research, interview, Internet research and survey.

3.3.1 LIBRARY RESEARCH

By accessing the University Malaya library database, I found lots of journal and articles about the development and management of online library. By review on these journal and articles I gained deeper understanding on online system design and how does an online system can be implemented effectively.

3.3.2 INTERVIEW WITH INFORMATION SYSTEM STAFF

A few interview sessions had been conducted with the IS staff in IS room to have a better understanding of their need toward the management of their current CD library so that OCDLib can help them better. From those sessions, I have got a clearer view of what OCDLib should provide in order to produce better way for managing the CD information. Their precious advices and suggestions help me a lot in producing a better system.

3.3.3 INTERNET RESEARCH

I have surf around the net for sometime to gain deeper understanding about library management and web technology that are available and how those technologies can help me in the process of developing the OCDLib.

3.3.4 SURVEY

In order to make my survey success, I have prepared 30 sets of questionnaire (see Appendix A). My respondents are students and lecturers in the campus who ever or never borrow the CD from the library. The objective of my questionnaire is to find out what problems they have with the current borrowing process and how can I improve it.

The respondents were asked to answer the questionnaire on the spot to ensure I can get back all the sets of questionnaire. Each of them took not more than 10 minutes to answer the questionnaire.

After collecting all the questionnaires, I analyze the data and identified some major problem as below:

- They need to travel for many times in order to know the CD availability.
- They do not know what kind of CDs that the library have.
- Time consuming borrowing process, need to wait IS staff search for the CD.

3.4 SUMMARY

This chapter is on the analysis carried out on the project requirement. It explained on the system methodology being used for developing OCDLib and the various information gathered techniques performed throughout the analysis.

CHAPTER 4 SYSTEM ANALYSIS

4.1 FUNCTIONAL REQUIREMENT

Functional requirement is a statement of the service or functions that a system should provide how the system reacts to particular inputs, and how the system should behave in particular situations.

The functional requirements for OCCLib consist of nine modules: which are login module, registration module, search and reserve module, user profile module, user guide module, loan module, return module, maintenance module and report module.

4.1.1 LOGIN MODULE

The system should be able to validate the user identity to see whether the user is a registered user or administrator and should be able to display or inform the users if they are not authorized user. The system should be able to display or inform the users if they are logged in to the system.

4.1.2 REGISTRATION MODULE

The system should be able to allow non registered member to register as a member of CD Library and able to validate is the user from FSCIT. If the user already is the member of CD Library, the system should be able to display or inform the users that the registration cannot be proceed. The system should be able to validate the format of email address that enter by user is a valid format. It should be able to validate whether the user ID enter by the user is already used by other user. If the user ID already used by other user, system will display or inform the user to enter other user

ID. The system should display or inform the user if they successful registered as member.

4.1.3 SEARCH AND RESERVE MODULE

The system must able to provide user with several option of search and must be able to return the search result in an appropriate view. It should be able to provide user with option that help user to limit down the range of search in order to get a more accurate result and able to provide the result viewer that displays the CD details such as software that contain in a CD, the CD and software key status. If the CD and software key status is not available, system should provide user reservation option. Else if the CD and software key status is available, system should not provide user reservation option. The system must be able to track the reservation which already exceeds the time length limit and able to automatically discard the reservation which is already exceeding the time length limit. The system should be able to update the CD status for reservation.

4.1.4 USER PROFILE MODULE

The system must be able to provide with the option that help user to edit their personal profile and change their login password. It should be able to return the user information in an appropriate viewer.

4.1.5 USER GUIDE MODULE

The system should be able to provide with the option to guide user on how to use the system, particularly on how to search and search CD and how to borrow CD from CD Library. The provided user guide should be clear and understandable by user.

4.1.6 LOAN MODULE

The system must be able to check and validate user login, inform the user whether this user is authenticated and ensure that user accept the terms and condition before user can borrow CD from CD Library. The system should be able to display only the list of available CD to user and provide with option to delete the selected CD before user confirm their borrowing. The system must be able to check whether the CD has been reserve by other user. If the CD has been reserve by other user, the system should be able to inform the user that they cannot borrow the CD. The system must be able to assign valid software key for all user's borrowed CD. It should be able to inform the user whether the borrowing process is successful. If the borrowing process successful system must be able to update the CD and software key status. The system should be able to provide with option to print or save the borrowed information.

4.1.7 RETURN MODULE

The system should be able to inform the user whether the return process is successful. If the returning process if successful, system must be able to update the CD status. System should be able to check whether the returned CD is being reserve by other user. If the CD has been reserve by other user, system should be able to send email notification to the user who had reserve the returned CD.

4.1.8 REPORT MODULE

The system should be able to provide various options for administrator to generate or print reports such as library transaction and information and system should be able printed out the report when requested.

4.1.9 MAINTENANCE MODULE

The systems should be able to provide administrator a function to help them manage the library information such as CD information, category information, software information, CD Key information and user information. The system must provide user with the functionality to add new information. The system must be able provide the user with the functionality to edit the information. The system must provide user with the functionality to delete unused information from database. The system should provide the user an appropriate viewer for them to view the information. The system should be able to provide the user a save function to make store up the made changes.

4.2 NON-FUNCTIONAL REQUIREMENT

Non-functional requirement is essential definition of the system properties and constraints under which a system must operate. It is a description of other features, characteristics, and constraints that define a satisfactory system.

Mostly system users might expect certain degree of non-functional requirement.

Some of the non-functional requirements for OCDLib are:

4.2.1 USER FRIENDLINESS

The system should have clearly labeled command, consistent, in terms of screen design and error messages displayed. The system must be able to accommodate a variety of user levels, as not all users have established technical backgrounds. It should provide easy and understandable commands and buttons to avoid blurriness. Appropriate error handling with associated error messages must be provided.

4.2.2 RELIABILITY AND ACCURATE

The system should perform all the services and function accurately and in a timely manner. It should set out an acceptance failure rate, which is that the system should be recoverable within 24 hours. While the system is in down time, the operation could be recorded manually in order to update the database directly after the down time. A system must be able to produce accurate results and can be trusted by the users.

4.2.3 FLEXIBILITY

The system should be able to provide a high degree of flexibility. It should have the ability to change or to be change according to circumstances.

4.2.4 ROBUSTNESS

Robustness refers to ability of the system to continue in operation despite facing unexpected problems. The OCDLib should be robust enough to handle anticipate or unanticipated error.

4.2.5 LEARNABILITY

The system should be easy to be lean. New user should not be facing any difficulty in coping with the technology used in the system. It should be easy to understand and easy to use.

4.2.6 MAINTAINABILITY

The system should be designed in such a way that it can be easily understood, corrected, adapted and enhanced.

4.2.7 CORRECTNESS

The system must operate correctly or it provides little value to its users. Correctness is the degree to which the software performs its required function. To ensure this application quality, lots of testing and trial-and-errors will be carried out.

4.2.8 SHORT LOADING TIME AND RESPOND TIME

Normally, everyone likes the system to respond fast. Thus a system must be able to provide short loading time and respond time. Slow loading and respond time might cause the users to wait and discourage them from using the system again. The system should be able to process any transaction at the highest speed and avoid unnecessary interaction.

4.2.9 MODULARITY

The system should be able to broke down into small modules so that distinct functions of objects could be isolated from one to another other. This will make the system testing and maintenance process easier because the processes can be done portion by portion and not involving the whole system.

4.2.10 SECURITY

System must be able to ensure that sensitive information will be handled in a safe and professional manner. In addition, various levels of functionality will be provided according to the user's status.

4.3 CHOSEN PLATFORM, WEB SERVER, DATABASE AND TOOLS

4.3.1 CHOSEN PLATFORM

For OCDLib, Windows is chosen as the development platform. Microsoft's Windows XP is built to work with a series of microprocessors from the Intel Corporation that share the same or similar sets of instructions. Microsoft's Windows XP is chosen as the development operating system is because most of the computers in FSCIT are currently installed with Windows XP. Therefore, the implementation of the new system can be done easily and effectively.

4.3.2 CHOSEN DEVELOPMENT WEB SERVER

For the development web server, Internet Information Services (IIS) is chosen. IIS is the Windows component that makes it easier to publish information and bring business applications to the Web. It makes it easier to create a strong platform for network applications and communications.

4.3.3 CHOSEN DATABASE SERVER

Microsoft SQL Server 2000 is used as OCDLib's database. Microsoft SQL Server provides powerful and scalable support for large database and complex queries. Features provided by SQL Server ensure easy-to-use for database administrators in building, managing and deploying business applications. The data transformation services make it easy to import, export and transform heterogeneous data using OLE Database, Open Database Connectivity (ODBC) or text-only files.

4.3.4 CHOOSING AUTHORING TOOLS

The authoring tools to develop OCDLib include Microsoft Visual Studio .Net 2003, Macromedia Flash MX, Macromedia Captivate and Adobe Photoshop 8.0.

Microsoft Visual Studio .Net 2003 and ASP .Net is the main authoring tools and language in the development of most of the functions or modules in OCDLib. This is because ASP .Net is a powerful tool for creating dynamic and interactive web pages, it has better language support, large set of new controls and XML based components and also better user authentication.

Macromedia Flash MX is used to create user interface for OCDLib. Flash is a tool for creating interactive and animated web site and will be load faster than other animated images. Beside that, flash also allow interactivity and not required any programming skills.

Macromedia Captivate can automatically records all onscreen actions and instantly creates an interactive Flash simulation. Point and click to add text captions, narration, and e-learning interactions without any programming knowledge. This is a useful tool to create user guide and is an effective way to show the end user how to use a particular module in OCDLib.

The use of Adobe Photoshop is to edit and create images or icons that needed in the OCDLib and to make the interface more attractive. Adobe Photoshop is an image editing program used for editing color of images, retouching proofs, adding and creating special affects to images. It also can be used for creating other forms of art.

4.3 SUMMARY

Functional and non-functional requirement were being discussed in this chapter as well as the consideration of web development tools being used for the system.

- System Architecture Design
- System Functionality Design
- User Interface Design
- Database Design

4.1 SYSTEM ARCHITECTURE DESIGN

System architecture refers to a software view which shows the description of the structural aspects of a software system. It is a framework that describes how the system components interact and work together to achieve total system goal.

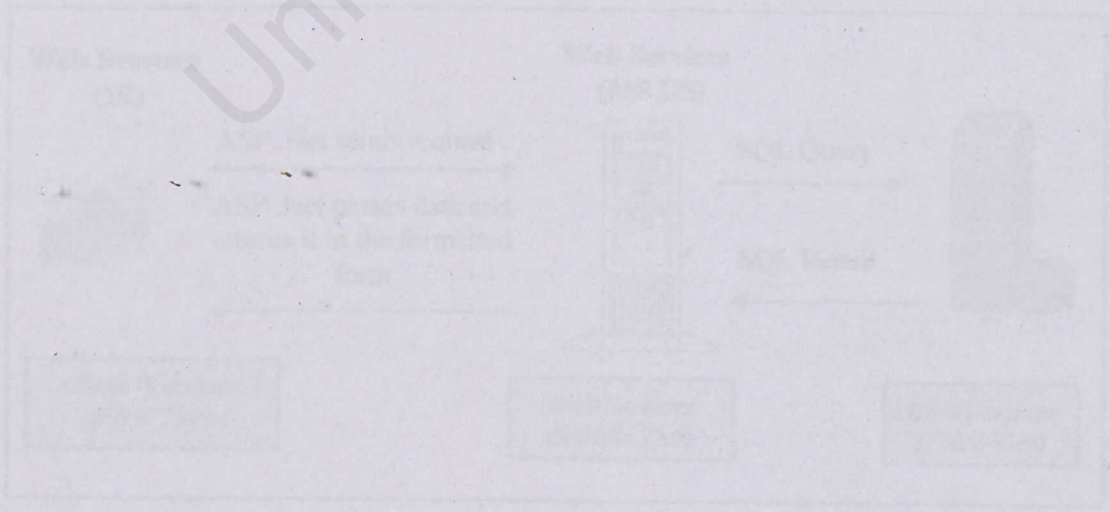


Figure 4-1: System Architecture Design

CHAPTER 5 SYSTEM DESIGN

5.1 INTRODUCTION

System Design is a phase of the waterfall that the entire requirements for the system are translated into system characteristics. The requirements for system are regarding to the analysis that had been discussed in the previous chapter. System design includes the following issues:

- System Architecture Design
- System Functionality Design
- User Interface Design
- Database Design

5.2 SYSTEM ARCHITECTURE DESIGN

System architecture from a software view, address the description of the structural aspects of a software system. It is a framework that describes how the system components interact and work together to achieve total system goal.

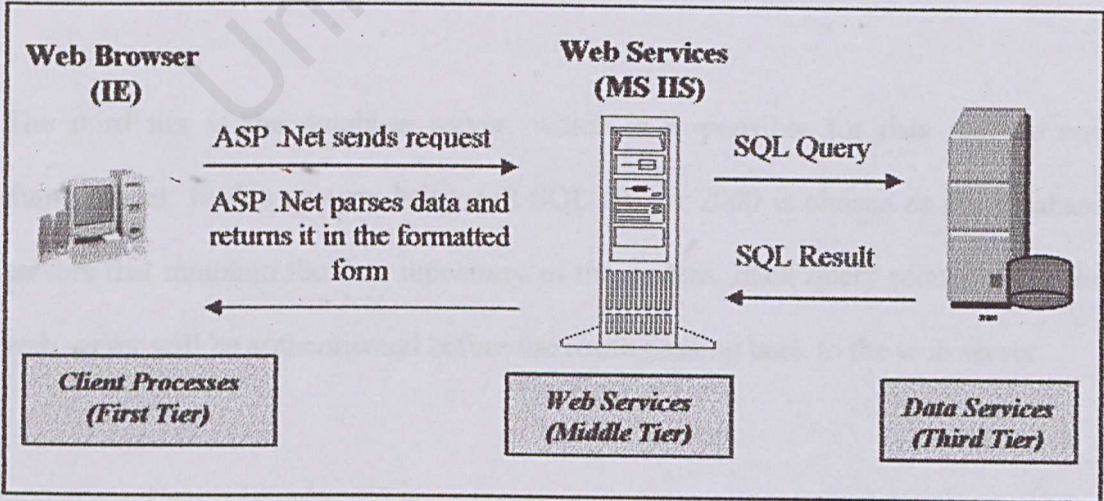


Figure 5-1: OCDLib's Architecture Design

The three tier architecture is chosen as the architecture design for OCDLIB. It is generally divided into three extensive tiers. This architecture is chosen because it allows any part of the system to be modified without having to change the other two part of the system. Thus it allows system to operate at its highest efficiency and the separation of the application function from the database makes it easier to implement load balancing.

From the above figure, the presentation logic in the first tier means any browser that the system administrator or user will use to access the web server. The interface for the system has been identified as a web interface which will be written using Asp .Net. User can access to the system any time and any where as long as he or she has the internet connection and uses a browser to access to the system.

The web server is resides in the middle tier. The web server for this system is IIS 5.0. It provides user's request from the client tier and then return results to the browser in HTML form. The web server is linked to the database server. Any data request will be authenticated to verify its validity.

The third tier is the database server, which is responsible for data storage and management. In this system, Microsoft SQL Server 2000 is chosen as the database servers that maintain the data repository of the system. Each query request from the web server will be authenticated before the result passing back to the web server.

5.3 SYSTEM FUNCTIONAL DESIGN

5.3.1 STRUCTURE CHARTS

The system's structure chart is designed to show how the modules in OCDLib are related to each other.

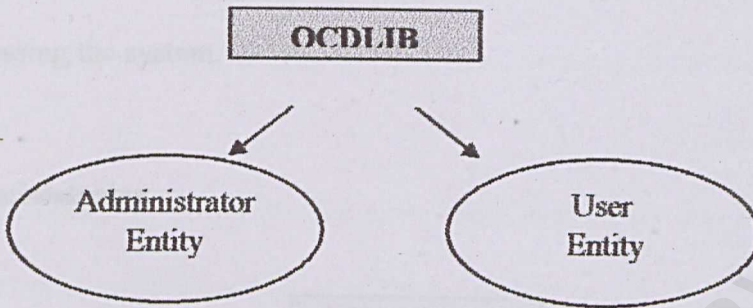


Figure 5-2: Structure Chart for OCDLIB

OCDLIB consists of two major parts, which are the Administration Entity and the User Entity. Each of these entities will perform different system function. The entities are then structured to the connectivity with the module in this OCDLIB.

5.3.1.1 User

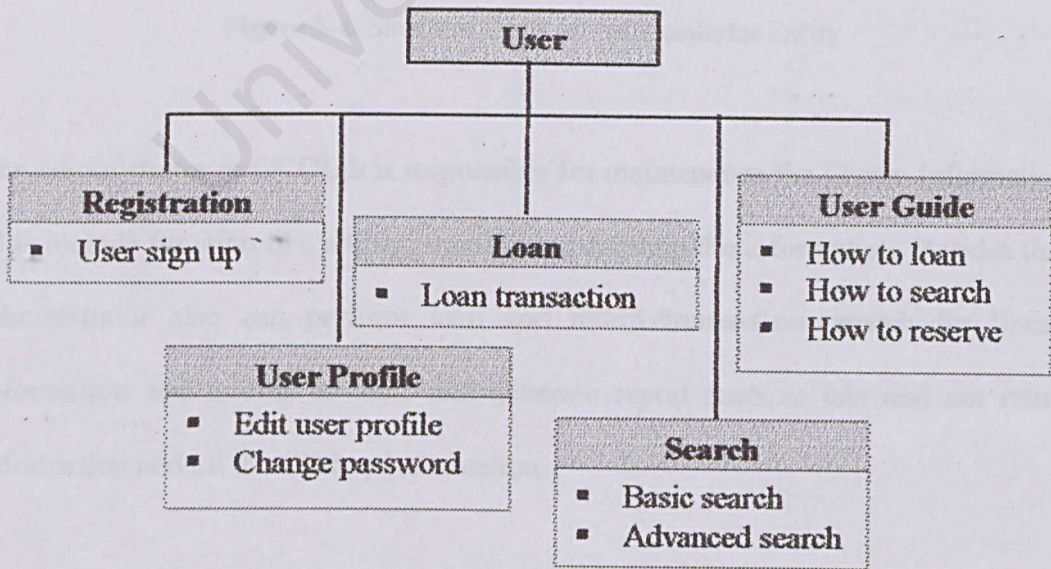


Figure 5-3: Structure Chart for User Entity

User is the name used to represent the students, teacher, faculty staff and administrator. They are the user of the system where they will perform function like new user registration, performs the loan transaction, searching information through the search function, reservation of the CD if the CD has been borrowed by other people and using the user guide to help out when they encounter any difficulty during accessing the system.

5.3.1.2 Administrator

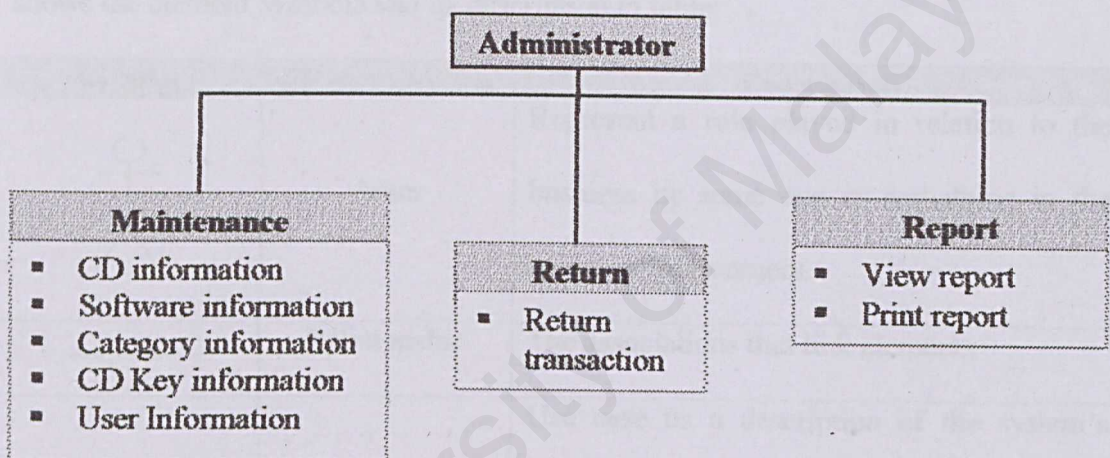


Figure 5-4: Structure Chart for Administrator Entity

The administrator in OCDLib is responsible for maintenance the library Information. This include function-like adding, modify and deleting the information. Besides that, administrator also can perform loan and return transaction, search for library information and is able to view and generate report such as late and not return information and all the CD key Information.

5.3.2 USE CASE DIAGRAM

A use case diagram contains use cases and actors, illustrating the relationships between the two sets. Use case diagrams describe what a system does from the standpoint of an external observer. The emphasis is on what a system does rather than how. A use case is a functionality the actor needs to perform with the help of the system and an actor is a kind of user that interacts directly with the system.

Table below shows the elements that have being used in the use case diagram. It shows the element symbols and its description in table.




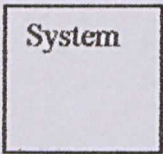
Symbol	Element Action	Description
	Actor	Represent a role played in relation to the business by some one or something in the business environment.
	Relationship	The associations that link elements
	Use case	Use case us a description of the system's behavior that results in a particular value for the actor. It can be used to diagram the main flow of events in a system, for when there are no errors.
	System Boundary Box	It indicates the scope of system – the use cases inside the rectangle represent the functionality that intend to implement.

Table 5-1: Elements in Use Case

Figure below illustrate the use case diagram of OCDLIB

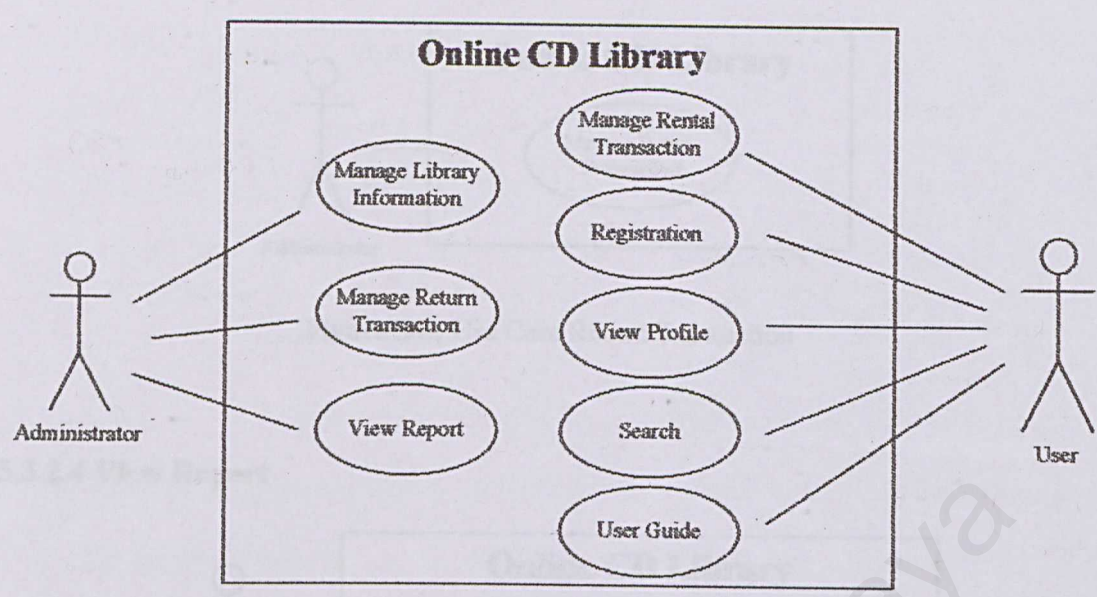


Figure 5-5: Use Case Diagram for OCDLIB

5.3.2.1 Login

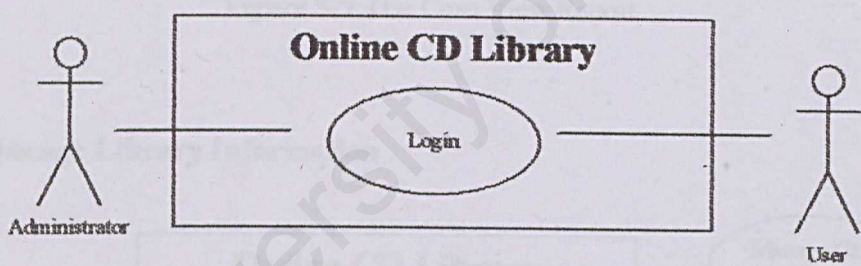


Figure 5-6: Use Case Login

5.3.2.2 Rental Transaction

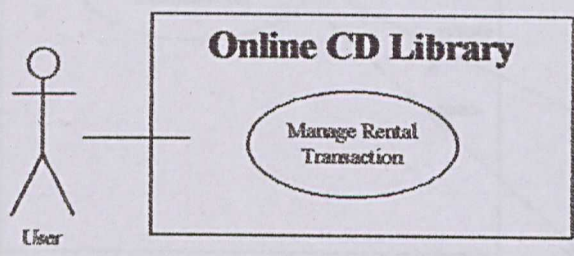


Figure 5-7: Use Case Rental Transaction

5.3.2.3 Return Transaction

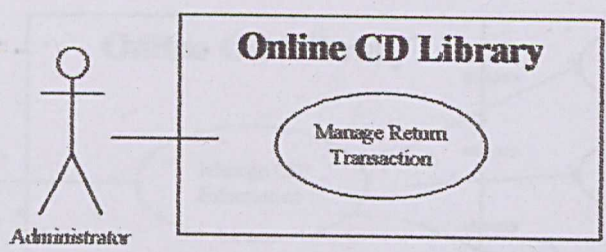


Figure 5-8: Use Case Return Transaction

5.3.2.4 View Report

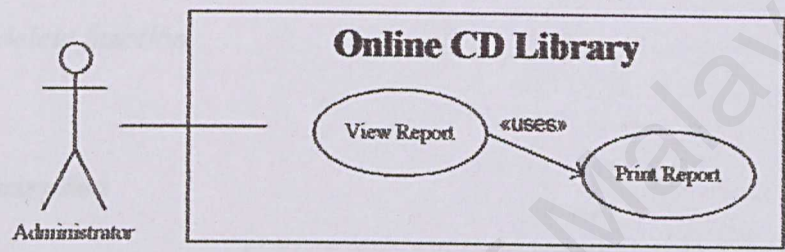


Figure 5-9: Use Case View Report

5.3.2.5 Manage Library Information

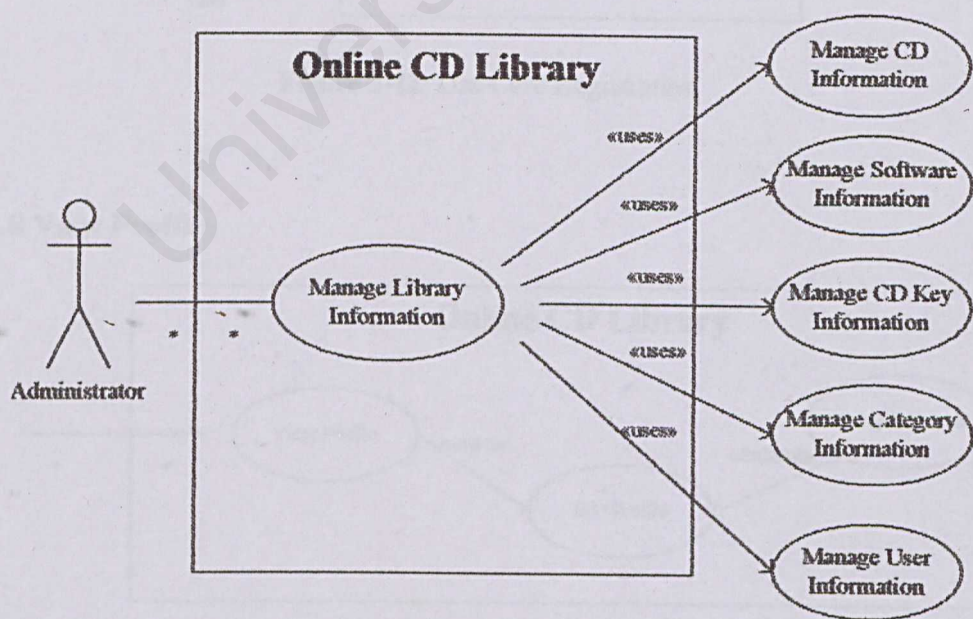


Figure 5-10: Use Case Manage Library Information

5.3.2.6 Manage CD Information

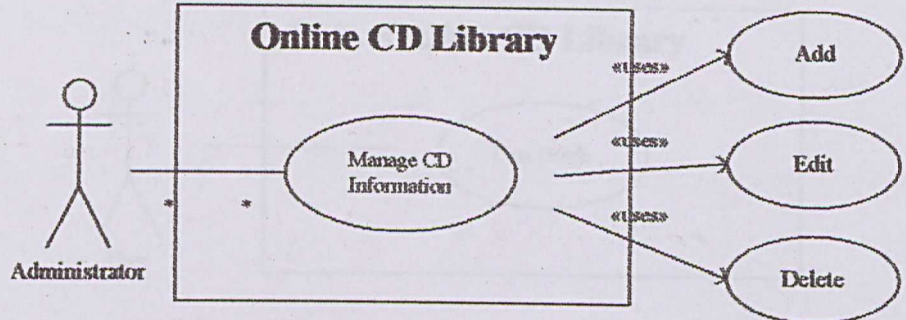


Figure 5-11: Use Case Manage CD Information

**Note: Manage software, category and CD key information also included add, edit and delete function.*

5.3.2.7 Registration

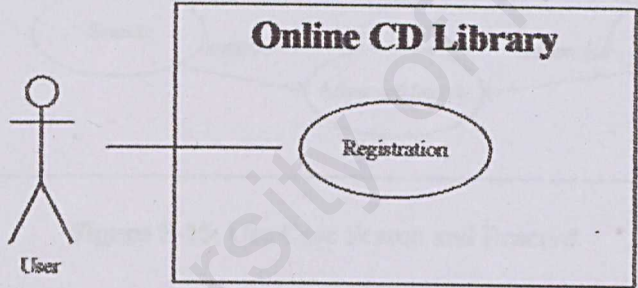


Figure 5-12: Use Case Registration

5.3.2.8 View Profile

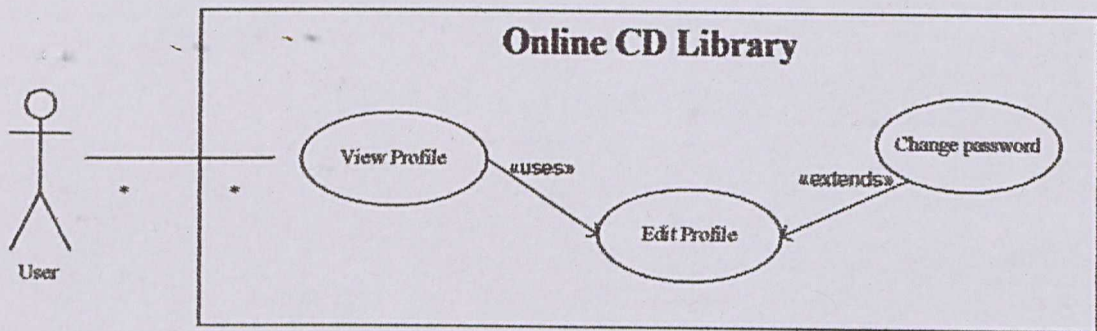


Figure 5-13: Use Case View Profile

5.3.2.9 User Guide

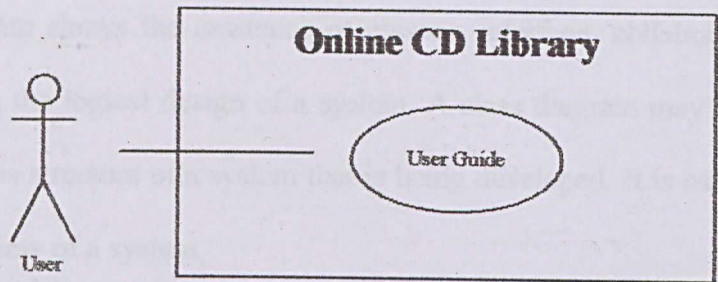


Figure 5-14: Use Case User Guide

5.3.2.10 Search and Reserve

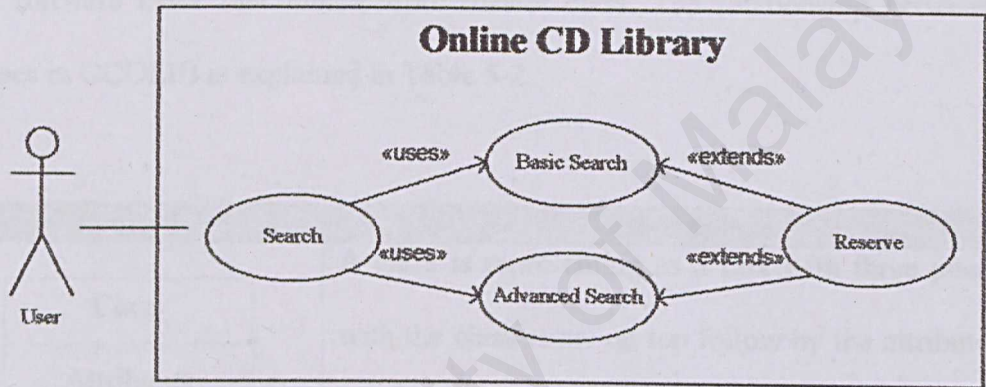


Figure 5-15: Use Case Search and Reserve

5.3.3 CLASS DIAGRAM

A class diagram shows the existence of classes, interface, collaboration and their relationship in the logical design of a system. A class diagram may represent all or part of the class structure of a system that is being developed. It is used to model the static design view of a system.

There are seven main classes and there are CDtable, user, loan, reserve, master, category and software. From below class diagram, there are two child class, category and software class that inherit from master class. The relationship between the classes in OCDLIB is explained in Table 5-2.

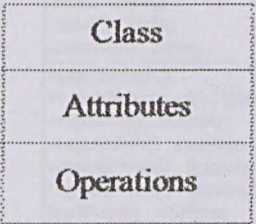
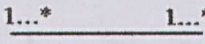
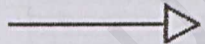
Symbol	Description
	A class is representing as a box with three positions with the class name on top follow by the attribute and operation. The attributes is the object used by the class and operation is the method of the class.
	Show the relationship between classes
	Generalization – Used to indicate the inheritance of an item.

Table 5-2: Elements in Class Diagram

Figure below shows the class diagram of OCDLIB

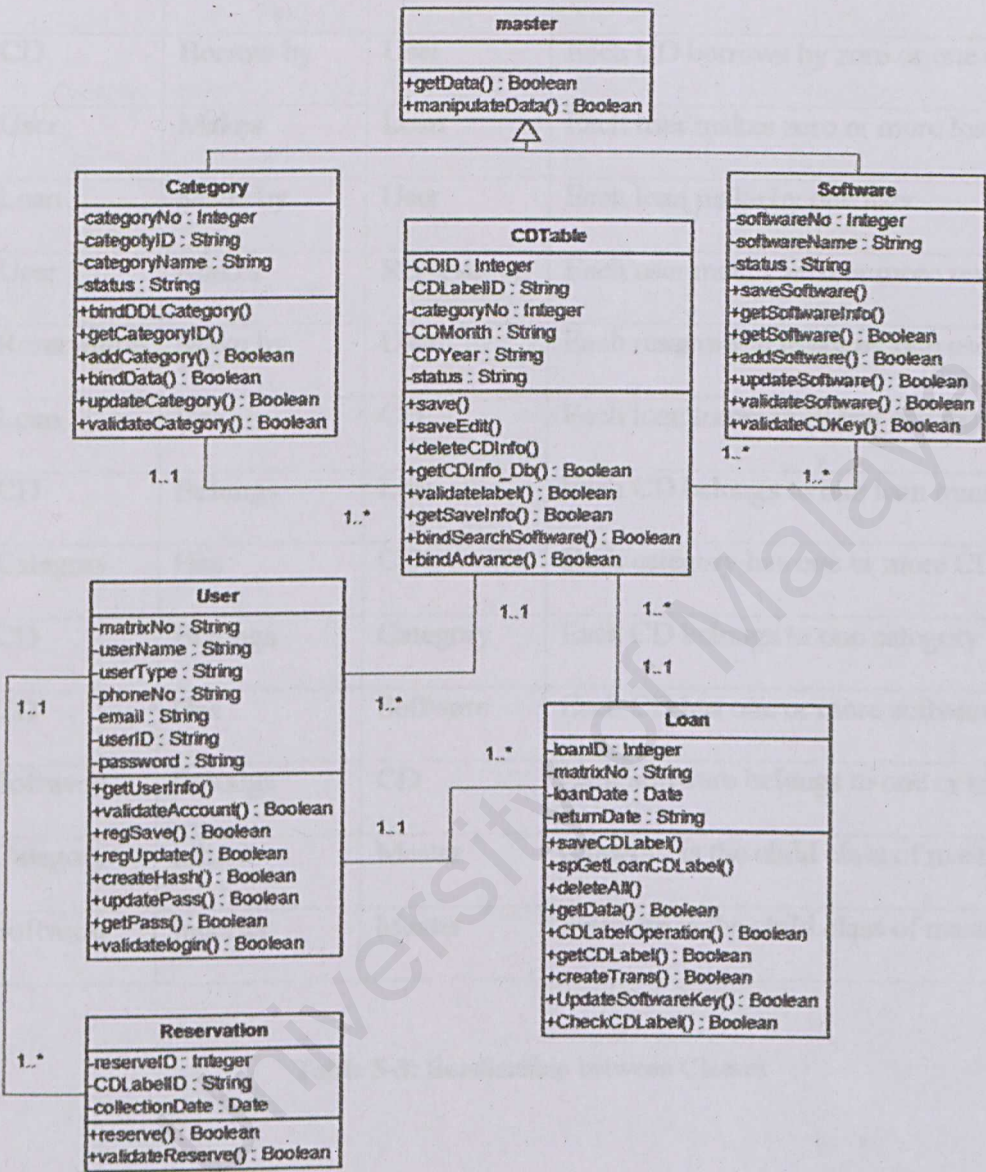


Figure 5-16: OCDLib's Class Diagram

Table below illustrate the relationship between classes in OCDLIB.

Class	Relationship	Class	Description
User	Borrows	CD	Each user borrows one or more CD
CD	Borrow by	User	Each CD borrows by zero or one user
User	Makes	Loan	Each user makes zero or more loan
Loan	Made by	User	Each loan make by one user
User	Makes	Reservation	Each user makes zero or more reservation
Reservation	Make by	User	Each reservation make by one user
Loan	Has	CD	Each loan transaction has one or more CD
CD	Belongs	Loan	Each CD belongs to one loan transaction
Category	Has	CD	Each category has one or more CD
CD	Belongs	Category	Each CD belongs to one category
CD	Has	Software	Each CD has one or more software
Software	Belongs	CD	Each software belongs to one or more CD
Category	Inherits	Master	Category is the child class of master
Software	Inherits	Master	Software is the child class of master

Table 5-3: Relationship between Classes

5.3.4 SEQUENCE DIAGRAM

Sequence diagram is an interaction diagram which describes the interaction among object in term of exchanging message over time. A message is the command sent by an object to another object to do a task. This diagram will used to show the sequence of all the modules in OCDLIB. Table below shows the elements that have being used in the sequence diagram of OCDLIB.


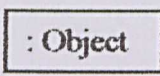


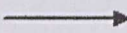

Symbol	Element Action	Description
	Actor	Represent a role played in relation to the business by some one or something in the business environment.
	Object	An object is instances of class. The object performed an action by sending message.
	Life line	A class is representing as a box with three positions with the class name on top follow by the attribute and operation. The attributes is the object used by the class and operation is the method of the class.
	Activation	The activation is a rectangle before on a life line. It indicates when the object performed an action.
	Call	A call action involves on operation on an object.
	Return	A return action is the return of a value to the caller, in response to a call action.

Table 5-4: Elements in Sequence Diagram

5.3.4.1 Administrator Login

Figure below illustrate the sequence diagram for administrator login.

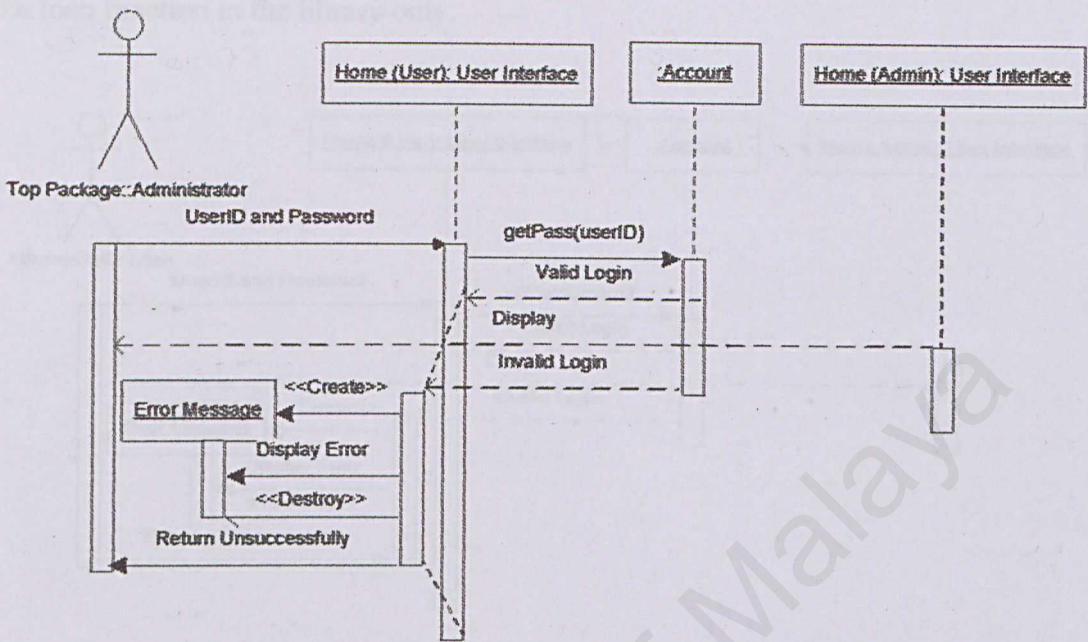


Figure 5-17: Sequence Diagram Administrator Login

5.3.4.2 User Login

Figure below illustrate the sequence diagram for user login.

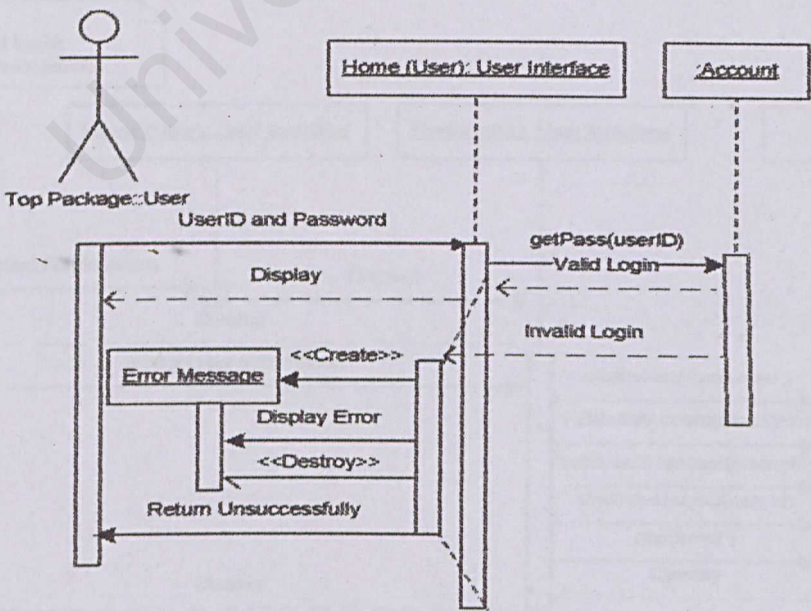


Figure 5-18: Sequence Diagram User Login

5.3.4.3 Administrator Login (Loan)

Figure below illustrate the sequence diagram of administrator login for user to use the loan function in the library only.

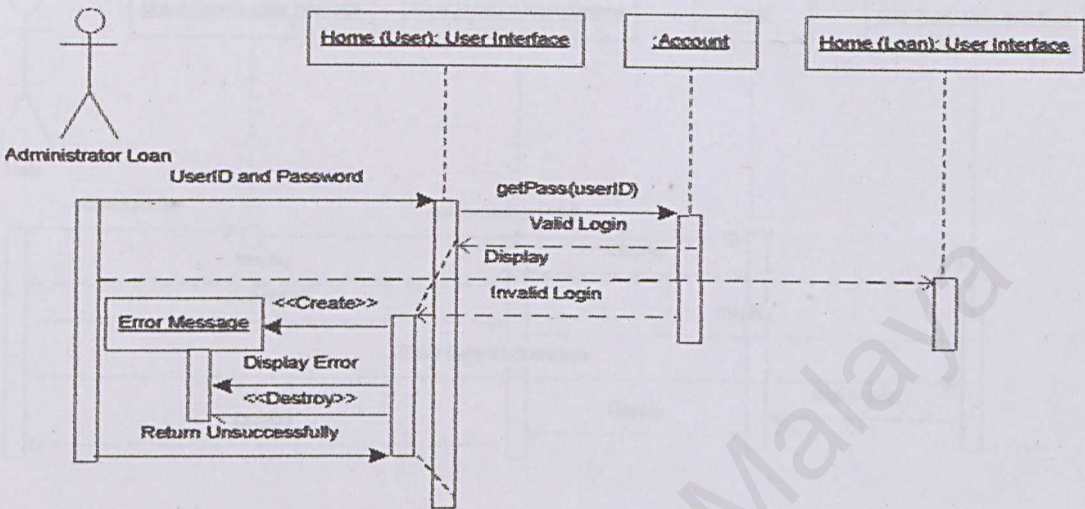


Figure 5-19: Sequence Diagram Administrator Login (for user loan)

5.3.4.4 Registration

Figure below illustrate the sequence diagram for registration process.

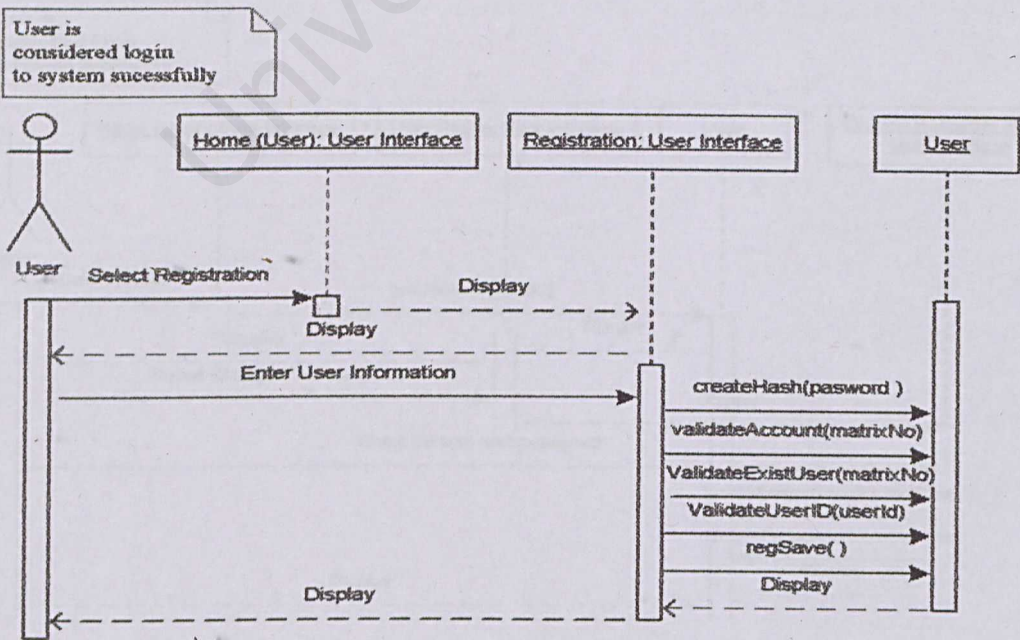


Figure 5-20: Sequence Diagram Registration

5.3.4.5 Edit Profile

Figure below illustrate the sequence diagram for profile editing.

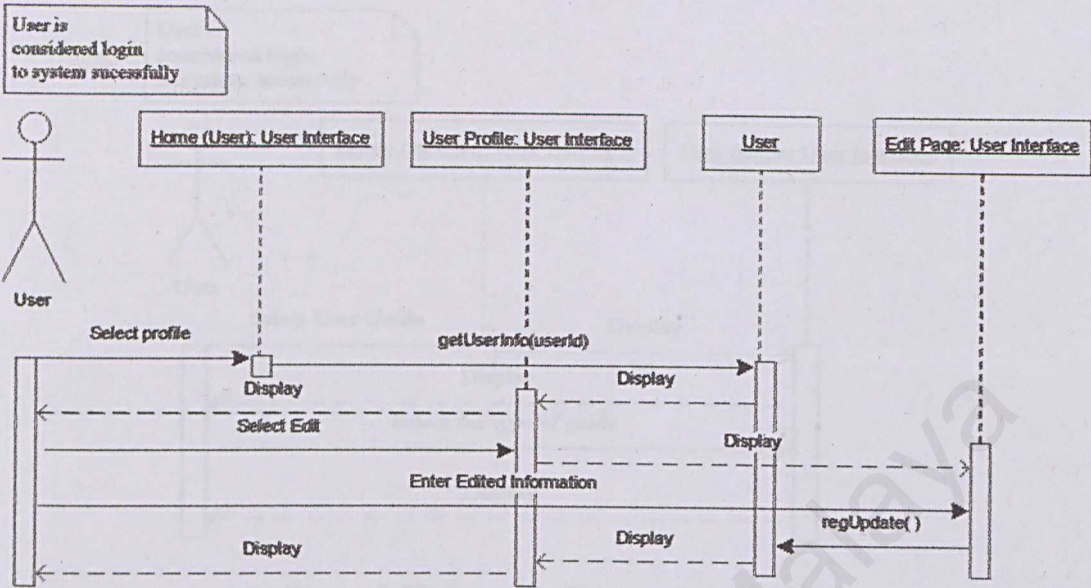


Figure 5-21: Sequence Diagram Edit Profile

5.3.4.6 Change Password

Figure below illustrate the sequence diagram for password changing.

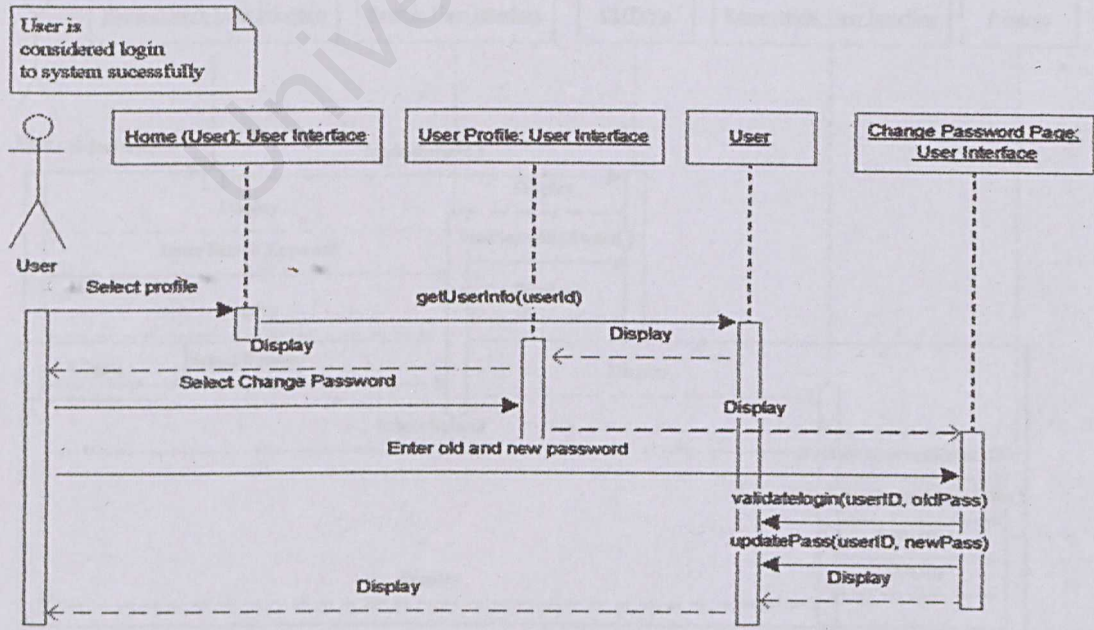


Figure 5-22: Sequence Diagram Change Password

5.3.4.7 User Guide

Figure below illustrate the sequence diagram for user guide.

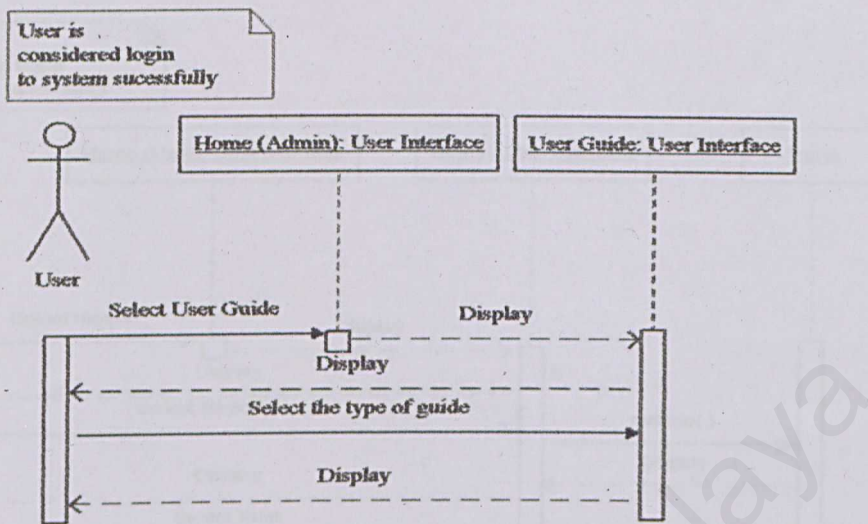


Figure 5-23: Sequence Diagram User Guide

5.3.4.8 Search

Figure below illustrate the sequence diagram for searching.

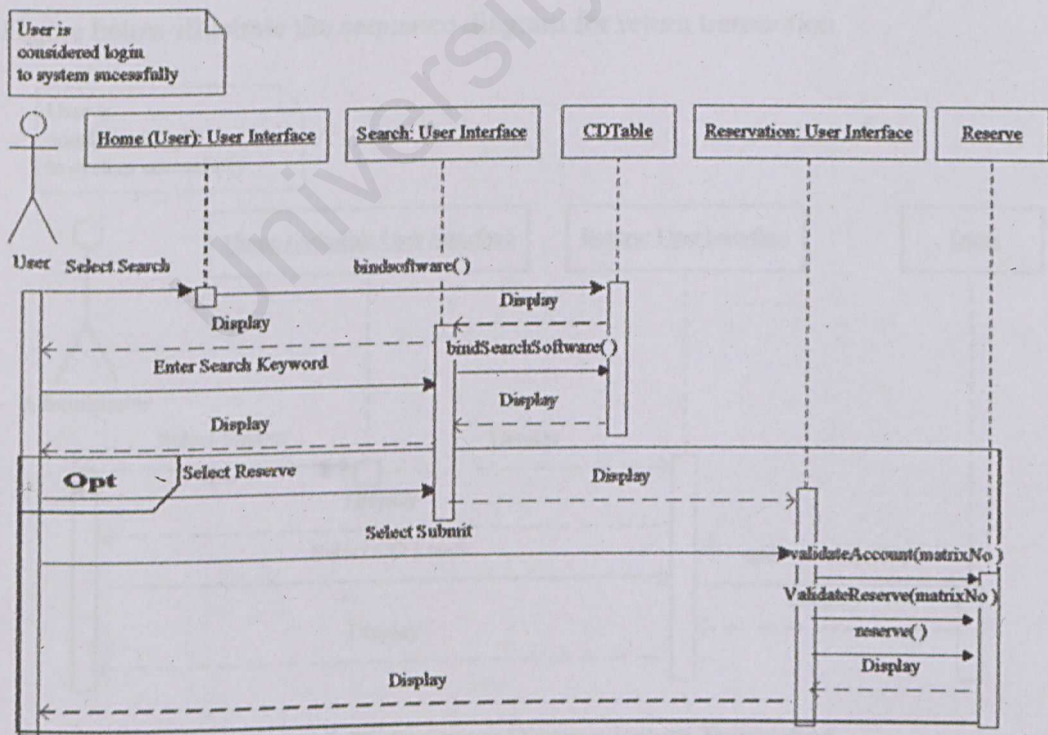


Figure 5-24: Sequence Diagram Search

5.3.4.9 Print Report

Figure below illustrate the sequence diagram for report printing process.

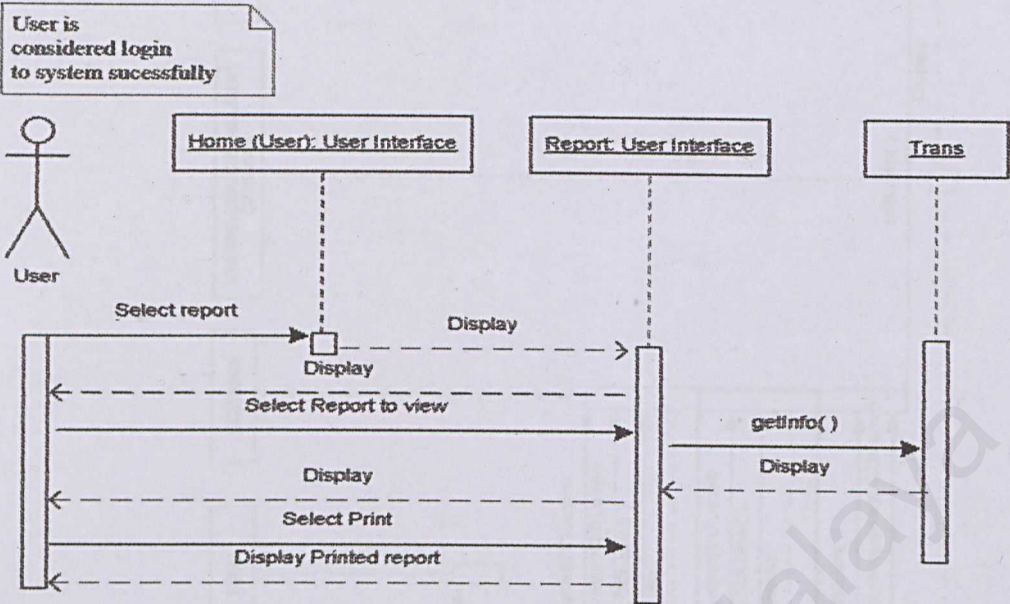


Figure 5-25: Sequence Diagram Print Report

5.3.4.10 Return Transaction

Figure below illustrate the sequence diagram for return transaction.

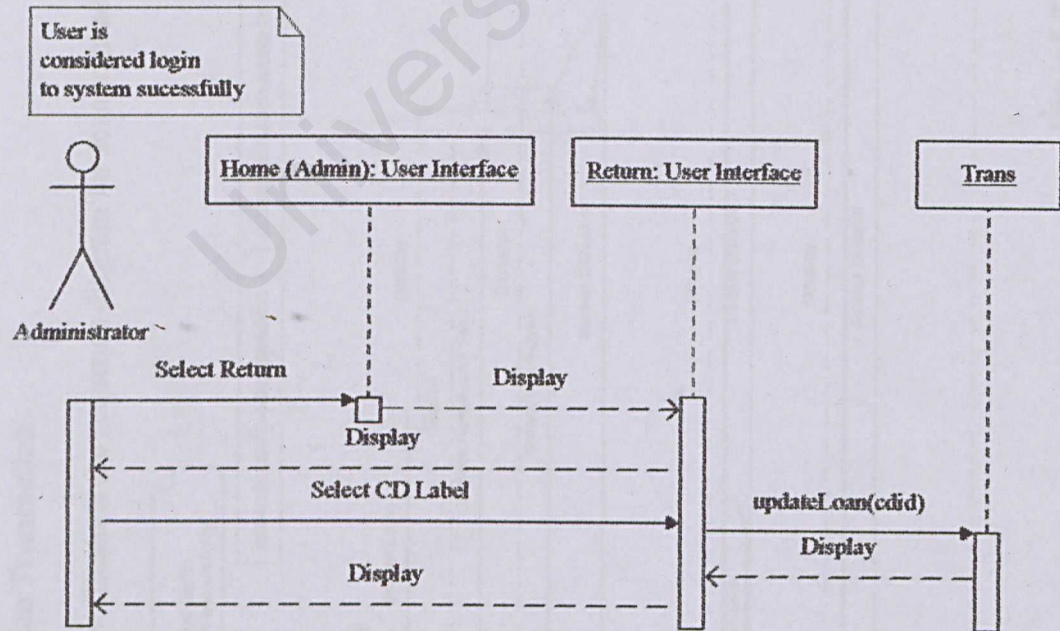


Figure 5-26: Sequence Diagram Return Transaction

5.3.4.11 Loan Transaction

Figure below illustrate the sequence diagram for loan transaction.

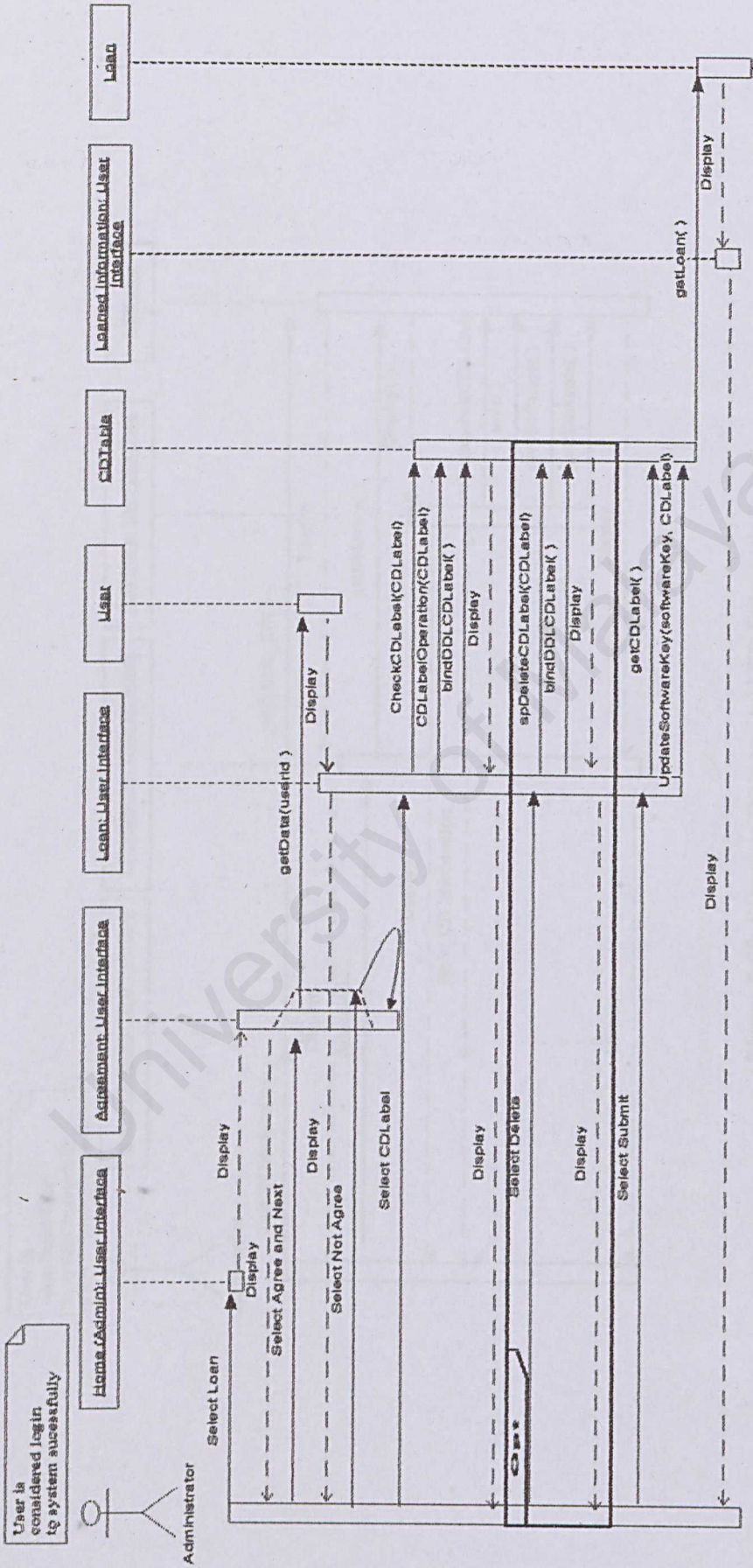


Figure 5-27: Sequence Diagram Loan Transaction

5.3.4.12 Add CD Information

Figure below: illustrate the sequence diagram for adding CD information to database.

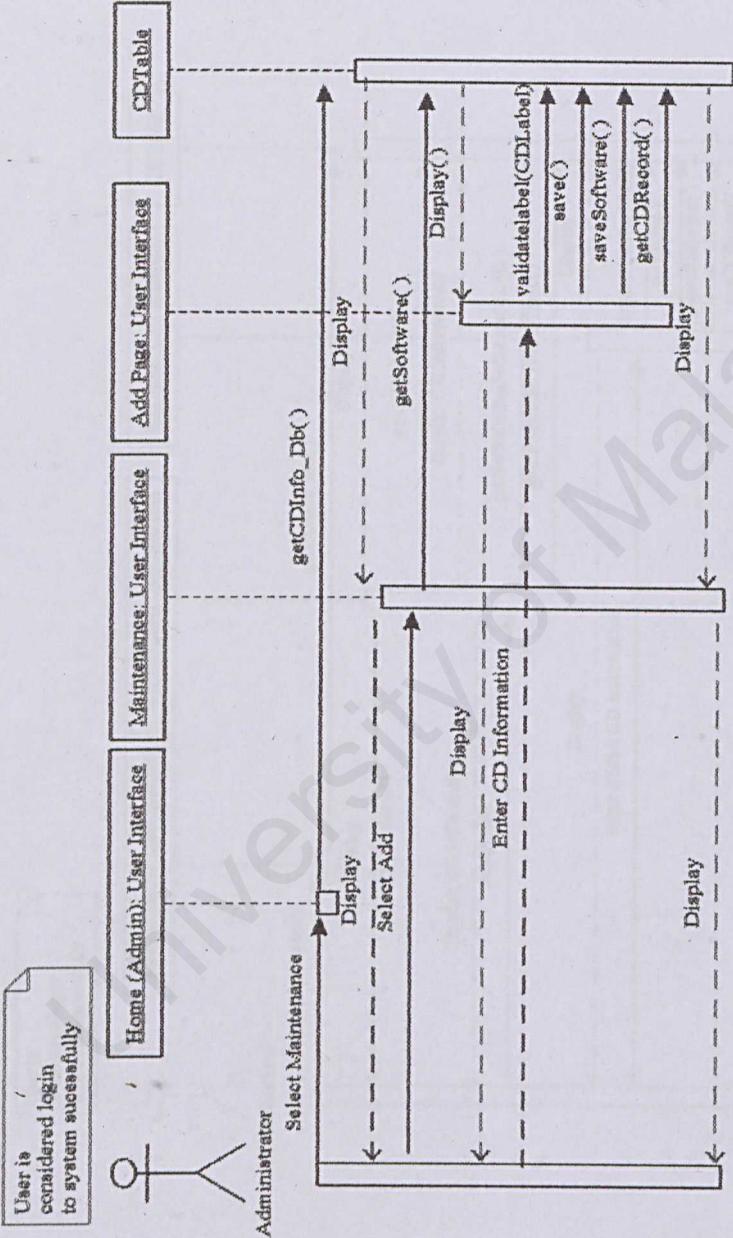


Figure 5-28: Sequence Diagram Add CD Information

5.3.4.13 Edit CD Information

Figure below illustrate the sequence diagram for editing CD information from database.

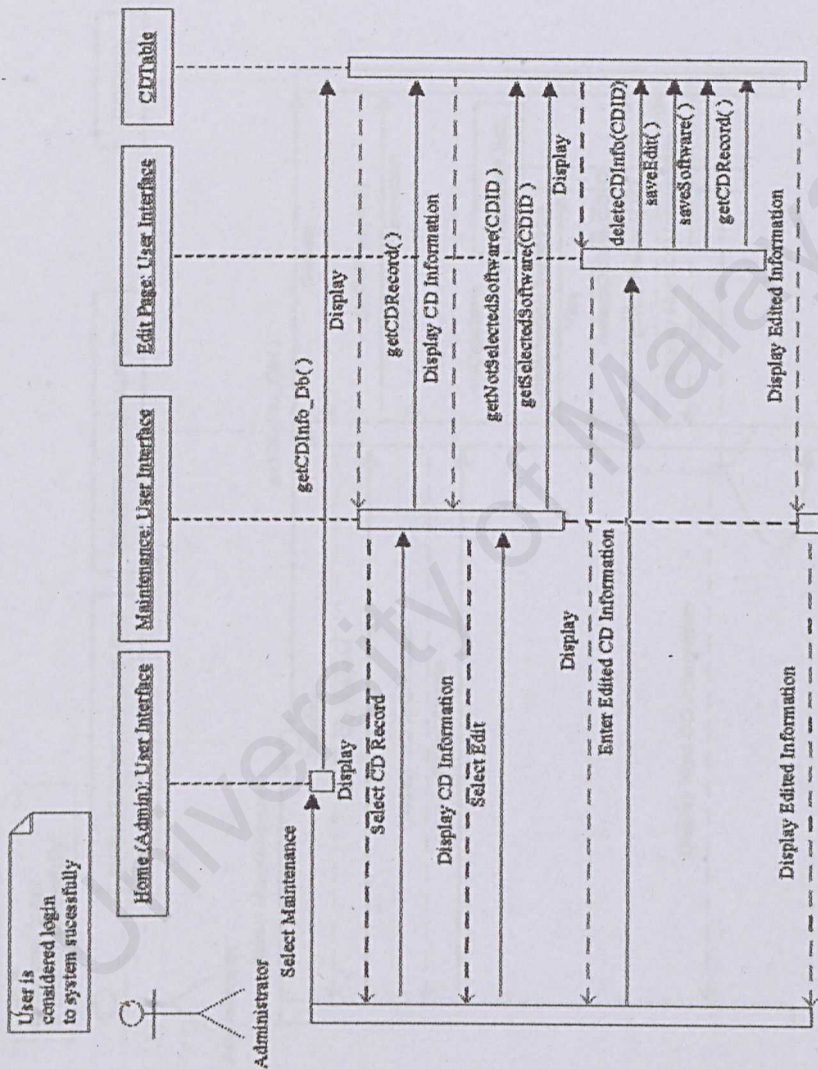


Figure 5-29: Sequence Diagram Edit CD Information

5.3.4.14 Delete CD Information

Figure below: illustrate the sequence diagram for deleting CD information from database.

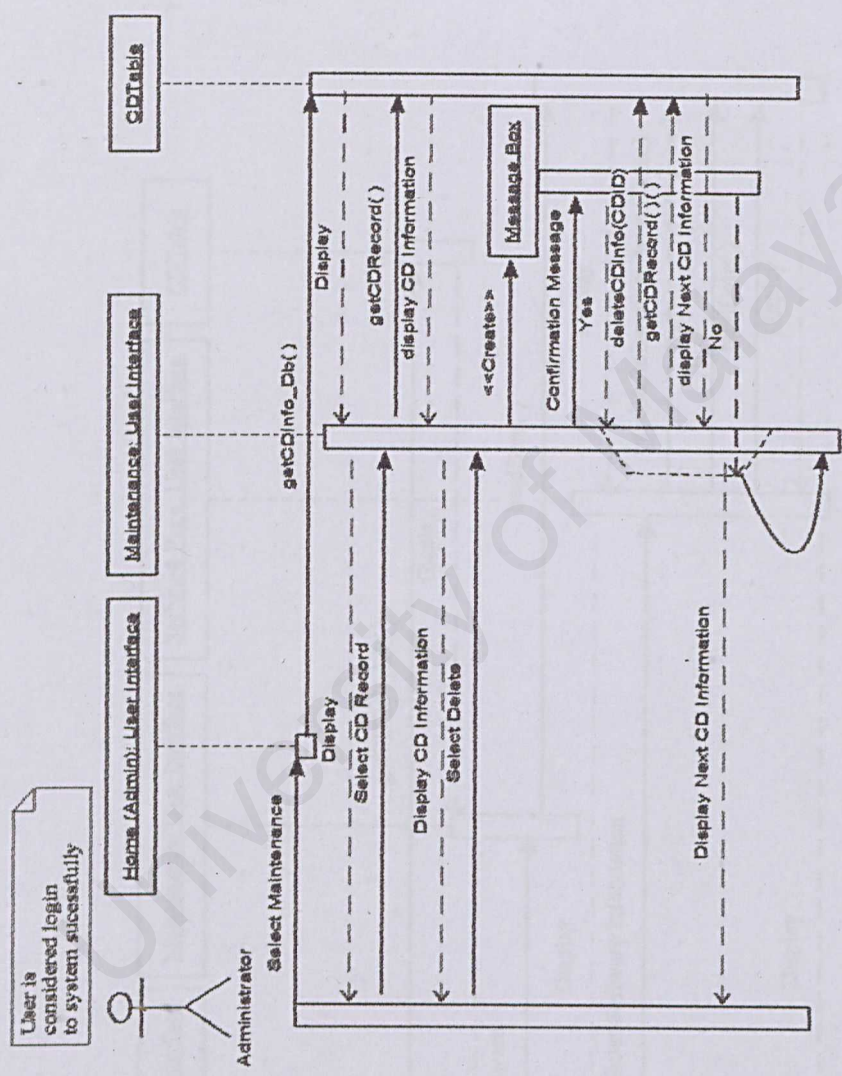


Figure 5-30: Sequence Diagram Delete CD Information

5.3.4.15 Add Software Information

Figure below illustrate the sequence diagram for adding software information to database.

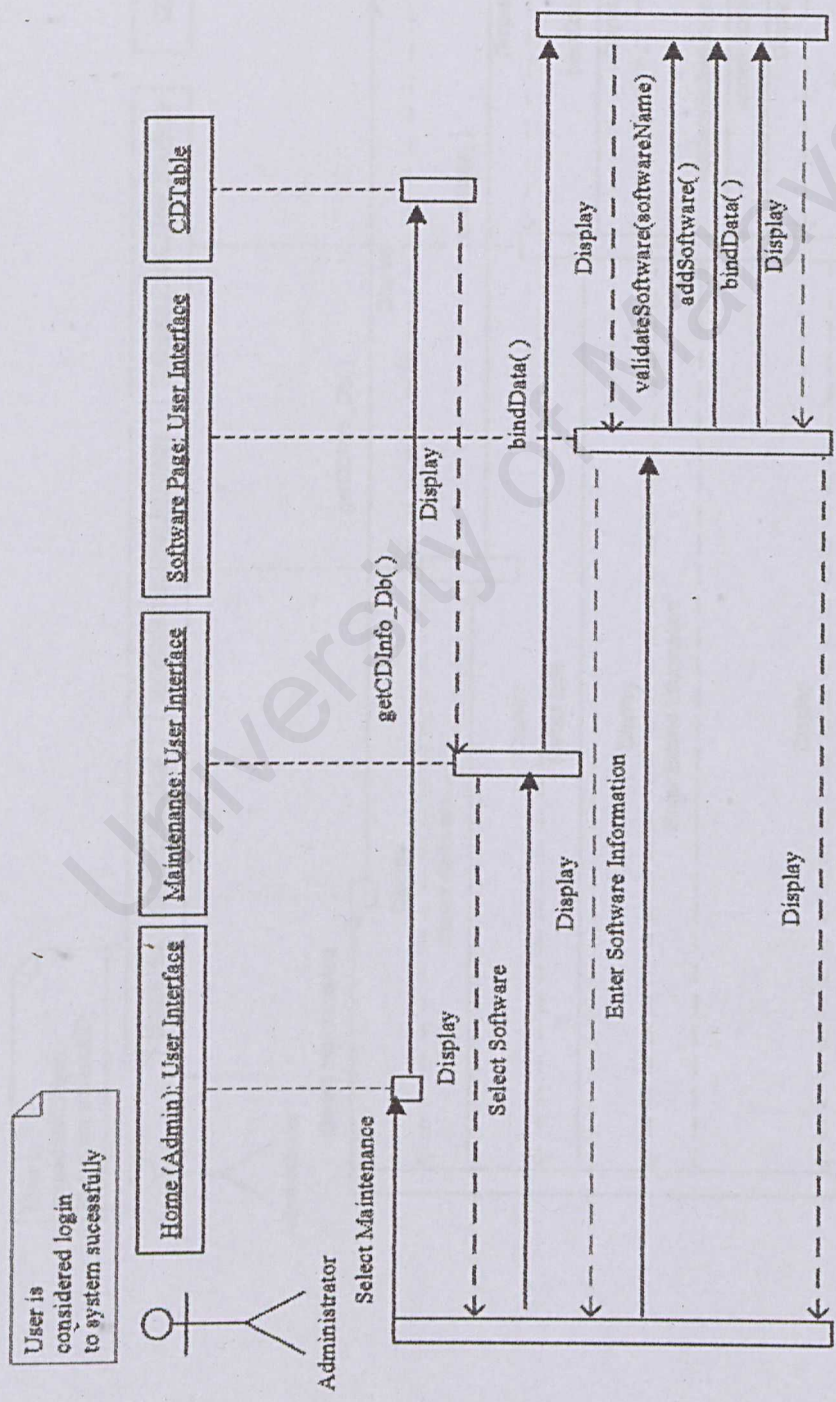


Figure 5-31: Sequence Diagram Add Software Information

**Note: For adding category information follow the same sequence, only the classes the user interface involves are change.*

5.3.4.16 Edit Software Information

Figure below illustrate the sequence diagram for editing software information to database.

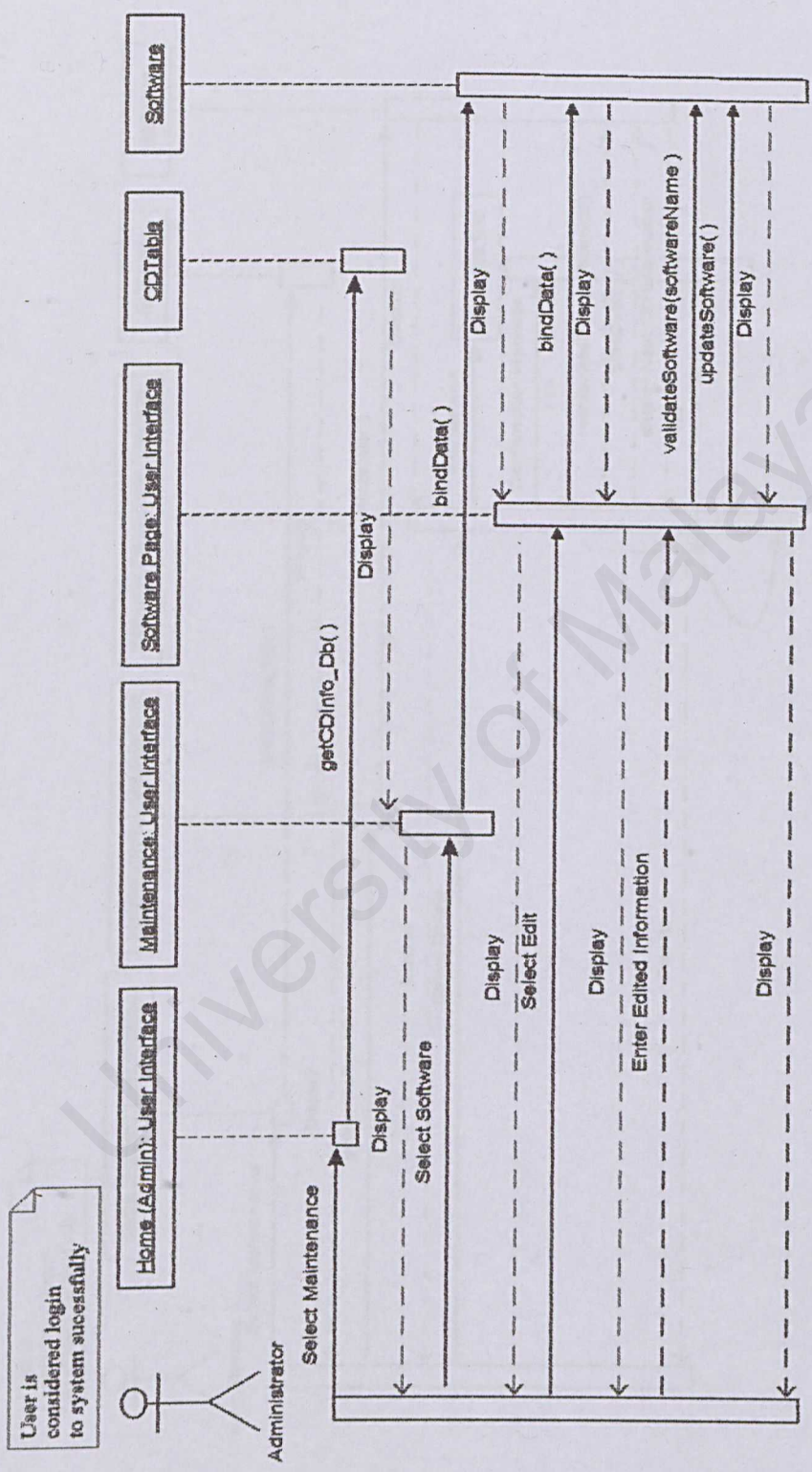


Figure 5-32: Sequence Diagram Edit Software Information

*Note: For editing category information follow the same sequence, only the classes the user interface involves are change.

5.3.4.17 Delete Software Information

Figure below illustrate the sequence diagram for deleting software information to database.

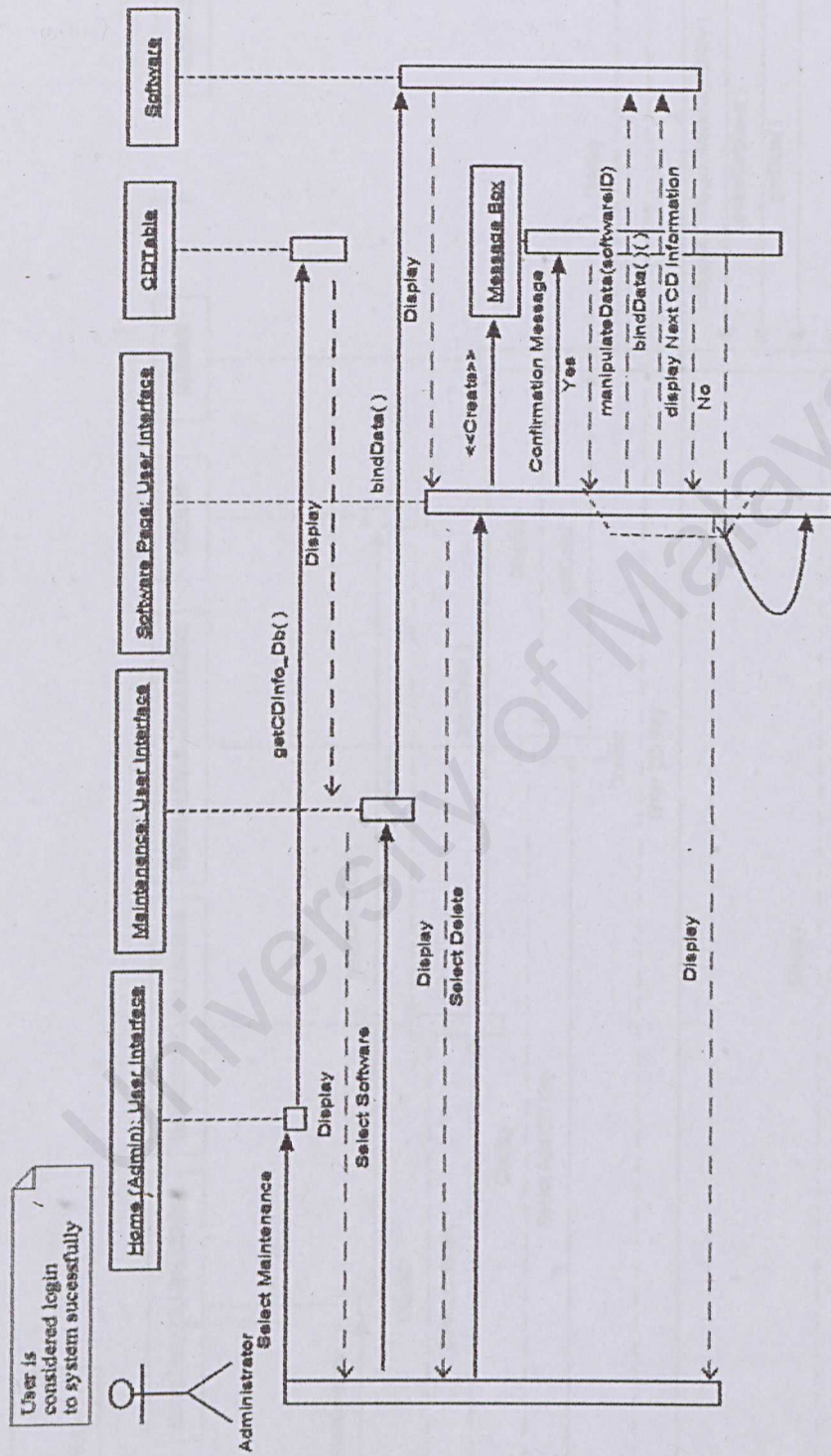


Figure 5-33: Sequence Diagram Delete Software Information

*Note: For deleting category information follow the same sequence, only the classes the user interface involves are change.

5.3.4.18 Add CD Key Information

Figure below illustrate the sequence diagram for add CD key information to database.

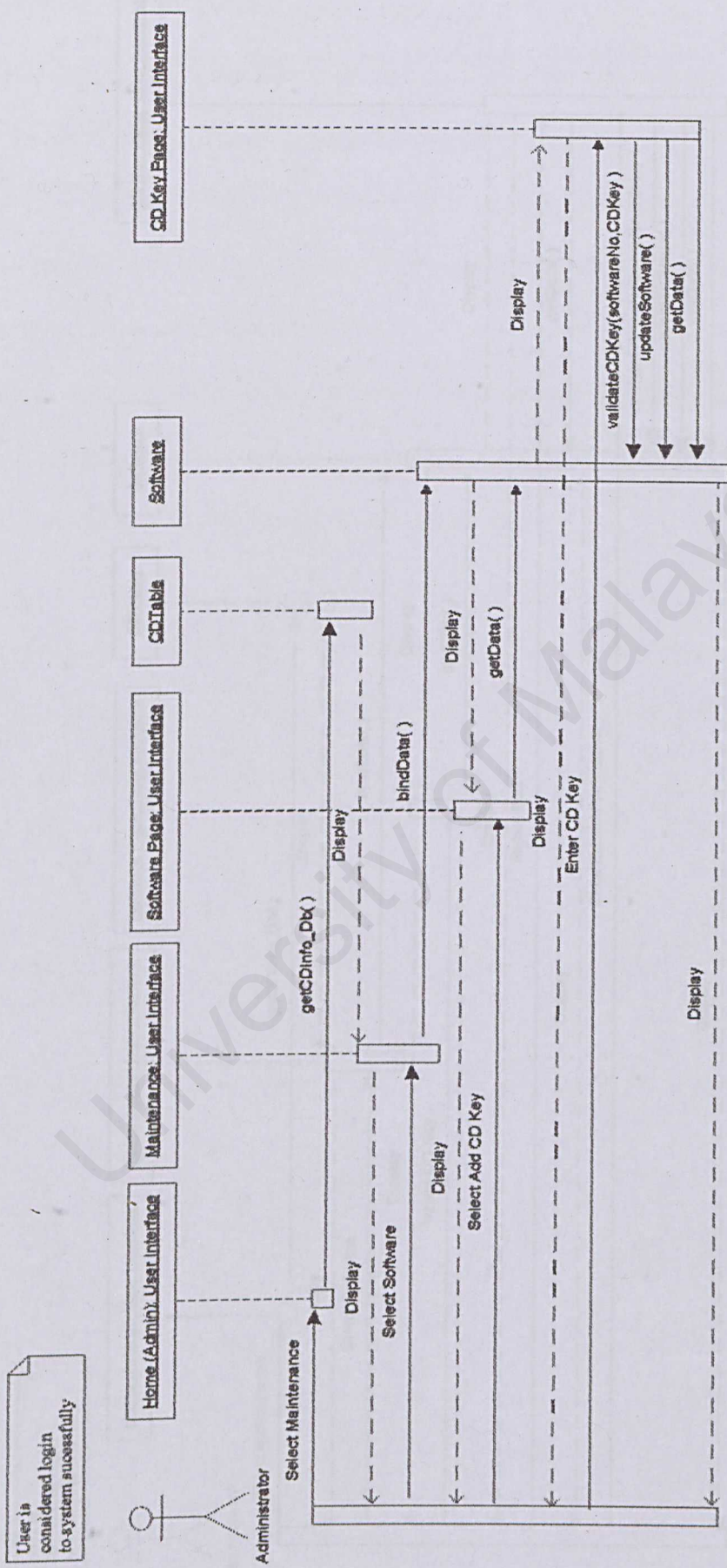


Figure 5-34: Sequence Diagram Add CD Information

5.3.4.19 Edit CD Key Information

Figure below illustrate the sequence diagram for edit CD key information to database.

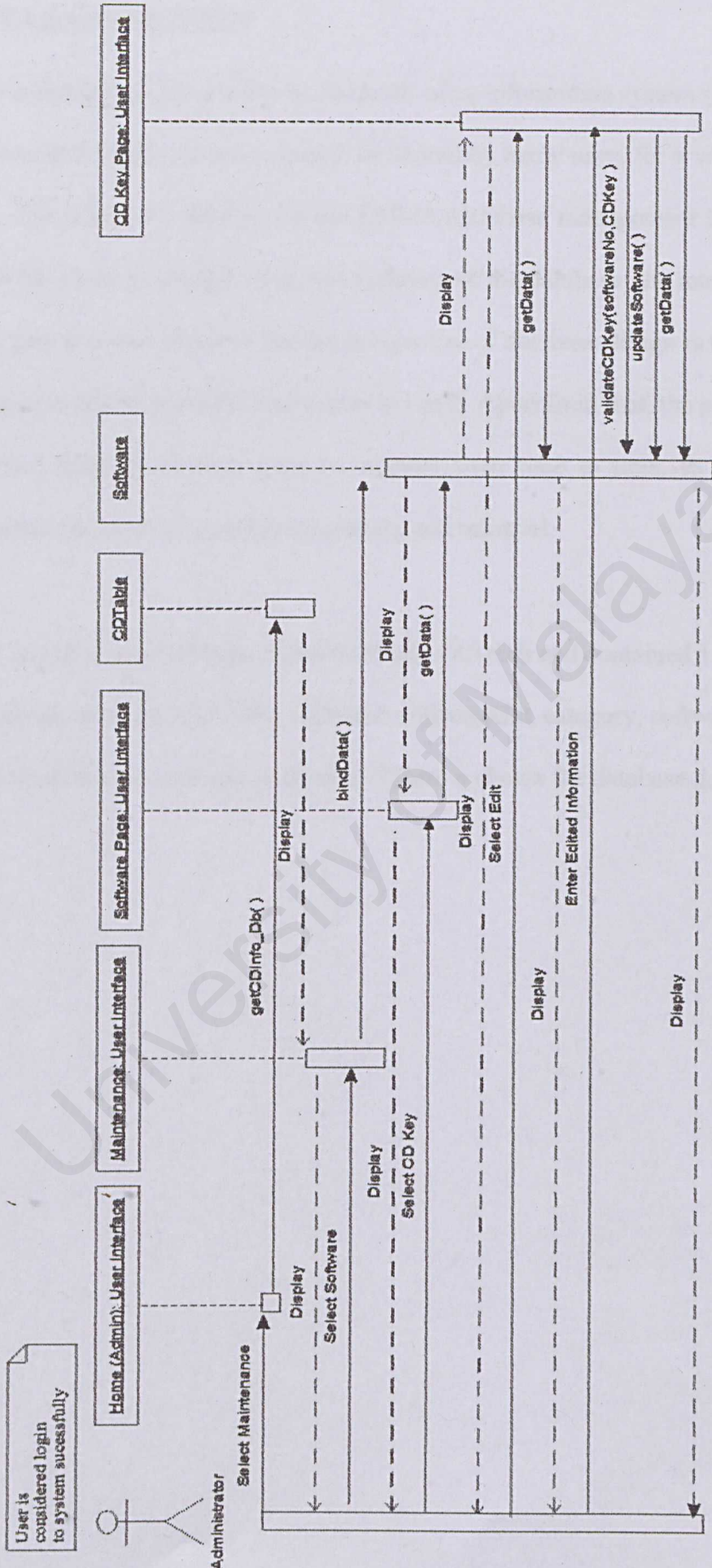


Figure 5-35: Sequence Diagram Edit CD Key Information

5.4 DATABASE DESIGN

Data storage is considered by some to be the heart of an information system (Kendall, 1996). It is a central source of data meant to be shared by many users for a variety of applications. The heart of a database is the DBMS (database management system), which allows the creation, modification and updating of the database; the retrieval of data; and the generation of reports. The main objective of database design is to make sure that data is available when the user wants to use it. Apart from that, the accuracy, consistency and integrity of data must be assured from time to time, to provide efficient data storage as well as efficient updating and retrieval.

In OCDLIB, one database had been defined namely OCDLib and contained 11 tables, which are account, userList, CDTable, software, softwareCD, category, softwareKey, trans, transactionLoan, reserve and temptable. Figure 6 shows the database design of OCDLIB.

5.4.1 ENTITY RELATIONSHIP DIAGRAM

An entity relation diagram is a way of presenting the structure of a relational database. Two basic concepts in entity relationship diagram are entities and relationships. An entity represents a discrete object and relationship captures how two or more entities are related to one another.

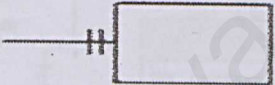

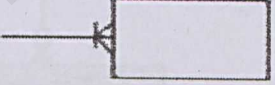
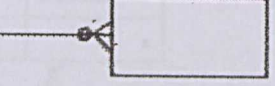
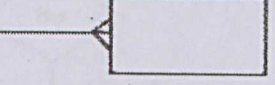
Cardinality Interpretation	Minimum Instances	Maximum instances	Graphic Notation
Exactly one (one and only one)	1	1	
0 or more	0	1	
1 or more	1	Many (>1)	
0, one or more	0	Many (>1)	
More than 1	>1	>1	

Table 5-5: Cardinality notation

Figure below illustrate the database design for OCDLIB.

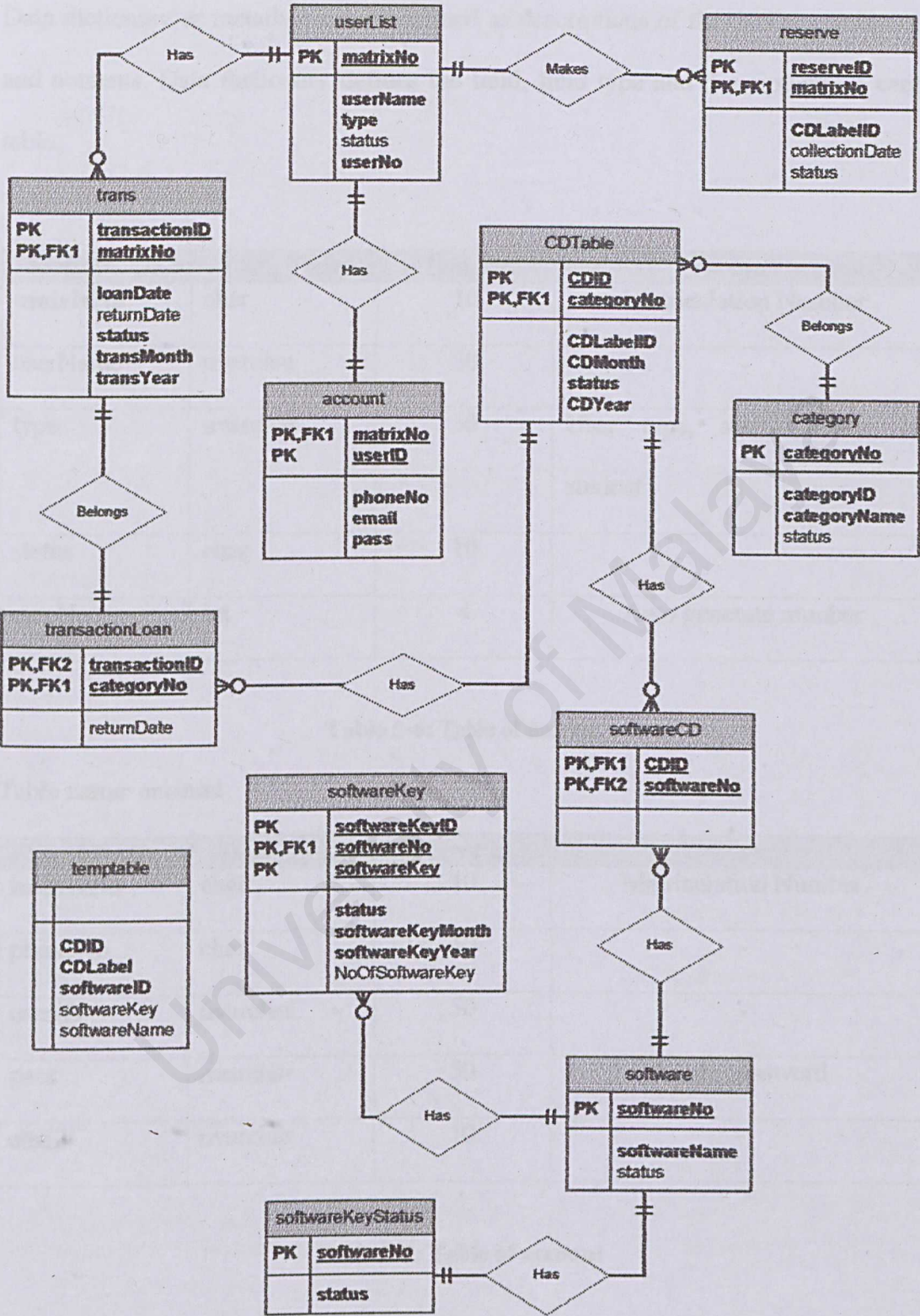


Figure 5-36: OCDLib's Database Design

5.4.2 DATA DICTIONARY

Data dictionary or metadata can be defined as descriptions of the database structure and contents. Data dictionary defines the field, field type and descriptions of each table.

Table name: userList

Field Name	Data Type	Length	Note
matrixNo	char	10	Matriculation Number
userName	nvarchar	50	-
type	nvarchar	50	User type, staff ,lecture or student
status	char	10	-
userNo	int	4	Auto generate number

Table 5-6: Table of userlist

Table name: account

Field Name	Data Type	Length	Note
matrixNo	char	10	Matriculation Number
phoneNo	char	10	-
userID	nvarchar	50	-
pass	nvarchar	50	Login password
email	nvarchar	50	-

Table 5-7: Table of account

Table name: category

Field Name	Data Type	Length	Note
catagoryNo	integer	4	Auto generate number
categoryID	char	10	Use in CD label
categoryName	nvarchar	50	-
status	char	10	-

Table 5-8: Table of category

Table name: software

Field Name	Data Type	Length	Note
softwareNo	integer	4	Auto generate number
softwareName	nvarchar	50	-
status	char	10	-

Table 5-9: Table of software

Table name: softwareCD

Field Name	Data Type	Length	Note
CDID	integer	4	Auto generate number
softwareNo	integer	4	Auto generate number

Table 5-10: Table of softwareCD

Table name: softwareKeyStatus

Field Name	Data Type	Length	Note
softwareNo	integer	4	Auto generate number
status	nvarchar	50	-

Table 5-11: Table of softwareKeyStatus

Table name: softwareKey

Field Name	Data Type	Length	Note
softwareKeyID	integer	4	Auto generate number
softwareNo	integer	4	Auto generate number
softwareKey	nvarchar	50	-
Status	char	10	-
softwareKeyMonth	char	10	-
softwareKeyYear	char	10	-
NoOfSoftwareKey	nvarchar	50	-

Table 5-12: Table of softwareKey

Table name: trans

Field Name	Data Type	Length	Note
transID	integer	4	Auto generate number
matrixNo	char	10	Matriculation Number
loanDate	datetime	8	-
returnDate	datetime	8	-
transMonth	char	10	-
trans Year	char	10	-
status	char	10	-

Table 5-13: Table of trans

Table name: transactionLoan

Field Name	Data Type	Length	Note
transID	integer	4	Auto generate number
CDID	integer	4	Auto generate number
returnDate	dateTime	8	-

Table 5-14: Table of tansactionLoan

Table name: CDTable

Field Name	Data Type	Length	Note
CDID	integer	4	Auto generate number
CDLabelID	nvarchar	50	-
categoryNo	integer	4	categoryNo from category
CDMonth	char	10	-
CDYear	char	10	-
status	char	10	-

Table 5-15: Table of CDTable

Table name: reserve

Field Name	Data Type	Length	Note
reserveID	integer	4	Auto generate number
matrixNo	char	10	Matriculation Number
CDLabel	nvarchar	50	-
collectionDate	datetime	8	-
status	char	10	-

Table 5-16: Table of reserve

Table name: tempTable

Field Name	Data Type	Length	Note
CDID	integer	4	Auto generate number
CDLabelID	nvarchar	50	-
softwareID	integer	4	Auto generate number

Table 5-17: Table of tempTable

5.5 USER INTERFACE

The user interface design describes how software communicates within itself, with human being who use it and to any other system which interoperates with it.

The user interface for OCDLIB is designed according to web page style as it is an online web application. Typically the user interface is to help the system administrator in performing their task at the same time enable other system user to navigate through web pages and make functional request on it. User interface can be seen as a transparent layer between the user, administrator and the back end system. Figure below show how the web components deploy in the OCDLIB. The figure () show the outline of the graphical user interface design of the system.

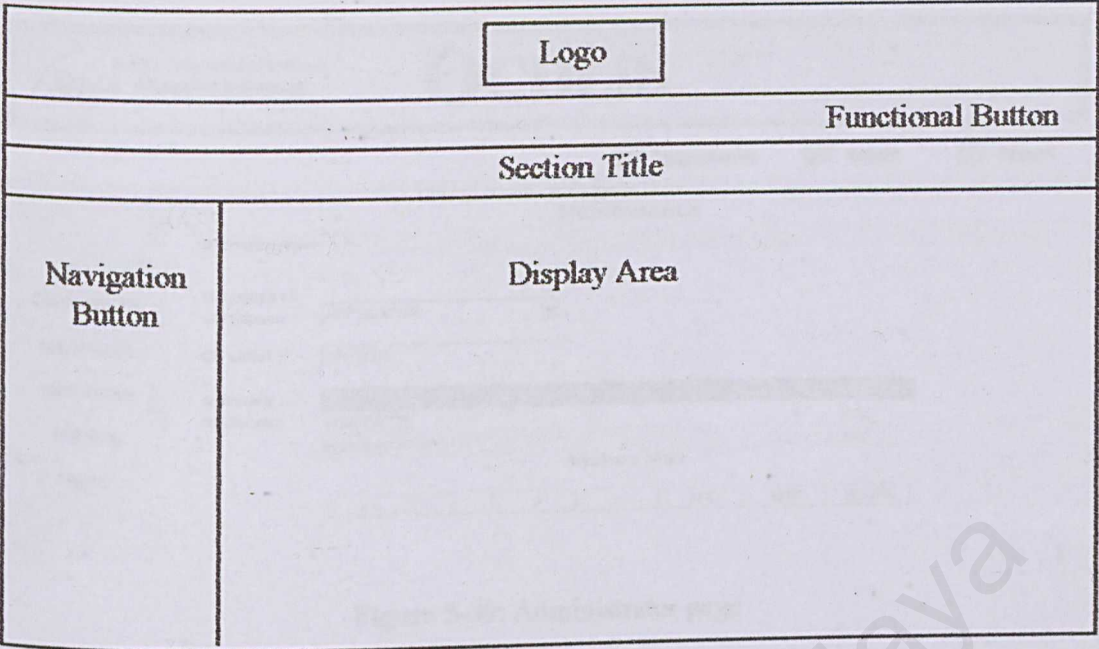


Figure 5-37: General User Interface for OCDLib

Figures below illustrate the main page of the OCDLIB.

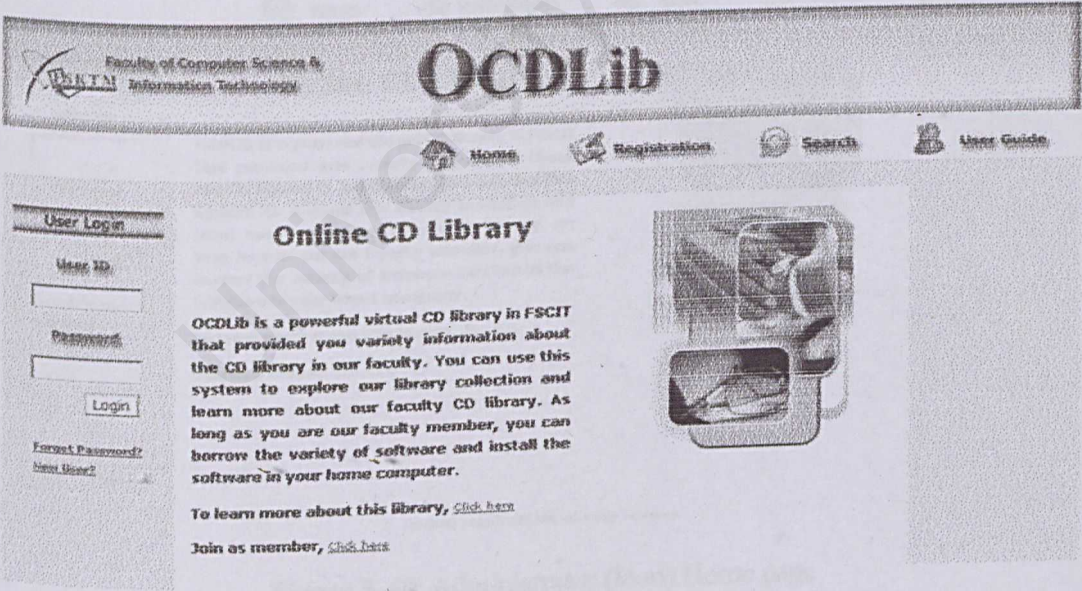


Figure 5-38: User Home page

Faculty of Computer Science & Information Technology
OCDLib
Maintenance
Return
Report
You are now in admin mode [Logout](#)
Maintenance
CD Information
Category : * APPLICATION
Add Category
CD Label : * APP0004
Software : *
Software Name
Software Key
Add Software
WINDOW 96
Add
WINDOW XP SP1
Add
Record 2 of 35
<< < > >> ADD EDIT DELETE

CD Information
Add Category
Add Software
Add User
Logout

Figure 5-39: Administrator page

Faculty of Computer Science & Information Technology
OCDLib
Home
Registration
Loan
Search
User Guide
You are now in loan mode [Logout](#)

User Login
User ID:
Password:
Login
Forgot Password?
New User?

Online CD Library

OCDLib is a powerful virtual CD library in FSCIT that provided you variety information about the CD library in our faculty. You can use this system to explore our library collection and learn more about our faculty CD library. As long as you are our faculty member, you can borrow the variety of software and install the software in your home computer.

To learn more about this library, [Click here](#)

Join as member, [Click here](#)

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Figure 5-40: Administrator (loan) Home page

5.6 SUMMARY

This chapter focuses on the overall system design for the OCDLib to be developed.

This chapter consists of the architecture design and functional design. The functional design includes the design of structure charts, use case, class diagram, sequence diagram, database and user interface.

6.1 DEVELOPMENT ENVIRONMENT

Development environment has a very large impact on the success of a system. The range of dynamic and available hardware is wide and the software is constantly changing. The development or construction of a system has also become the main focus of the project. The development environment is the hardware and software used to develop and document a system.

6.2 HARDWARE ENVIRONMENT

The hardware environment is the physical hardware used to develop and document a system.

• Intel Pentium IV 1.4GHz

• 2GB RAM

• 20GB Hard Drive

• 24x7x24 Network

• Modem / network card

• Mouse and keyboard and others

• Other needed device or component

CHAPTER 6 SYSTEM IMPLEMENTATION

6.1 INTRODUCTION

System implementation is the construction of the system and the delivery of that system into production. It converts system requirement and design into program codes. OCDLib has been developed modularly using top down approach which involves building high level software modules that are refined further into function and procedure. Appropriate tools and language are being used to develop the system.

6.2 DEVELOPMENT ENVIRONMENT

Development environment has a very huge input on the development of a system. The usage of dynamic and suitable hardware and software was not only helping accelerate the development or construction of any system but also determines the success of the project. The following sections discuss the hardware and software used to develop and document OCDLib.

6.2.1 HARDWARE REQUIREMENT

The hardware used to develop OCDLib is listed as below.

- Intel Pentium IV 1.4 GHz
- 64MB RAM
- 3 ½ Floppy Disc Drive
- 5GB hard Disk space
- Modem / network card
- Mouse and keyboard input devices
- Other standard desktop PC component

6.2.2 SOFTWARE REQUIREMENT

6.2.2.1 Software tools for documentation

There are various tools used in documenting the OCDLib. Table below depict all the software used in documented the OCDLib.

Software	Usage	Description
Microsoft Word 2003	Documentation	Report writing and user manual
Microsoft Visio 2003	Various design diagram	Draw the structure chart, use case, sequence diagram, class diagram, entity relationship diagram and other related diagrams
Microsoft Project 2003	Project schedule	Draw the project schedule
Adobe Photoshop 8.0	User manual's interface	Edit the user manual's interface.

Table 6-1: Software tools for Documentation

6.2.2.2 Software Tools for Development

During the course of OCDLib development a vast array of software are used. Table below depicts all the software used in develop the OCDLib.

Software	Usage	Description
Microsoft Window XP	System Requirement	Operating System
Microsoft Internet Information Services	System Requirement	Web Server Host
Microsoft SQL Server 2000	Database Design	Database design, construction and implementation for data

		storage and manipulation
Microsoft Visual Studio .Net	System Development	Web page coding, ASP .Net, and HTML layout design
Microsoft Internet Explorer	System Development	Web Client, Web page viewing
ASP .Net	System Development	Web page coding
HTML	System Development	Web page coding
Macromedia Flash	User Interface Design	Animation movie
Adobe Photoshop 8.0	User Interface Design	Image and button design, artwork, image files, interface, image and icon editing

Table 6-2: Software tools for Development

6.3 PLATFORM DEVELOPMENT

Services and tools installations may be the very first step in order to start the development. Platform development includes setting up the operating system and web server is the most important step that needs to be done before starting the development of OCCLib.

6.3.1 SETTING UP OPERATING SYSTEM

Microsoft Windows XP is used as the operating system for this project. Before the installation begins, the hard disk needs to be formatted. This is ensuring a more stable and secure environment. Moreover, it can also prevent the environment from being affected by previous settings or configurations. Windows XP's installation is very easy as it

provides user –friendly and descriptive interface guide. I just follow the step by step instruction appear on the installation's menu interface.

6.3.2 SETTING WEB SERVER

Microsoft Internet Information Server (IIS) is chosen as the web server for this project. IIS provides a feature that allows web content to be organized by using virtual server. It enables user to map local directory is created for OCDLib and is created through <http://localhost/thesis/>

6.4 DATABASE IMPLEMENTATION

Microsoft SQL Server 2000 is used as Database Management System to manage and control database access in OCDLib data retrieving, storing, deleting and other information manipulation activities can be done.

6.4.1 SETTING UP DATABASE

After the SQL Server has been installed successfully, a database named 'Thesis' is created. The creation of database is done using the SQL Server 2000 Enterprise Manager. After create database, create table according to database design. Field types and size of length are specified according to functional requirement and logic.

6.4.2 DATABASE CONNECTION

When building ASP.NET application, connection the database is needed to extract or manipulate data. Connection to 'Thesis is being done using SQL Connection object. In order to use this project, the first step is to import the System.Data.SqlClient namespace into the application using the 'import' keyword.

Imports System.Data.SqlClient

Following is an example of the code for database connection.

Connection String in the Code Behind

```
Dim strConnection As String
```

```
Dim boolConnection As Boolean
```

```
strConnection = ConfigurationSettings.AppSettings("DBConnection")
```

```
sqlConnection.ConnectionString = strConnection
```

```
If sqlConnection.ConnectionString = strConnection Then
```

```
    sqlConnection.Close()
```

```
End If
```

```
sqlConnection.Open()
```

```
If sqlConnection.State = ConnectionState.Open Then
```

```
    boolConnection = True
```

```
End If
```

```
Return boolConnection
```

Connection String setting in the web config

```
<appSettings>
```

```
<add key="DBConnection" value="server=(local);database=thesis;
```

```
uid=plian;pwd=5012"/>
```

```
</appSettings>
```

6.5 SYSEM DEVELOPMENT

During program development, program is written, user interface is being developed and database is initialized with data.

6.5.1 SYSTEM DEVELOPMENT PROCESS

Basically, the development process followed by OCDLib consists of 5 steps, as shown in figure

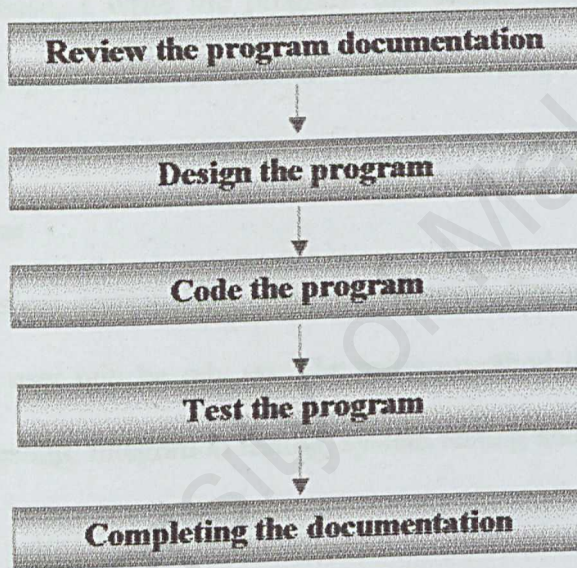


Figure 6-1: Program Development Process

6.5.1.1 Review the System Documentation

At the early phases of the development, I reviewed the system document. This document helps me to understanding better of the works that need to be covered during the coding phase.

6.5.1.2 Design the Program

After review the system document, I started the system design which needs to be completed during the system development. During the design phase, I decide exactly what the system can accomplish. This is the process of what it must do by developing a logical solution to programming problem.

6.5.1.3 Code the system

During the coding phase, I write the program instruction where this instruction implements the design specification to machine-readable format.

6.5.1.4 Test the system

During the level system testing, the testing processes the data and produces information in which user will be rely on. The testing method that I used includes unit testing, module testing, integration testing, system testing and acceptance testing.

6.5.1.5 Documentation of the system

Completing the program is essential for the successful operation and maintenance of the system. The document that I prepared includes system specification and user manual that may be needed by most of the user or administrator.

6.5.2 CODING APPROACH

Top-down approach is chosen to break the big modules of OCDLib into functions and procedures. All these small modules or functions are built and developed separately. In the beginning stage, all the classes are designed using object-oriented

methodology. These classes were created, compiled and run and each of them performs only a specific role.

The purpose of using top-down methodology in OCDLib is to enable tests to be done on the simple module of OCDLib, while the complex modules are still in the process of coding. Besides, by implementing on the simple module first can check whether the flow of the system are the same as designed as well as to enable the connectivity of each page to be seen clearly.

6.5.3 CODING PRINCIPLE APPLIED

The following are few principles that I follow when coding the program:

- Readability is essential for future enhancement. Coding style and convention applied may strongly affect the readability. Codes need to be formatted to enhance understanding.
- Reusability is an important principle. It can be considered as a method for improving product quality throughout the system development process. In addition, it also reduces the coding time as well as the testing and documentation time.
- Software with effective modularity is easier to develop because function may be compartmentalized and interfaces are simplified. Independent modules are easier to maintain because secondary effects caused by design code modification are limited, error propagation is reduces and reusable module are possible.

6.5.4 STYLE ADOPTED

The coding paradigm adopted by the system is oriented at giving reliability and performance a balance.

6.5.4.1 Naming Convention

Naming convention provides easy identification for the programmer. The naming convention is created with coding consistency and standardization in mind.

For example:

Textbox = txt

Label = lbl

Button = btn

6.5.4.2 Indentation and Spacing

The main purpose of indentation and spacing is to ease reading a tracing of code.

They make the coding looks neat and tidy.

6.5.4.3 Program Comments

I used comments explain the logic of the certain code, the purpose of a particular program block or other descriptive label.

6.5.4.4 Sample Code

a. ASP.NET Coding Example

```
<%@ Register TagPrefix="uc1" tagName="menuAdmin" Src=
"menuAdmin.ascx" %>

<%@Page Language="vb" AutoEventWireup="false" Codebehind=
"CalendarSet.aspx.vb" Inherits="eLeaveSystem.CalendarSet"%>
```

b. VB.NET Coding Example

i. Insert record into database

The coding in Code behind Microsoft Visual Studio .NET (Stored Procedure)

```
Dim sqlconnection As New SqlConnection
Dim scSoftware As New SqlCommand
blnConnection = clsConnection.Connection(sqlconnection, strErrMsg)
If blnConnection Then
    Try
        With scSoftware
            .Connection = sqlconnection
            .CommandType = CommandType.StoredProcedure
            .CommandText = strStorePro
            .Parameters.Add("@Id", SqlDbType.Int).Value = Id
            .Parameters.Add("@Name", SqlDbType.NVarChar).Value =
Name
        Next
    
```


The Stored Procedure Coding in Microsoft SQL

```
CREATE PROCEDURE spAddSoftwareKey
```

```
(
```

```
  @id int,
```

```
  @name nvarchar(50),
```

```
  @noOfSoftwareKey nvarchar (50)
```

```
)
```

```
AS
```

```
Insert into softwareKey
```

```
values
```

```
(
```

```
  @id,
```

```
  @name,
```

```
Next
```

```
.
```

```
)
```

```
GO
```

ii. Select records from database

The coding in Code behind Microsoft Visual Studio .NET (Stored Procedure)

```
Dim sqlConnection As New SqlConnection
Dim scCD As New SqlCommand
Dim sdaCD As New SqlDataAdapter
blnConnection = clsConnection.Connection(sqlConnection,
strErrMsg)
If blnConnection Then
    Try
        With scCD
            .Connection = sqlConnection
            .CommandType = CommandType.StoredProcedure
            .CommandText = "spGetStaff"
        End With
        sdaCD.SelectCommand = scCD
        sdaCD.Fill(dtCD)
    Catch ex As Exception
    End Try
Next
```

The Stored Procedure Coding in Microsoft SQL

```
CREATE PROCEDURE spGetStaff AS
select * from userList where type='Staff'
GO
```


iii. Update database record

The coding in Code behind Microsoft Visual Studio .NET (Stored Procedure)

```
Dim sqlConnection As New SqlConnection
Dim scCD As New SqlCommand

blnConnection = clsConnection.Connection(sqlConnection,
strErrMsg)

If blnConnection Then
    Try
        With scCD
            .Connection = sqlConnection
            .CommandType = CommandType.StoredProcedure
            .CommandText = strStorePro
            .Parameters.Add("@status", SqlDbType.NVarChar).Value
= status
            .ExecuteNonQuery()
        End With
    Catch ex As Exception
    End Try
Next
```

The Stored Procedure Coding in Microsoft SQL

```
CREATE PROCEDURE spUpdateCurrentStatus  
(  
    @status nvarchar(50)  
)  
AS  
    update CDtable  
    set status = @status where status='D'  
GO
```

iv. Delete database record

The coding in Code behind Microsoft Visual Studio .NET (Stored Procedure)

```
Dim sqlConnection As New SqlConnection  
Dim scCD As New SqlCommand  
    blnConnection = clsConnection.Connection(sqlConnection,  
    strErrMsg)  
If blnConnection Then  
    Try  
        With scCD  
            .Connection = sqlConnection  
            .CommandType = CommandType.StoredProcedure  
            .CommandText = strStorePro  
            .Parameters.Add("@cdid", SqlDbType.Int).Value = cdid  
            .ExecuteNonQuery()
```


End With

Catch ex As Exception

Next

The Stored Procedure Coding in Microsoft SQL

```
CREATE PROCEDURE spDeleteCDInfo
```

```
(
```

```
    @cdid int
```

```
)
```

```
as
```

```
delete from cdtable
```

```
where CDID=@cdid
```

```
GO
```

6.5.4.5 ASP.NET Validation Control

```
<asp:requiredfieldvalidator id="rfvStartDate" runat="server" CssCalss="ErrorMsg"
```

```
ControlToValidate="txtStartDate" ErrorMessage="Start date is required.">
```

```
</asp:requiredfiledvalidator>
```

6.5.5 DEBUGGING

Debugging is the process to look the incompleteness of a program. It enables the developer to detect the bugs or errors occur during the execution of the program. During the development of OCDLib, once a function is written, I will try to debug the function to test for its functionality, and test for the correctness.

The debugger that I use is Microsoft debugger with the help of Internet Explorer browser. When there are errors occur in the created function, I will drop the break point between the lines of codes and press F10 or F11 to start the debugging process. This can help me to understand the logic of a program and to fix the logic errors that occur. An intermediate window (Quick Watch) will appear at the bottom of Visual Studio .Net main window when the debugging process is start. This window is used to grab the value of a variable or even the attributes of a component. The experience gained during the debugging process can help me to be more aware of the common errors and bugs and also to fix the bugs effectively.

6.6 SUMMARY

Chapter has been discussed on the coding approach, coding principle and the development of the OCDLib as well as the development tools used. During the development of the OCDLib, the database is the data source to support the system. The web forms are the interface design and layout of the system, which the user can interact with. While the code behind of the web form will carry out the action request by the users and return the desire output to user. Debugging process and techniques were discussed in the last part of the chapter.

CHAPTER 7 TESTING

7.1 INTRODUCTION

System testing is executed after system implementation. Whatever that is implemented in the system should be tested thoroughly to ensure the system is reliable and meets the user requirement. A system which is able to “Do the right things” and “Do the things right” is a good system.

7.2 TESTING PROCESS

The testing phases that used on OCDLib have four main phases which are unit testing, module testing, integrated testing and system testing as shown at the figure below. All the error or bugs discovered during the testing phases are solved before the system is delivered to end user.

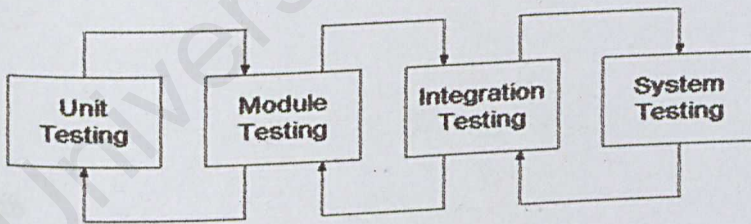


Figure 7-1: Testing Process

7.2.1 UNIT TESTING

Unit testing is the test of the software element at the lowest level of development. Every component or page of OCDLib is tested independently upon completion. Techniques used during the unit testing process of OCDLib are code review, compilation and test case.

7.2.1.1 Code Review

Codes are reviewed line by line before compile to discover any syntax error as well as semantic error. If errors are discovered, it can be corrected immediately.

7.2.1.2 Compilation

Code compilation is a faster method compared to code review techniques and it is efficient in discovering errors. During the compilation, the compiler will detect type of errors in a program and display the error type as well as the line number in which the error occurs.

7.2.1.3 Test Case

A various set of test case have been created during the unit testing of OCDLib, this is to effectively discover the program defects and showing that the system meets its requirements. The table 7-1 shows an example of test case that created to check the user login.

Test Case: 1

Module: Login

Scenario: To login to the system

No	Test Procedures	Input Value	Output	Analysis of test result and solution
1.	Insert valid user id and password.	<ul style="list-style-type: none">• User Id: plian• Password: 1234	<p>Able to login to the system successfully.</p>	<ul style="list-style-type: none">• Successfully login to the system.• Objective is to be able to login to the system.

2.	Insert valid user id and invalid password	<ul style="list-style-type: none"> • User Id: plian • Password: 4567 	Login denied	<ul style="list-style-type: none"> • Login denied, user redirected back to the login page with the error message and try again. • Objective is to prevent any unregistered user from login to the system.
3.	Insert invalid user id and valid password	<ul style="list-style-type: none"> • User Id: test • Password: 1234 	Login denied	<ul style="list-style-type: none"> • Login denied, user redirected back to the login page with the error message and try again. • Objective is to prevent any unregistered user from login to the system.

Table 7-1: Example of test case

7.2.2 MODULE TESTING

As every component or function in a module of OCDLib system is completed, it is combined into a module and thoroughly tested before moving to develop other module. For example, the maintenance module in OCDLib consists of various functions such as add, edit or delete particular information. After all these function are completed, they will combine together as a module and the module is tested by using the testing technique which used during the unit testing.

7.2.3 INTEGRATION TESTING

Integration test is needed when all modules are integrated. The main focus in integration test is to navigate the interfaces repeatedly to detect any interface mismatch problem.

Several important aspects are checked to ensure that the flow of the data in OCDLib is well organized and are user friendly to all the system users. . The table 7-2 shows an example of test case that created for integration testing.

The use of Flash will increase the user understanding by representing the entire steps involved in graphic and animation.

Test Case: 1

Module: Login, User Profile

Scenario: User login to the system, view and edit user profile

No	Test Procedures	Input Value	Output	Analysis of test result and solution
1.	Login as a valid user	<ul style="list-style-type: none">• User Id: plian• Password: 1234	User is redirected to the user home page.	<ul style="list-style-type: none">• User is redirected to the user home page.• Objective is to test is the system able to identity the user identity.

2.	Click on "Profile" icon on the left hand side of the menu	-	User is redirected to the user profile page.	<ul style="list-style-type: none"> • The particular user profile is display. • Objective is to test is the hyperlink and the bind user profile function is work correctly.
3.	User click on the "Edit" button and change the information then click "Save"	<ul style="list-style-type: none"> • User's new Information 	User is redirected to the user profile page	<ul style="list-style-type: none"> • The particular user new profile is display. • Objective is to test is the update user profile function is work correctly.

Table 7-2: Example of test case

7.2.4 SYSTEM TESTING

When all the modules have been written and system has been put together, the OCDLib system testing starts. The main purpose in system testing is to find errors that result from unanticipated interactions between sub-systems. Besides that, it is used to validate whether the system meets its functional and non-functional requirement.

At this stage, the OCDLib is tested with a realistic volume of data. System testing for OCDLib system involves four phase, which are functional testing, performance testing, acceptance testing and regression testing.

7.2.4.1 Functional Testing

For the functional testing, list all functional requirement of OCDLib, then enter data and test the system to see if the output is as desired and whether all requirement are fulfilled.

7.2.4.2 Performance Testing

Performance test is performed to compare the integrated modules with the non-functional system requirements.

7.2.4.3 Regression Testing

Each time changes made on function of the OCDLib, the embedded function is tested repeatedly with various data to make sure that it fulfills the requirement.

7.2.4.4 Acceptance Testing

Acceptance testing is the testing that carried out by inviting end users such as real end user to run and try the system themselves. For the acceptance testing of OCDLib, this system has been deployed in the IS room and being tested by the IS staffs for the administrator part and three faculty students also being invited to test the system.

After end users have finished the testing, they were asked to fill a questionnaire in order to gather some feedback about this system. From the system testing, all users

agree that the system is user friendly because all the links and buttons are in simple and easy to locate. Also when a particular function is successfully performed, the notification is clearly displayed to the user.

7.3 SUMMARY

Chapter 7 presented the system testing which explain each types of testing involved. The testing is delivered into four main stages, which are unit testing, integrated testing, system testing and acceptance testing. Unit testing integrated testing, system testing are conducted by myself and while the acceptance testing us conducted by end user who are IS staffs and faculty students.

The testing phase is important to validate and verify the functional and non functional requirement. Testing the system thoroughly ensure that delivered system is error free and meets the user requirement.

CHAPTER 8 SYSTEM EVALUATION AND

CONCLUSION

8.1 INTRODUCTION

Evaluation is the ultimate phase of developing a system and an important phase before delivery the system to the end users. Evaluation was related to user environment, attitudes, information priorities and several other concerns that are to be considered carefully before effectiveness can be concluded. At all phases of the system approaches, evaluation is a process that occurs continuously, drawing on a variety of sources and information.

8.2 PROBLEM ENCOUNTERED AND SOLUTION

8.2.1 DIFFICULTIES IN DETERMINING THE SCOPE OF SYSTEM

Although there are lots of information can be gathered regarding the library system through literature review, but I am lack of experience and knowledge in real library management system. Due to this problem, several discussion session has been held with the IS staff who currently managed the CD borrowing process. A questionnaire regarding the problems faced by IS staff of the current is prepared by me and filled by the IS staffs. From the questionnaire analysis, I have started to out line the scope of OCDLib.

8.2.2 LACK OF WEB BASED PROGRAMMING

The major programming languages that I used in developing OCDLib are ASP .Net and VB .Net. Although these programming language had been used during my industrial training in developing the web based system, but for other more difficult

function, such as report generation by using crystal report and email sending notification still need some time for me to learn further

So, in order for me to overcome this problem, I have read reading up on relevant material such as e-book, references book and online forum regarding to the problem that I faced. Besides, search engine, such as Google, has helped me a lots in finding the solution for my problems. By typing in the problem that I faced in Google search engine, it will provide me lots of solution. In addition, the advice and guidance from course mate and experienced senior or discussion with course mate that also using the same function also is a great help.

8.2.3 PROGRAMMING BUGS AND RUNTIME ERROR

During the implementation phase which the system design is turned to source code, I was struggling to look for the simplest algorithm to accomplish the stated requirement. Syntax errors were not threat anymore with advent of powerful like Microsoft Visual Studio .Net as the IDE printed out the syntax error on coding time and also during compilation.

However, the logic errors were still a headache to me when solving complex problem which require complex algorithm. This type of error can only revealed during testing of the method or module and can be very tedious to locate and hit the error.

And lastly were the runtime error, which were may worse nightmares some of these error can be solved but some were totally out of my sense and beyond my ability due to my knowledge and experience.

8.2.4 INEXPERIENCE

During the time of development, I was inexperienced in handling such a large scale project. In the previous semester, what were taught to us were just minor projects and programs which can be done in a couple of days or even a couple of minutes but this project was totally different.

This project is a full length software development project which comprises all the phases such as the requirements capture, analysis, design and implementation, testing and finally delivering the full system.

So, more effort was spent in getting advice from experienced seniors or friends in order to get more understanding in the development of OCDLib.

8.2.5 LACK OF GRAPHIC DESIGN SKILL

Designing a good and user-friendly interface is a critical phase. I need to consider many areas like color-matching, icons used, button placements and so on and so forth. Since it is a web-based system, it needs to be in a formal yet user-friendly interface. Besides, a very consistent layout is very important to ensure that the user will not be misled or confused when navigating the website. Discussion with course mates is a good help for me to solve this problem.

8.3 SYSTEM STRENGTH

8.3.1 SIMPLE USER FRIENDLY INTERFACE

Each function in OCDLib is arranged systematically at the right hand side of each web page, this is to give the web site a structured appearance. This makes it easy for

user to get a long and familiar with OCDLib function. The web site is also designed to be pleasant to the eye. The color used on each page is standard and carefully coordinated so as not to confuse the user with many colors.

Graphics and image are used where possible. However, animated graphic are minimized to give the web site a clean, professional look as well as to reduce the time been to load the web page.

8.3.2 E-MAIL NOTIFICATION

Another plus point of OCDLib is its ability to send e-mail notification automatically to remind the user who is yet to returns their borrowed CD after the due date. This e-mail notification will be automatically generated every day when the user opens the computer. Besides that, system also will send the email to notify user that their reserved item is available or an e-mail will be send to those user who had been successfully return their borrowed CD.

8.3.3 EMAILING FORGOTTEN PASSWORD

Another unique feature that OCDLib has is the ability to generate and send the new password to user who forgot their password. User only need to provide their user id and Matrix No, then the system will automatically generate a new password for the user and send this new password to the user's mail box. Then, user can choose to change their password after they login into the system by using the new password that had emailed to them.

8.3.4 AUTOMATICALLY CANCEL RESERVATION STATUS

OCDLib provide a feature for user to reserve a particular CD if the CD is being borrowed by other user. If the CD is available, within 1 day, the user who reserves the CD must go to IS room to collect the reserved CD, if not then the reservation status will be automatically cancels by the system.

8.3.5 VALIDATION ON INPUT DATA AND FIELDS

The system is developed to be robust enough to handle any invalid input into the system. Each time user try to insert any information into the system, system will check the validation of every data input. If the user tries to enter any invalid input into the system, then the system will display a user friendly error message to inform the user about the type of error the user has made. Besides validation of the input data, the system also will display the error message if the input fields that required to be filed are left without any input.

8.3.6 SYSTEM TRANSPARENCY

The system provides feature where the user of the system do not need to know about the system structure, where the database resides, its database management system or anything related to the system build. User will only need to know how to use the system. Therefore, the users can use the system without any difficulty.

8.3.3 REPORT

OCDLib serve as a management system as well. It provides the capability for administrator to generate various type of report and administrator also can choose to save or print out the report.

8.3.7 USER GUIDE

User guide is important in any application. Therefore, OCDLib provides an user guide for user who accessed and used the system. The user guide will assist and provide full guidance for user.

8.4 SYSTEM LIMITATION

Although there are many features provided by the system, there are some constraints or limitation in it. The system limitations are stated as below.

8.4.1 SEARCHING LIMITATION

OCDLib provide both normal search and advanced search function. But user only can enter only simple keyword to search for CD. The both normal search and advanced search function do not provide Boolean search function. So, user cannot search by word likes "AND", "OR" "NOT".

8.4.2 REPORT PRINTING

There is a printing function for user to print their CD borrowed information and administrator to print report. But the user needs to go through several step before they can really perform the print function, where this can be.....

8.4.3 BAR CODE READER

This system is unable to support bar code reading. Data has to be entered manually and thus increased typing errors.

8.5 FUTURE ENHANCEMENT

Due to the limitation found in the system, future enhancement can be done to make the system more advance and with more functionality features. There are several enhancements that could extend the usability of the developed system and thus can apply to the system to improve the ability of the system. The following section provides a summary on the enhancement of the system functionality.

8.5.1 SEARCHING

The system should be able to perform Boolean search, user should able to search with keywords "AND", "OR" and "NOT", so that user can easily search for any CD information.

8.5.2 PRINTING

The system should be able to print the report directly when the user click on print button. Users no need to go through few steps to print out the report or particular information.

8.5.3 BAR CODE READER

The system should be able to enhance to be support bar code reading to reduce and eliminate data entry errors.

8.6 KNOWLEDGE AND EXPERIENCE GAINED

A lot of knowledge and experience I gained throughout the development of this system. Valuable knowledge is gained from the complexities and intricacies of web programming, these include knowledge in SQL server, web based programming language and concepts of client and server.

The primary knowledge is the web based programming technology that is the ASP .Net. It was an eye opening experience using this technology and was also a challenging experience.

In addition to the knowledge gained in web based programming, I have also learned how to design a database, to store and manipulate data. From designing the user interface has given me a lot of experience in using Adobe Photoshop for creating and editing of buttons and images.

Besides that, developing the library system has provided the opportunity to learn the knowledge of information management system. Theories and knowledge that are taught throughout the three years course of Information Technology studies such as System Analysis and Design, Database Management and Software Engineering were literally put into practical while developing the system. Programming skill learnt during the industrial attachment too help a lot in learning up other web based programming.

This project has improved my skill in acquiring information as well as time management. I have learned on how to manage my work within a specific duration of

time. Time management is an important aspect in work. In order to complete the project on time, priority of work has to be specified. A project schedule as summarized in chapter 1 is essential in order to achieve the goal of task in time. In short, I have learned how to manage time wisely.

Despite all these, I have learned how to cope with my task. Making mistake is just part and parcel of developing a system, especially when we are new to the programming language being used. The most important is in realizing the mistake and will not repeat it in future. On the other hand, I have learned and improved from the mistake. The willingness to learn new things and new technology is also important for us to improved on ourselves and in order to get ready for the real working life.

These are all the valuable knowledge and new technology that I gained throughout the development of this project. This project serves as a good practical testing on the undergraduates' capabilities in developing and implementing a project in real life as well as providing the opportunity for them to apply all gained knowledge to a real world environment.

8.7 SUMMARY

This chapter has emphasized on the problems encountered and how the problems were solved in order to develop a complete and feasible system that meets the requirement stated in the earlier chapter. Besides, the system us evaluated by end user and therefore the system's strength and limitation were stated out

The strength of the system includes simple user friendly interface, email notification feature, emailing forgotten password to user, automatically cancel the reservation status, validation on user's input data and fields, system transparency, report and user guide function.

Its future enhancement based on the limitation is described late in order to develop a more complete system in future. Last but not least, the knowledge and experience gained through developing and implementing the system are a major advantages.

8.8 CONCLUSION

As a conclusion, this project has successfully achieved and fulfilled the objectives and requirement specification as an online CD Library management system, which are defined in the project scope and system analysis. OCDLib is a fully operational web based library management system, which was found to be user friendly, easily understood and effective.

Due to certain limitation, there is only so much that can be done on the system. Therefore, it is highly recommended that future enhancements be performed in order to further improve the functionality of this system. Further enhancement will guarantee that OCDLib will continue to provide more exciting features as well as improve its reliability and security of many years to come.

Judging from the overall result, it can be concluded that OCDLib has achieved and fulfilled its entire stated objective successfully.

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APPENDIX A: SURVEY FORM

This survey asks administrator question about the functionality of Online CD Library (OCDLib) System. This survey allows you to express your opinions and provide information about your experiences anonymously.

1. What do you think about this system, OCDLib in terms of user interface?
(Rank: 1-poor, 2-Average, 3-Good, 4-Excellent)

- a. Color combination ----- ☐
- b. Image ----- ☐
- c. Animation ----- ☐
- d. Wording ----- ☐

2. For "**Maintenance**" module, what is your opinion toward its functionality?

(Tick only one)

- ☐ Absolutely easy to use
- ☐ Acceptable
- ☐ Still need to refer to user manual
- ☐ Hard to use

3. For **"CD Information"** function, what is your opinion toward its functionality?

(Tick only one)

- ☐ Absolutely easy to use
- ☐ Acceptable
- ☐ Still need to refer to user manual
- ☐ Hard to use

4. For **"Add Software"** function, what is your opinion toward its functionality?

(Tick only one)

- ☐ Absolutely easy to use
- ☐ Acceptable
- ☐ Still need to refer to user manual
- ☐ Hard to use

5. For **"Add CD Key"** function, what is your opinion toward its functionality?

(Tick only one)

- ☐ Absolutely easy to use
- ☐ Acceptable
- ☐ Still need to refer to user manual
- ☐ Hard to use

6. For **"Return"** module, what is your opinion toward its functionality?

(Tick only one)

- ☐ Absolutely easy to use
- ☐ Acceptable
- ☐ Still need to refer to user manual
- ☐ Hard to use

7. For "**Report**" module, what is your opinion toward its functionality?

(Tick only one)

- ☐ Absolutely easy to use
- ☐ Acceptable
- ☐ Still need to refer to user manual
- ☐ Hard to use

8. For "**CD Information**" function, what is your opinion toward its functionality?

(Tick only one)

- ☐ Absolutely easy to use
- ☐ Acceptable
- ☐ Still need to refer to user manual
- ☐ Hard to use

~~Thank You~~

This survey asks user question about the functionality of Online CD Library (OCDLib) System. This survey allows you to express your opinions and provide information about your experiences anonymously.

9. Have you been exposed to any computerized library system?

☐ Yes

☐ No

10. What comes to your mind when we mentioned about Online CD library system?
(Tick whenever appropriate)

☐ Can access any time and any where

☐ Can access to library online searching

☐ Web based look like system

☐ Anyone can access, because it is world wide web stuff

11. What do you think about this system, OCDLib in terms of user interface?
(Rank: 1-poor, 2-Average, 3-Good, 4-Excellent)

e. Color combination ----- ☐

f. Image ----- ☐

g. Animation ----- ☐

h. Wording ----- ☐

12. For "**Registration**" function, what is your opinion toward its functionality?

(Tick only one)

- ☐ Absolutely easy to use
- ☐ Acceptable
- ☐ Still need to refer to user manual
- ☐ Hard to use

13. For "**Search**" function, what is your opinion toward its functionality?

(Tick only one)

- ☐ Absolutely easy to use
- ☐ Acceptable
- ☐ Still need to refer to user manual
- ☐ Hard to use

14. For "**Advanced Search**" function, what is your opinion toward its functionality?

(Tick only one)

- ☐ Absolutely easy to use
- ☐ Acceptable
- ☐ Still need to refer to user manual
- ☐ Hard to use

15. For "**Reserve**" function, what is your opinion toward its functionality?

(Tick only one)

- ☐ Absolutely easy to use
- ☐ Acceptable
- ☐ Still need to refer to user manual
- ☐ Hard to use

16. For “**User Guide**” module, what is your opinion toward its functionality?

(Tick only one)

- ☐ Absolutely easy to use
- ☐ Acceptable
- ☐ Still need to refer to user manual
- ☐ Hard to use

17. For “**Loan**” module, what is your opinion toward its functionality?

(Tick only one)

- ☐ Absolutely easy to use
- ☐ Acceptable
- ☐ Still need to refer to user manual
- ☐ Hard to use

18. For email notification features, what is your opinion toward its functionality?

(Tick only one)

- ☐ Absolutely easy to use
- ☐ Acceptable
- ☐ Still need to refer to user manual
- ☐ Hard to use

19. Any suggestion to the system?

~~~Thank You~~~

ONLINE CD LIBRARY

MANAGEMENT SYSTEM

## **APENDIX B: USER MANUAL**

USER MANUAL

University of Malaya



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# CHAPTER 1 INTRODUCTION

OCDLib comprise of nine modules: which are login module, registration module, search and reserve module, user profile module, user guide module, loan module, return module, maintenance module and report module. With all the modules and function of OCDLib, it serve as information system and as well as management information system. It provides effective and efficient way of managing library's information and also provides useful statistical to the library administrator.

## 1.1 ABOUT THIS MANUAL

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

- System Overview
- Hardware and Software Requirements
- User Section
- Administrator Section

## 1.2 CONVENTION

To help you to locate a interpret information easily, this user manual uses the consistent typographic. These conventions are explained as follows:

- [Button]: Indicates a button
- (Image Button): Indicates an image button
- Hyperlink: Indicates a hyperlink

# **CHAPTER 2    SOFTWARE                    AND                    HARDWARE REQUIREMENT**

## **2.1 SERVER SIDE REQUIREMENT**

### **2.1.1 HARDWARE REQUIREMENT**

Hardware requirements for the server computer are:

- PC with Pentium 233MHz or above
- At least 128MB RAM or above
- 2.5GB available hard disk space
- 15" SVGA monitor

### **2.1.2 SOFTWARE REQUIREMENT**

- Microsoft Windows XP
- Microsoft Information Internet System 5.0 with .NET Framework
- Microsoft Visual Studio .NET
- Microsoft SQL Server 2000
- Crystal Report
- Internet Explorer 5.0 and above



## **2.2 CLIENT SIDE REQUIREMENT**

### **2.2.1 HARDWARE REQUIREMENT**

Hardware requirements for the server computer are:

- PC with Pentium 233MHz or above
- At least 128MB RAM or above
- 2.5GB available hard disk space
- 15" SVGA monitor

### **2.2.2 SOFTWARE REQUIREMENT**

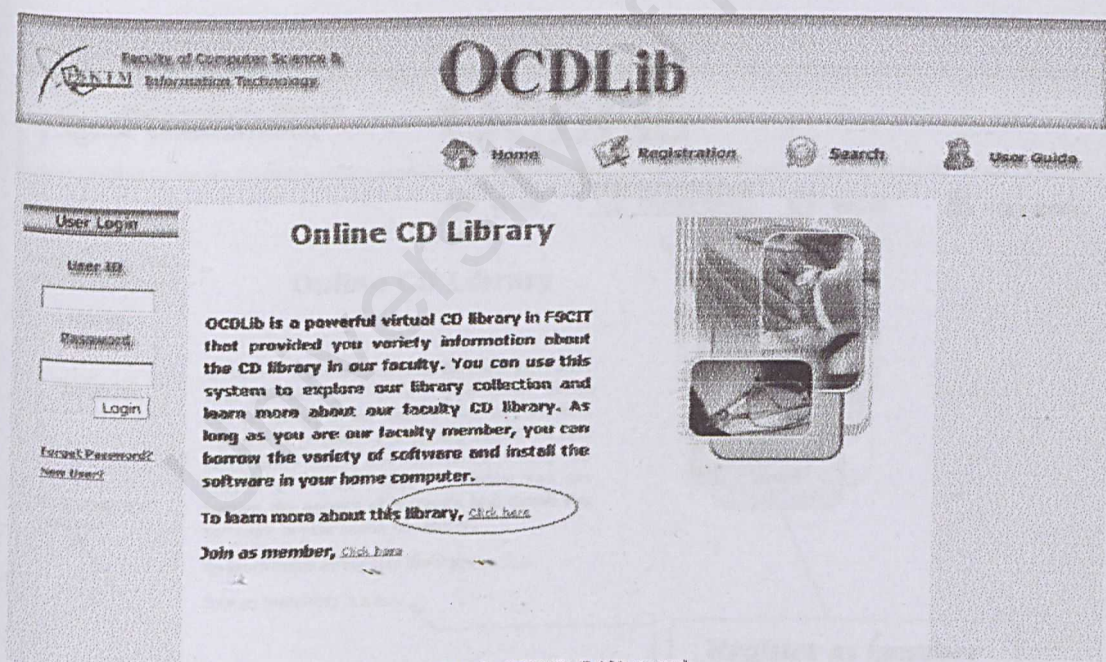
The software required to be installed into the client computer are:

- Any platforms and browser that suitable (Internet Explorer 6.0 is recommended for browser)

## CHAPTER 3 USER SECTION

### 3.1 OPEN THE SYSTEM

| Step | Action                                                                                                |
|------|-------------------------------------------------------------------------------------------------------|
| 1    | Click on Internet Explorer.<br><br>Or click on Start → All Programs → Internet Explorer               |
| 2    | Type the web site address of OCDLib,<br><br>http://localhost/thesis/user/home.aspx and press [Enter]. |
| 3    | The Main page of OCDLib will appear, as shown in Figure 3-1                                           |
| 4    | If want to know more about this library, click on the <u><a href="#">Click here</a></u> hyperlink.    |



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**Figure 3-1: OCDLib Main Page**



## 3.2 NON-MEMBER REGISTRATION

| Step | Action                                                                                                                                                                                                              |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Click on <b>(Registration)</b> icon or <b>New User</b> or <b>Click here</b> hyperlink as shown as Figure 3-2.                                                                                                       |
| 2    | The registration page is display.                                                                                                                                                                                   |
| 3    | Fill in the registration form by providing correct information else error message will be display, Figure 3-3 shown an example of error message that displayed when user enter the invalid format of email address. |
| 4    | After fill in the registration form click on <b>[Submit]</b> button.                                                                                                                                                |
| 5.   | If the user successfully registers as a member of OCDLib, the Registration Successful page will be display, as shown in Figure 3-4.                                                                                 |

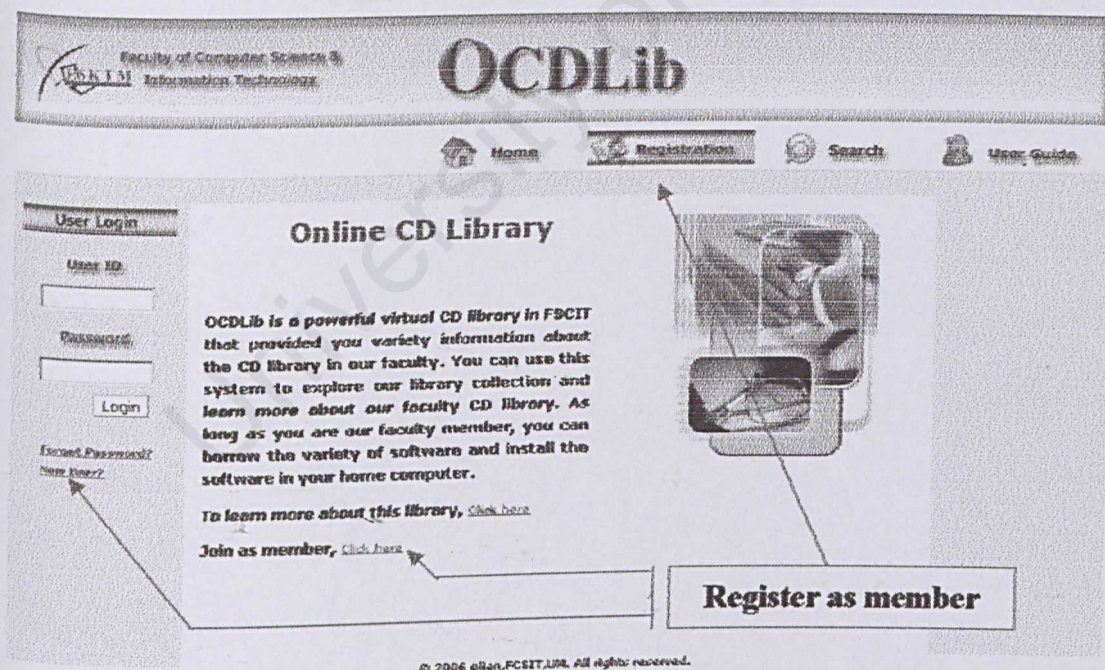


Figure 3-2: OCDLib Main Page

**Registration Form**

**Enter Your Information**

Type:\*                      ☐ Lecturer    ☐ Staff    ☒ Student

Matrix No:                \*    WE1030005                      (eg: WE1030005)

Phone No:\*                0121234567                      (eg: 031234567 / 0121234567)

E-mail Address:\*                pkl                      E-mail Address Invalid Format

Confirm E-mail Address:\*               

**Figure 3-3: Example of error message**

**Registration Successful**

~Thanks You ALI~

Your Account had been created. Now you can borrow or reserve CD from CD library

[OK](#)

**Figure 3-4: Registration Successful page**



### 3.3 SEARCH FOR CD INFORMATION

#### 3.3.1 Normal Search

| Step | Action                                                                                                                                                       |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Click on <b>(Search)</b> icon at the menu bar.                                                                                                               |
| 2    | The Search page is displayed                                                                                                                                 |
| 3    | In the search page, there is a list of all CD collection in the CD library, as shown in Figure 3-5.                                                          |
| 4    | Enter the search keyword, then choose search by software name or by CD Label from the drop down list and click <b>[Search]</b> button.                       |
| 5.   | If keyword found, search result will be display. Else a message "Result Not Found" will be displayed.                                                        |
| 6    | To get more detail information about a particular CD, click on the Software Name or CD Label as shown in Figure 3-6.                                         |
| 7    | Figure 3-7 shows the details CD information for a particular CD.                                                                                             |
| 8    | If the CD Status is available, then you can borrow this CD, else if the CD status is not available, you can reserve the CD by click <b>[Reserve]</b> button. |
| 9    | To reserve the CD, enter your Matrix No and click <b>[Submit]</b> button.                                                                                    |
| 10   | If the reservation process success, then Reservation Successful message will be display.                                                                     |



## Search

Software Name

Search

[Advanced Search](#)

| CD Label | Software Name  | Software Key Status | CD Status |
|----------|----------------|---------------------|-----------|
| APP 0003 | WINDOW 2000 SS | Not Available       | Available |
| APP 0003 | WINDOW 98      | Not Available       | Available |
| APP 0004 | WINDOW 98      | Not Available       | Available |
| APP 0004 | WINDOW XP SP1  | Not Available       | Available |
| APP 0005 | WINDOW 2000 SS | Not Available       | Available |
| APP 0005 | WINDOW 98      | Not Available       | Available |
| APP 0005 | WINDOW XP SP1  | Not Available       | Available |
| APP 0006 | WINDOW 2000 SS | Not Available       | Available |
| APP 0006 | WINDOW 98      | Not Available       | Available |
| APP 0006 | WINDOW XP SP1  | Not Available       | Available |

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**Figure 3-5: Search Page – List of all CD collection in CD Library**

## Search Result

[TOTAL SEARCH RESULT: 6]

| CD Label | Software Name                                      | Software Key Status | CD Status     |
|----------|----------------------------------------------------|---------------------|---------------|
| APP 0009 | MICROSOFT OFFICE PROJECT PROFESSIONAL 2003         | Available           | Not Available |
| APP 0013 | MICROSOFT SQL SERVER 2000                          | Available           | Not Available |
| APP 0014 | MICROSOFT OFFICE FRONTPAGE 2003                    | Available           | Not Available |
| DSS 0009 | MICROSOFT WINDOWS XP PROFESSIONAL                  | Not Available       | Not Available |
| PRO 0001 | MICROSOFT OFFICE FRONTPAGE 2003                    | Available           | Not Available |
| PRO 0002 | MICROSOFT OFFICE PROFESSIONAL ENTERPRISE EDITION 2 | Available           | Available     |

**Figure 3-6: Search Result – click to view the details CD information**

Category : APPLICATION

CD Label : APP 0003

| Software Name  | Software Key Status |
|----------------|---------------------|
| WINDOW 2000 SS | Not Available       |
| WINDOW 98      | Not Available       |

Status : All Software Key Not Available

[Back](#)

[Reserve](#)

**Figure 3-7: Particular CD details information**



**Reservation**

Matrix No: \*

CD Label ID: \*

**Figure 3-8: Reservation Page**

### 3.3.1 Advanced Search

| Step | Action                                                                                                                                |
|------|---------------------------------------------------------------------------------------------------------------------------------------|
| 1    | In Search page, click <b>Advanced Search</b> hyperlink.                                                                               |
| 2    | The Advanced Search page is displayed as shown in Figure 3-9                                                                          |
| 3    | Enter the search keyword you would like to search, such as software name, CD Label Id or the CD category.                             |
| 4    | If have the searched keyword found, then the search result will be displayed, or else a message "Result Not Found" will be displayed. |
| 5.   | Then follow step 6 to step 10 from the normal search to get the details CD Information and reserve a particular CD.                   |

**Search**

Software Name :

CD Label :  Category :

[Normal Search](#)

**Figure 3-9: Advanced Search Page**

### 3.4 USER GUIDE

| Step | Action                                                                  |
|------|-------------------------------------------------------------------------|
| 1    | Click on [User Guide] icon at the menu bar.                             |
| 2    | Choose a user guide, "How to Search and Reserve" or "How to Borrow".    |
| 3    | The video will start.                                                   |
| 4    | You can control the video by using the control bar as shown Figure3-10. |

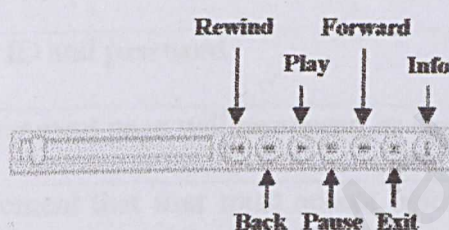


Figure 3-1: Video Control Bar



### 3.5 BORROW CD

In order for you to borrow CD from CD Library, you can search for the CD availability by using the search function provided in this system, if the CD is available then you can go to the IS room and get the CD you want to borrow at rack.

| Step | Action                                                                                                                     |
|------|----------------------------------------------------------------------------------------------------------------------------|
| 1    | Click on <b>(Loan)</b> icon at the menu bar.<br><br><i>(Note: You only can access this function inside IS room.)</i>       |
| 2    | Enter your User ID and password.                                                                                           |
| 3    | Student Use Agreement page will be appear, as shown in Figure 3-11.                                                        |
| 4    | This is the agreement that user must accept before you can borrow any CD from the CD Library.                              |
| 5.   | Read through the agreement and make sure you understand the terms and condition.                                           |
| 6    | To accept the agreement, click on <b>[I Agree]</b> radio button and click <b>[Next]</b> button.                            |
| 7    | Select the CD that you want to borrow from the drop down list and your selected CD will be appear as shown in Figure 3-12. |
| 8    | To deselect the selected CD, click on the <b><u>Delete</u></b> hyperlink.                                                  |
| 9    | After selecting the CD you want to borrow, click <b>[Submit]</b> button.                                                   |
| 10   | Your borrowing information will appear, as shown in Figure 3-13.                                                           |
| 11   | You can print or save this information by click <b>[Print]</b> button.                                                     |
| 12   | The borrowed information will appear in report format.                                                                     |
| 13   | Click on <b>[Print]</b> button to print or save the information.                                                           |
| 14   | The information is exported to PDF file, from here you can click on the                                                    |

[Print] button to print the information or [Save] button to save the information.

## Loan

### Step 2: Student Use Agreement

As a member of the MSDN Academic Alliance (MSDNAA), the department in which you take credit courses is authorized to provide you with program software for use on your personal computer. You must agree to the MSDNAA usage guidelines listed below, the MSDN End-User License Agreement (EULA), and the MSDNAA License Amendment, as well as any conditions required by your department.

The MSDNAA program administrator for your department will maintain records of student use, provide aggregate data to Microsoft upon request, and ensure full compliance with the program among departmental users including students, faculty, and technical staff.

By installing, copying, or otherwise using the software, you agree to be bound by the terms of the EULA and the License Amendment. If you do not agree to be bound, do not install, copy, or use the software.

#### Installation(Guidelines)

You must be registered in at least one for-credit course within the member department to be eligible to load program software on

CHAN PENG LIAN

WET030005

#### Acceptance of Agreement

☒ I agree

☐ I not agree

to be bound by the terms of the MSDN EULA, the MSDNAA License Amendment, the MSDNAA Student Use Agreement, and my department's software-usage policies.

Next

Cancel

Figure 3-2: Student Use Agreement

## Loan

### Step 3: Loan Information

Name:

CHAN PENG LIAN

Matrix No:

WET030005

CD Label ID:\*

PLEASE SELECT

| CD Label ID | Delete |
|-------------|--------|
| APP 0006    | Delete |
| PRO 0002    | Delete |

Number of CD you will borrow: 2

\* Required Field

Back

Submit

Cancel

Figure 3-3: Selected CD



## Loan Sucessful

### CheckOut Items

Name: CHAN PENG LIAN

Matrix No: WET030005

### CheckOut Items:

| CD Label ID | Software Name                                      | Software Key |
|-------------|----------------------------------------------------|--------------|
| APP 0006    | VISUAL STUDIO 6.0                                  | kuku         |
| PRO 0002    | MICROSOFT OFFICE PROFESSIONAL ENTERPRISE EDITION 2 | h,h;         |
| PRO 0002    | VISUAL STUDIO 6.0                                  | kuku         |

Print

Figure 3-4: Borrowed Information

### 3.6 EDIT USER PROFILE

| Step | Action                                                                                                                       |
|------|------------------------------------------------------------------------------------------------------------------------------|
| 1    | Enter your User ID and Password on the left hand side of home page as shown in Figure 3-14.                                  |
| 2    | Click <b>[Login]</b> button.                                                                                                 |
| 3    | User home page will be displayed as shown in Figure 3-15.                                                                    |
| 4    | Click <b>(My Profile)</b> icon.                                                                                              |
| 5    | User Profile page will be displayed as shown in Figure 3-16.                                                                 |
| 6    | Click <b>[Edit]</b> button.                                                                                                  |
| 7    | Enter new information and click <b>[Submit]</b> button.                                                                      |
| 8    | If the information is successfully updated, the User Profile page will be displayed or else error message will be displayed. |

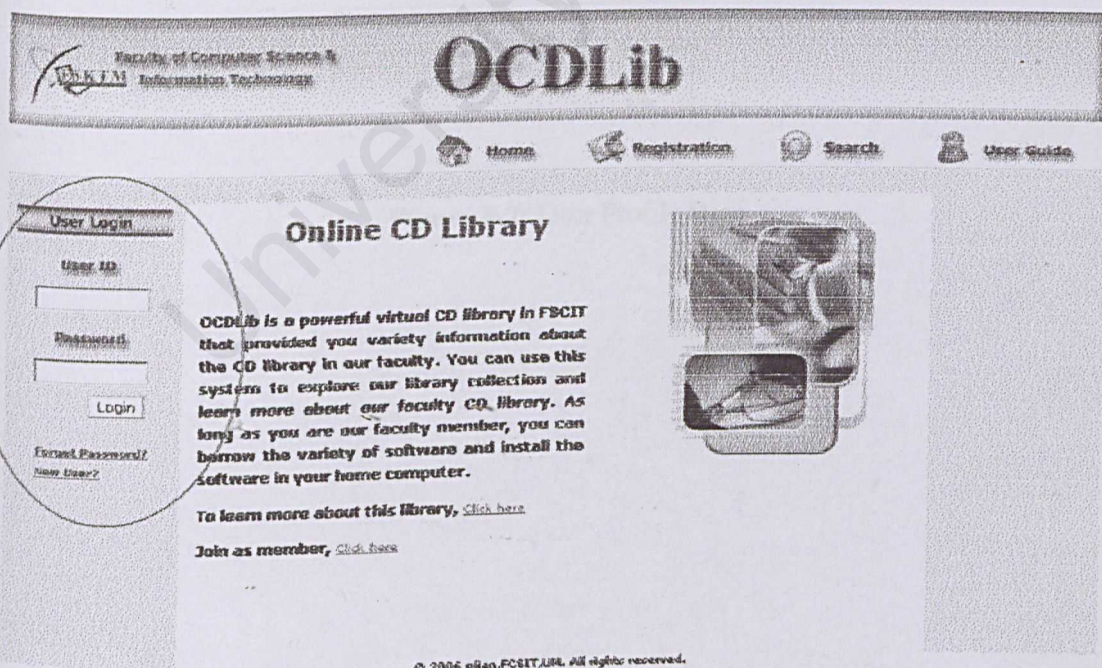


Figure 3-5: OCDLib Main Page



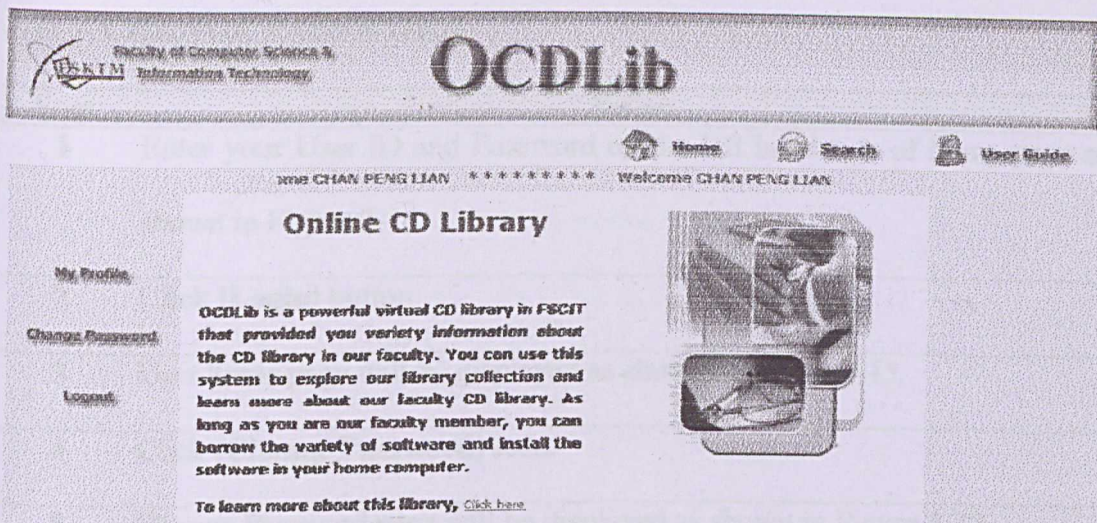


Figure 3-6: User Home Page

### My Profile

**Enter Your Information**

**Type:**      ☒ Lecturer    ☐ Staff    ☐ Student

**Name:**     

**Matrix No/LecturerID:**     

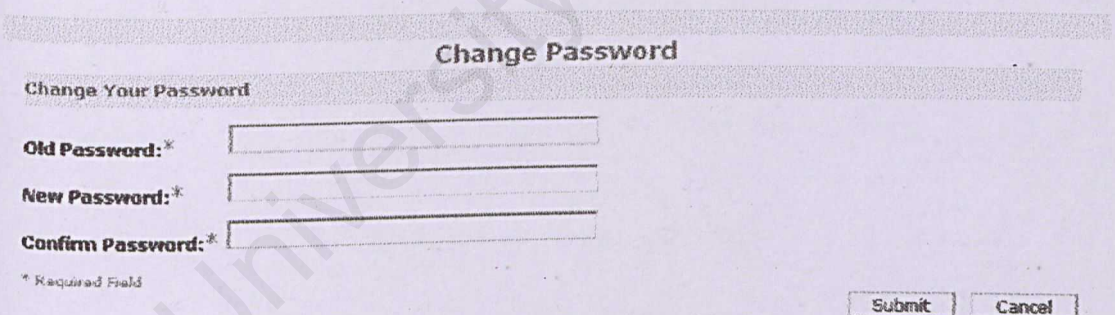
**Phone No:**     

**E-mail Address:**     

Figure 3-7: User Profile Page

### 3.7 CHANGE PASSWORD

| Step | Action                                                                                                                            |
|------|-----------------------------------------------------------------------------------------------------------------------------------|
| 1    | Enter your User ID and Password on the left hand side of home page as shown in Figure 3-14.                                       |
| 2    | Click <b>[Login]</b> button.                                                                                                      |
| 3    | User home page will be displayed as shown in Figure 3-15.                                                                         |
| 4    | Click <b>(Change Password)</b> icon.                                                                                              |
| 5    | Change Password page will be displayed as shown in Figure 3-17.                                                                   |
| 6    | Enter old password, new password and confirm password.                                                                            |
| 7    | Click <b>[Submit]</b> button.                                                                                                     |
| 8    | If the password has been successfully changed, the Password Changed page will be displayed or else error message will be display. |



**Change Password**

Change Your Password

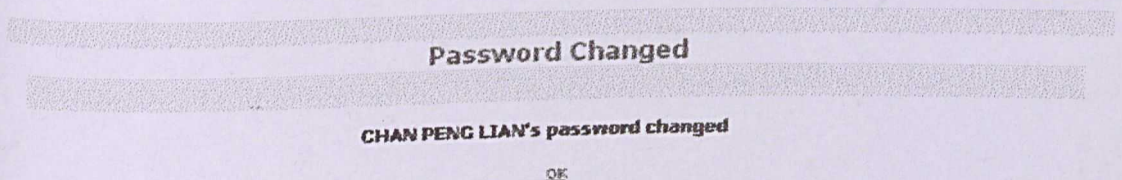
Old Password:\*

New Password:\*

Confirm Password:\*

\* Required Field

**Figure 3-8: Change Password Page**



**Password Changed**

CHAN PENG LIAN's password changed

**Figure 3-9: Password successfully changed message**



### 3.8 FORGOT PASSWORD

| Step | Action                                                                     |
|------|----------------------------------------------------------------------------|
| 1    | Click <b>Forgot Password</b> hyperlink on the left hand site of Home page. |
| 2    | Forgot Password Page will be display as shown in Figure 3-19.              |
| 3    | Enter User ID and Matrix No, Click <b>[Submit]</b> button.                 |
| 4    | The new password will be sent to your mail box.                            |

Forgot Password

User ID and E-mail

Please enter below information, new password will be send to your mail box

User ID:\*

Matrix No/Lecturer ID: \*

\* Required Field

Submit

Cancel

Figure 3-10: Forgot Password Page

# CHAPTER 4 – ADMINISTARTOR SECTION

## 4.1 LOGIN TO ADMINISTRATOR PAGE

| Step | Action                                                                                               |
|------|------------------------------------------------------------------------------------------------------|
| 1    | Enter administrator User ID and Password on the left hand side of home page as shown in Figure 3-14. |
| 2    | Click [Login] button.                                                                                |
| 3    | CD Information Page will be displayed as shown in Figure 4-1.                                        |

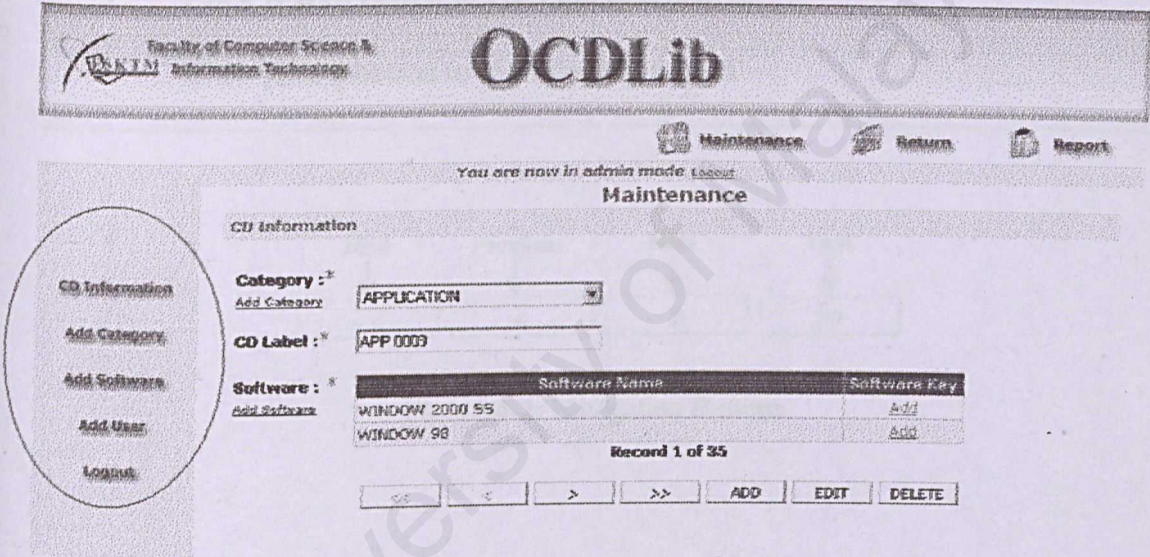


Figure 4-1: CD Information Page



## 4.2 MAINTAIN CD INFORMATION

### 4.2.1 View CD Information

| Step | Action                                                                                   |
|------|------------------------------------------------------------------------------------------|
| 1    | Click <b>(CD Information)</b> icon on the left hand side of menu as shown in Figure 4-1. |
| 2    | CD Information Page will be displayed as shown in Figure 4-1.                            |
| 3    | Click <b>[Next]</b> button to view the next record.                                      |
| 4    | Click <b>[Previous]</b> button to view the previous record.                              |
| 5    | Click <b>[First]</b> button to view the first record.                                    |
| 6    | Click <b>[Last]</b> button to view the last record.                                      |

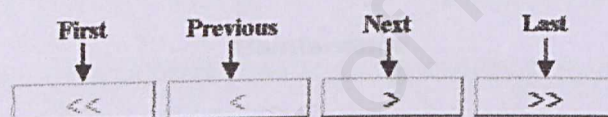


Figure 4-2: Navigation Buttons

### 4.2.2 Add New CD Information

| Step | Action                                                                                   |
|------|------------------------------------------------------------------------------------------|
| 1    | Click <b>(CD Information)</b> icon on the left hand side of menu as shown in Figure 4-1. |
| 2    | CD Information Page will be displayed as shown in Figure 4-1.                            |
| 3    | Click <b>[ADD]</b> button.                                                               |
| 4    | Add CD Information page displayed as shown in Figure 4-3.                                |
| 5    | Select a category for new CD, the CD Label will be automatically created.                |
| 6    | If the category is not stated in the list, refer to Add New Category section             |

to add the new category.

- 7 Select software for the CD from the left hand side list. Press Ctrl and click to select more than one software.
- 8 Click **[Select]** button.
- 9 To deselect the selected software, select software from the right hand side list, press Ctrl and click to select more than one software.
- 10 Click **[Deselect]** button.
- 11 If the software is not stated in the list, refer to Add New Software section to add the new software.
- 12 After enter all the necessary information, click **[Save]** button.

**Maintenance**

**CD Information**

**Category : \***  
Add Category

**CD Label : \***

**Software : \***  
Add Software

WINDOW XP SP1A

▼

WINDOW 2000 SS

WINDOW 98

WINDOW XP SP1

VISUAL STUDIO 6.0

VISUAL STUDIO 2003

VISUAL STUDIO 2005

VISUAL STUDIO 2005 REMOTE DEBUGGER SE

Select

Deselect

SAVE

CANCEL

**Figure 4-3: Add CD Information Page**



4.2.3 Edit CD Information

| Step | Action                                                                                                                                |
|------|---------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Click <b>(CD Information)</b> icon on the left hand side of menu as shown in Figure 4-1.                                              |
| 2    | CD Information Page will be displayed as shown in Figure 4-1                                                                          |
| 3    | Click <b>[EDIT]</b> button.                                                                                                           |
| 4    | Edit CD Information page displayed as shown in Figure 4-4.                                                                            |
| 5    | If you edit the CD category, the CD Label will be automatically edit too.                                                             |
| 6    | To add software to the CD, select software from the left hand side list.<br>Press Ctrl and click to select more than one software.    |
| 7    | Click <b>[Select]</b> button.                                                                                                         |
| 8    | To delete software from the CD, select software from the right hand side list, press Ctrl and click to select more than one software. |
| 9    | Click <b>[Deselect]</b> button.                                                                                                       |
| 10   | After editing all necessary information, click <b>[Save]</b> button.                                                                  |

Maintenance

CD Information

Category :\*  
Add Category APPLICATION

CD Label :\*  
APP 0004

Software :\*  
Add Software

WINDOW XP SP1A  
WINDOW 2000 SS  
VISUAL STUDIO 6.0  
VISUAL STUDIO 2003  
VISUAL STUDIO 2005  
VISUAL STUDIO 2005 REMOTE DEBUGGER SE  
VISUAL FOXPRO 9.0 (ENGLISH)  
MICROSOFT SQL SERVER 2000

Select

Deselect

WINDOW 95  
WINDOW XP SP1

Record 2 of 37

SAVE CANCEL

Figure 4-4: Edit CD Information Page

## 4.2.4 Delete CD Information

| Step | Action                                                                                                                            |
|------|-----------------------------------------------------------------------------------------------------------------------------------|
| 1    | Click <b>(CD Information)</b> icon on the left hand side of menu as shown in Figure 4-1.                                          |
| 2    | CD Information Page will be displayed as shown in Figure 4-1                                                                      |
| 3    | Click <b>[DELETE]</b> button.                                                                                                     |
| 4    | A confirmation dialog box will appear as shown in Figure 4-5.                                                                     |
| 5    | If you confirm want to delete the CD information, click <b>[OK]</b> button, or else click <b>[Cancel]</b> button                  |
| 6    | If the CD is being borrowed by user, an error message will be displayed to inform user that the CD information cannot be deleted. |

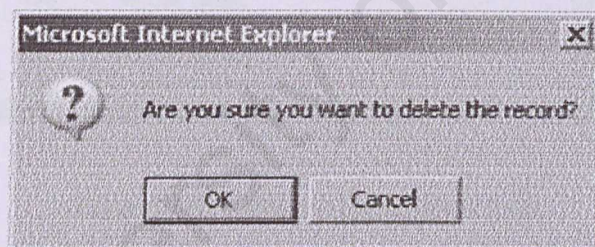


Figure 4-5: Confirmation dialog box



## 4.3 MAINTAIN CATEGORY INFORMATION

### 4.3.1 Add New Category Information

| Step | Action                                                                                 |
|------|----------------------------------------------------------------------------------------|
| 1    | Click <b>(Add Category)</b> icon on the left hand side of menu as shown in Figure 4-1. |
| 2    | Category Information Page will be displayed as shown in Figure 4-6.                    |
| 3    | Enter Category ID and Category Name and click <b>[Submit]</b> button.                  |

**Maintenance**

Add Category

Category ID:\*

Category Name:\*

\* Required Field

| Category No | Category ID | Category Name    | Delete                 | Edit                 |
|-------------|-------------|------------------|------------------------|----------------------|
| 76          | VBB         | VISUAL BASIC     | <a href="#">Delete</a> | <a href="#">Edit</a> |
| 77          | APP         | APPLICATION      | <a href="#">Delete</a> | <a href="#">Edit</a> |
| 78          | PRO         | PROGRAMMING      | <a href="#">Delete</a> | <a href="#">Edit</a> |
| 79          | OSS         | OPERATING SYSTEM | <a href="#">Delete</a> | <a href="#">Edit</a> |

Figure 4-6: Category Information Page

### 4.3.2 Edit Category Information

| Step | Action                                                                                 |
|------|----------------------------------------------------------------------------------------|
| 1    | Click <b>(Add Category)</b> icon on the left hand side of menu as shown in Figure 4-1. |
| 2    | Category Information Page will be displayed as shown in Figure 4-6.                    |
| 3    | Click the <b><u>Edit</u></b> hyperlink of the category that you want to edit.          |
| 4    | Category Edit Page will be display as shown in Figure 4-7                              |
| 5    | Edit the information, click <b><u>Update</u></b> hyperlink.                            |
| 6    | Click <b><u>Cancel</u></b> hyperlink if you want to cancel the edit.                   |



## Maintenance

### Add Category

Category ID:\*

Category Name:\*

\* Required Field

Add

Clear

| Category No | Category ID | Category Name    | Edit          |
|-------------|-------------|------------------|---------------|
| 76          | VBB         | VISUAL BASIC     | Update_Cancel |
| 77          | APP         | APPLICATION      | Edit          |
| 78          | PRO         | PROGRAMMING      | Edit          |
| 79          | OSS         | OPERATING SYSTEM | Edit          |

**Figure 4-7: Edit Category Information Page**

### 4.3.3 Delete Category Information

| Step | Action                                                                                                                        |
|------|-------------------------------------------------------------------------------------------------------------------------------|
| 1    | Click <b>(Add Category)</b> icon on the left hand side of menu as shown in Figure 4-1.                                        |
| 2    | Category Information Page will be displayed as shown in Figure 4-6.                                                           |
| 3    | Click the <b>Delete</b> hyperlink of the category that you want to delete.                                                    |
| 4    | A confirmation dialog box will appear as shown in Figure 4-5.                                                                 |
| 5    | If you confirm want to delete the information, click <b>[OK]</b> button, else click <b>[Cancel]</b> button                    |
| 6    | If the category is being used, an error message will be displayed to inform user that the category information cannot delete. |



## 4.4 MAINTAIN SOFTWARE INFORMATION

### 4.4.1 Add New Software Information

| Step | Action                                                                                 |
|------|----------------------------------------------------------------------------------------|
| 1    | Click <b>(Add Software)</b> icon on the left hand side of menu as shown in Figure 4-1. |
| 2    | Software Information Page will be displayed as shown in Figure 4-8.                    |
| 3    | Enter Software Name and click <b>[Submit]</b> button.                                  |

**Maintenance**

**Add Software**

Software Name: \*

\* Required Field

| Software No | Software Name                                      | Software Key        | Delete                 | Edit                 |
|-------------|----------------------------------------------------|---------------------|------------------------|----------------------|
| 67          | MICROSOFT WINDOWS XP PROFESSIONAL                  | <a href="#">Add</a> | <a href="#">Delete</a> | <a href="#">Edit</a> |
| 68          | MICROSOFT OFFICE FRONTPAGE 2003                    | <a href="#">Add</a> | <a href="#">Delete</a> | <a href="#">Edit</a> |
| 69          | MICROSOFT OFFICE ONENOTE 2003                      | <a href="#">Add</a> | <a href="#">Delete</a> | <a href="#">Edit</a> |
| 70          | MICROSOFT OFFICE PROJECT PROFESSIONAL 2003         | <a href="#">Add</a> | <a href="#">Delete</a> | <a href="#">Edit</a> |
| 71          | MICROSOFT OFFICE PROJECT SERVER 2003               | <a href="#">Add</a> | <a href="#">Delete</a> | <a href="#">Edit</a> |
| 72          | MICROSOFT OFFICE PROFESSIONAL ENTERPRISE EDITION 2 | <a href="#">Add</a> | <a href="#">Delete</a> | <a href="#">Edit</a> |

Figure 4-8: Software Information Page

### 4.4.2 Edit Software Information

| Step | Action                                                                                 |
|------|----------------------------------------------------------------------------------------|
| 1    | Click <b>(Add Software)</b> icon on the left hand side of menu as shown in Figure 4-1. |
| 2    | Software Information Page will be displayed as shown in Figure 4-8.                    |
| 3    | Click the <b>Edit</b> hyperlink of the software that you want to edit.                 |
| 4    | Software Edit Page will be display as shown in Figure 4-9.                             |
| 5    | Edit the information, click <b>Update</b> hyperlink.                                   |
| 6    | Click <b>Cancel</b> hyperlink if you want to cancel the edit.                          |



## Maintenance

### Add Software

Software Name: \*

\* Required Field

Add

Clear

| Software No | Software Name                                      | Edit          |
|-------------|----------------------------------------------------|---------------|
| 67          | MICROSOFT WINDOWS                                  | Update_Cancel |
| 68          | MICROSOFT OFFICE FRONTPAGE 2003                    | Edit          |
| 69          | MICROSOFT OFFICE ONENOTE 2003                      | Edit          |
| 70          | MICROSOFT OFFICE PROJECT PROFESSIONAL 2003         | Edit          |
| 71          | MICROSOFT OFFICE PROJECT SERVER 2003               | Edit          |
| 72          | MICROSOFT OFFICE PROFESSIONAL ENTERPRISE EDITION 2 | Edit          |

**Figure 4-9: Edit Software Information Page**

### 4.4.3 Delete Software Information

| Step | Action                                                                                                                      |
|------|-----------------------------------------------------------------------------------------------------------------------------|
| 1    | Click <b>(Add Software)</b> icon on the left hand side of menu as shown in Figure 4-1.                                      |
| 2    | Software Information Page will be displayed as shown in Figure 4-8.                                                         |
| 3    | Click the <b>Delete</b> hyperlink of the software that you want to delete.                                                  |
| 4    | A confirmation dialog box will appear as shown in Figure 4-5.                                                               |
| 5    | If you confirm want to delete the information, click <b>[OK]</b> button, or else click <b>[Cancel]</b> button               |
| 6    | If the software is being used, an error message will be displayed to notify that the software information cannot be delete. |



## 4.5 MAINTAIN SOFTWARE KEY

### 4.5.1 Add New SoftwareKey Information

| Step | Action                                                                                                                           |
|------|----------------------------------------------------------------------------------------------------------------------------------|
| 1    | Click ( <b>Add Software</b> ) icon on the left hand side of menu as shown in Figure 4-1.                                         |
| 2    | Software Information Page will be displayed as shown in Figure 4-8.                                                              |
| 3    | Click the <b>Add</b> hyperlink of the software that you want to add its software key.                                            |
| 4    | Add Software Key Page will be displayed as shown in Figure 4-10.                                                                 |
| 5    | Enter new software key and click [ <b>Submit</b> ] button.                                                                       |
| 6    | To view all the software key of particular software, click <b>All Software Key</b> hyperlink.                                    |
| 8    | To change the Number of Software Key status from "Single" to "Multiple", click on <b>Change</b> hyperlink.                       |
| 9    | To change the Number of Software Key status from "Multiple" to "Single", make sure the software only has one software key.       |
| 10   | Else, an error message will display to ask user to delete the software key before can change the status as shown in Figure 3-11. |
| 11   | Click [ <b>Back</b> ] hyperlink to go back to Software Information Page.                                                         |
| 12   | Repeat step 3 to step 9 if you want to add software key.                                                                         |

## Maintenance

### Add Software key

Software Name:

VISUAL STUDIO 2005

Number of Software Key:

☒ Single

☐ Multiple

Change

Software Key:\*

\* Required Field

Add

Clear

[All Software Key](#)

| Software Key | Delete                 | Edit                 |
|--------------|------------------------|----------------------|
| 222          | <a href="#">Delete</a> | <a href="#">Edit</a> |

[Back](#)

Figure 4-10: Add Software Key Page

## Maintenance

### Add Software key

Software Name:

VISUAL STUDIO 2005

Number of Software Key:

☒ Single

☐ Multiple

You must delete all the existing software key before you can proceed.

Software Key:\*

\* Required Field

Add

Clear

[All Software Key](#)

| Software Key | Delete                 | Edit                 |
|--------------|------------------------|----------------------|
| 222          | <a href="#">Delete</a> | <a href="#">Edit</a> |
| k;           | <a href="#">Delete</a> | <a href="#">Edit</a> |

[Back](#)

Figure 4-11: Error Message



4.6 RETURN CD

| Step | Action                                                                                                              |
|------|---------------------------------------------------------------------------------------------------------------------|
| 1    | Click on <b>(Return)</b> icon at the menu bar.                                                                      |
| 2    | The Return page is displayed as shown in Figure 4-12.                                                               |
| 3    | Select the CD that user intended to return from the CD Label ID drop down list.                                     |
| 4    | Click <b>[Submit]</b> button.                                                                                       |
| 5    | If the CD successfully returned, Return Successful message will displayed as shown in Figure 4-13.                  |
| 6    | If the returned CD is being reserved by user, a message will be display to notify the administrator to keep the CD. |
| 7    | An e-mail notification will be sent to the user who reserves the CD.                                                |

Return

CD Label ID:

Figure 4-12: Return Page

Return

CD Label: APP 0009

Status: Return Successfully

This CD has been reserve by someone, please keep the CD

OK

Figure 4-13: Return Successfully message

## 4.7 REPORT

### 4.7.1 View Report

| Step | Action                                                                                                                |
|------|-----------------------------------------------------------------------------------------------------------------------|
| 1    | Click on <b>(Report)</b> icon at the menu bar.                                                                        |
| 2    | Report of library transaction is display as shown in Figure 4-14.                                                     |
| 3    | Select report type that you wish to display from report drop down list and select month or year of report.            |
| 4    | Click <b>[Generate]</b> button.                                                                                       |
| 5    | The generated information will be display.                                                                            |
| 6    | To view the report of library information, click <b>(Library Information)</b> icon at the left hand side of the menu. |
| 7    | Repeat step 3 and 4 to generate the report.                                                                           |

**Report**

Step 1: Choose report type

|         |                                            |
|---------|--------------------------------------------|
| Report: | <input type="text" value="PLEASE SELECT"/> |
| Month:  | <input type="text" value="PLEASE SELECT"/> |
| Year:   | <input type="text" value="PLEASE SELECT"/> |

**Figure 4-14: Report page**



4.7.2 Print Report

| Step | Action                                                                                                                                                   |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Click on <b>(Report)</b> icon at the menu bar.                                                                                                           |
| 2    | Report of library transaction is displayed.                                                                                                              |
| 3    | Select report type that you which to display from report drop down list and select month or year of report.                                              |
| 4    | Click <b>[Generate]</b> button.                                                                                                                          |
| 5.   | The generated information is display.                                                                                                                    |
| 6    | To print the generated information, click <b>[Print]</b> button.                                                                                         |
| 7    | The generated information is displayed in report format as shown in Figure 4-15                                                                          |
| 8    | Click on <b>[Print]</b> button to print or save the report.                                                                                              |
| 9    | The report is exported to PDF file, from here you can click on the <b>[Print]</b> button to print the report or <b>[Save]</b> button to save the report. |

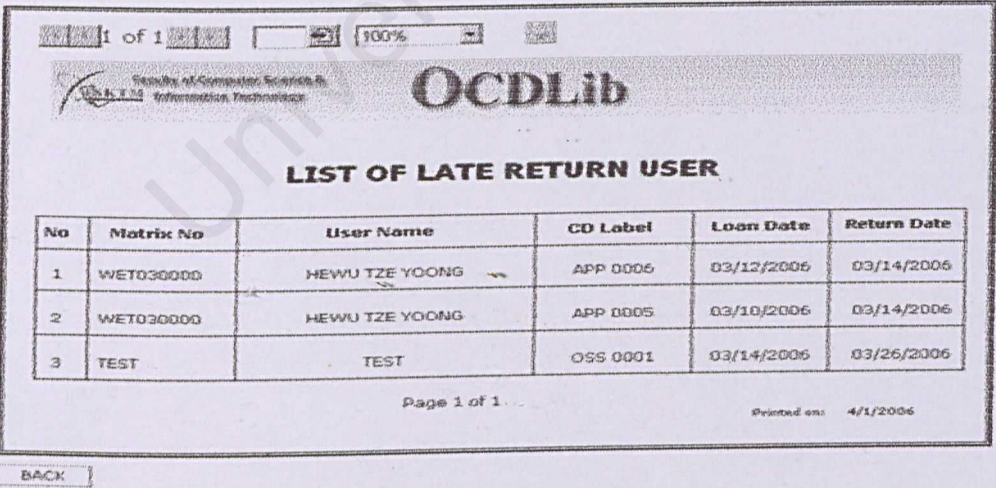


Figure 4-15: Generated Information in report format.