

LIBRARY MANAGEMENT SYSTEM

By

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Declaration

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Title : Library Management System

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Abstract

This report describes the project development of Library Management System that was developed to manage the daily book transaction and manage the member, books record more efficiency. It can improve management of the book property in the library.

This library management system is mainly use by librarian and library admin. Normal Librarian is able to manage the member maintenance module, book maintenance module and also the most important module in a library which is book transaction module. Besides that, library management system also allows user to manage the publisher as well as lost book module. On the other hand, other type of user which is admin level staff is able to handle the staff module and view the report module.

The methodology I used to developed this system is waterfall model. Thus, the report's chapter was included system planning, requirement analysis, system design, programming, system testing, and evaluation of the project. For the system planning, the outcomes are the project objectives and project aims as well as to defined the project scope. Requirement analysis is a stage to gather the user requirement such as functional requirement and nn functional requirement. Next, the system design is mainly used to design the user interface and database design. The next stage after system design is programming stage. This is the stage for coding. After complete coding part, we proceed to system testing to minimize the system bug.

Compare to the existing library system, this system has some strength and weaknesses compare to others such as lack of smart card technology. In the future, we can enhance the system with smart card technology to make it more perfect.

Acknowledgements

After complete my Final Year Project, I would like to take this chance to express my sincere gratitude to my project supervisor which is Ms. Choon Kwai Mui who has guided me a lot throughout the project development. When I still doing nothing while project due date is getting close, Ms Choon give me some pressure to complete the system. Without her, I think I can't finish the system on time. In addition, while I meet some logic problem or design problem, Ms Choon always the one give me useful and logic answer.

I would like to thanks Ms Choon for one more time because she share her experience with us so that we can get more logic understanding on how to develop a software which suitable for the current society.

Last but not at least, I would like to acknowledge my course-mate Chan Cheang Hau as he has assisted me no matter in coding or logic design. When I met some coding problem, he is the one who always teach me with his understanding in programming.

Table of Contents

Table of Contents

Chapter 1 : System Planning	1-18
1.1 Project Aims and Objectives.....	2
1.2 Background of Project	2
1.3 Project Scope.....	4
1.4 Project Schedule	14
1.5 Outline of approach / Methodology used.....	15
1.6 Operation Environment.....	17
1.7 Chapter 1 Conclusion	18
Chapter 2 : Requirement Analysis	19-39
2.1 Software Requirement Specification.....	20
2.2 Data Flow Diagram	34
2.3 Chapter 2 Conclusion	39
Chapter 3 : System Design	40-74
3.1 External Interface Requirement	41
3.2 Entity Relationship Diagram	63
3.3 Normalization	64
3.4 Data Dictionary.....	67
3.5 Chapter 3 Conclusion	74
Chapter 4 : Programming	75-88
4.1 Coding.....	76
4.2 Chapter 4 Conclusion	88

Chapter 5 : System Testing	89-97
5.1 Test Plan	90
5.2 Conclusion	97
Chapter 6 : Conclusion	98-103
6.1 Introduction.....	99
6.2 Linkage to seminar	99
6.3 Evaluation of Project Objectives	100
6.4 Project Management Issues	100
6.5 Evaluation of Project Strengths and Weaknesses	101
6.6 Suggestion for Future Enhancement.....	102
6.7 Personal Reflection.....	103
Chapter 7 : References	105-106
Appendices	107-149

Chapter 1

System Planning

1.0 System Planning

The developing process of the Library Management System will be carried out in this chapter as well as the system objectives, scope and schedules.

1.1 Project Aims and Objectives

The project aims and objectives that will be achieved after completion of the system were carried out in this sub chapter. The succession of the system also will be evaluated through this sub chapter.

The project objectives are:

- To eliminate the paper-work in library
- To record every transaction in computerized system so that problem such as record file missing won't happen again
- To implement BarCode, SMS technologies into the system
- To design a user friendly graphical user interface which suit the users
- To complete the system according to project schedule
- To produce technical report that documents the phases, tasks and deliverables in the project

1.2 Background of Project

Library Management System is an application refer to other library system and it is suitable to use by small and medium size library. It is use by librarian and library admin to manage the library using a computerized system. The system was developed and designed to help librarian record every book transaction so that the problem such as file missing or record missing will not happened again.

Barcode reader is equipped in this system so that users can enjoy the convenience without need to key in the barcode of the book themselves. It is convenience and time saving as the

users can direct scan in the book's barcode id when the members borrows few books in one time.

Book and member maintenance module also included in Library Management System. Users can register or edit the member or book in the system. With this computerized maintenance, library will not lost the book record or member record which always happen when no computerized system bring used.

In addition, report module is also included in Library Management System. If user's position is Admin, the user is able to view different kind of report. First type of report are rental and return report, user can check the rental, return transaction which happen on particular day. Besides that, user can check the Top10 books which borrow by the member in a day, month or year based on category. Moreover, activity log report also provided by system so that admin can check what process has been carried out such as register new book, edit member information as well as login, logout information.

When user lost the book, user can use Lost Book Module to register the lost book and receive the fine which is double price of that book.

All these modules are able to help librarian to manage the library more convenience and efficiency compare to those library without computerized system.

1.3 Project Scope

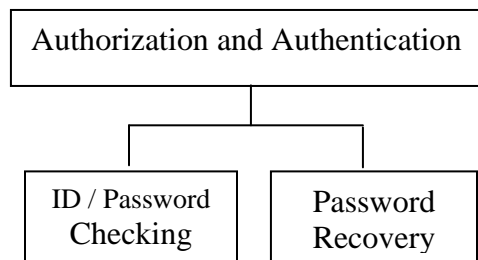
In this sub chapter, project scope will carried out what modules were contains inside the Library Management System.

For Library Management System, it is divided into online web site and library system. For my part, I was responsible for library system while the online web site was carried out by my friend Koh Yee Keat.

At here, I will describe my own part which is library system which used by librarian.

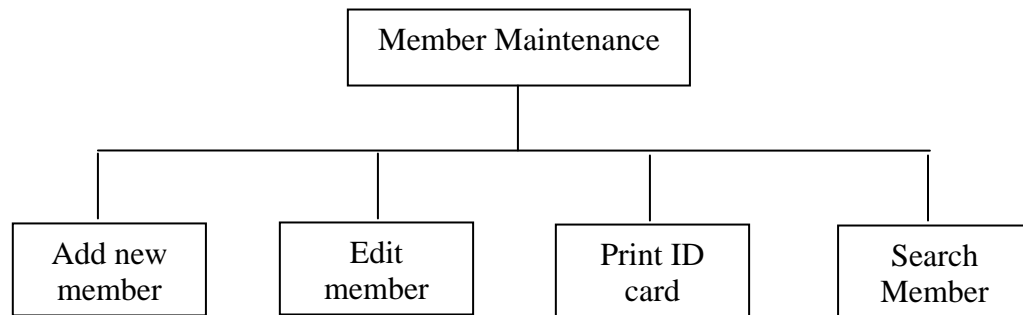
Library system

➤ Authorization and Authentication Module



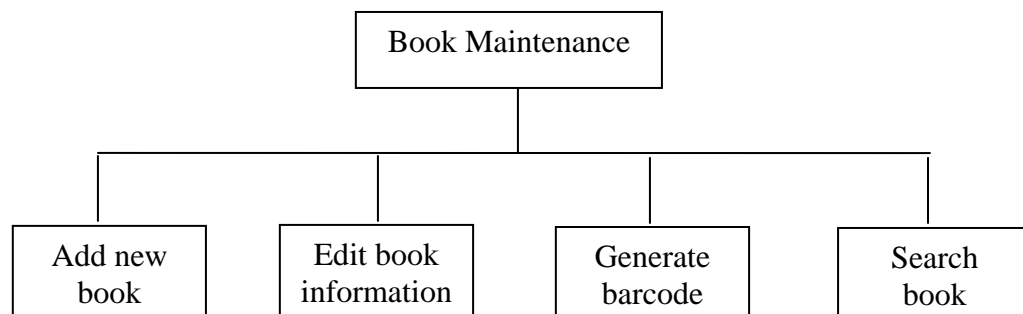
This module is used by user which means librarian in the library. They need to login to the system using their id and password. In order to distinguish the user's level, user can access to different module when successfully login. For example, only admin level users are able to access the report module.

➤ **Member Maintenance Module**



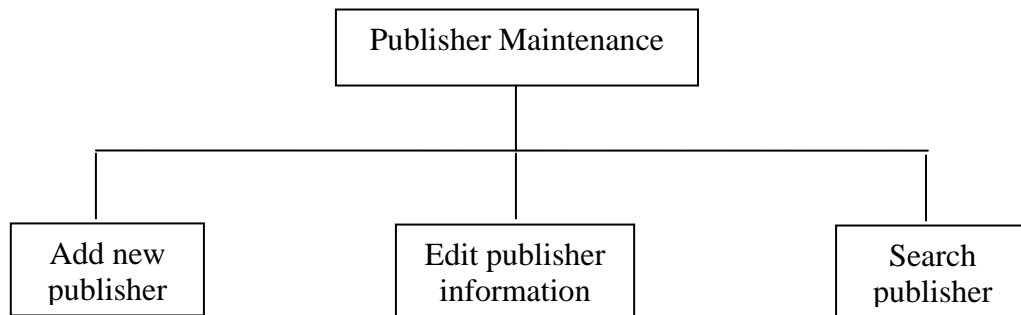
This module can be accessed by either librarian or library admin to maintain member's profile or record such as search, add, edit and print ID card.

➤ **Book Maintenance Module**



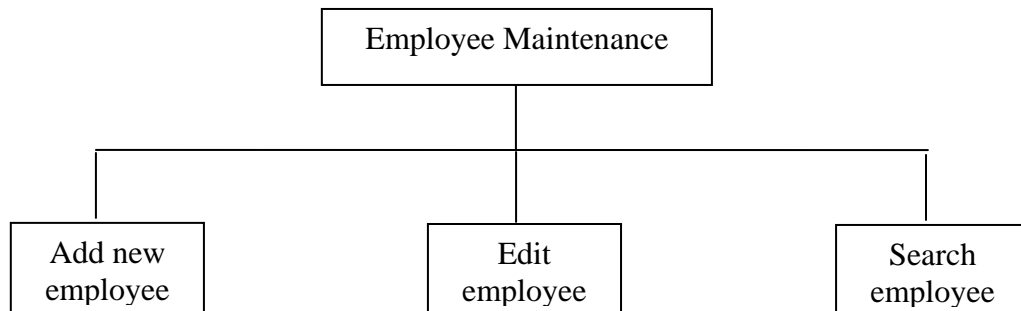
Book Module can access by any user from all levels. This module can used to maintain the book inventory record such as search, add and edit. In addition, we can generate the barcode for particular book and print it out so that librarian can stick the barcode on the book cover.

➤ **Publisher Maintenance Module**



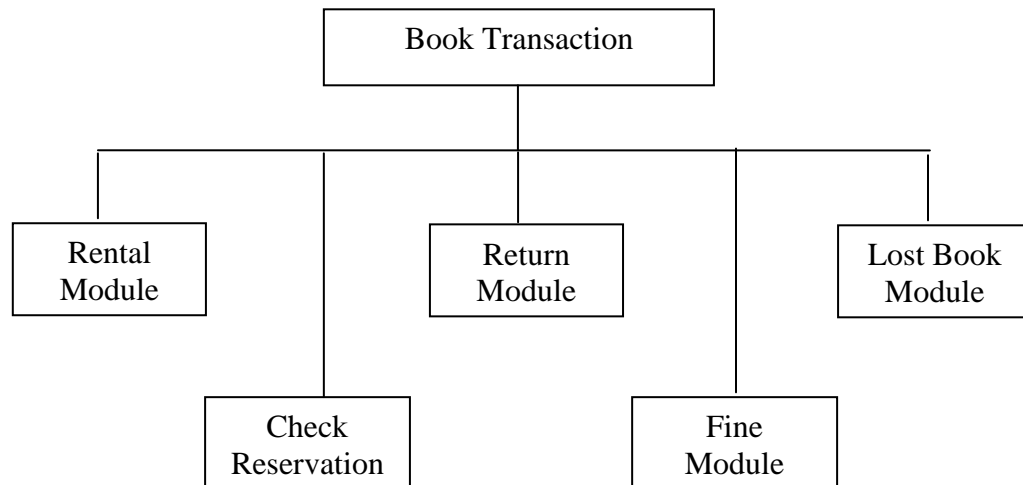
This module allows user to add and edit the book's publisher. Publisher is used when register a new book.

➤ **Employee Maintenance Module**



Employee Maintenance is only can carried out by admin level user. It can use to add the new librarian to the library which means add the new user.

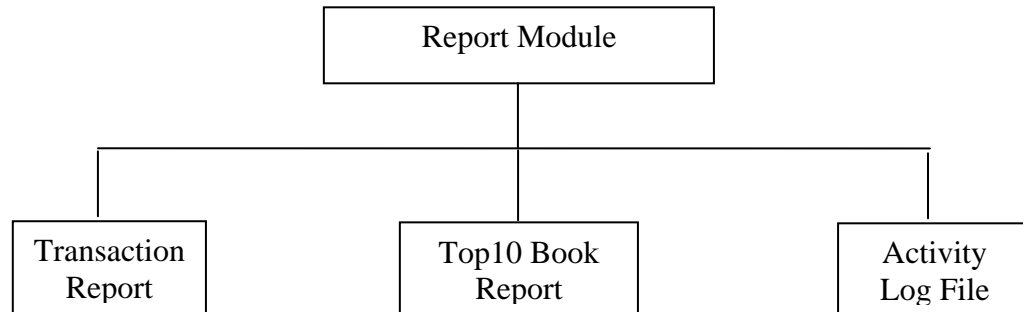
➤ **Book Transaction Module**



Book Transaction module is a main module in Library Management System. When member wants to borrow books, return books or they want to register lost book, it is all under book Transaction module. This module can be accessed by normal user or admin user. When member wants to borrow a book, librarian needs to scan in their member id. After that, librarian will scan their book's barcode id. If the book is under reservation, the book is not available to rent.

For return module, librarian just needs to scan the book's barcode id, and confirm the rental detail with user. If the rental detail is correct, return module can be complete if no any fine issued.

➤ **Report Module**



Report module is the main module for admin user. It is because normal user is not allowed to view the report. The report divided into 3 types. First one is transaction report which can let admin views the book transaction happen on particular date such as rental report and return report.

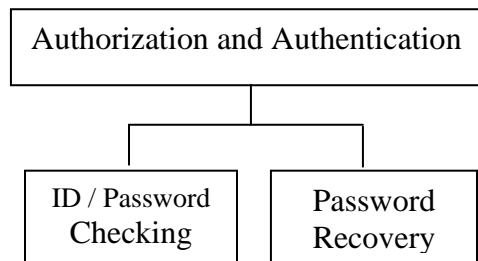
Top10 Report is the top rental rate's book. Admin can filter the information based on book's category and also filter by date in type of daily, monthly and yearly.

Activity Log File is a log which records every process in the Library Management System such as login / logout activity, register new book, new member or edit information or a member. All the activity done by every user will be record so that when system crash, admin or system admin are able to check the activity that may crash the system.

Library Web Site

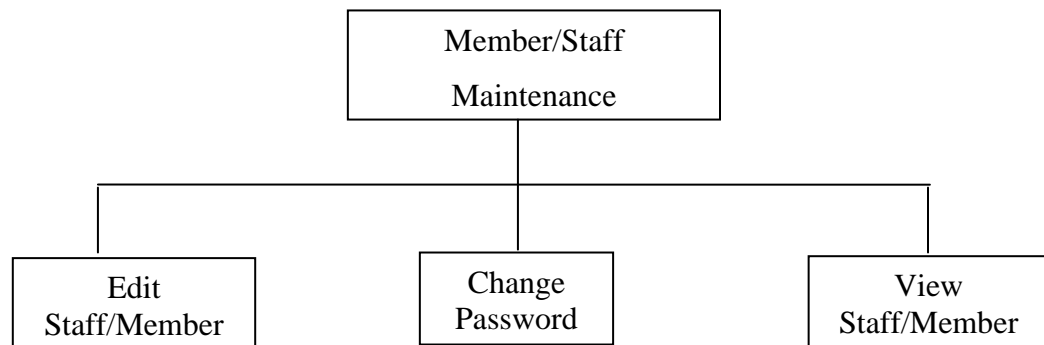
At here, I will describe my friend's part which is library website which used by librarian and member.

➤ **Authorization and Authentication Module**



This module is used by user and also admin user for the website. They need to login to the website using their id and password. In order to distinguish the user's level, user can access to different module when successfully login. For example, admin can implement News.

➤ **Member/Staff Maintenance Module**



This module allows user and also admin to view their profile. Not only that, they allow to edit their profile and also change their password.

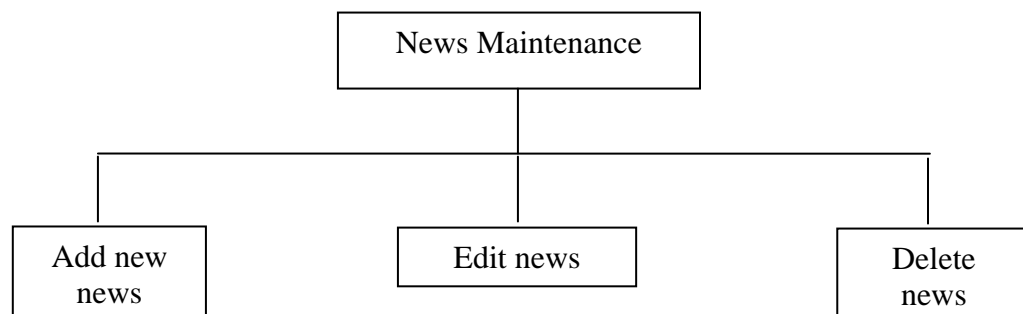
➤ **Search Module**

Search module allow user or guess who visit website to search the book. Not only that the user allow viewing the detail of the book and also seeing the comment of the book. There are a few of type allow users to search. They can search via ISBN, book title, author, publisher, and category.

➤ **Top 10 new book and recommended book Module**

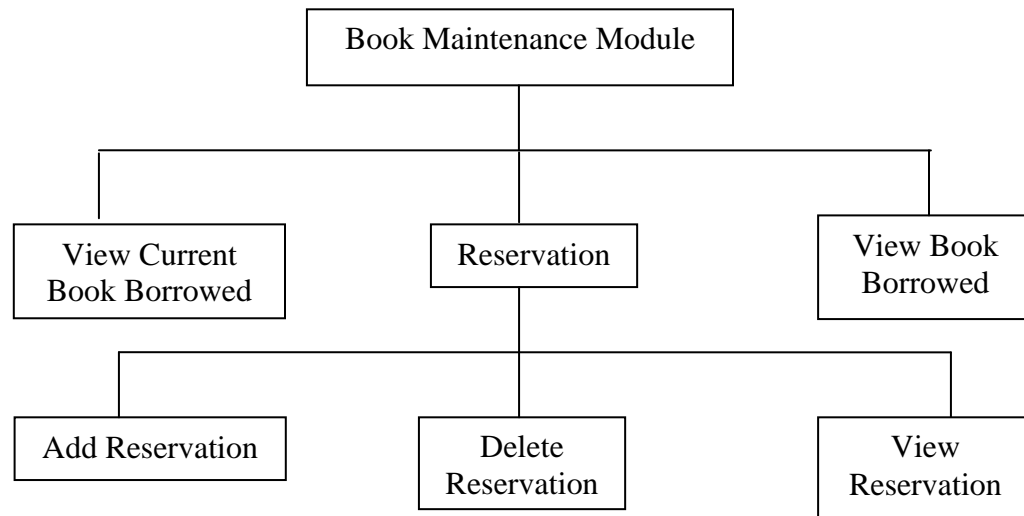
Top 10 new book modules allow guess and member to see the top 10 new book has brought by the library and the recommended book module only can see by member after log in to the system. It recommended based on their category example the user like to see action type book then it will recommend some action book for

➤ **News Maintenance Module**



This module allows user to add, edit and delete the news. So when the users visit the website the website will have shown updated news.

➤ **Book Maintenance Module**

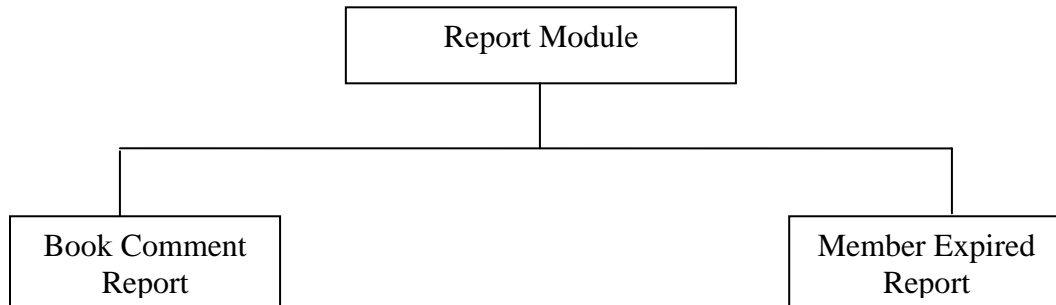


Book maintenance module allows the member to view the book currently they have borrowed and also view the book they have borrowed. Not only that, there got reservation module which allow member to reserve book. Members are allowing reserving book and deleting the reservation and also view currently the book they reserve.

➤ **E-mail Module**

E-mail module has implemented in FAQ and also forget password. So when the member forgot their password they can get back their password via matching their ID and E-mail. Other than that, for FAQ if guess or members have more questions to ask they can ask via E-mail.

➤ **Report Module**

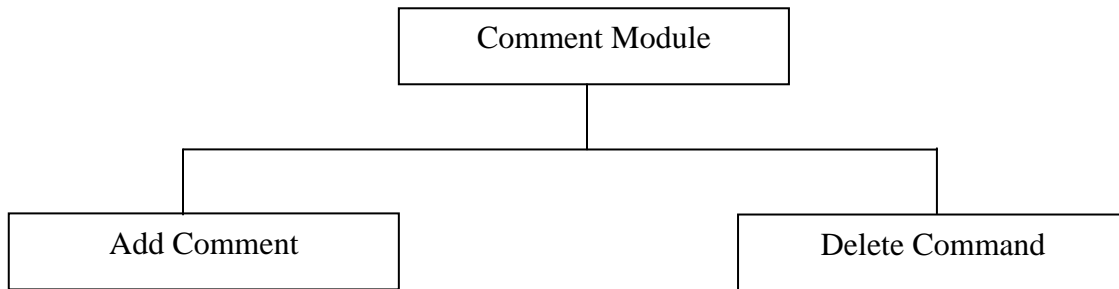


Report module is the module for admin user. There is two report which is Book Comment and Member Expired.

For Book Comment report is to view the top book that has been commented. It allows the admin to know the popularity of the book so that they can get more new books. It can view via day, month and year.

Member Expired report is to view the member is expired via which date, month or year. So they can remind their member to renew the membership and also can know the popularity of the library. So, it can be estimate the popularity of the library currently is increasing or decreasing.

➤ **Comment Module**



Comment Module created is for member to comment a book. So, if the member have opinion about the book they can actually comment on the book. Not only that they can also delete their own comment. Admin users can delete any comment of the book that member has already comment.

1.4 Project Schedule

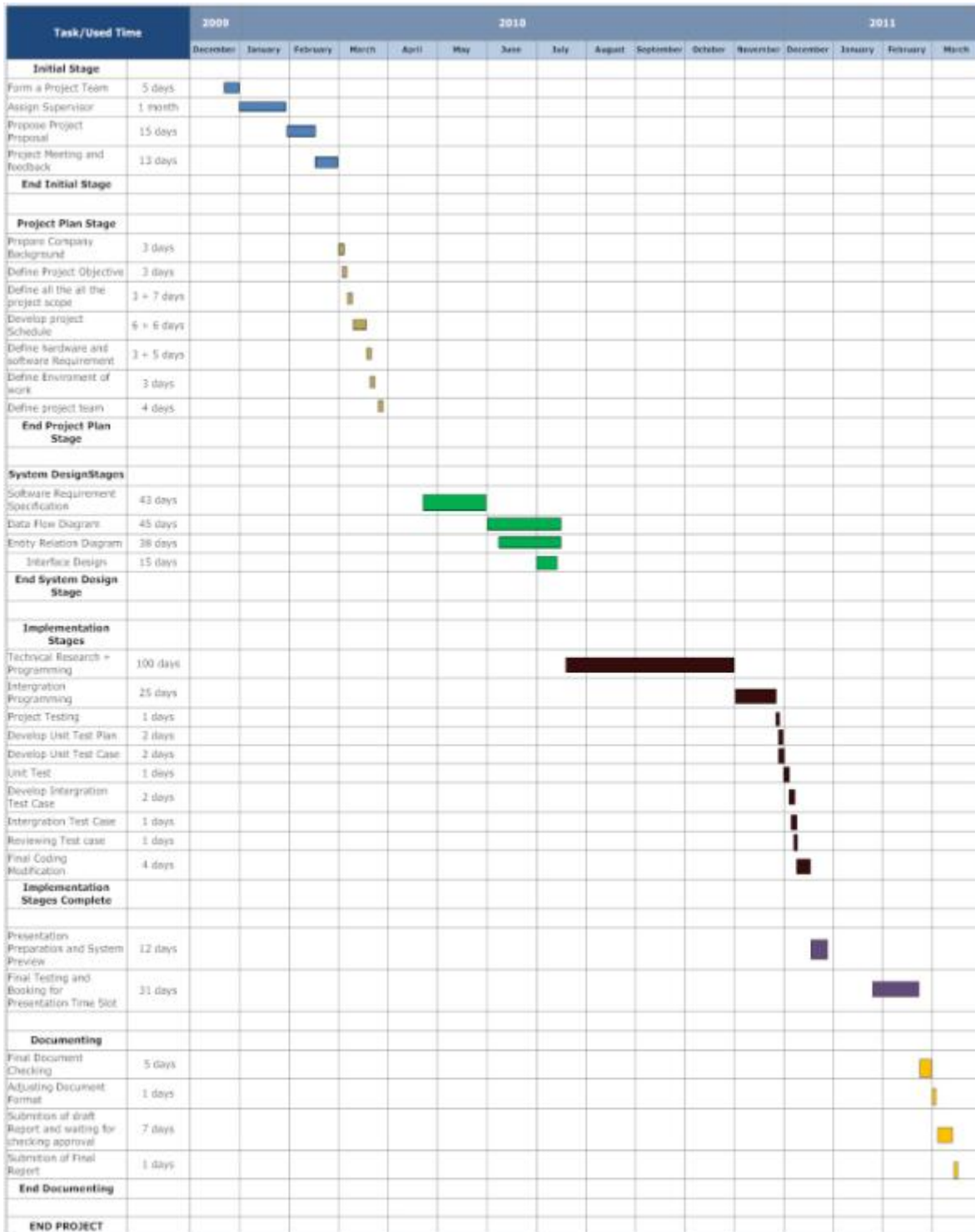


Figure 1.1 Project Schedule

1.5 Outline of approach / Methodology used

The software used to develop Library Management System is Microsoft Visual Studio 2008 and SQL Server 2008 as the database. On the other hand, the methodology I used to develop this system is waterfall model.

Waterfall model is one of a system development life cycle(SDLC) model. Users proceed to next phase if and only if current phase is complete. Users are not allowed go back to previous phases if there are any mistake so they named it waterfall model, just like the water is always fall down from the waterfall and not flow upward.

In Royce's original waterfall model, the waterfall model originally consists of 7 phases which is Requirement Specification, Design, Construction, Integration, Testing and Debugging, Installation and Maintenance.

Firstly, we collect the requirement for the library system, and then we analyzed it. After analyzed the requirement, we proceed to design stage. In the design phase, I design not only the user interface, but also the database design. The next phase in waterfall model after design phase is Construction phase. Construction phase is an important phase in waterfall model and it is a time consuming phase depends on programmer's ability. In Library Management System development, construction phase is using VB.Net coding to write the program. IT is very time consuming if the programmer don't understand the logic or still fresh to the coding. After done the coding phase, we will proceed to integration phase. In this phase, online web site and library system will share a same database to make integration between two applications. The next phase after integration is the testing and debugging phase. For testing module, it is separated into few types which are module testing, system testing, unit testing and user acceptance test. Once there is a bug founded, it will be solve immediately before the system is launched to ensure the system launched is bug free.

Lastly, it is installation and maintenance phase. In this phase, the system will be installed at user side. After installed the system, maintenance is compulsory needed to

ensure the system is always-on and up to date with latest technologies or latest business process.

In my opinion, the time spent on earlier phases of SDLC can lead to greater economy in later stages. It is because in the earlier phase, a bug can be fixed in short time, less cost and less effort compared to later phases.

1.5.1 Development Environment

Software

- Operating system: Window XP Professional SP2

Window XP is selected as my developing operating system because it is more stable than Window 7. The advantage of Window XP over Window 7 is able to run a lot applications and hardware that is not compatible with Window 7. We choose Window XP professional to avoid this kind compatibility problem.

- Database: Microsoft SQL Server 2008

Microsoft SQL Server 2008 is the latest version of SQL Server. Although there is one SQL Server 2008 V2 on the market, but I found it was under Beta after survey on it. So I decide to use Microsoft SQL Server 2008 as the database software for my system. In addition, SQL Server 2008 enables us to copy or move the database to another computer easily. This is very useful when we developing the Library Management System.

- Development tools and programming language: Microsoft Visual Studio 2008 and VB.NET

We would like to use Microsoft Visual Studio 2008 as our developing software. Visual Studio 2008 is powerful and flexible developing software, it allows us to build a good design application with an easy-use drag and drop controls on our form. We can see the user-friendliness of our application once we finished drop the control on form.

Hardware

- Processor: AMD Phenom(™) II X4 925 Processor 2.81 Ghz

AMD Processor provide better processing capabilities and better cooling technology to our CPU. With an AMD processor, we can run our pc for long time without need to switch off. Besides that, AMD processor can help us to boost up the CPU processing power. By using this, we can keep developing the Library Management System without need to worry that the pc cannot support.

- Ram: 3.25 Gb

In order to support Visual Studio and SQL Server 2008, we use 3.25 Gb Ram to avoid any problem occurred during development phase. Besides that, SQL Server can process faster when running SQL statement with 3Gb ram. It can save a lot of time if total up the process time.

1.6 Operation Environment

The table shown below is the minimum requirement for the Library Management System:

Processor	Intel Pentium 233Ghz or better performance
Operating System	Microsoft Window XP, Vista or Window 7
Memory	2GB RAM
Screen Resolution	Minitor with screen resolution minimum 1024 x 768
Hard disk Space	Minimum 5GB to include database usage for future
Database	Microsoft SQL Server 2008

Figure 1.2 Table for operation environment

1.7 Chapter 1 Conclusion

In chapter 1, we discussed about the project background, project schedule, project scope, methodology used and the developing environment and operating environment.

I have faced few problems during system planning. Firstly, the biggest different with other group is my group didn't make system for targeted company. We create the system which contains the library management basic function and the library system can be used by any library especially those not yet implement the computerized system. In this case, we are not able to ask about the user requirement from the end user. Thus, we seek the library system requirement from internet and ask the opinion from supervisor and friends.

On the other hand, we meet some problem in the project schedule. Originally we plan to start the development process at July 2010, but during internship we didn't have much time to process our FYP and delay until end of internship. This make us waste a lot of time and we need to finish a module in a week on time while other people are having a month to complete a module.

The methodology used by me is waterfall model. We need to complete the current stage before we can proceed to next stages. In this case, we need to design the interface before proceed to coding problem. These cause us a big problem because the interface we designed causes some problem during coding stages. The way I solve this problem is write come linkage coding while designing the interface. This process can let me imagine the process flow while designing the interface and ease my work during coding stage.

In this chapter, I have learn that during when using one methodology, we must not followed the steps blindly but make some necessary changes that will ease our job while minimize the error.

Chapter 2

Requirement Analysis

2.0 Requirement Analysis

In this chapter, we will discuss and analyses about the developing process of Library Management System including Software Requirement Specification (SRS) and Data Flow Diagram (DFD).The functional and non-functional requirements is included in SRS part to provide complete description and overview of system requirement before the developing process is carried out. Besides that, DFD provides a view of how the system or business flows that able to increase the efficiency and effectiveness to achieve system objectives.

2.1 Software Requirement Specification (SRS)

2.1.1 General Description

Product Description

Library Management System is a computerized system which can helps user (librarian) to manage the library daily activity in electronic format. It reduces the risk of paper work such as file lost, file damaged and time-consuming. It can help user to manage the transaction or record more effectively and time-saving.

Problem Statement

The problem occurred before having computerized system includes:

➤ File lost

When no computerizes system is implemented, the file always lost because of human and environment. Sometimes librarian didn't keep the record to its original place because of a lot member queue up to borrow books. After that the file was missing due to messy environment.

➤ File damaged

In the other possibility, the file/record will be damaged due to accident. For example the librarian accidentally hit a glass of drink and pours onto the paper file. The record will be damaged. Besides this, natural disaster such as flood also will cause damage to the file record.

➤ Difficult to search record

Without computerized system, when member wants to borrow a book, librarian hard to search for the member's record. It will cause time-consuming when a lot member are waiting to borrow the books.

➤ Space-consuming

After long operation time of the library, the records are getting more and more. Finally, the physical record was space-consuming and no place to keep the file.

➤ Difficult to view reports

Report need to generate manually without computerizes system. Admin need to get the book transaction record and find the information based on the time period. It is time consuming to generate one report.

➤ Cost consuming

Paper is needed to add every new record. After a long period of time, the cost to buy a paper can be high. On the other hand, library needs to employ more staff to solve the long queue problem. If the library only has one staff, it is not enough time to process the book transaction.

2.1.2 System objectives

- Improvement in control and performance
The system was developed to overcome the current problem occurred in library. The system must be able to validate the user, store the record and bug free.
- Save cost
After implementing the computerized library system, library can only hire 1 or 2 staff to handle the book transaction process. With the aids of computerized system, library can save the cost of hire employee and also save the paper-cost.
- Save time
Librarian is able to search the record in short time by pressing only few keys. Compare to previous time before implementing the system, librarian can save a lot time.

2.1.3 System Requirements

2.1.3.1 Non-functional Requirements

➤ Products Requirements

Efficiency requirements

With the library management system, librarian should be able to process faster when they process book transaction. In addition, with the use of bar code scanner, librarian can avoid to type the book id one by one, bar code scanner enable librarian to scan the book id instantly.

Reliability requirements

The system must perform accurately towards member request. For example, when the librarian saves the edited profile detail, after they review their detail, the details must be change according to the latest details that they have updated. When member return the book after the expired date, the fine should be calculate accurately. Besides that, in the registration form, it will have validity check to check the input to prevent wrong data type.

Usability requirements

This system must be designed with user-friendly and easy to use by the staff so that the user can perform their job nicely. It must have a clear instruction to guide user through the system. Besides that, the description of error message should be clear.

➤ Organizational Requirements

Implementation requirements

In implementing the system, it uses the vb.net as the main programming language and tools. Besides that, the SQL language will be use to maintain the information in the database. On the other hand, SQL Server 2008 needs to be installed.

Delivery requirements

The whole system is estimate to be done around 6 months time and the documentation will be done in 2 months. The full system will be delivers in a softcopy method while the documentation will be delivers in hardcopy and softcopy.

➤ External Requirements

Legislative requirements

The information that use must be acknowledge by the authorized people so that it has no violating the law. This information is copyrighted and protected by the law. Besides that, when visitors wants to become the member of the library, he or she must agree with the rules stated in the system.

Security requirements

This system must be highly secure in the login part. It is because the report can only view by admin level. Staff can perform most of the process except viewing report module and log file module.

2.1.3.2 Functional Requirements

1. Normal User

1.1 User Login

Description of Feature

This feature used by the user (librarian / library admin) to login into the system. They are required to key in the user id and password before they are allows entering the system. The user id and password will be verified and invalid id is not allowed to enter the system.

Stimulus / Response Sequences

Stimulus : User runs the system.

Response : System request for user id and password.

Stimulus : User enters user id and password at the textbox provided.

Response : System verifies the user id and password with the data inside database. If the user id is invalid or password not matches, message box will be prompt out to notify the user. If valid, user successfully login to the Library Management System.

Functional Requirements

- User id is provided when they register as staff.
- The system must only allow the user with valid id and password to enter the system.

- The system must be able to perform authorization process which decides what the user's level can access to.
- The user must be able to logout after they finished using the system.

1.2 Password Recovery

Description of Feature

This feature used by the user (librarian / library admin) whenever they forget their login password.

Stimulus / Response Sequences

Stimulus : User runs the system.

Response : System request for user id and password.

Stimulus : User forgets the password and press the "Forget Password".

Response : System sends the email which contains applicant's password to his email. The email is set when the staffs was registered. No any validation because only the user can open his own mailing account.

Functional Requirements

- The system must be able to send the correct password to the user's mailbox.

1.3 Register New book

Description of Feature

This feature can be performing by all users to register new book to the library.

Stimulus / Response Sequences

Stimulus : User press Register new book.

Response : System prompts Add Book form.

Stimulus : User scans the book ISBN number and key in the related information. User chooses a quantity of how many new books were bought and the purchase price.

Response : System will validate the information entered such as ISBN length, price entered whether in correct format. If all the information was entered correctly, system will add the book into [Book] table and [BookInfo] table. The row entered into [bookcopy] is depends on how many book purchased. After enter into database, system will prompts a message box stated that the book was enter successfully.

Functional Requirements

- System must be able to verify the information.
- System must enter the correct copies quantity into book copies table.
- The repeated ISBN number should not be allowed to enter into database.

1.4 Search Book

Description of Feature

This feature is found at book maintenance part. The event is using TextChanged. User can search the book based on ISBN, book title, category or publisher. Once user key in a character into the Search textbox, system will filter and show out the books which fulfil the search criteria.

Stimulus / Response Sequences

Stimulus : User press Book maintenance

Response : System shows all books.

Stimulus : User selects a search criteria and key in a word as keyword.

Response : System will use the keyword and search for the database. For example user selects ISBN, after that key in '1'. System will search the database and looks for book which ISBN contains '1' character. After that, system will show out the filtered book at listview.

Functional Requirements

- System must be able to search the database based on selected search type (ISBN, book title , etc)
- System must able to filter the book based on the keyword entered.
- System must able to show out the filtered book in listview.

1.5 Publisher Maintenance

Description of Feature

This feature can be performing by all users to register, edit information of publisher of the book.

Stimulus / Response Sequences

Stimulus : User press Register new publisher.

Response : System prompts Add publisher form.

Stimulus : To add a new publisher, user clicks 'Add' and enters the information. The publisher id is generated automatically. On the other hand, if the user wants to change the publisher information, they need to select a publisher, and click 'Edit', the textbox will become enable so that they are able to change the data.

Response : System will store the latest information into database.

Functional Requirements

- System must able to auto generate the publisher id.
- System must not generate the same publisher id.
- When user click the publisher on listview, system should show out the publisher information on textbox provided.
- System should not allow PublisherID to be change when user clicks 'Edit'.

1.6 Member Maintenance

Description of Feature

This feature can be performing by all users to register, edit information of a member.

Stimulus / Response Sequences

Stimulus : User press Member Registration.

Response : System prompts Member Registration form.

Stimulus : To add a new member, user clicks 'Add' and enters the information. The member id is generated automatically. On the other hand, if the user wants to change the member information, they need to select a member, and click 'Edit', the textbox will become enable so that they are able to change the data. Click 'Member Renewal' will add 1 years more valid status for member.

Response : System will store the latest information into database.

Functional Requirements

- System must able to auto generate the member id.
- System must not generate the same member id.
- When user click the member on listview, system should show out the member information on textbox provided.
- System should not allow MemberID to be change when user clicks 'Edit'.
- System should be able to validate the ic, email and other info before insert into database.

1.7 Lost Registration

Description of Feature

This feature allows the librarian to register the lost book when member lost the book.

Stimulus / Response Sequences

Stimulus : Member tells librarian that he lost the books, librarian click Lost Registration.

Response : System prompts lost registration form.

Stimulus : Librarian scans the member id using bar code scanner.

Response : System will search the rental info about the member and show all rental books.

Stimulus : Librarian clicks the book where member say it's lost.

Response : System will show out the payment form with the total double for the book's purchase price.

Stimulus : Librarian received money from member and key in the total paid.

Response : System will calculate the balance and update the database.

Functional Requirements

- System must able to search which book was rent by member.
- System must be able to calculate the correct balance

2. Admin User

2.1 View Rental Report

Description of Feature

This feature allows the admin to view the rental transaction info on particular day.

Stimulus / Response Sequences

Stimulus : Admin select a day from datePicker as well as select the type of report whether rent report or return report.

Response : System search the transaction which happen on that day and show out the information.

Stimulus : User can close the report or press 'Print' to generate the report.

Response : System will show print preview dialog for user.

Functional Requirements

- System must able to show out the correct information about the transaction happens on particular date.
- System must show the information correctly whether it is rental report or return report.

2.2 View Top10 Book Report

Description of Feature

This feature allows the admin to view which book is having highest rental rate. By viewing this report, maybe admin can decide to purchase more similar type books.

Stimulus / Response Sequences

Stimulus : Admin select a day from datetimePicker as well as select the book category.

Response : System search the rentalInfo table to get the Top10 Book rental based on the date and category that chose by user.

Stimulus : User can view, close the report or press 'Print' to generate the report.

Response : System will show print preview dialog for user.

Functional Requirements

- System must able to show out the correct information about the transaction happens on particular date.
- The same book should not appear repeatedly.
- The book should only appear only when the book's category is selected by user.
- System must show the report title correctly includes date and category.

2.3 Activity Log

Description of Feature

This feature records every process done by user in the system. System will record down every process such as add record, update record as well as login information.

When system crash, admin can check back which action happens lastly and maybe the action is the cause for system crash.

Stimulus / Response Sequences

Stimulus : Admin select Activity Log from menu

Response : System retrieves the data and show to user using list view.

Stimulus : User views the activity log.

Functional Requirements

- System must able to show out all the activity log information.
- System must store all the critical process into activity log.

2.2 Data Flow Diagram

2.2.1 Context Diagram

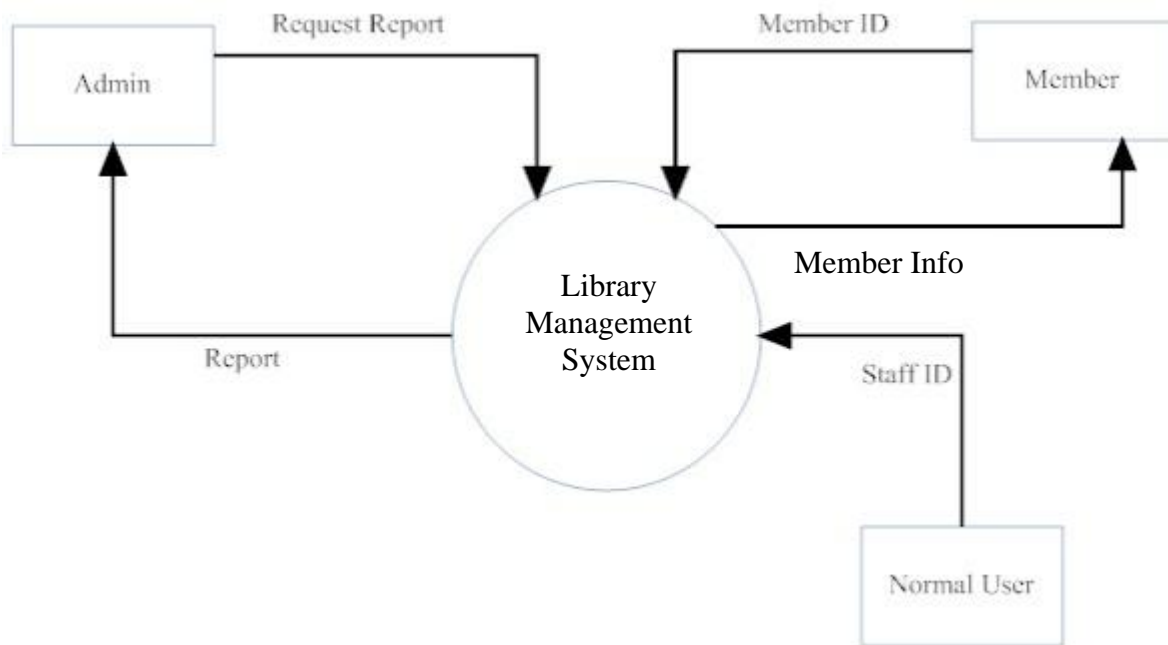


Figure 1.3 Context Diagram for Library Management System

2.2.2. Level 0 DFD (Overview Diagram)

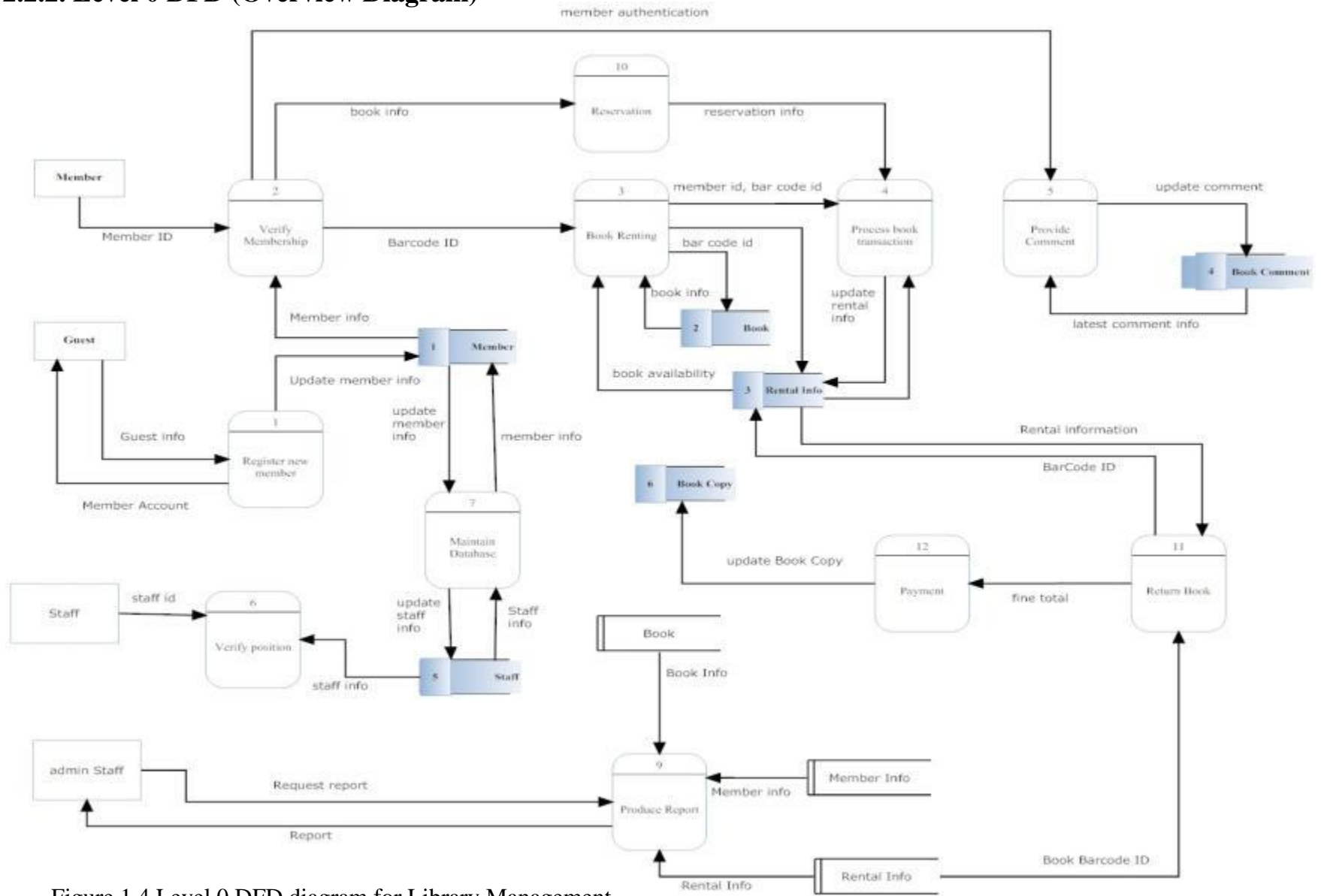


Figure 1.4 Level 0 DFD diagram for Library Management

2.2.3 Level 1DFD (Lower – Level Diagram)

1. Member Registration

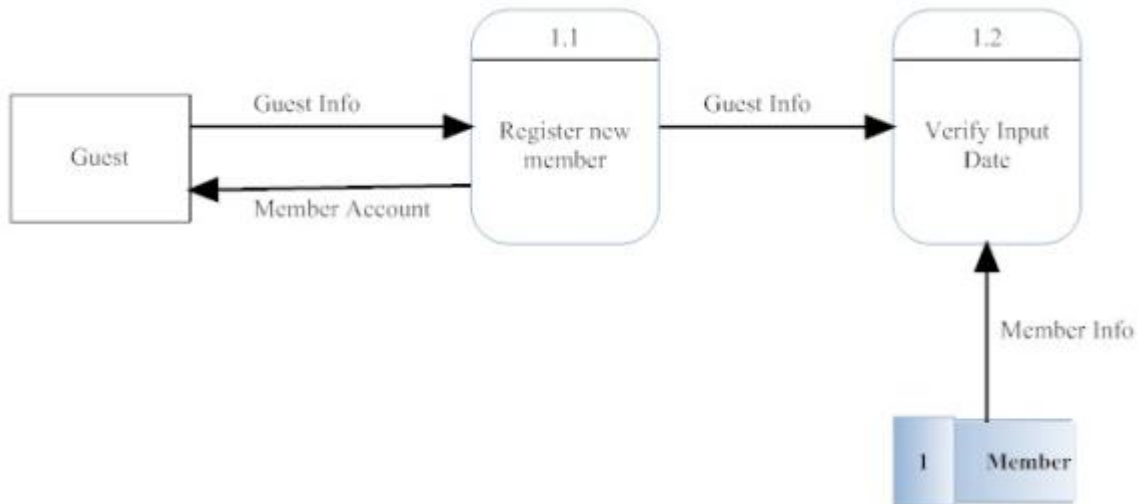


Figure 1.5 Level 1 DFD for Member Registration Module

2. Book Rental

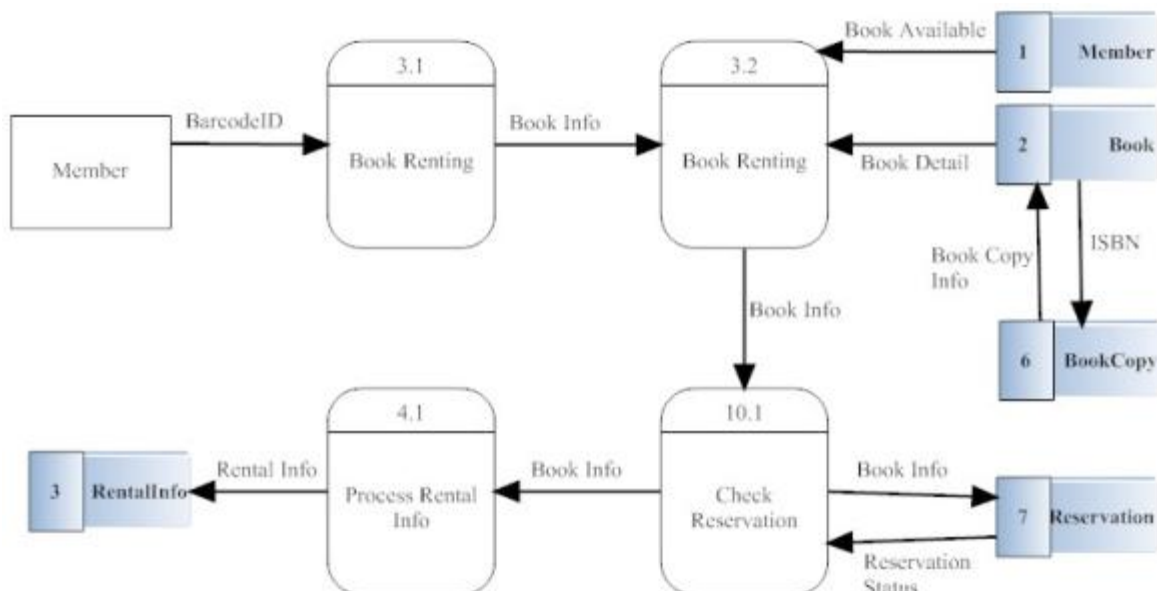


Figure 1.6 Level 1 DFD for Book Rental Module

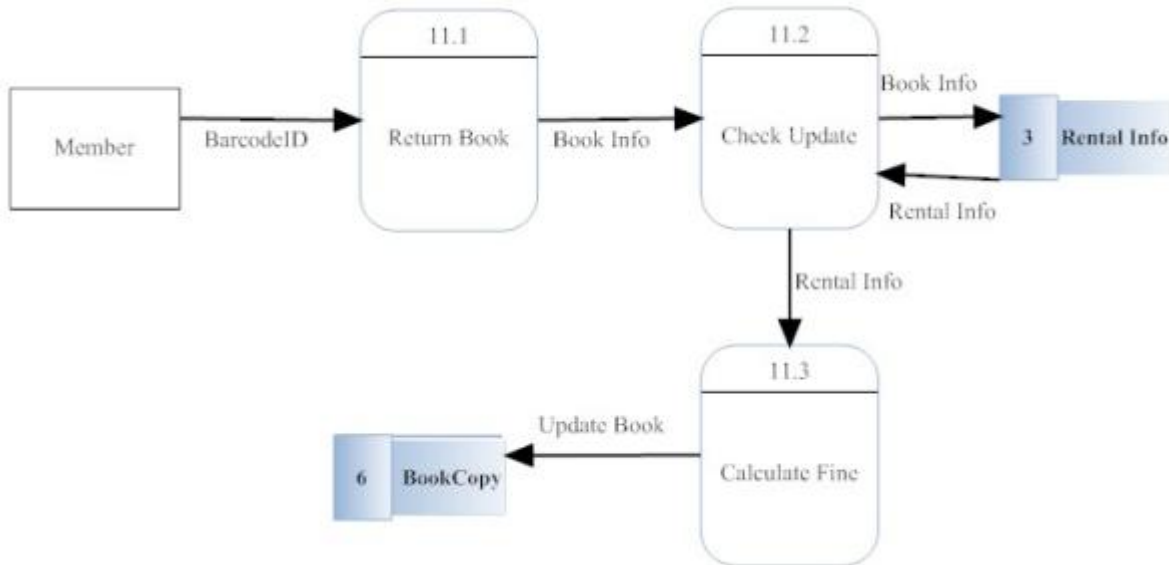
3. Return book

Figure 1.7 Level 1 DFD for Return Book Module

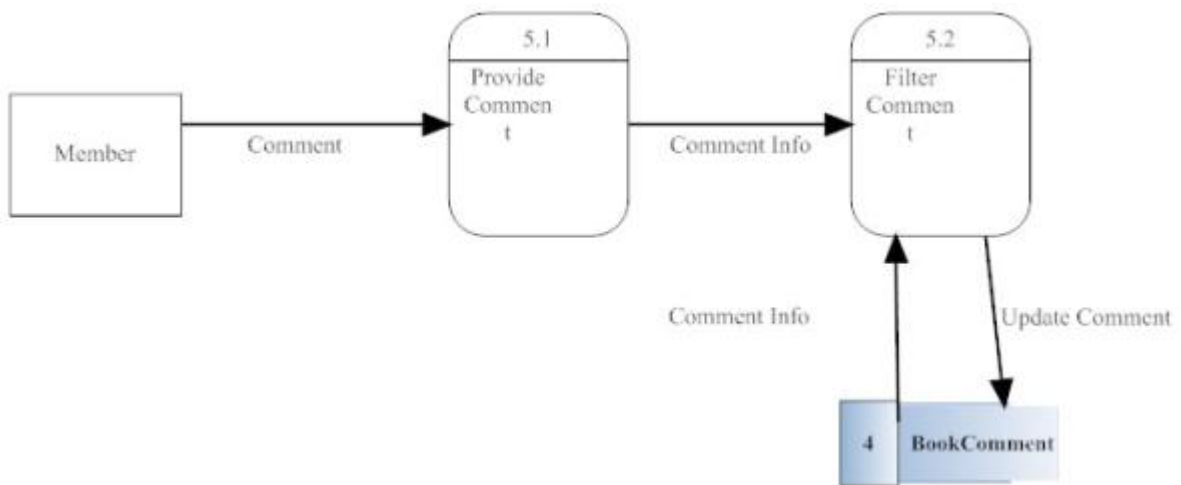
4. Comment

Figure 1.8 Level 1 DFD for Comment Module

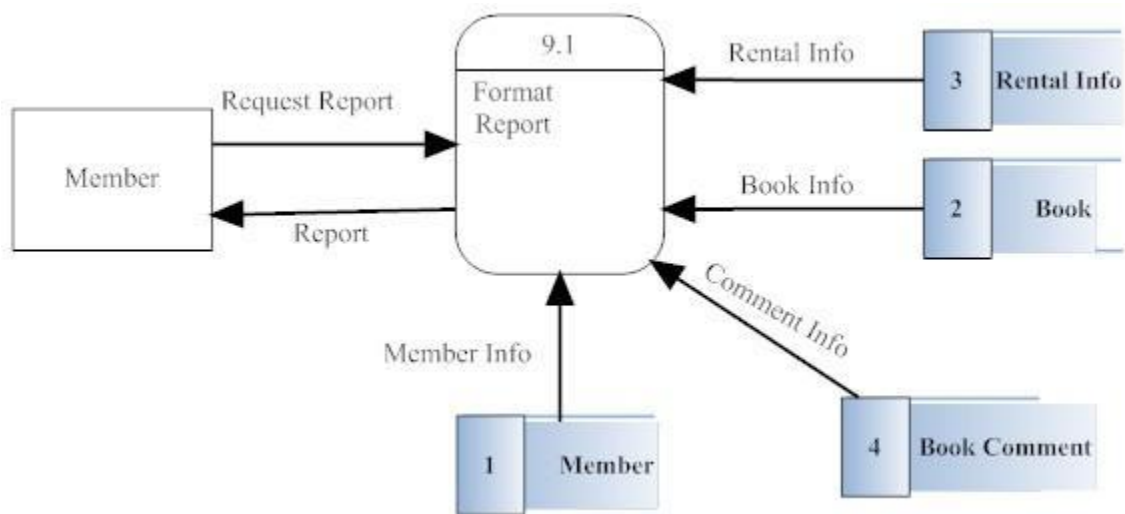
5. Report

Figure 1.9 Level 1 DFD for Report Module

2.3 Chapter 2 Conclusion

In this chapter, I do research about system objectives and system requirements. Besides that, I need to construct the Level 0 Data Flow Diagram (DFD) as well as Level 1 DFD/

In this chapter, I meet a lot problem during construction of DFD diagram. The main reason is because the DFD diagram construction if study during Diploma level and I have forget how to draw it. When I refer to senior's final report, my brain is blank about how to construct.

After seek help from few friends, I found that they unable to help me because all of them also meet the situation like me. Thus, I have to study back the DFD on my own. I found back my Diploma study material, course System Analysis Design. I study again the DFD chapter and finally I could construct the DFD for my Library Management System.

The lesson I learn in this chapter is we must try not to forget what we have learn in the college because in future we might need it in future. In addition, I found the Level 0 DFD is very useful because it can let next programmer or user to understand how to system works.

Chapter 3

System Design

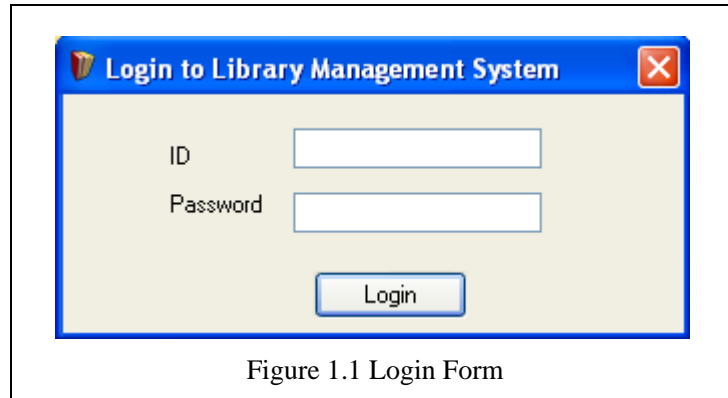
3.0 System Design

This chapter will discuss about System Design phase which is one of the SDLC phase. The GUI design, database design will be carried out in this chapter.

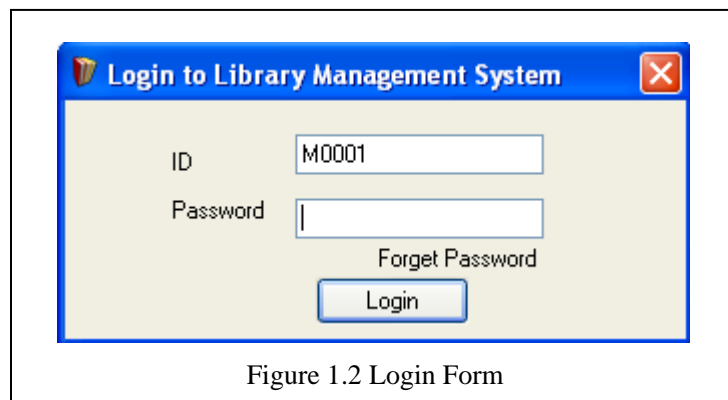
3.1 External Interface Requirements

3.1.1 User Interfaces

Library Management System is used by librarian and admin so it just simply designed and not colorful. The interface is user friendly and easy to use. This can be proving when user can know what the button's function is when he/she looks at the button. It is because the button's text is clear and easy to understand. For example when want to delete a record, I use 'Delete' as button's text and not 'Destroy' or 'Eliminate'.

Library Management System (application used by librarian)Normal level user1. Login Page

This is the login page for librarian and admin. The form is designed without colorful interface because it is used by librarian and admin which can be considered as backend. The login interface is simply design with ID and password textbox.



In figure 1.2, the 'Forget Password' label will show when user focused on password textbox.

2. Main Page

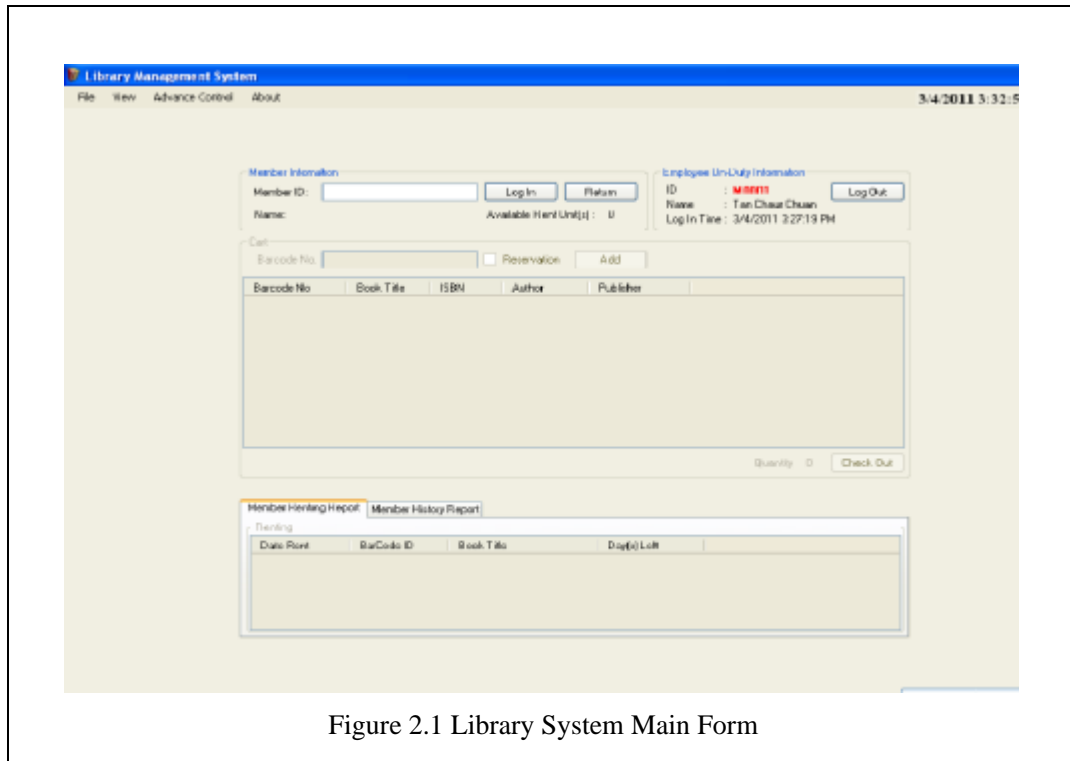


Figure 2.1 Library System Main Form

Figure 2.1 is the main page for library system. In is the form where book transaction module was carried out. The top left side got the menu and top right part show the current time. In this form, the color and word is default setting by Visual Studio 2008. There is no necessary to design the form colorful because member didn't make use of this system.

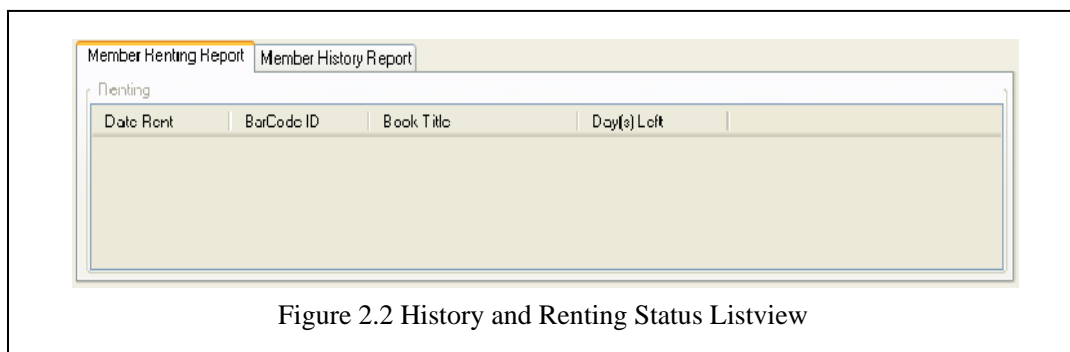
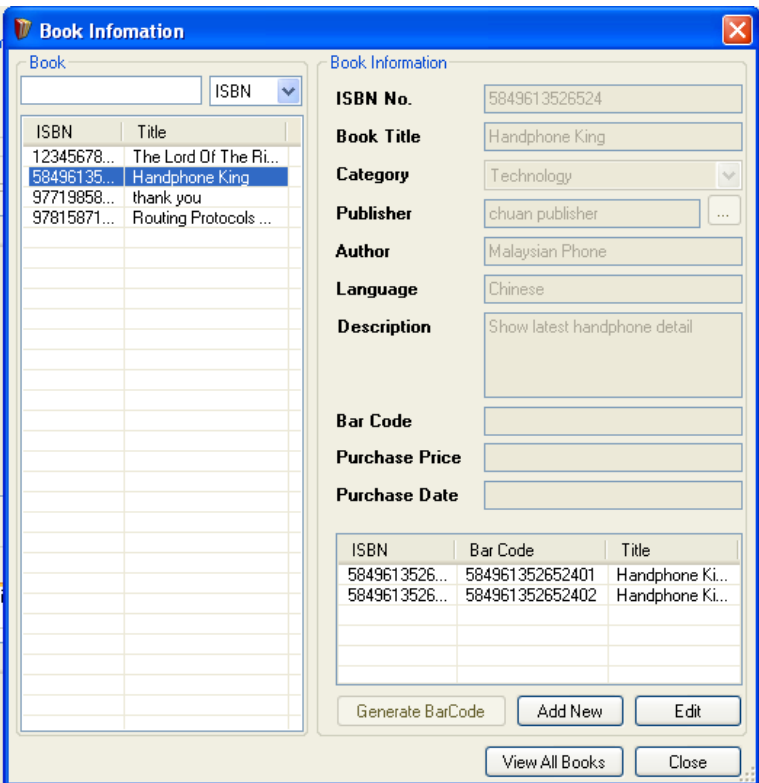


Figure 2.2 History and Renting Status Listview

Figure 2.2 is the control which shown member's transaction detail and also transaction history.

3. Book Maintenance Form



The screenshot displays a software window titled "Book Information" with a search bar and a list of books. The selected book, "Handphone King", has its details shown on the right side of the window. The details include ISBN No., Book Title, Category, Publisher, Author, Language, Description, Bar Code, Purchase Price, and Purchase Date. A small table at the bottom right shows the ISBN, Bar Code, and Title for the selected book.

ISBN	Title
12345678...	The Lord Of The Ri...
58496135...	Handphone King
97719858...	thank you
97815871...	Routing Protocols ...

ISBN No.	5849613526524
Book Title	Handphone King
Category	Technology
Publisher	chuan publisher
Author	Malaysian Phone
Language	Chinese
Description	Show latest handphone detail
Bar Code	
Purchase Price	
Purchase Date	

ISBN	Bar Code	Title
5849613526...	584961352652401	Handphone Ki...
5849613526...	584961352652402	Handphone Ki...

Figure 3.1 Book Maintenance Form

This is the book maintenance form. It will show all books in library when the form is loaded. When user selects one of the books, its details will be shown at right part. Search function is provided so that user can easily found the book if there are hundreds of book in the library.




Figure 3.2 Book Registration Form

Figure 3.2 is a sub module under book maintenance which is Book Registration. The form is provided with few textbox to insert the book information. I used a picture box to let user select the picture so that user can preview the photo after select a file.

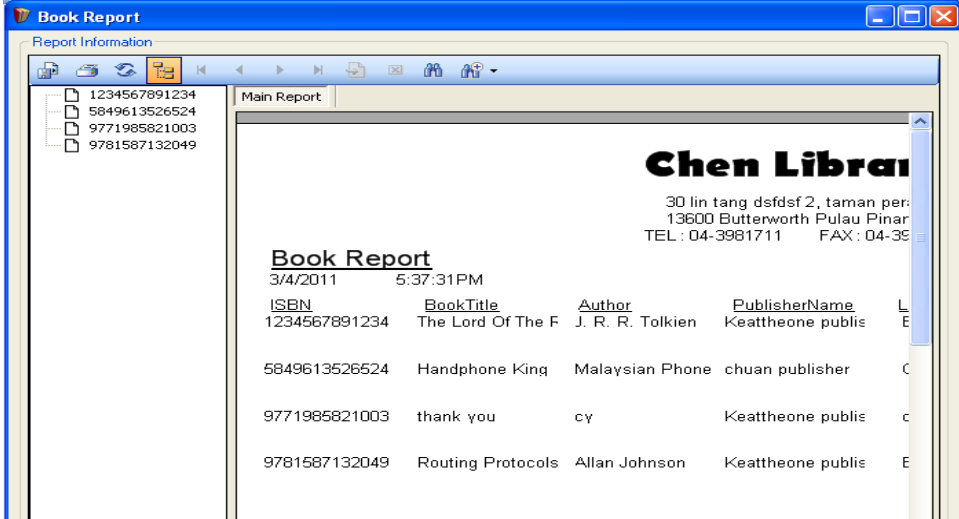


Figure 3.4 View All Books Report

ISBN	BookTitle	Author	PublisherName
1234567891234	The Lord Of The F	J. R. R. Tolkien	Keattheone publis
5849613526524	Handphone King	Malaysian Phone	chuan publisher
9771985821003	thank you	cy	Keattheone publis
9781587132049	Routing Protocols	Allan Johnson	Keattheone publis

Figure 3.4 is a book report under book maintenance module. I used crystal report viewer to let user preview the report before they print out.

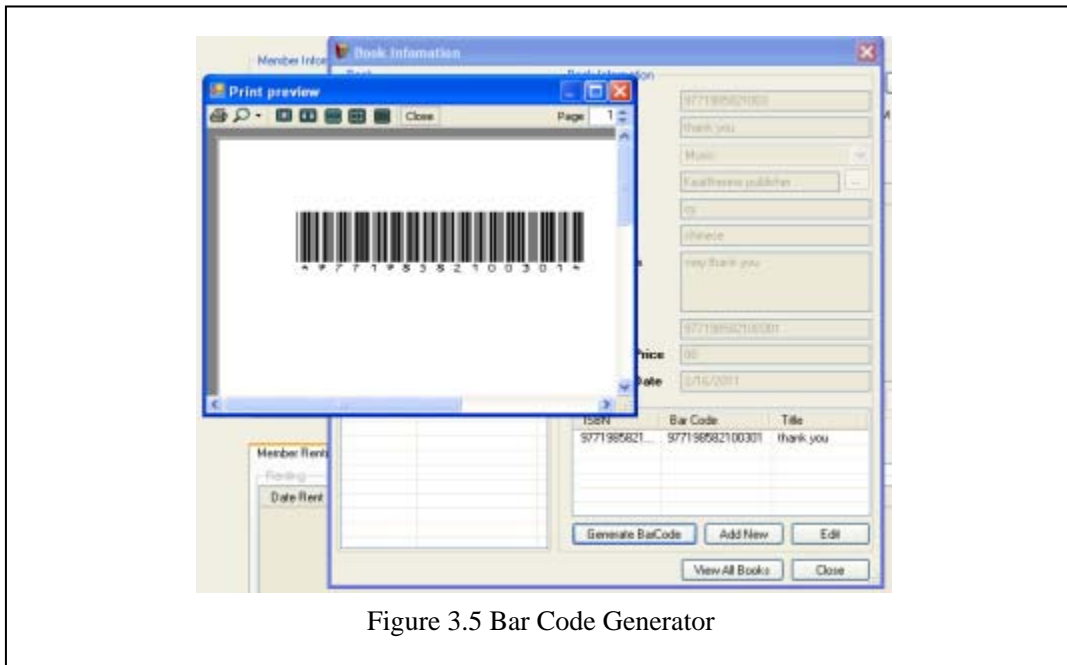


Figure 3.5 Bar Code Generator

Bar Code Generator sub module enable user to print the barcode. The bar code generated based on the book copy that selected by user.

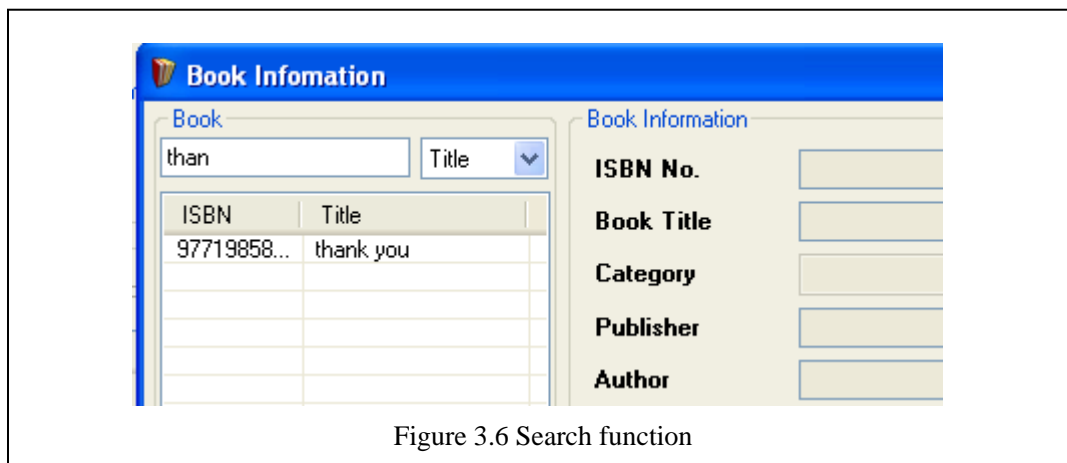


Figure 3.6 Search function

Search function is provided in book maintenance so that user can search the book easily if the library is having more than hundred books. I provide a drop down list for user so that user can select other search category.

4. Member Maintenance Form

ID	Name
M0001	Doi Yee Neng
M0002	Chan Cheang Hau
M0003	Koh Yee Keat
M0004	tan chen chen
M0005	tan tan

Member Information

Member ID:

Name:

IC. No.:

Phone No.:

E - Mail:

Address:

Register Date: Expired Date:

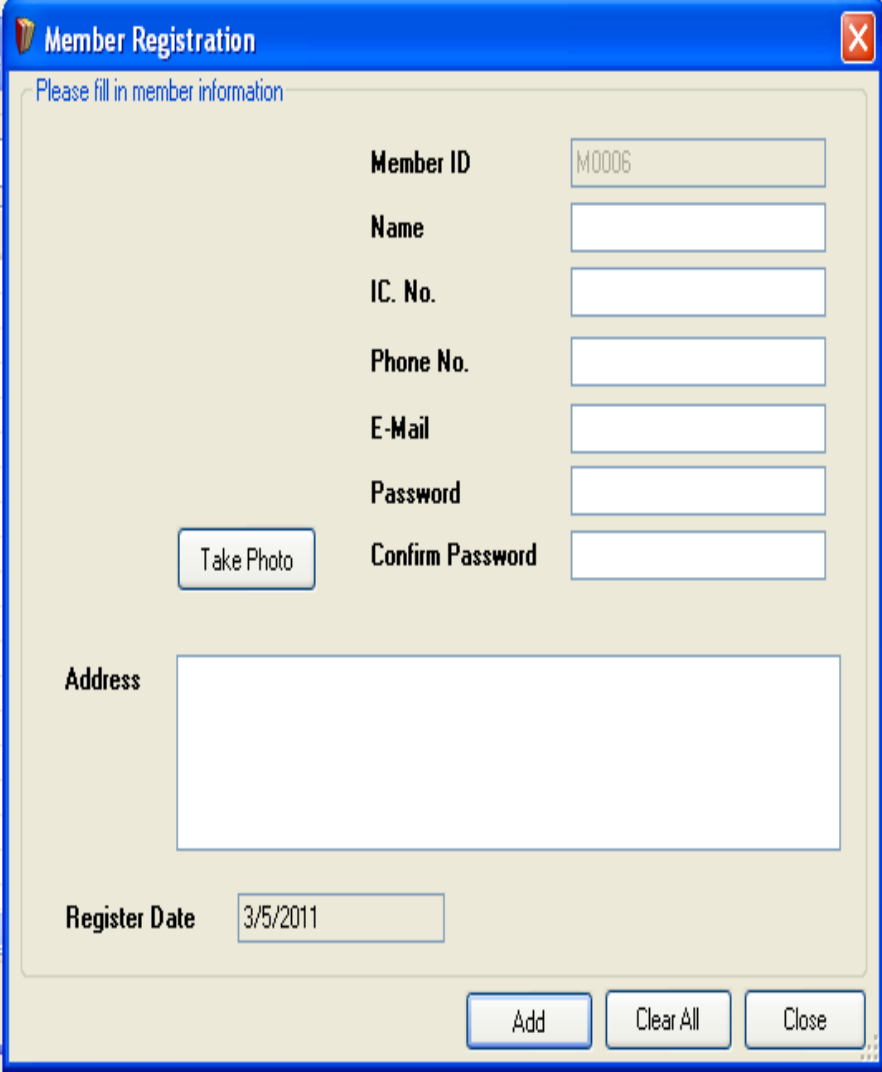
Add Edit View All Members

Membership Renewal Print ID Card Close

Figure 4.1 Member Maintenance Form

This is the form for member maintenance. It is almost similar to book maintenance form. The developer put the listview at left side so that user can view the information at right side. It is more users friendly.

There are few functions can be done in member maintenance such as add new member, edit member information. Membership renewal, print ID card and also View all member Report.



Member Registration

Please fill in member information

Member ID M0006

Name

IC. No.

Phone No.

E-Mail

Password

Confirm Password

Take Photo

Address

Register Date 3/5/2011

Add Clear All Close

Figure 4.2 Member Registration Form

Figure 4.2 shows the member registration form. The form only contains the few fields which user need to insert when register the member. A proper control has been used so that user can use the system easily.

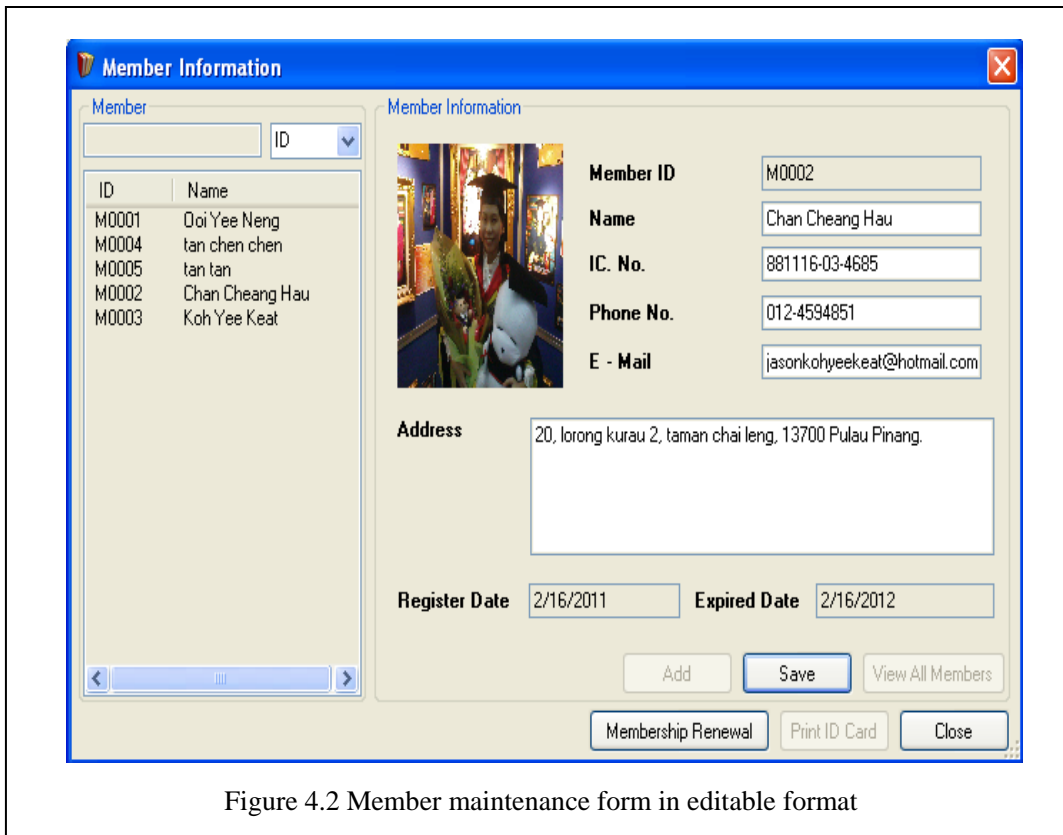


Figure 4.2 Member maintenance form in editable format

Figure 4.2 shows the outlook of Member maintenance form when librarian presses 'Edit'. Librarian is only allows to edit some information such as name, ic, phone, email and address. The member id is not allowed to change because it uniquely identified a member. Some control is disabled in edit mode to avoid the functional error.

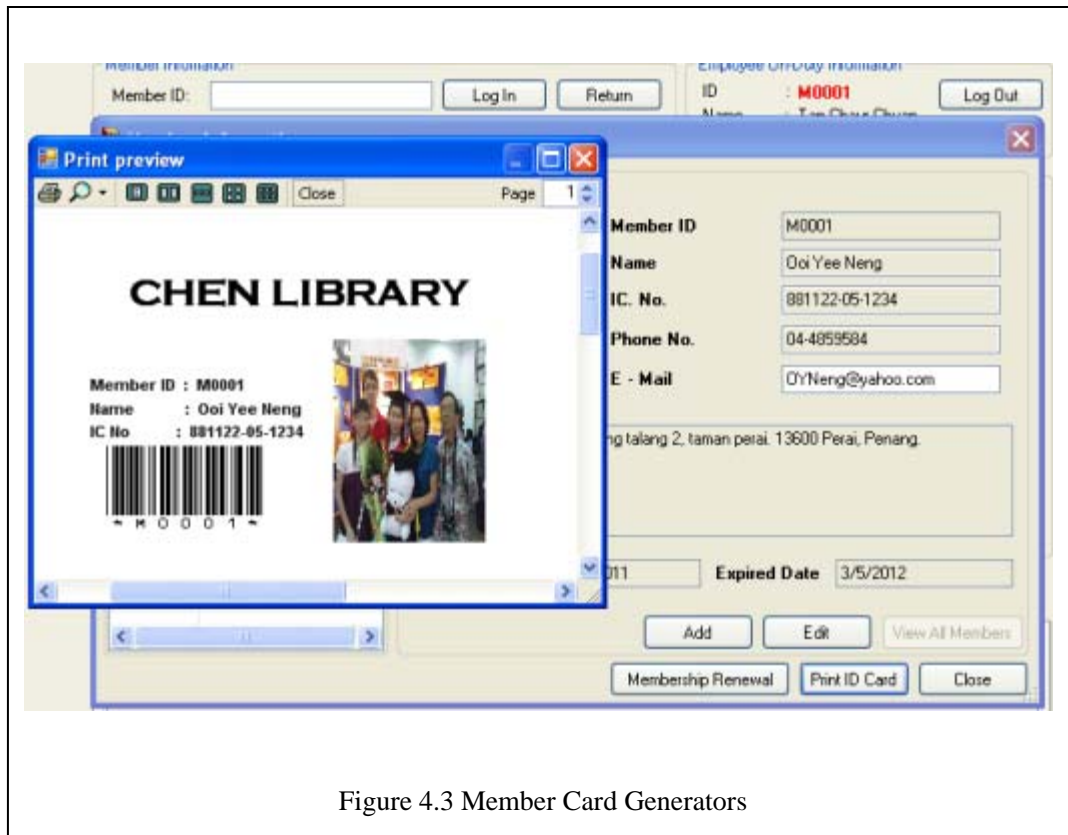


Figure 4.3 Member Card Generators

This sub module is used to generate member ID card. Each member will have their own ID card after they register as member. Print Preview enable user to preview the member card before print it out. If the user is not able to preview, they need to re print and waste the paper.

5. Publisher Maintenance Form

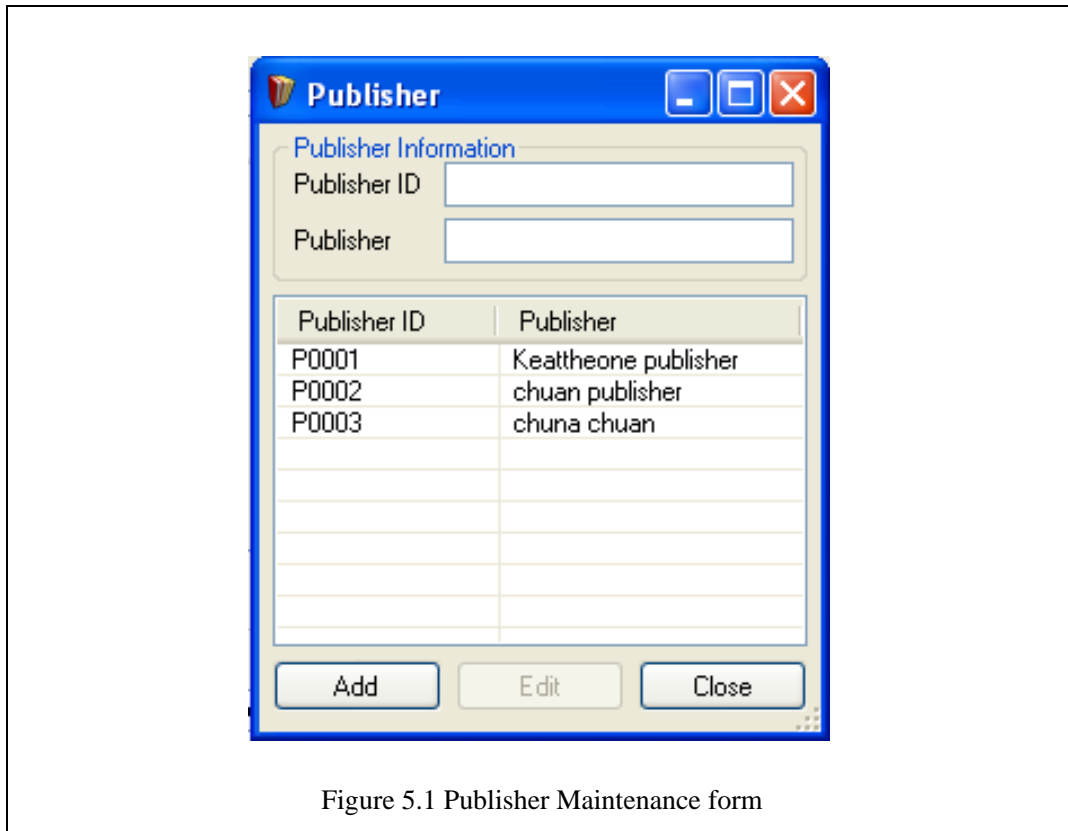
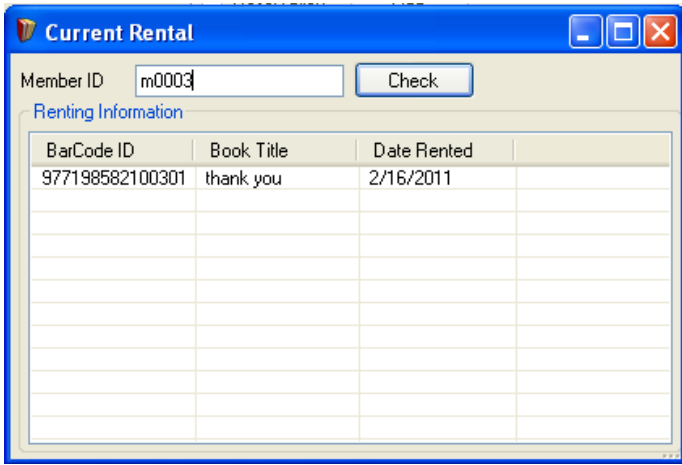


Figure 5.1 Publisher Maintenance form

Figure above shows Publisher maintenance forms. The form is only contains 2 information which is publisher ID and publisher name. It is be because this is additional module used when user wants to ad a book.


6. Lost Book Module Form

The screenshot shows a window titled "Current Rental". At the top, there is a "Member ID" field containing "m0003" and a "Check" button. Below this is a section titled "Renting Information" which contains a table with the following data:

BarCode ID	Book Title	Date Rented
977198582100301	thank you	2/16/2011

Figure 6.1 Lost Book Form

When member lost the books, he needs to register the lost book to librarian. Librarian need to select 'Lost Registration' from File menu. This form is simple because user just needs to select the book rented.



The screenshot shows a window titled "Payment". On the left, there is an image of a balance scale with a stack of books on one side and a dollar sign on the other. On the right, there is a summary of payment details:

Total : 176
Payment : 200
Changes : RM 24.00

Thank You !

At the bottom, there are two buttons: "Calculate Changes" and "Close".

Figure 6.2 Payment Form

After double click on the selected book, the payment form will be shown to receive payment from member.

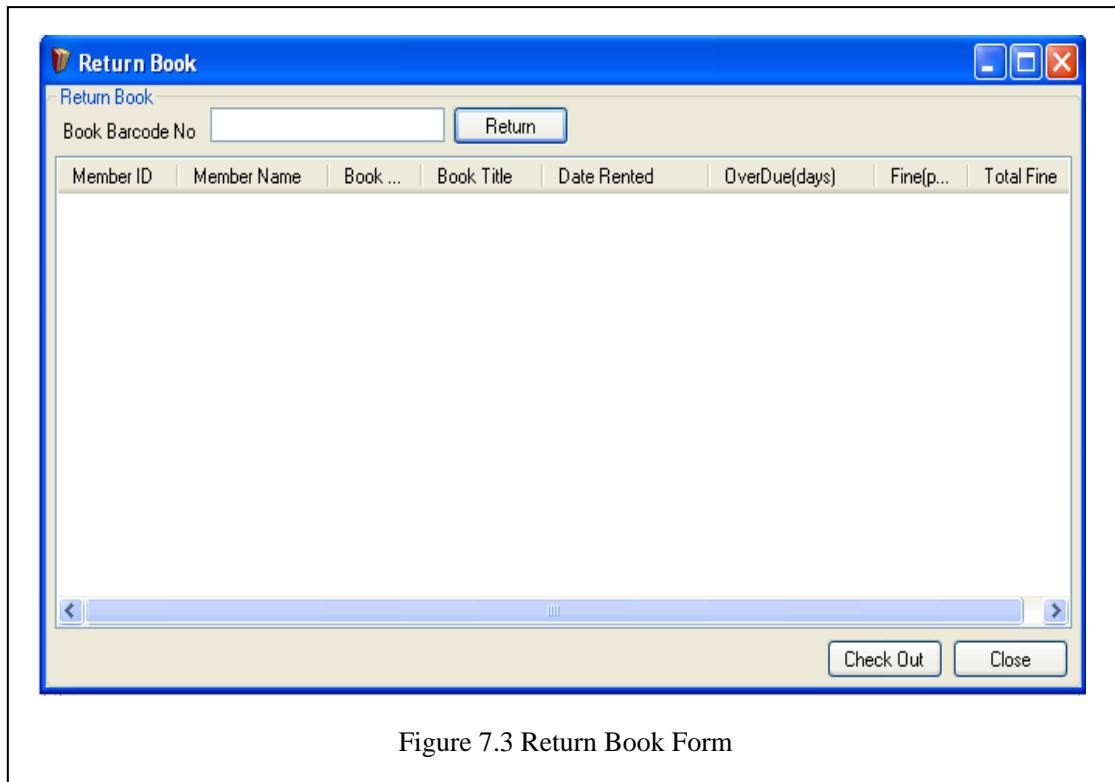
7. Book Transaction Module

The screenshot displays the main form for the Book Transaction module. It is divided into several sections:

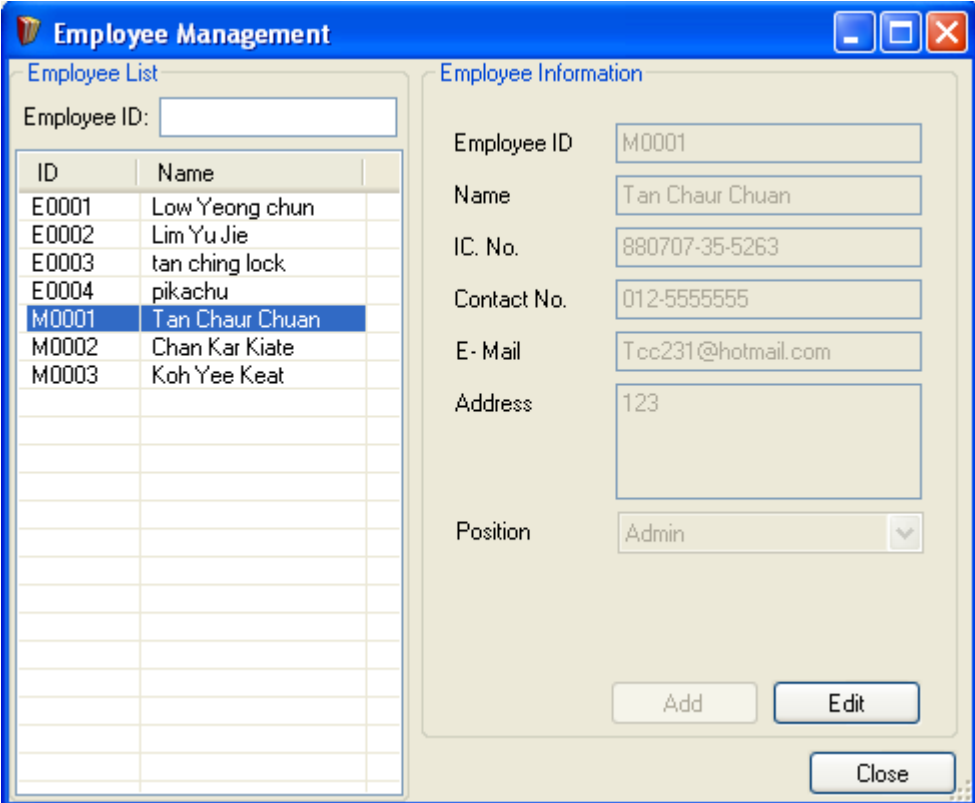
- Member Information:** Includes a text input for "Member ID:", a "Log In" button, a "Return" button, a "Name:" label, and a display of "Available Rent Unit(s): 0".
- Employee On-Duty Information:** Shows "ID : M0001" (with M0001 in red), "Name : Tan Chaur Chuan", "Log In Time : 3/5/2011 7:25:30 PM", and a "Log Out" button.
- Cart:** Features a "Barcode No." input field, a "Reservation" checkbox, and an "Add" button.
- Table:** A table with columns for "Barcode No", "Book Title", "ISBN", "Author", and "Publisher". The table body is currently empty.
- Bottom Right:** Displays "Quantity 0" and a "Check Out" button.

Figure 7.1 Main form – Book Transaction module

This is the interface where book transaction process is done located at main page.



This is the return book form. It can be open by pressing 'Return' button at main screen.

Admin level user8. Employee Maintenance Form

The screenshot displays a software window titled "Employee Management". It is divided into two main sections: "Employee List" and "Employee Information".

Employee List: A table with two columns, "ID" and "Name". The data is as follows:

ID	Name
E0001	Low Yeong chun
E0002	Lim Yu Jie
E0003	tan ching lock
E0004	pikachu
M0001	Tan Chaur Chuan
M0002	Chan Kar Kiate
M0003	Koh Yee Keat

Employee Information: A form with the following fields and values:

- Employee ID: M0001
- Name: Tan Chaur Chuan
- IC. No.: 880707-35-5263
- Contact No.: 012-5555555
- E-Mail: Tcc231@hotmail.com
- Address: 123
- Position: Admin (selected from a dropdown menu)

At the bottom of the form, there are three buttons: "Add", "Edit", and "Close".

Figure 8.1 Employee Management Form

Figure above show the employee maintenance form. This form is designed in the same concept with member registration and suitable control has been apply for certain information such as using drop down list for position.

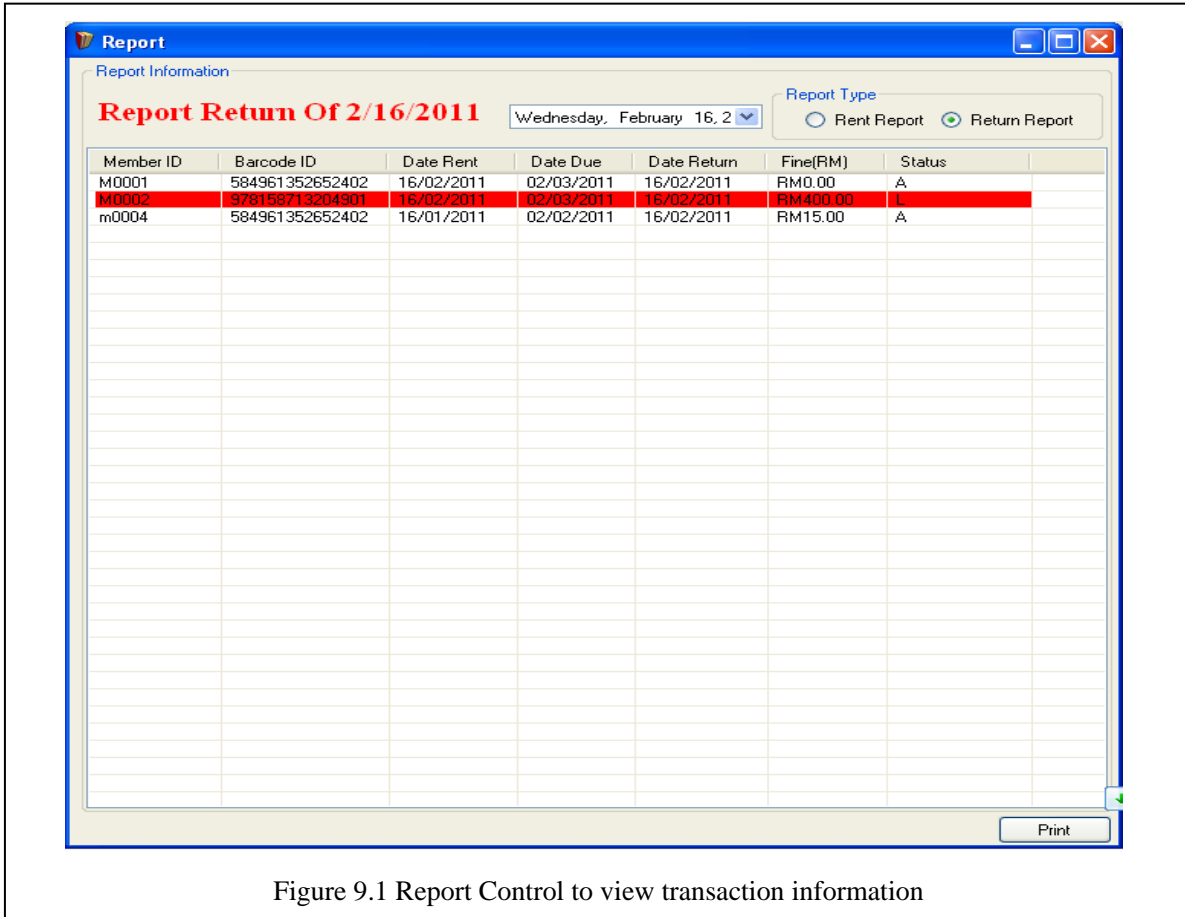
9. Book Transaction Report (Rental / Return)

Figure 9.1 Report Control to view transaction information

This is the report list view that shows all the book transaction happens on particular date. It is a shortcut way to view the report without need to print out the report.

10. Top10 Book Report

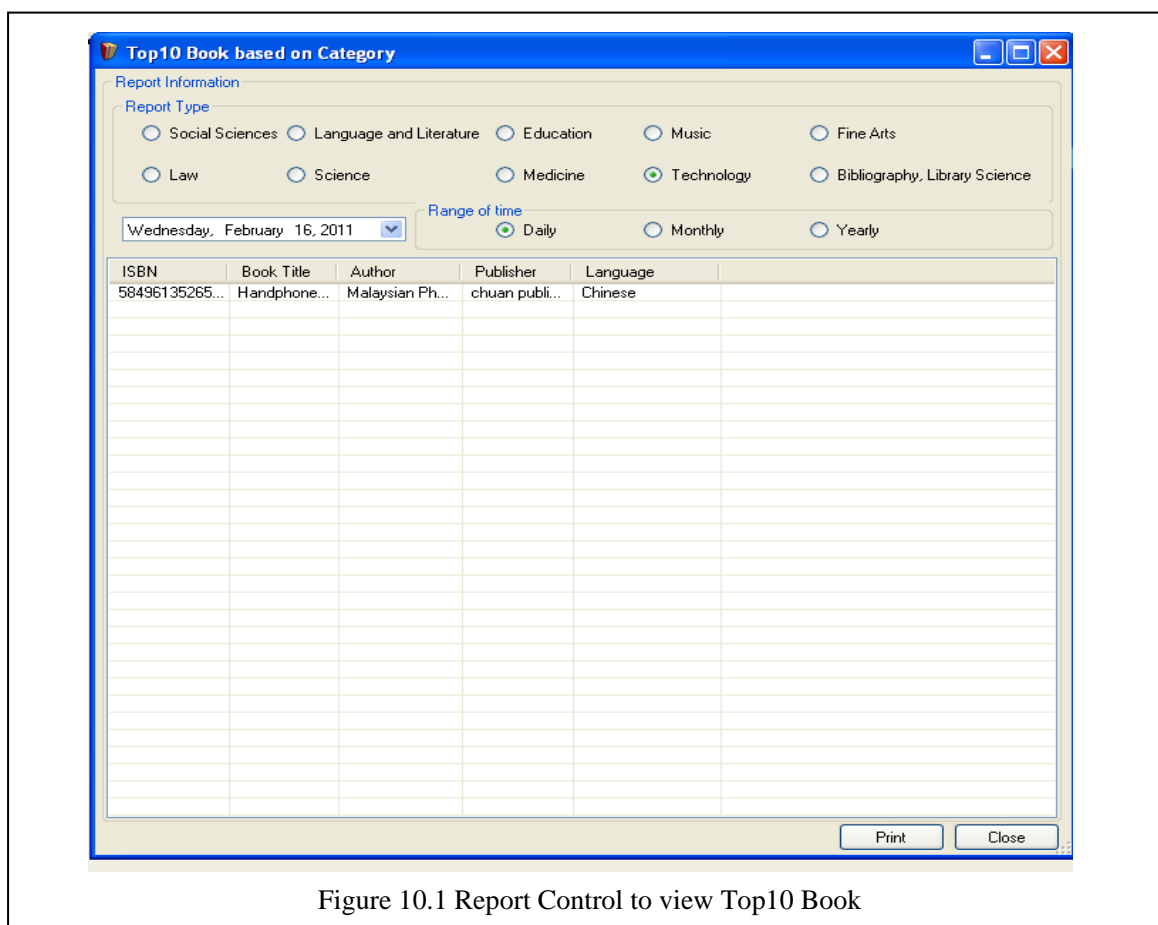


Figure above shows the Top 10 Book report. User can filter it by select the book category and also the type of report such as daily, monthly or yearly. Print function is also provided in this report module. The radio button has been used so that user can have different control used besides drop down list. The date time picker control is used so that user no need to key in the date by them.

11. Lost Book Report

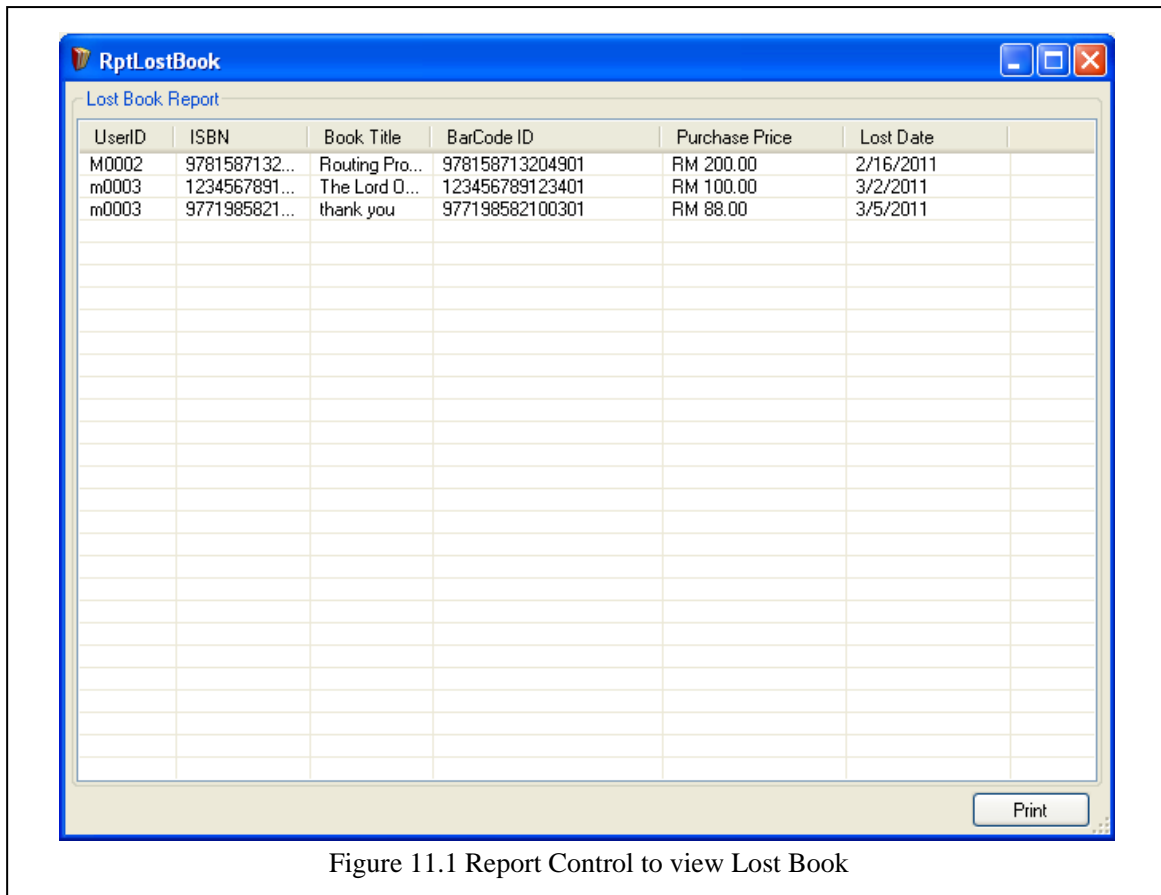
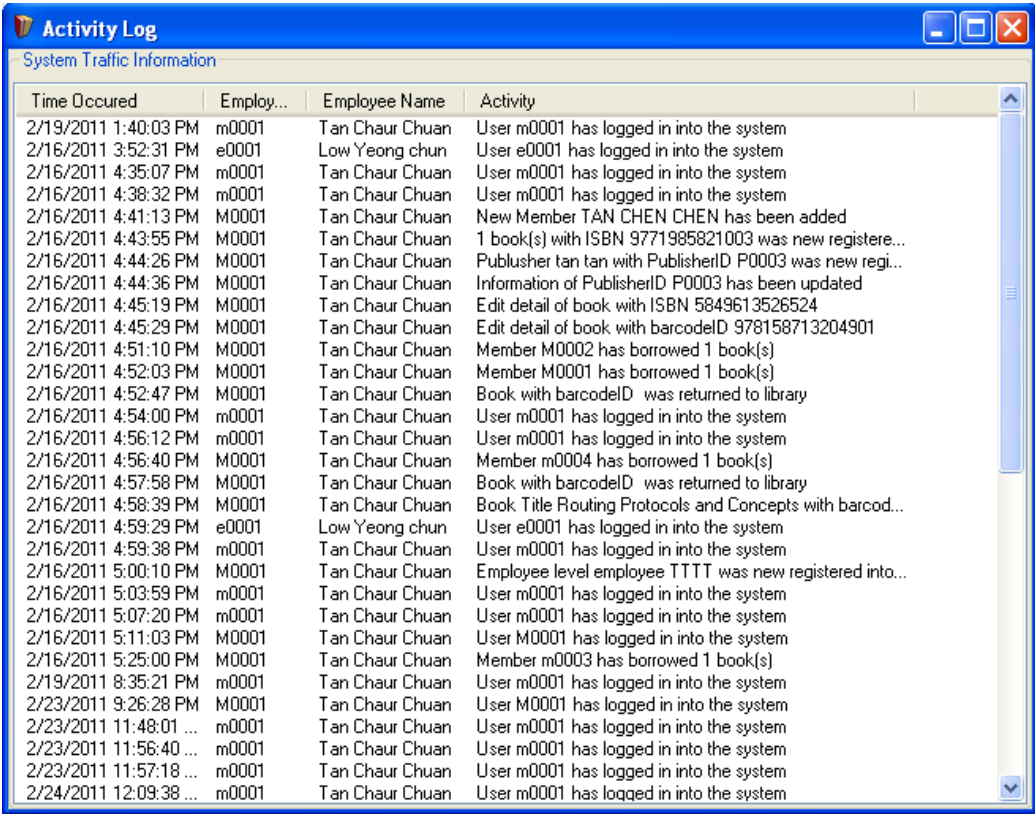


Figure 11.1 Report Control to view Lost Book

Admin user can view the lost book's information through the list view without need to print out.

12. Activity Log Report

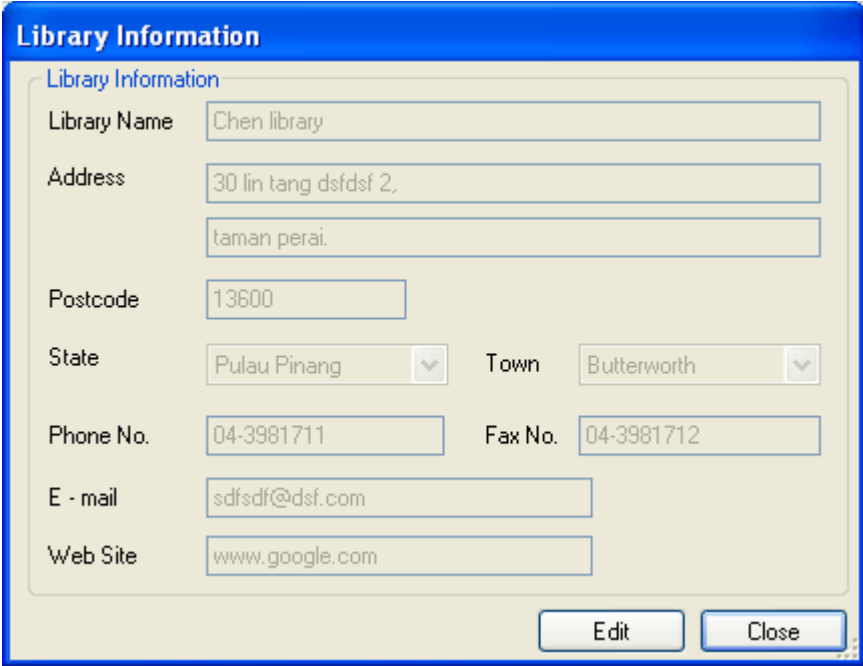


Time Occured	Employ...	Employee Name	Activity
2/19/2011 1:40:03 PM	m0001	Tan Chaur Chuan	User m0001 has logged in into the system
2/16/2011 3:52:31 PM	e0001	Low Yeong chun	User e0001 has logged in into the system
2/16/2011 4:35:07 PM	m0001	Tan Chaur Chuan	User m0001 has logged in into the system
2/16/2011 4:38:32 PM	m0001	Tan Chaur Chuan	User m0001 has logged in into the system
2/16/2011 4:41:13 PM	M0001	Tan Chaur Chuan	New Member TAN CHEN CHEN has been added
2/16/2011 4:43:55 PM	M0001	Tan Chaur Chuan	1 book(s) with ISBN 9771985821003 was new registere...
2/16/2011 4:44:26 PM	M0001	Tan Chaur Chuan	Publisher tan tan with PublisherID P0003 was new regi...
2/16/2011 4:44:36 PM	M0001	Tan Chaur Chuan	Information of PublisherID P0003 has been updated
2/16/2011 4:45:19 PM	M0001	Tan Chaur Chuan	Edit detail of book with ISBN 5849613526524
2/16/2011 4:45:29 PM	M0001	Tan Chaur Chuan	Edit detail of book with barcodeID 978158713204901
2/16/2011 4:51:10 PM	M0001	Tan Chaur Chuan	Member M0002 has borrowed 1 book(s)
2/16/2011 4:52:03 PM	M0001	Tan Chaur Chuan	Member M0001 has borrowed 1 book(s)
2/16/2011 4:52:47 PM	M0001	Tan Chaur Chuan	Book with barcodeID was returned to library
2/16/2011 4:54:00 PM	m0001	Tan Chaur Chuan	User m0001 has logged in into the system
2/16/2011 4:56:12 PM	m0001	Tan Chaur Chuan	User m0001 has logged in into the system
2/16/2011 4:56:40 PM	M0001	Tan Chaur Chuan	Member m0004 has borrowed 1 book(s)
2/16/2011 4:57:58 PM	M0001	Tan Chaur Chuan	Book with barcodeID was returned to library
2/16/2011 4:58:39 PM	M0001	Tan Chaur Chuan	Book Title Routing Protocols and Concepts with barcod...
2/16/2011 4:59:29 PM	e0001	Low Yeong chun	User e0001 has logged in into the system
2/16/2011 4:59:38 PM	m0001	Tan Chaur Chuan	User m0001 has logged in into the system
2/16/2011 5:00:10 PM	M0001	Tan Chaur Chuan	Employee level employee TTTT was new registered into...
2/16/2011 5:03:59 PM	m0001	Tan Chaur Chuan	User m0001 has logged in into the system
2/16/2011 5:07:20 PM	m0001	Tan Chaur Chuan	User m0001 has logged in into the system
2/16/2011 5:11:03 PM	M0001	Tan Chaur Chuan	User M0001 has logged in into the system
2/16/2011 5:25:00 PM	M0001	Tan Chaur Chuan	Member m0003 has borrowed 1 book(s)
2/19/2011 8:35:21 PM	m0001	Tan Chaur Chuan	User m0001 has logged in into the system
2/23/2011 9:26:28 PM	M0001	Tan Chaur Chuan	User M0001 has logged in into the system
2/23/2011 11:48:01 ...	m0001	Tan Chaur Chuan	User m0001 has logged in into the system
2/23/2011 11:56:40 ...	m0001	Tan Chaur Chuan	User m0001 has logged in into the system
2/23/2011 11:57:18 ...	m0001	Tan Chaur Chuan	User m0001 has logged in into the system
2/24/2011 12:09:38 ...	m0001	Tan Chaur Chuan	User m0001 has loqged in into the system

Figure 12.1 Report control to view activity log

Figure 12.1 shows the interface for activity log. Admin can which user has performed what process. The information such as login detail, add book or edit the member/book information will be recorded.

13. Library Detail Form



The screenshot displays a 'Library Information' form with the following fields and values:

Field	Value
Library Name	Chen library
Address	30 lin tang dsfdf 2, taman perai.
Postcode	13600
State	Pulau Pinang
Town	Butterworth
Phone No.	04-3981711
Fax No.	04-3981712
E - mail	sdfsdf@dsf.com
Web Site	www.google.com

Buttons: Edit, Close

Figure 13.1 Library Detail Form

This form will be shown when admin user login for first time. The library detail must be entered to avoid some functional error. The form is small and full with the field needed. Most of the real system also designed in this way because the user is not member.

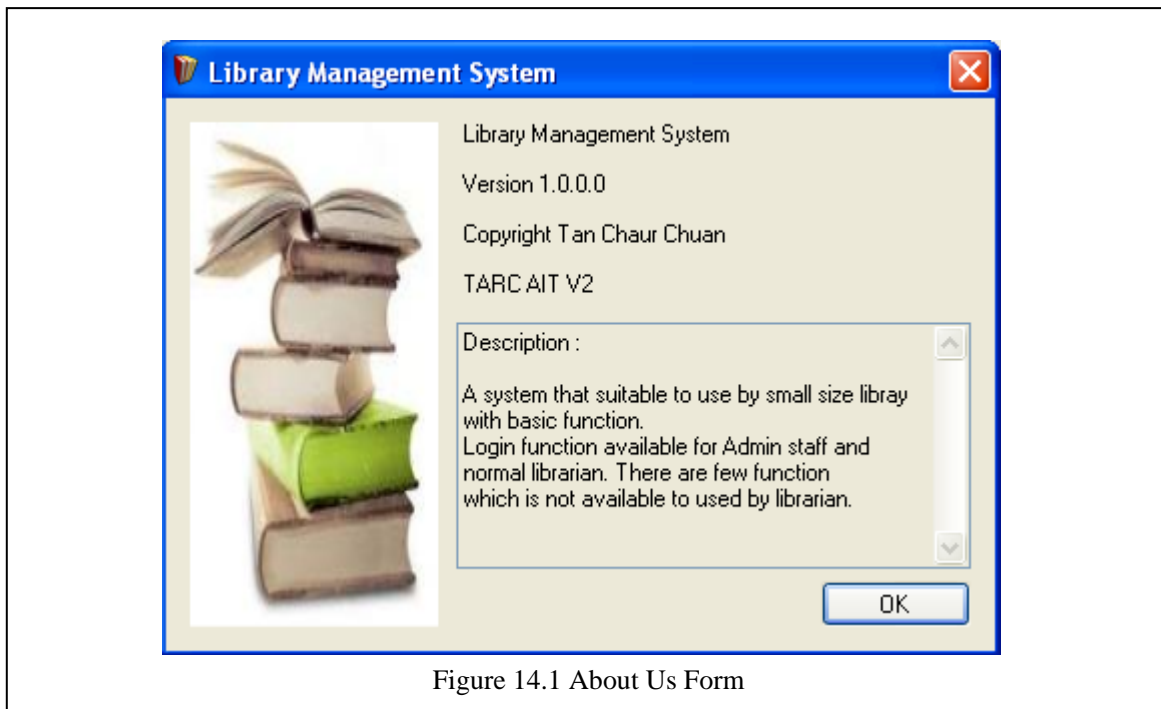
14. About us

Figure 14.1 About Us Form

This is About us form which show the detail of developer and brief description of Library System.

3.1.2 Hardware Interfaces

For Library Management System, the additional device needed is bar code scanner. Barcode scanner is needed to scan the book barcode id and also scan the member id. This can be time saving because librarian no need to type the bar code of the book or member.

3.1.3 Software Interfaces

Library Management System requires user to install SQL Server 2008. SQL Server 2008 is the latest version of SQL Server and it has been enhanced compared to SQL Server 2005. For operating system, Library System requires Window XP or newer version.

3.1.4 Communication Interfaces

Although Library System is not a web application, but some function required the internet connection. Thus, HyperText Transfer Protocol (HTTP) shall be used to provide internet connection to the system. HTTP is a standard method of transferring data between web server and web client. Our library system will serves as web client and send the request to targeted web server. On the other hand, USB port is also required to plug in the bar code reader.

3.2 Entity Relationship Diagram (ERD)

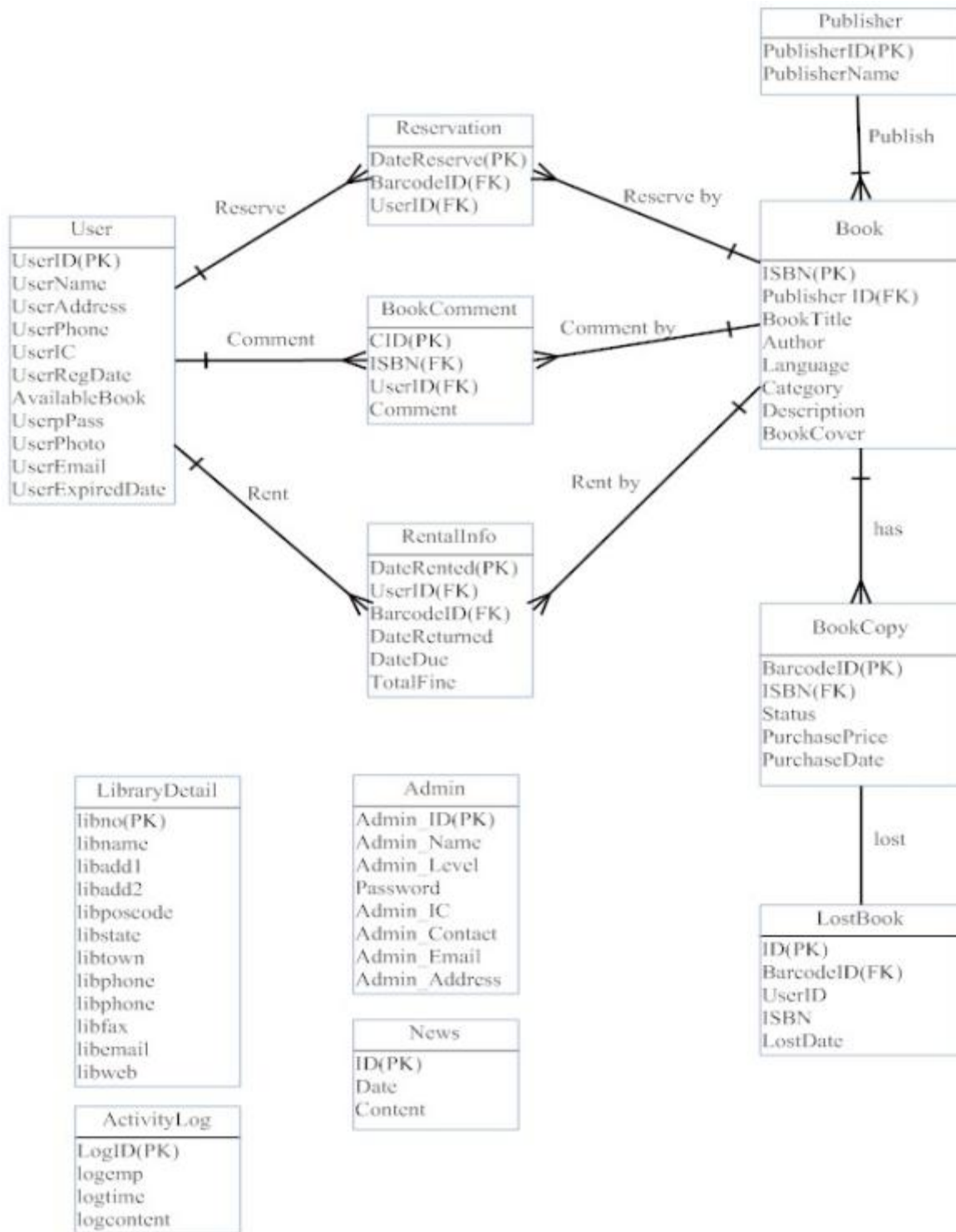


Figure 15.1 Entity Relationship Diagram for Library Management System

3.3 Normalization

3.3.1 1st Normalization

RentalInfo (UserID, ISBN, BookTitle, Author, PublisherID, PublisherName, Language, Category, Description, BookCover, BarCodeID, Status, PurchasePrice, PurchaseDate, UserName, UserAddress, UserPhone, UserIC, UserRegDate, AvailableBook, UserPass, UserPhoto, UserEmail, UserExpiredDate, DateRented, DateReturned, DateDue, TotalFine)

Reservation (UserID, BarCodeID, DateRented)

LibraryDetail (Libno, libname, libadd1, libadd2, libposcode, libstate, libtown, libphone, libfax, libemail, libweb)

News(ID, date, content)

ActivityLog (LogID, LogEmp, LogContent)

LostBook (ID, BarCodeID*, UserID*, ISBN*, LostDate)

Admin (Admin ID, AdminName, AdminLevel, Password, AdminID, AdminContact, AdminEmail, AdminAddress)

3.3.2 2nd Normalization

RentalInfo (UserID, ISBN, BookTitle, Author, PublisherID, PublisherName, Language, Category, Description, BookCover, BarCodeID, Status, PurchasePrice, PurchaseDate, DateRented, DateReturned, DateDue, TotalFine)

User (UserID, UserName, UserAddress, UserPhone, UserIC, UserRegDate, AvailableBook, UserPass, UserPhoto, UserEmail, UserExpiredDate)

Reservation (UserID, BarCodeID, DateRented)

LibraryDetail (Libno, libname, libadd1, libadd2, libposcode, libstate, libtown, libphone, libfax, libemail, libweb)

News(ID, date, content)

ActivityLog (LogID, LogEmp, LogContent)

LostBook (ID, BarCodeID*, UserID*, ISBN*, LostDate)

Admin (Admin ID, AdminName, AdminLevel, Password, AdminID, AdminContact, AdminEmail, AdminAddress)

3.3.2.3 3rd Normalization

RentalInfo (UserID, ISBN, BarCodeID, DateRented, DateReturned, DateDue, TotalFine)

Book (ISBN, BookTitle, Author, PublisherID, Language, Category, Description, BookCover)

Publisher (PublisherID, PublisherName)

BookCopy (BarCodeID, ISBN, Status, PurchasePrice, PurchaseDate)

User (UserID, UserName, UserAddress, UserPhone, UserIC, UserRegDate, AvailableBook, UserPass, UserPhoto, UserEmail, UserExpiredDate)

Reservation (UserID, BarCodeID, DateRented)

LibraryDetail (Libno, libname, libadd1, libadd2, libposcode, libstate, libtown, libphone, libfax, libemail, libweb)

News(ID, date, content)

ActivityLog (LogID, LogEmp, LogContent)

LostBook (ID, BarCodeID*, UserID*, ISBN*, LostDate)

Admin (Admin_ID, AdminName, AdminLevel, Password, AdminID, AdminContact, AdminEmail, AdminAddress)

3.4 Data Dictionary

Table Name: ActivityLog				
Description : store all the activity done by user in the system				
Fields	Data Type	Null/Not Null	Default Value	Rules
LogId	int	Not null	-	-
LogEmp	nchar(10)	Not null	-	-
LogTime	datetime	Not null	-	-
LogActivity	varchar(MAX)	Not null	-	-

Field	Example Data
LogId(PK)	113
LogEmp	M0001
LogTime	2011-02-16 16:35:07.000
LogActivity	Information of PublisherID P0003 has been updated

Table 3.4.1 Data Dictionary for ActivityLog table

Table Name: Admin				
Description : store the information of user who used the library system				
Fields	Data Type	Null/Not Null	Default Value	Rules
Admin_ID	nvarchar(50)	Not null	-	-
Admin_Name	nvarchar(50)	Not null	-	-
Admin_Level	nvarchar(50)	Not null	-	Format : 1,0
Password	nvarchar(50)	Not null	-	-
Admin_ic	nvarchar(50)	Not null	-	-
admin_contact	nvarchar(50)	Not null	-	-
admin_email	nvarchar(50)	Not null	-	-
admin_address	nvarchar(MAX)	Not null	-	-

Field	Example Data
Admin_ID	M0001
Admin_Name	Tan Chaur Chuan
Admin_Level	1
Password	12341234
Admin_ic	880704-35-5263
admin_contact	04-3984851
admin_email	sdfsdf@hotmail.com
admin_address	30, lintang perai 2, taman chai leng, 34567 pahang.

Table 3.4.2 Data Dictionary for Admin table

Table Name: Book				
Description : store the information of the books				
Fields	Data Type	Null/Not Null	Default Value	Rules
ISBN	nvarchar(50)	Not null	-	-
BookTitle	nvarchar(50)	Not null	-	-
Author	nvarchar(50)	Not null	-	-
PublisherID	nvarchar(50)	Not null	-	-
Language	nvarchar(50)	Not null	-	-
Category	nvarchar(50)	Not null	-	-
Description	nvarchar(MAX)	Not null	-	-
BookCover	nvarchar(MAX)	Not null	-	-

Field	Example Data
ISBN(PK)	9781587132049
BookTitle	Handphone King
Author	C.Y
PublisherID	P0001
Language	Chinese
Category	Technology
Description	A book which show the latest information of all brand handphome
BookCover	Handphone.JPG

Table 3.4.3 Data Dictionary for Book table

Table Name: BookComment				
Description : to store the comment for particular book				
Fields	Data Type	Null/Not Null	Default Value	Rules
CID	Int	Not null	-	-
ISBN	Nvarchar(50)	Not null	-	-
UserID	Nvarchar(max)	Not null	-	-
Comment	Nvarchar(max)	Not null	-	-

Field	Example Data
CID	13
ISBN	1234567891234
UserID	M0001
Comment	This book is very interesting...thanks

Table 3.4.4 Data Dictionary for BookComment table

Table Name: BookCopy				
Description : to store the quantities of books and the detail of each book				
Fields	Data Type	Null/Not Null	Default Value	Rules
BarcodeID	nvarchar(50)	Not null	-	-
ISBN	nvarchar(50)	Not null	-	-
Status	nvarchar(50)	Not null	-	Format : L, A, N
PurchasePrice	Money	Not null	-	-
purchaseDate	Datetime	Not null	-	-

Field	Example Data
barcodeID	978158713204901
ISBN	9781587132049
Status	L
PurchasePrice	200.0000
PurchaseDate	2011-02-16 00:00:00.000

Table 3.4.5 Data Dictionary for BookCopy table

Table Name: News				
Description : to post the latest news at web site's main page				
Fields	Data Type	Null/Not Null	Default Value	Rules
ID	Int	Not null	-	-
Date	Date	Not null	-	-
[content]	Nvarchar(50)	Not null	-	-

Field	Example Data
ID	9781587132049
Date	2011-01-13
[content]	The popular book 'The Lord of the Ring' is now available !!!

Table 3.4.6 Data Dictionary for News table

Table Name: LibraryDetail				
Description : to store the information of the library				
Fields	Data Type	Null/Not Null	Default Value	Rules
libno	Char(10)	Not null	-	-
Libname	varchar(50)	Not null	-	-
Libadd1	varchar(50)	Not null	-	-
Libadd2	varchar(50)	Not null	-	-
Libposcode	Char(5)	Not null	-	-
Libstate	varchar(50)	Not null	-	-
Libtown	varchar(50)	Not null	-	-
Libphone	varchar(50)	Not null	-	-
Libfax	varchar(50)	Not null	-	-
Libemail	varchar(50)	Not null	-	Format : abc@abc.abc
Libweb	varchar(50)	Not null	-	-

Field	Example Data
libno	001
Libname	Chen Library
Libadd1	30, lintang perai 5,
Libadd2	Taman putang,
Libposcode	13506
Libstate	Pulau Pinang
Libtown	Butterworth
Libphone	04-3859451
Libfax	04-3225645
Libemail	librarycs@hotmail.com
Libweb	www.google.com

Table 3.4.7 Data Dictionary for LibraryDetail table

Table Name: Reservation				
Description : to record the book reservation for the member				
Fields	Data Type	Null/Not Null	Default Value	Rules
UserID	Nvarchar(50)	Not null	-	-
BarCodeId	Nvarchar(50)	Not null	-	-
DateReserve	date	Not null	-	-

Field	Example Data
UserID	M0001
BarCodeId	584961352652401

Table 3.4.8 Data Dictionary for Reservation table

Table Name: LostBook				
Description : to keep the information of lost book				
Fields	Data Type	Null/Not Null	Default Value	Rules
ID	int	Not null	-	-
Userid	varchar(50)	Not null	-	-
Barcodeid	varchar(50)	Not null	-	-
ISBN	varchar(50)	Not null	-	-
LostDate	Date	Not null	-	-

Field	Example Data
ID	3
Userid	M0002
Barcodeid	978158713204901
ISBN	9781587132049
LostDate	2011-02-16

Table 3.4.7 Data Dictionary for LostBook table

Table Name: RetailInfo				
Description : to keep the book transaction detail				
Fields	Data Type	Null/Not Null	Default Value	Rules
userID	nvarchar(50)	Not null	-	-
BarCodeID	nvarchar(50)	Not null	-	-
DateReturned	Datetime	-	-	-
DateRented	Datetime	Not null	-	-
DateDue	Datetime	Not null	-	-
Total Fine	money	-	-	-

Field	Example Data
userID	M0003
BarCodeID	123456789123401
DateReturned	2011-03-02 00:00:00.000
DateRented	2010-09-09 00:00:00.000
DateDue	2010-10-10 00:00:00.000
Total Fine	200.0000

Table 3.4.7 Data Dictionary for Rental Info table

Table Name: Publisher				
Description : to store the publisher so it is available when register book				
Fields	Data Type	Null/Not Null	Default Value	Rules
PublisherId	Nvarchar(50)	Not null	-	-
PublisherName	nvarchar(50)	Not null	-	-

Field	Example Data
PublisherId	P0001
PublisherName	Tan Khen Khen

Table 3.4.7 Data Dictionary for Publisher table

Table Name: User				
Description : to store the information of the member				
Fields	Data Type	Null/Not Null	Default Value	Rules
UserID	Char(10)	Not null	-	-
Username	varchar(50)	Not null	-	-
Useraddress	varchar(50)	Not null	-	-
UserPhone	varchar(50)	Not null	-	-
UserIC	Char(5)	Not null	-	-
UserRegDate	varchar(50)	Not null	-	-
AvailableBook	varchar(50)	Not null	-	-
Userpass	varchar(50)	Not null	-	-
Userphoto	varchar(50)	Not null	-	-
Useremail	varchar(50)	Not null	-	Format : abc@abc.abc
UserExpiredDate	varchar(50)	Not null	-	-

Field	Example Data
UserID	M001
Username	Ooi Yee Neng
Useraddress	30 lintang talang 2, taman perai. 13600 Perai, Penang.
UserPhone	04-3568956
UserIC	880407-35-5266
UserRegDate	2011-02-16 00:00:00.000
AvailableBook	4
Userpass	12345678
Userphoto	Tan_chen_khen.JPG
Useremail	mrtan@hotmail.com
UserExpiredDate	2012-03-05 00:00:00.000

Table 3.4.7 Data Dictionary for User table

3.5 Chapter 3 Conclusion

In Chapter 3 System Design, we had done about user interface design, database design, normalization and Entity Relationship Diagram.

Due to the user of library system is staff and admin staff, the interface does not need to colorful but need to maintain the user friendliness. The interface designed is using system default color. The button also designed in suitable size so that the interface won't be messy. Suitable control has been used to ensure users can easily using the library system.

One of the problems I meet in interface design is the report interface. I don't know how to design a common report which can be used by most of the library. With the aids from my supervisor, I design one more form to let user key in the library detail. The library detail will be used as report header. In this way, every library who used our library system can print the report with different library details.

Next, I meet a big problem when doing normalization. This is because we have already designed the database before doing the documentation. The database we designed is actually a 3rd normalization form. Thus, we need to de-normalize the database back to 1st normalization format. Besides that, I have forgotten how to do the normalization because normalization is learning during Diploma level study. I find back the study material for Database Management subject and refer how to normalize the database.

After completed this chapter, the lesson I learn is we must design a good user interface for the system. It is because the system is used for ease human work. If the user interface is not users friendly, user can't enjoy the benefits of the system and they will not likely to use the system. Thus, we must learn how to design a good user interface to bring the maximize benefits to users.

Chapter 4

Programming

4.0 Programming

This chapter will discuss about the programming coding of the Library Management System. Different logic thinking and coding is required at development of the system. A lot research has been done to enhance the efficiency when writing coding. Following would discuss the sample programming coding of VB.NET.

4.1 Coding

1. Database Connection

```
Private conn As OleDbConnection = New OleDbConnection
'update database by using SQL

Public Sub dbOpen()
    Dim strConnect As String = "Provider =
    SQLNCLI10;server=192.168.1.222;Database=LibrarySystem; user id=keat; Password=1234;"

    conn.ConnectionString = strConnect

    conn.Open()
End Sub

-----

Public Sub dbClose()
    conn.Close()
End Sub
```

```
dbOpen()
    dbUpdate("UPDATE [User] SET Username = '" & txtname.Text & "',Useraddress = '" &
    txtadd.Text & "' WHERE Userid = '" & txtid.Text & "'")
dbClose()
```

Coding above is the connection string declared in DatabaseMD. It can be used by other forms after it is declared. The second box shows the example of using the DbOpen() and DbClose(). The main advantage of this code is we only change at DatabaseMD if we change the database.

2. Book Maintenance – show all books

```
datas.Tables.Clear()
Dim strSql As String
Dim oleDbConnection1 As OleDb.OleDbConnection
Dim strConnect As String = "Provider =
SQLNCLI10;server=192.168.1.222;Database=LibrarySystem; user id=keat; Password=1234;"
Dim dapBook, dapBookDetail As OleDbDataAdapter
    oleDbConnection1 = New System.Data.OleDb.OleDbConnection(strConnect)

strSql = "SELECT * FROM [book],[publisher] WHERE book.publisherid = publisher.publisherid"
dapBook = New OleDbDataAdapter(strSql, strConnect)

strSql = "SELECT * FROM [bookcopy],[book] WHERE bookcopy.isbn = book.isbn order by
bookcopy.isbn,barcodeid"
dapBookDetail = New OleDbDataAdapter(strSql, strConnect)

Dim arrRow() As DataRow = datas.Tables("Book").Select("ISBN like '*" & txtSearch.Text.Trim
& "*" ", "ISBN")
lstvBook.Items.Clear()

For i = 0 To arrRow.Length - 1
    Dim row As DataRow = arrRow(i)
    lstvBook.Items.Add(row("ISBN"))
    lstvBook.Items(i).SubItems.Add(row("Booktitle"))
Next
```

This code is used to retrieve all books from database and insert the data into the listview when user opens Book maintenance form. I used dataset to store the information retrieved.

3. Book Maintenance – Show book information

```

Private Sub lstvbook_MouseClick(ByVal sender As System.Object, ByVal e As
System.Windows.Forms.MouseEventArgs) Handles lstvBook.MouseClick
    lstbookdetail.Items.Clear()

    Dim arrRow() As DataRow = datas.Tables("BookDetail").Select("ISBN = ' " &
lstvBook.SelectedItems.Item(0).Text & "' ")
    Dim arrRowBook() As DataRow = datas.Tables("Book").Select("ISBN = ' " &
lstvBook.SelectedItems.Item(0).Text & "' ")

    'show out Book info
    If arrRowBook.Length > 0 Then
        Dim row As DataRow = arrRowBook(0)
        txtisbn.Text = (row("ISBN"))
        txttitle.Text = (row("BookTitle"))

        'show publisher id at txtinvil
        txtinvil.Text = row("publisherID")

        Dim bookCategory As String = row("Category")
        combocategory.Text = row("Category")

        txtdesc.Text = (row("description"))
        txtpublisher.Text = (row("publisherName"))
        txtauthor.Text = (row("author"))
        txtLanguage.Text = (row("language"))
        txtbarcode.Text = ""
        txtprice.Text = ""
        txtdate.Text = ""
    End If
End Sub

```

This part of code used to show the book information when user click on the book list view. I use data row to retrieve the selected book's information and after that I used the data row's data to show at the textbox.

4. Barcode Generator

```

Private Sub btnbarcode_Click(ByVal sender As System.Object, ByVal e As System.EventArgs)
Handles btnbarcode.Click

    If lstbookdetail.SelectedItems.Count < 1 Then
        MessageBox.Show("Not Barcode ID selected." & Chr(13) & "Please select a book from
Book Detail Table.", "ALERT", MessageBoxButtons.OK, MessageBoxIcon.Warning)
        Exit Sub
    End If

    strPrint = "*" & lstbookdetail.SelectedItems.Item(0).SubItems(0).Text & "*"

    PrintPreviewDialog1.Document = PrintDocument1
    PrintPreviewDialog1.ShowDialog()
End Sub

-----

Private Sub PrintDocument1_PrintPage(ByVal sender As System.Object, ByVal e As
System.Drawing.Printing.PrintPageEventArgs) Handles PrintDocument1.PrintPage
    Dim sglX As Single = e.MarginBounds.Left
    Dim sglY As Single = e.MarginBounds.Top
    Dim myfont As New Font("arial", 12, FontStyle.Regular)
    Dim barcodefont As New Font("IDAutomationHC39M", 16, FontStyle.Regular)
    Dim sglLH As Single = myfont.GetHeight + 5
    Dim sglLO As Single = myfont.GetHeight + 15
    Dim intLPP As Integer = (e.MarginBounds.Bottom - e.MarginBounds.Top) / sglLH

    e.Graphics.DrawString(strPrint, barcodefont, Brushes.Black, sglX, sglY)
End Sub

```

The coding above is used to generate the bar code of the book. The reason I implement this barcode generator is to save cost. If library need to buy additional bar code generator software, maybe the license fee is required. Thus, this module is to save the library's cost.

5. Book Maintenance – Add new book

```

If txtisbn.Text = "" Then
    MessageBox.Show("Please enter ISBN number.", "NULL", MessageBoxButtons.OK,
    MessageBoxIcon.Error)
    Exit Sub
Else
    If Not IsNumeric(txtisbn.Text) Then
        MessageBox.Show("Please enter ISBN in Numeric", "Error", MessageBoxButtons.OK,
        MessageBoxIcon.Error)
        Exit Sub
    End If
End If

```

Code above show the validation of text box before adds the new book into database. All the textbox should not be blank because the information is all needed in some other process.

```

    dbOpen()
    ' insert into book table
    ' check if the book alrdy exist or not...if not add into book table
    Dim arrRow0() As DataRow = datas.Tables("Book").Select("ISBN =" & txtisbn.Text.Trim,
    "ISBN")
    If arrRow0.Length = 0 Then
        dbUpdate("INSERT INTO Book VALUES(' " & isbn & "'," & title & "'," & author & "'," &
        publisher & "'," & languagel & "'," & category & "'," & desc & "'," & bookcover & "')")

        ' insert into log table
        dbUpdate("INSERT INTO [activitylog](logemp,logtime,logactivity) VALUES(' " &
        frmMain.lblEmpID.Text & "'," & DateTime.Now & "'," & updownQuantity.Value.ToString() & "
        book(s) with ISBN " & isbn & " was new registered into database' )")
    Else
        MessageBox.Show("Book already exist.", "Error", MessageBoxButtons.OK,
        MessageBoxIcon.Error)
        Exit Sub
    End If
    dbClose()

```

This part is the part that inserts the book information into database. Firstly we check whether the book already exist in the book table. If already exist, then prompt out the message box and stop the process. If the book is new, then insert into database.

6. Book Maintenance – Update Book

```
dbOpen()

dbUpdate("UPDATE Bookcopy SET purchaseprice=" & txtprice.Text & " WHERE barcodeid=" &
txtinvi2.Text & " ")

dbUpdate("INSERT INTO [activitylog](logemp,logtime,logactivity) VALUES(' " &
frmMain.lblEmpID.Text & "',' " & DateTime.Now & "','Edit detail of book with barcodeID " &
txtinvi2.Text & "' ' )")

dbClose()
```

The code shown above is used to update the book information as well as insert into activity log table.

7. Library Detail – Email verification

```
Dim Expression As New System.Text.RegularExpressions.Regex("\S+@\S+\.\S+")
If Not Expression.IsMatch(txtemail.Text) Then
    MessageBox.Show("E-Mail is not valid.", "E-mail Error", MessageBoxButtons.OK,
    MessageBoxIcon.Error)
Exit Sub
End If
```

This email verification is used to verify whether the email is in correct format. It required user to insert "@" and "." and also some string.

8. Alphabet Validation

```

'Check alphabet
Private Function IsAlphabet(ByVal strCheck As String) As Boolean

    Dim chrCheck As Char() = strCheck.ToCharArray()
    For i As Integer = 0 To strCheck.Length - 1
        If Not (CShort(AscW(chrCheck(i))) >= 65 And CShort(AscW(chrCheck(i))) <= 90 _
            Or CShort(AscW(chrCheck(i))) >= 97 And CShort(AscW(chrCheck(i))) <= 122 _
            Or CShort(AscW(chrCheck(i))) = 32) Then
            Return False
            Exit Function
        End If
    Next
    Return True
End Function

```

This code is used to check whether the parameter is from A-Z or a-z. This function is used at name part because human's name should not contain integer. This function will detect the ASCII of that character and check whether it is inside the range. If all the character is alphabet, then function will return true.

9. Employee Logout

```

Private Sub frmMain_FormClosing(ByVal sender As System.Object, ByVal e As
System.Windows.Forms.FormClosingEventArgs) Handles MyBase.FormClosing

    If MessageBox.Show("Are you sure want to log out? ", "Confirm",
        MessageBoxButtons.YesNo, MessageBoxIcon.Question) = Windows.Forms.DialogResult.No Then
        e.Cancel = True
        dbOpen()
        dbUpdate("INSERT INTO [activitylog](logemp,logtime,logactivity) VALUES(' " &
            lblEmpID.Text & "', ' " & DateTime.Now & "', 'User " & lblEmpID.Text & " has logged
            out from the system' )")
        dbClose()
        Exit Sub
    End If

    Login.txtName.Clear()
    Login.txtPass.Clear()
    Login.Show()
End Sub

```

When employee wants to log out, the message box will prompt out to double confirm it. If yes, then the employee will successful log out and jump to login page.

10. Member – Print ID Card

```

Private Sub PrintDocument1_PrintPage(ByVal sender As System.Object, ByVal e As
System.Drawing.Printing.PrintPageEventArgs) Handles PrintDocument1.PrintPage
    Dim sglX As Single = e.MarginBounds.Left + 20
    Dim sglX1 As Single = e.MarginBounds.Left + 30
    Dim sglY As Single = e.MarginBounds.Top
    Dim sglMID As Single = e.MarginBounds.Left + 45
    Dim myfont As New Font("IDAutomationHC39M", 12, FontStyle.Regular)
    Dim myfont1 As New Font("Copperplate Gothic Bold", 20, FontStyle.Bold)
    Dim myfont2 As New Font("Arial", 8, FontStyle.Bold)
    Dim sglLH As Single = myfont2.GetHeight + 5
    'Dim string_format As New StringFormat
    'string_format.Alignment = StringAlignment.Center
    'string_format.LineAlignment = StringAlignment.Center

Dim libraryname As String
Dim arrRow() As DataRow = ds.Tables("Library").Select("libno = '001'")
Dim row As DataRow = arrRow(0)
libraryname = row("libname")
'print library header

e.Graphics.DrawString(libraryname.ToUpper(), myfont1, Brushes.Black, sglMID, sglY)
sglY = sglY + sglLH + 60
e.Graphics.DrawString("Member ID : " & txtid.Text, myfont2, Brushes.Black, sglX,
sglY)
sglY += sglLH
e.Graphics.DrawString("Name          : " & txtname.Text, myfont2, Brushes.Black,
sglX, sglY)
sglY += sglLH
e.Graphics.DrawString("IC No          : " & txtic.Text, myfont2, Brushes.Black, sglX,
sglY)
sglY += sglLH
e.Graphics.DrawString("*" & txtid.Text & "*", myfont, Brushes.Black, sglX1, sglY)

Dim original As Image = Image.FromFile(memberpic)

e.Graphics.DrawImage(original, New Rectangle(300, 150, 112, 150))

End Sub

```

This part of code is used to generate member ID card. I use DrawString and DrawImage method to print out the member information and member photo.

11. Web site validation

```

Public Function UriIsValid(ByVal url As String) As Boolean
    If url.ToLower().StartsWith("www.") Then url = "http://" & url
    Dim webResponse As Net.HttpWebResponse = Nothing
    Try
        Dim webRequest As Net.HttpWebRequest = Net.HttpWebRequest.Create(url)
        webResponse = DirectCast(webRequest.GetResponse(), Net.HttpWebResponse)
        Return True
    Catch
        Return False
    Finally
        If webResponse IsNot Nothing Then webResponse.Close()
    End Try
End Function

```

The web site verification code works by sending web request to the web site that user pass in as parameter. If get web Response, then the web site is valid.

12. Show history

```

Private Sub showHistory()
    lstvHistory.Items.Clear()
    Dim i As Integer
    Dim arrRow() As DataRow = ds1.Tables("RentalInfo").Select("UserID =' " & txtCustID.Text
        & "' AND dateReturned IS NOT NULL")

    If arrRow.Length < 1 Then
        lstvHistory.Items.Clear()

    End If

    For i = 0 To arrRow.Length - 1
        Dim row As DataRow = arrRow(i)
        lstvHistory.Items.Add(row("daterented"))
        lstvHistory.Items(i).SubItems.Add(row("dateReturned"))
        lstvHistory.Items(i).SubItems.Add(row("BarcodeID"))
        lstvHistory.Items(i).SubItems.Add(row("booktitle"))

        Dim fine As Decimal = row("totalfine")
        lstvHistory.Items(i).SubItems.Add(fine.ToString("RM 0.00"))
    Next
End Sub

```

This code search the rentalinfo database for the data where dateReturned is not null which means the books has returned to library already. The history is show at main form after log in the member.

13. Check out cart

```

If lstvCart.Items.Count < 1 Then
    MessageBox.Show("No item inserted in Cart", "ALERT", MessageBoxButtons.OK,
        MessageBoxIcon.Warning)
    Exit Sub
End If
'check history
For i = 0 To lstvCart.Items.Count - 1
    For j = 0 To lstvHistory.Items.Count - 1
        If lstvCart.Items(i).SubItems(2).Text = lstvHistory.Items(j).SubItems(3).Text
            Then
                If MessageBox.Show(lstvCart.Items(i).SubItems(2).Text & " is rented
                    before." & Chr(13) & "Do you want do continue transaction? ",
                        "Confirmation", MessageBoxButtons.YesNo, MessageBoxIcon.Question) =
                    Windows.Forms.DialogResult.No Then
                        Exit Sub
                    End If
                Exit For
            End If
        Next
    Next
    For i = 0 To lstvCart.Items.Count - 1
        Dim arrRow() As DataRow = ds1.Tables("book").Select("BarcodeId = '" &
            lstvCart.Items(i).SubItems(0).Text & "'")
        Dim row As DataRow = arrRow(0)

        dbOpen()
        dbUpdate("UPDATE bookcopy SET status = 'N' WHERE barcodeID = '" & row("barcodeID") &
            "'")
        dbUpdate("UPDATE [user] SET availablebook ='" & lblAvaibook.Text & "' WHERE [userid] =
            '" & txtCustID.Text & "'")
        dbUpdate("INSERT INTO rentalinfo(userid, barcodeid, daterented, datedue) VALUES('" &
            txtCustID.Text & "', '" & row("barcodeID") & "', '" & datNow.ToString("d") &
            "', '" & datNow.AddDays(14).ToString("d") & "' )")
        dbUpdate("INSERT INTO [activitylog](logemp, logtime, logactivity) VALUES('" &
            lblEmpID.Text & "', '" & DateTime.Now & "', 'Member '" & txtCustID.Text & "' has
            borrowed '" & lblQty.Text & "' book(s)' )")
        If chkreserve.Checked = True Then
            dbUpdate("DELETE FROM reservation WHERE [userid] = '" & txtCustID.Text & "' AND
                barcodeid = '" & row("barcodeID") & "'")
        End If

        dbClose()
        refreshds1()
    Next

```

The above code is functioning when user press Check Out button at main form. Firstly it will check the member logged in and check his transaction history. If the cart item is rented before, system will prompt message to confirm whether member wants to re-borrow or not. After that, system will insert the data into rental table and change the book status.

13. Return book

```

Private Sub btnCheckOut_Click(ByVal sender As System.Object, ByVal e As System.EventArgs)
Handles btnCheckOut.Click
    Dim i As Integer
    Dim decPayment As Decimal

    If lstvReturn.Items.Count < 1 Then

        Exit Sub
    End If

    dbOpen()
    For i = 0 To lstvReturn.Items.Count - 1
        Dim userID As String = lstvReturn.Items(i).SubItems(0).Text
        Dim barcodeID As String = lstvReturn.Items(i).SubItems(2).Text
        Dim totalFine As Decimal
        totalFine =
            Decimal.Parse(Microsoft.VisualBasic.Right(lstvReturn.Items(i).SubItems(7).Text,
                lstvReturn.Items(i).SubItems(7).Text.Length - 3))

        dbUpdate("UPDATE rentalinfo SET totalfine=" & totalFine & ", datereturned = ' " &
            Now.ToString("d") & "' WHERE rentalinfo.userid = ' " & userID & "' AND
            rentalinfo.barcodeid=' " & barcodeID & "'")
        dbUpdate("UPDATE bookcopy SET status = 'A' WHERE barcodeid=' " & barcodeID & "'")
        dbUpdate("UPDATE [user] SET availablebook = availablebook +1 WHERE [userid]=' " &
            userID & "'")
        dbUpdate("INSERT INTO [activitylog](logemp,logtime,logactivity) VALUES(' " &
            frmMain.lblEmpID.Text & "', ' " & DateTime.Now & "', 'Book with barcodeID " &
            txtID.Text & " was returned to library' )")
        decPayment += totalFine
    Next
    dbClose()
    count = 0
    frmMain.refreshds1()
    payment.lblTotal.Text = decPayment

    If Not decPayment = 0 Then
        payment.ShowDialog()
    End If
    Me.Close()
End Sub

```

System will change the book status for the return book and show the payment form if there is any fine. Activity log will record this activity as well.

14. Payment

```
Private Sub btncalculate_Click(ByVal sender As System.Object, ByVal e As System.EventArgs)
Handles btncalculate.Click
    If txtpayment.Text = "" Then
        MessageBox.Show("Please enter Payment Amount", "ALERT", MessageBoxButtons.OK,
        MessageBoxIcon.Warning)
        Exit Sub
    End If

    If Not IsNumeric(txtpayment.Text) Then
        MessageBox.Show("Please enter Payment Amount in Numeric", "ALERT",
        MessageBoxButtons.OK, MessageBoxIcon.Warning)
        txtpayment.Text = ""
        txtpayment.Focus()

        Exit Sub
    End If

    If Decimal.Parse(txtpayment.Text) < Decimal.Parse(lblTotal.Text) Then
        MessageBox.Show("Payment Amount insufficient", "ALERT", MessageBoxButtons.OK,
        MessageBoxIcon.Warning)
        txtpayment.Text = ""
        txtpayment.Focus()
        Exit Sub
    End If

    lblchanges.Text = (Decimal.Parse(txtpayment.Text) -
        Decimal.Parse(lblTotal.Text)).ToString("RM 0.00")
    Label23.Visible = True
    txtpayment.Enabled = False
    btncalculate.Enabled = False

End Sub
```

The payment form contains a button which is calculating balance. The code for that button is like figure above. The function will check blank, and check whether it is numeric or not. Besides that, system also validate whether the payment amount is sufficient for the fine or not. Lastly, the system will calculate the balance and show to user.

4.2 Chapter 4 conclusion

Chapter 4 is programming chapter which include the important coding used in the system.

By referring to the chapter 4, user can roughly know how the system process.

In programming stages, the problem I faced is to write some coding which I never learn before such as DrawString and DrawImage. These two methods are used to print out the string or an image. When I try to do the print member card module, I search Google for the Drawstring and DrawImage method to produce the member card. The coding include a lot of X and Y-axis to defined the location of the string.

After few hours on research, finally I can generate the member card with the desirable outlook.

The lesson I learnt in this chapter is the most difficult part of programming is not coding but logic. Each business has their owns business logic and business flow process. We need to have clear understanding of how an organization works to create a system which desirable for them. Besides that, whenever we meet some coding difficulties, we can always seek help from Google. From this project, I knew that every coding have the sample or solution on the web. We should not keep complain that the coding is difficult but we should improve our knowledge on the logic business process.

Chapter 5

System Testing

5. System Testing

This chapter will show the test plan which programmer used to test the system. System Testing is an important phase in SDLC to ensure the system is bug free. If the system hasn't been test properly, user will meet a lot problem when using the system.

5.1 Test Plan

Tester Name : Tan Chaur Chuan			
Module Name : login module			
UserID:	M0022	Password	1234123
Expected Result: Invalid ID			
Comments from Supervisor / Moderator : none			

Tester Name : Tan Chaur Chuan			
Module Name : login module			
UserID:	M0001	BarcodeID	111
Expected Result: Invalid Password			
Comments from Supervisor / Moderator : none			

Tester Name : Tan Chaur Chuan			
Module Name : login module			
UserID:	M0001	BarcodeID	12341234
Expected Result: Success login to system If library detail is nothing, user are prompt to insert library detail			
Comments from Supervisor / Moderator : none			

Tester Name : Tan Chaur Chuan	
Module Name : Add member	
Test method	Key in invalid data
Expected Result: Messagebox prompt out to tell user that information is blank or in wrong format	
Comments from Supervisor / Moderator : Must include email address also	

Tester Name : Tan Chaur Chuan	
Module Name : Add member	
Test method	Key in correct information
Expected Result: Messagebox show user 'AAA' successfully add	
Comments from Supervisor / Moderator : none	

Tester Name : Tan Chaur Chuan			
Module Name : add new book			
ISBN	9771985821003	BarcodeID	977198582100301
Expected Result: Book successful added Show database to show that book and bookcopy has been update			
Comments from Supervisor / Moderator : -Add currency format when add new book			

Tester Name : Tan Chaur Chuan			
Module Name : add publisher			
PublisherId	P0003	PublisherName	Supervisor publisher Ltd.
Expected Result: Publisher successful added			
Comments from Supervisor / Moderator : none			

Tester Name : Tan Chaur Chuan			
Module Name : book management			
Expected Result: 1. successful edit the book and bookcopy information 2. show barcode printing of particular book			
Comments from Supervisor / Moderator : Crystal report need add header and generate time			

Tester Name : Tan Chaur Chuan
Module Name : crystal report to show all books
Expected Result: Show report which contains all the books
Comments from Supervisor / Moderator : Add time and Date generate report and add report header

Tester Name : Tan Chaur Chuan
Module Name : Member management
Expected Result: Show all member at listview When select one of the member...show member information at right side Click print id card to print the member id card
Comments from Supervisor / Moderator : -add Member Renewal function -Show expired date and Register Date

Tester Name : Tan Chaur Chuan
Module Name : main form login member
UserID: M0001
Expected Result: Successful login and cart is available
Comments from Supervisor / Moderator : none

Tester Name : Tan Chaur Chuan			
Module Name : Renting Module			
UserID:	M0001	BarcodeID	584961352652402
	M0002		978158713204901
Expected Result: The book was added to cart Available book -1 Press check out then borrow and logout			
Comments from Supervisor / Moderator : none			

Tester Name : Tan Chaur Chuan	
Module Name : show renting	
UserID:	M0001
Expected Result: Listview for current book renting will show 584961352652402 which is just borrowed	
Comments from Supervisor / Moderator : none	

Tester Name : Tan Chaur Chuan	
Module Name : Return module	
BarcodeID	584961352652402
Expected Result: Book was return to database Try login m0001to show that listview borrowed has nothing and history got one record. Available book +1	
Comments from Supervisor / Moderator : none	

Tester Name : Tan Chaur Chuan			
Module Name : Lost book Module			
UserID:	M0002	BarcodeID	978158713204901
Expected Result: Show that book was registered lost. Member available book no +1 because lost book Need pay double			
Comments from Supervisor / Moderator : none			

Tester Name : Tan Chaur Chuan			
Module Name : Admin Module (employee module)			
Expected Result: Add employee and edit employee			
Comments from Supervisor / Moderator : -Clear payment form -Add Email(for company announcement) -Add Contact number			

Tester Name : Tan Chaur Chuan			
Module Name : Rental report			
date	Today date		
Expected Result: Show renting occurred today M0001 , 584961352652402			
Comments from Supervisor / Moderator : Add daily,monthly,yearly report.			

Tester Name : Tan Chaur Chuan	
Module Name : Return report	
date	Today date
Expected Result: Show M0001 , 584961352652402	
Comments from Supervisor / Moderator : none	

Tester Name : Tan Chaur Chuan	
Module Name : top10 book Report	
Expected Result: Choose technology because the book rented jz now is technology category	
Comments from Supervisor / Moderator : none	

Tester Name : Tan Chaur Chuan	
Module Name : Lost book module	
Expected Result: Show m0002 lost a book	
Comments from Supervisor / Moderator : Create print button to generate report	

Tester Name : Tan Chaur Chuan	
Module Name : Activity Log	
Expected Result: Show all the process of user in the system	
Comments from Supervisor / Moderator :none	

5.2 Chapter 5 Conclusion

System testing phase made me understand the important of bug free system. If one system contains bugs, users will be frustrated and meet some problems. Computerized system should be creating to help user reduce the work so it is very importance so ensure the system is bug free.

In system testing, the problem I meet is time limitation. After complete the system, I only left few day due to wasting too much time at earlier stages. With the helps of my friend, I done the module test and debug on it.

We must test the system completely and perfectly to ensure the system is bug free. No matter how powerful a system, it will not consider as good system if it contains bugs. The system which is bug free is more powerful and more helpful to end user because it does not produce problems and bugs.

Chapter 6

Conclusion

6. Conclusion

6.1 Introduction

In this final chapter, the final evaluation and conclusion will be performed on the testing and analyzing process that done in previous chapter including seminar linkage, strengths, weakness and future enhancement of the Library Management System. In addition, personal reflection also include in final part of this chapter.

6.2 Linkage to seminar

In this project development, I used SQL Server 2008 because I chose SQL Server 2008 as my seminar title. During seminar research process, I found out that SQL Server 2008 is an enhanced security features database. The seminar shows that SQL Server 2008 contains more function compare to the previous version of SQL Server.

In the project development, I use some of the SQL Server 2008 new features such as new data type, DATETIME2. I use DATETIME2 to store the information for ActivityLog table. It is because DATETIME2 have better accuracy of time compare to datetime. The different between datetime and DATETIME2 is DATETIME2 contains nanosecond which is a smaller unit after seconds. With DATETIME2, we can record every activity done by user in most accurate time.

On the other hand, SQL Server 2008 provides authentication so that unauthorized personnel is not able to gain access into database. In my project development, my project partner, Koh Yee Keat used his laptop as database server. I need to obtains the authentication code only can access and view the tables. In the coding part, I need to define the Server path, username and password to provide connection for Library System. This can help to enhance security and prevent unauthorized access.

6.3 Evaluation of Project Objectives

Objectives	Function / Module	Status
Eliminate paper work	Book Transaction Module	Achieved
To implement BarCode technology	Bar Code Generator	Achieved
To eliminate record missing problem	Book Maintenance Module	Achieved

Table 6.1 Table of Evaluation Project Objectives

6.4 Project Management Issues

During the development process of Library Management system, there are a lot issues encountered. Firstly, I don't have much knowledge about how library process the book transaction and the business logic in the library. Thus, a lot research has been done to refer and to get more understanding about the library management.

For the coding part, I meet some problem in bar code generator. That is because I can't found the bar code font. I have found few types of bar code font such as EAN 13. Although it looks like a standard bar code, but my bar code scanner is still fail to scan it. And finally with the help of my friend I successfully found the font which is IDAutomationHC39M.

Besides the bar code font issue, I have met some problem regarding the member id generator module. In that module, I need to print out the member details such as name, id and also photo. In this case, I never learn how to print the detail in A4 size paper. With the help of Google and my friend, finally I know the method to use is DrawString and DrawImage.

On the other hand, I met problem of constructing the DFD and ERD due to the less understanding of the diagram such as entity and relationship. With the help of Diploma studies materials, finally I successful construct the ERD and DFD diagrams.

Finally, the biggest problem I met is the documentation format. Although I have been provided with the document guidelines, but the instruction and guide is too much to follow especially the Reference part.

6.5 Evaluation of Projects Strengths and Weaknesses

Strengths

- ✓ System response is fast after user press a button to perform some actions.
- ✓ User interface is considered user friendly and ease of use.
- ✓ Validation has been done to avoid some functional error in later time.
- ✓ Some listview control has been included to allow user view the history or some important data without print out the report.
- ✓ Some important data is generated automatically such as Member ID, and member registration date to minimize user input error.
- ✓ Search features are included in several modules to ease user so that they can filter the data easily.
- ✓ Allow user to generate bar code of the book without using additional bar code generator software.
- ✓ Allow user to keep track member renting history.
- ✓ Member card can be generated by using the system.
- ✓ No additional/unnecessary steps required to perform the task.
- ✓ Allow user to keep track the lost book.
- ✓ Barcode Scanner is required in this Library System to reduce manual process.
- ✓ System is able to check the book whether is under reservation or not.

Weakness

- The user interface of this system is suitable for screen resolution 1024 x 768 only.
- The reservation that make by member online unable to update the database immediately.
- The member id generated is in A4 format. Not in proper Member card size.
- System didn't implement smart card technology.

6.6 Suggestion for Future Enhancement

For future enhancement, there are few suggestions to improve the system abilities. Firstly, the library system should implement smart card technology which will log in the member by scanning the smart card. The smart card can act as a unique identifier of a member. The smart card technology is more advanced and is able to store all the information inside the chips. By implements this, the book transaction process will be enhanced and save time.

Next, the wide screen monitor is getting more popular day by day. Library Management System should able to support the wide screen resolution such as 1152 x 648 or 1280 x 720 so that user can view the system in perfect view.

More information can be inserted into book table such as product version, type of product (magazine, encyclopedia or newspaper) to enhance the system to be more perfect. In addition, the system should be enhanced so that one book can have more than one author. Currently the system only supports one author per book. Some book is having more than one author and user may miss to search the book.

Currently, the reservation made cannot be detected without restart the system. The system should be enhance so that the data can be updated in short time or pressing a button to avoid any error.

6.7 Personal Reflection

In this project development process, I have learnt a lot of new knowledge and programming code from this project. Besides that, there are also some problems that appears as biggest challenge during the development process.

During system design stages, the problem appears on how to construct the Entity-Relationship diagram and Data Flow Diagram. Assignments and studies materials in Diploma level studies materials are referred back. Some sample diagram and researches are done via Internet for more reference.

The barcode generator is the biggest challenge for me in Programming Stage. Firstly, I never know how the bar code work and how to bar code scanner work. After done some research and try the barcode, I realize that bar code is a type of font that unreadable by human. Barcode scanner is the reader special to read the barcode and convert into human readable text. In the font finding process, I have downloaded few bar code font but all of the font are failed to read by the scanner. Finally, with the help of my partner and Google, I found that the font type is IDAutomationHC39M.

After get to know the bar code font, the problem is How to generate the barcode label for user? After made some research on internet, I found out there is one string called as DrawString. DrawString is a method which put the string on a print paper. By using DrawString, we need to set the font type, and also the X as well as Y. At the first, all of my printed word is stick together in one row because I don't know how to set the T position. Again with the help Google, I solve this problem by increasing the Y value with the font's height.

On the other hand, the biggest harvest gained through this project development process is the importance of communication between teammates. The communication is very important because there must be integration between 2 teammate's systems. In this project, I do library system and my friend do library web site. We share one database server and so that we must communicate at early stage so that there is no crash when integration. In addition, discussion is needed in developing the project to match among library system and library web site. A good communication is needed to avoid unnecessary problems appear and delay the completion time.

Chapter 7

References

7. References

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Appendices

Setup Project Environment

To execute this system, user must first setting up some project environment. Firstly, user must create a folder named 'Pictures' located in C:\. This folder is used to store the photo used in the system such as book cover or member photo.

Installation Guide

- Double click on a LibraryManagementSystemSetup.exe
- Click Next
- Select the installation path
- Click Next twice to proceed to installation process.
- After complete installation, click Close to exit the installation.
- The Library system is now available to use at desktop.

Appendix I : Project Specification

A. Company Background

This system is developed for common library. We created the system which suits small size library. Most of the function we refer to other library system.

B. Project Objectives

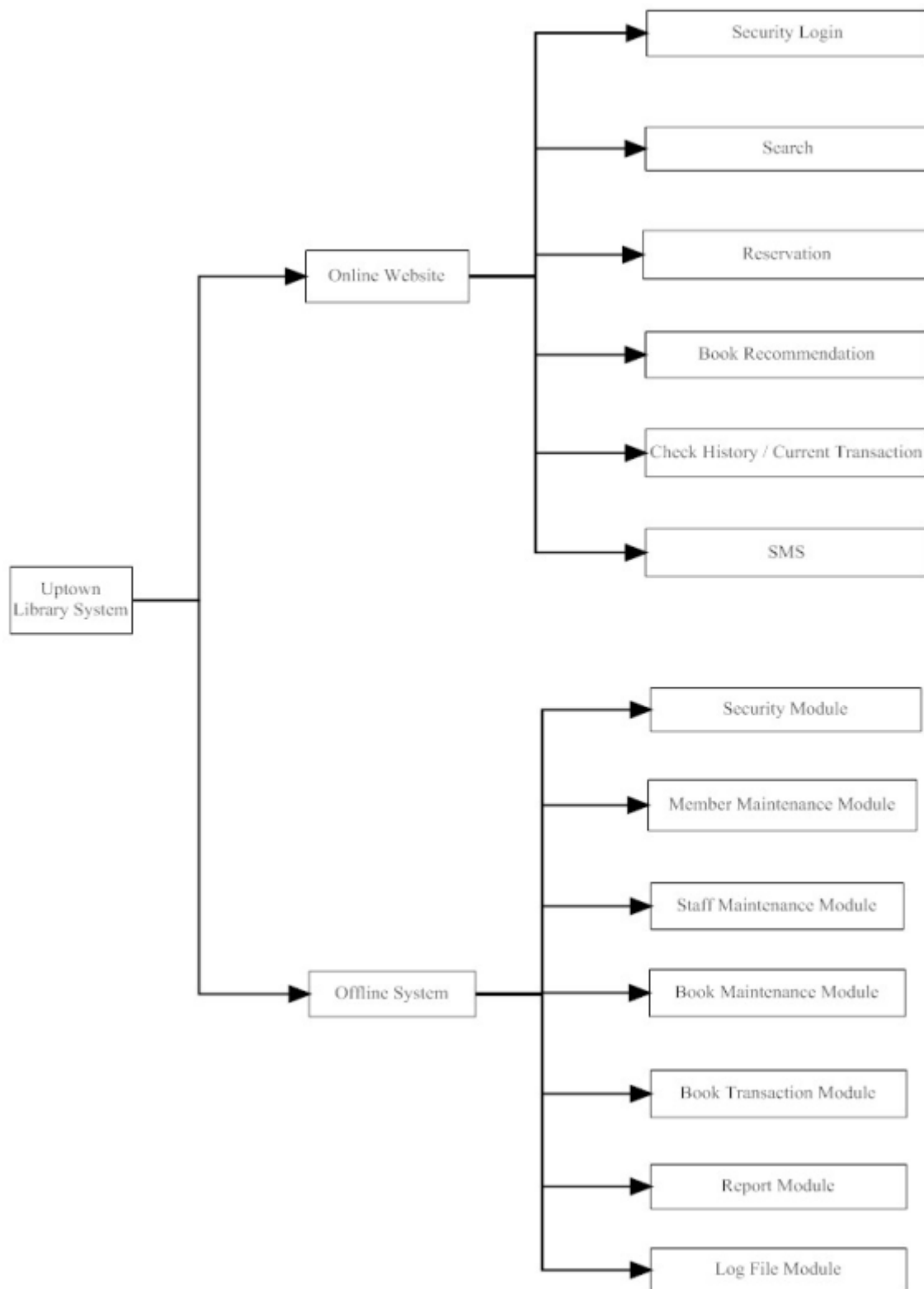
The purpose we creating this project are to let common library have an electronic library management system. A lot small size library was using paper-based management system. But followed by the increase of visitors and member, librarian was suffered because there are a lot of records. When need to search for particular member record, the librarian need a lot of time.

In addition, they are suffered from a lot paper-based problem such as lost of member's record. Some record was missing because they failed to take good care of it. For example, the librarians forget to put back the record into cupboard when they are busy.

Since my last visit to that library, I found that they need a computer management system so I think of this idea to developing a system for small size library. This is to avoid some paper-based problem such as lost of record and etc.

With the library system, librarians are able to record all the new books and new transactions. We implement the use of bar code in this project so that librarian can process the book transaction faster when a lot of members want to make a transaction. They can save a lot of time without writing the book id.

C. Project Scope



This is the project scope that our group is going to do in the whole project. Our group consists of two members whose are me Tan Chaur Chuan and my teammate Koh Yee Keat. In this project, it consists two parts which are online web site and offline system. The online web site will in charge by Koh Yee Keat while the offline system will be in charge by me, Tan Chaur Chuan. The Project Scope for online web site will be preparing by my teammate Koh Yee Keat. The module I cover below is only for offline system :-

1. Security Module

In this module, the user need to login so that able to our system:-

2. Member Maintenance Module

This module allows users to:-

- **Add** register a new member
- **Edit** maintain member's profile such as change of phone number or any other personal information.
- **View** View all the existing member
- **Photo** When register a member, librarian need to insert the photo which brought by member.
- **Print** system can print out member id card

3. Staff Maintenance Module

This module allows *admin* to:-

- **Add** admin can add a new staff
- **View** can check the entire existing librarian in library.
- **Edit** can edit the librarian information such as phone number and photo.

4. Log File Module

In this module, the *admin* are able to check what action has been done in the system previously.

5. Book Maintenance Module

This module allows *staffs* to:-

- **Add** staff/admin can register a new book
- **View** can check the entire existing book in library
- **Edit** can edit the book information
- **Photo** When register a book, staff needs to capture the book cover's photo
- **BarCode Generator** Users able to generate the bar code for particular book

6. Book Transaction Module

In this module, the *staff* will responsible to register a new book transaction when member wants to borrow the book

- **Bar Code** Bar code was used in this module to scan the book's barcode
- **Check out** After scan in the book, press check out to log out the member and register the book transaction
- **Lost Book** If a member lost a book, he/she need to pay double.
- **Return** Scan a barcode of a book to let member return the book
- **Fine** Calculate the fine if the date of return was expired

7. Report Module

This module allows *managers* to:-

- **Rental Report** Admin can view the rental report based on selected date
- **Return Report** Admin can view the return report based on selected date
- **Print** the report that they want to keep in their file as the backup or review.
- **Book** View all the book in library in crystal report format
- **Member** View all the member in library in crystal report format
- **Top10** Admin can view top10 book which most borrowed by member based on selected category and time range (daily, monthly, yearly)
- **Lost Book Report** Admin able to view all the book information which are registered lost.

Non-functional Requirements

i) Product Requirements

a) Efficiency requirements

With the library management system, librarian should be able to process faster when they process book transaction. In addition, with the use of bar code scanner, librarian can avoid to type the book id one by one, bar code scanner enable librarian to scan the book id instantly.

b) Reliability requirements

The system must perform accurately towards member request. For example, when the librarian saves the edited profile detail, after they review their detail, the details must be change according to the latest details that they have updated. When member return the book after the expired date, the fine should be calculate accurately. Besides that, in the registration form, it will have validity check to check the input to prevent wrong data type.

c) Usability requirements

This system must be designed with user-friendly and easy to use by the staff so that the user can perform their job nicely. It must have a clear instruction to guide user through the system. Besides that, the description of error message should be clear.

ii) Organizational Requirements

a) Implementation requirements

In implementing the system, it uses the vb.net as the main programming language and tools. Besides that, the SQL language will be use to maintain the information in the database. On the other hand, SQL Server 2008 needs to be installed.

b) Delivery requirements

The whole system is estimate to be done around 6 months time and the documentation will be done in 2 months. The full system will be delivers in a softcopy method while the documentation will be delivers in hardcopy and softcopy.

iii) External Requirements**a) Legislative requirements**

The information that use must be acknowledge by the authorized people so that it has no violating the law. This information is copyrighted and protected by the law. Besides that, when visitors wants to become the member of the library, he or she must agree with the rules stated in the system.

b) Security requirements

This system must be highly secure in the login part. It is because the report can only view by admin level. Staff can perform most of the process except viewing report module and log file module.

D. General Description

This section generally describes the overall system's functionalities and other information.

a) Product Functions

Library Management system was creates for the small library. The product was developed to let the librarian have electronic management system to replace paper-based system. The part I will describe here is offline system. Beside offline system, there is one more online web site which in charge of my teammate, Koh Yee Keat. The main function of this library management system is to let librarian perform their work with more efficiency and effectively.

b) Similar System Information

The type of library management system is quite similar with the existing library system used by Library Jalan Ong Yi How. After compare the system requirements with their system, I found that our system have 80% similar to them.

c) User Problem Statement

Currently, the library was using paper-based system. According to the librarian, they will lost the member's record sometimes because of too busy. When they busy to handle book transaction process, they will accidentally lost the record. Besides that, they need to calculate the fine manually. For example, the user return the book after expired date, currently the librarian need to check how many days has passed after expired date and then multiply with RM0.50 the process is all done manually and it is waste of time.

d) Users Objectives

Nowadays, the visitors are increase day by day. The librarian needs library management systems which can easier their job efficiently and effectively. The library management system should able to process book transaction process and also register new member, staff and book.

e) General Constraints**i) Lack of time to complete the Final Year Project**

The estimated duration to complete this project is about 8 month, and we are busy with industrial training. The time is very limited and still we need to determine the time to:

- Plan how the system works
- Review and analyze the requirement on the system
- Designed the system based on the project specification
- Code the program up with the complete documentation
- Having system testing

- Implement the system

E. External Interface Requirements

a) User Interface

For the user interface, the system will contain the standard Graphic User Interface (GUI) which is:

- It will be created to be full screen so that user can view the system clearly.
- The background colour will not be too bright because too bright will cause user's eye not comfortable.
- The background colour for the entire page in the system will be consistent.
- The book image or member photo size will be compress into small size so that librarian can know how the book's cover looks like or librarian can know the member's outlook.
- When customer login into the system, his or her name will appear in top right corner of the main page following by the current time and "logout" word.
- The size of the button will be standard in some size to avoid customer confusion.
- The button label would be easier to understand. For example, delete a record using "Delete" button but not "Destroy" or "Drop".

b) Hardware Interface

- This system can use in any type of computer such as personal computer and laptop.

c) Software Interface

- i) The operating system that the customers need to use Library Management System is Window XP and Window Vista.
- ii) SQL Server 2008 is needed to work as a database server.

d) Communication Interface

1. Library Management system that we developed is a main interface that allows communication between users and the system.

F. Development Environment

In developing Library Management System, we will need to use some hardware, software tools, and other resources such as programming languages.

- Hardware

The hardware that use to develop the project include standard personal computer. It is the basic requirement for developing the Library Management System. In addition, bar code reader is also compulsory to make the process more efficiency and reliability. User may not accidentally key in wrong information when make a book transaction.

- Software tools

The following is the software and tools that use to develop the project because these can help the project to be build.

- i) Microsoft Visual Studio 2008

- This software can use to design the system's interface. Besides that, we can write some coding to allow the button functioning. After developed the system, we can generate the installer to let user install the system.

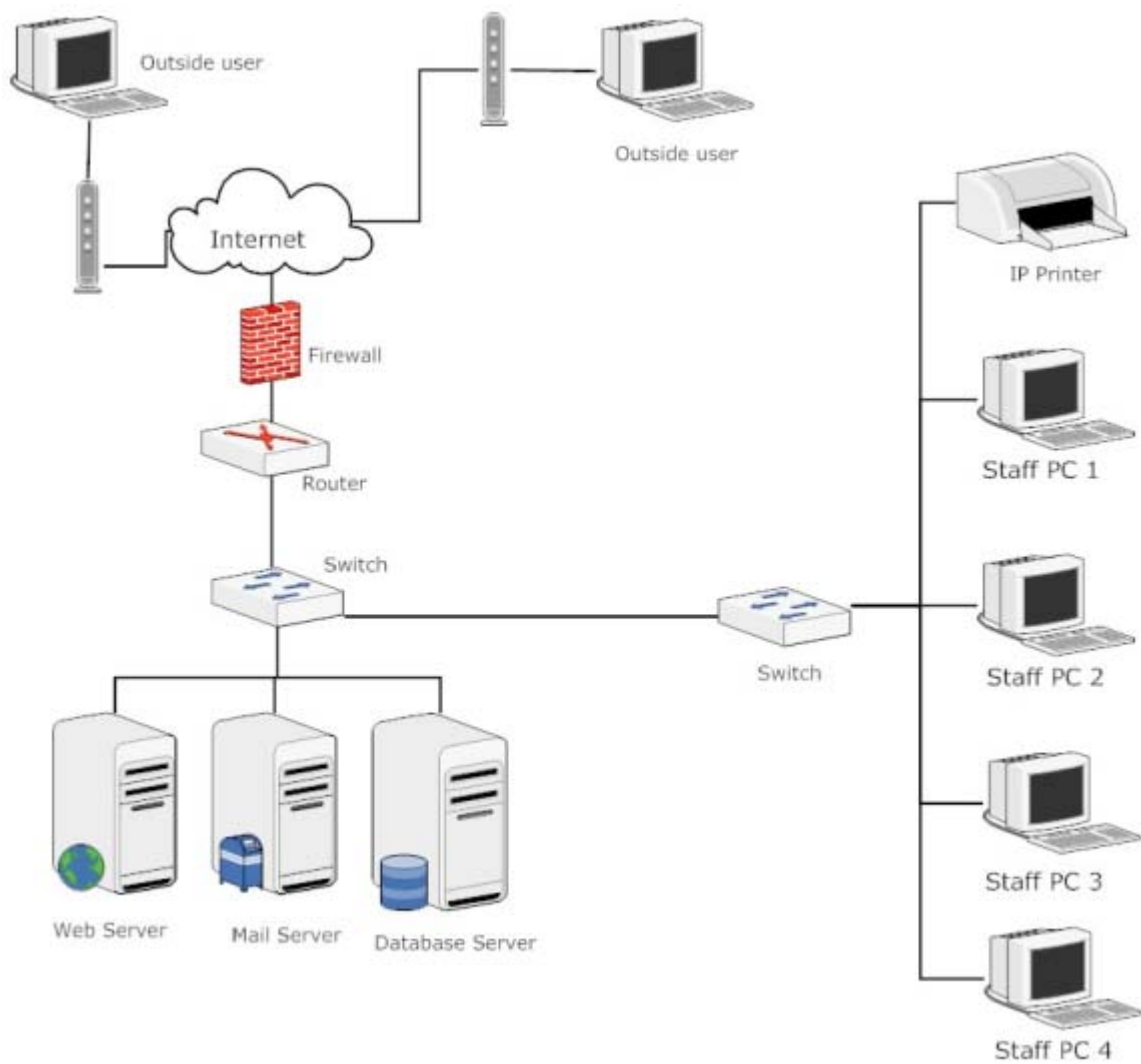
- ii) SQL Server 2008

- The SQL server 2008 will act as the database server in our system.

- Programming language

Programming language that use includes *VB.NET* to develop the library system through visual studio software. While for the database, *SQL language* uses to maintain the database. The reason we choose to use these programming language is because these language is being teach before and I am familiar with it.

G. Operation Environment



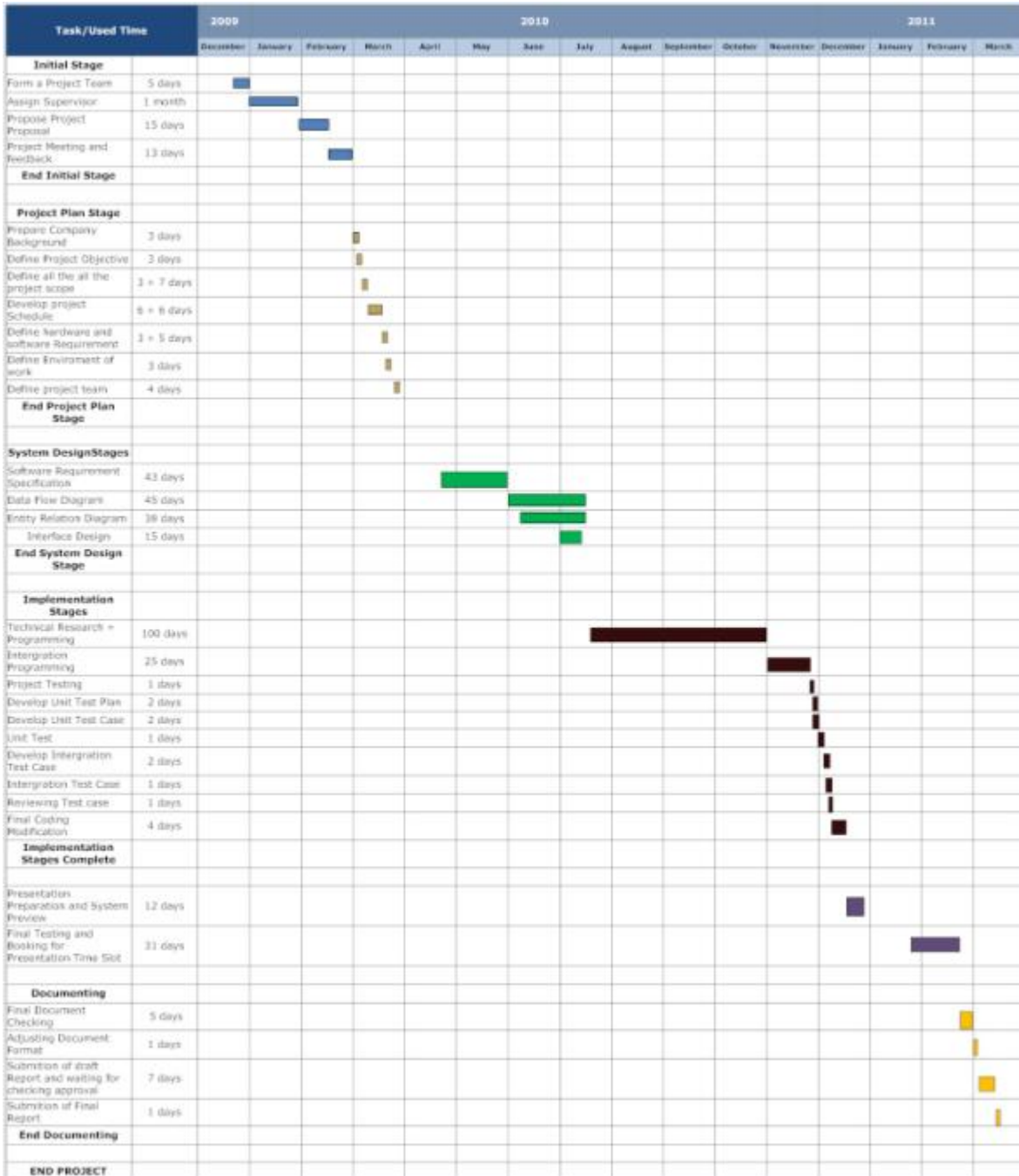
1) Staff site(User)

Hardware	Requirement	Function
RAM	Above 256MB	Additional RAM allows a computer work with more information at the same time.
Modem	Above 56Mbps	Allow the client to connect to the Internet and the output displayed will depend on the speed capacity.
Hard Disk	Above 80GB	Allow operating system, software titles and other files stored in this device.
Software	Requirement	Function
OS (Operating System)	Window XP	Basic requirement for computer to maintain all the process

Service**1) Web hosting service**

A service that allows us to host the web site on the internet to allow member login.

H. Project Schedule



I. Project Team

In doing this project, our team have two member which each of us will handle will handle different things. Tan Chaur Chuan will handle the offline system part while Koh Yee Keat will handle the online web site part.

Appendix II : User Manual

1. Login Page

Purpose : To provide authentication and authorization for user.

User : All users

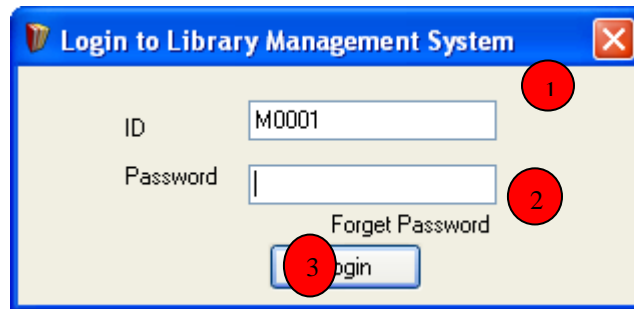


Figure 1.1 Print Screens for Login Form

- Section 1 is the textbox to enter the user id. User ID is unique for each user. Authorization is controlled based on this user ID. If the login ID is admin user, the user will be loaded into the system with admin control.
- Section 2 is a label which will pop up when user focus on password textbox. If user forgets their password, they can press the control. Email will be sent to user's registered email address.
- Section 3 is the login button which performs authentication checking. Only the authenticated users are allow to login to the Library System.

2. Main Form

Purpose: To perform book transaction module and act as a main form of Library System.

User : Normal User

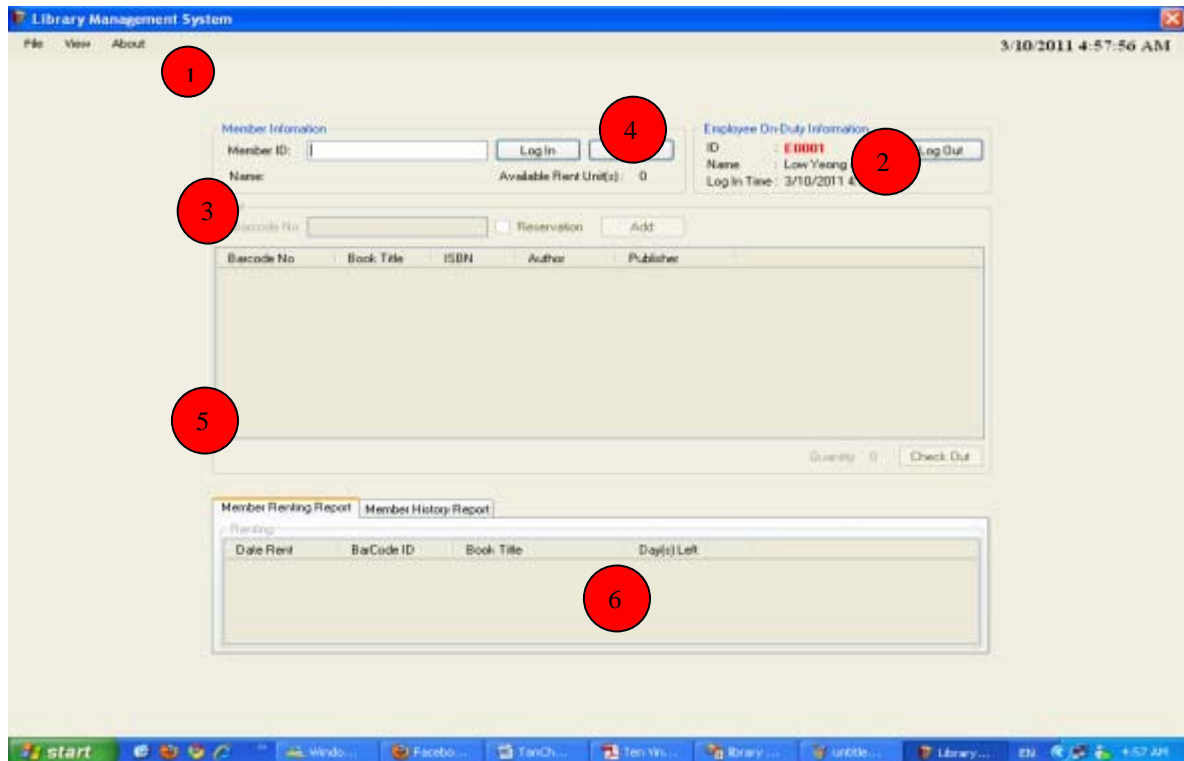


Figure 2.1 Print Screen for Main Form

- ✚ Section 1 is the menu strips. User can perform more tasks using the menu.
- ✚ Section 2 is the Employee-on-Duty information. The information show the current logged in user and the login time.
- ✚ Section 3 used to log in the member when the member wants to borrow a book.
- ✚ Section 4 is a Return button that will show the return book form.
- ✚ Section 5 is the cart that records the scanned book information. When users want to borrow few books, the books detail will be inserted into cart before checking out.

- ✚ Section 6 shows the renting history and current renting status of the logged in user.

3. Book Transaction Process

Purpose : Process to borrow a book

User : All Users

Member Information

Member ID:

Name: Koh Yee Keat Available Rent Unit(s): 1

Figure 3.1 First process for borrow a book

- ✚ Firstly, user must log in the member id.

Member Information

Member ID:

Name: Available Rent Unit(s): 0

Cart

Barcode No.

Barcode No | Book Title | ISBN | Author | Publisher

978158713204901 | Routing Prot... | 9781587132049 | Allan Johnson | Keattheone publisher

Quantity 1

ALERT
Member ID not found.

Figure 3.2 Print screen for the messagebox

- ✚ If the member ID is not found, the message box will pop up to inform user that member ID not found.

Cart

Barcode No. Reservation

Barcode No	Book Title	ISBN	Author	Publisher
978158713204901	Routing Prot...	9781587132049	Allan Johnson	Keattheone publisher

Quantity 1

Figure 3.3 Print screen for Cart

- ✚ The next step is user use bar code scanner to add the books into the cart.
- ✚ If the book is under reservation, user must check the Reservation checkbox.

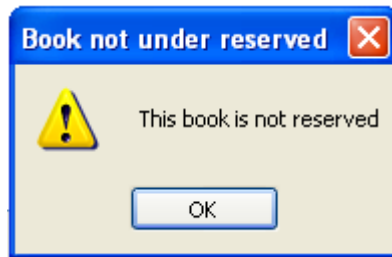


Figure 3.4 Print screen for message box if the book not under reservation

- ✚ This messagebox will be show if the user checks the messagebox but the book barcode id is not found in reservation database.

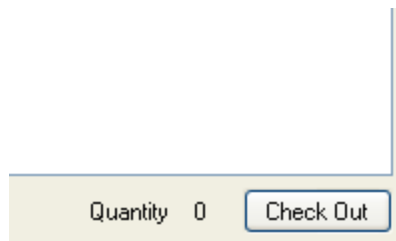


Figure 3.5 Print Screen for check out button

- ✚ After user scan all the books that member wants to borrow, user can press check out button to complete the rental process.

4. Member Registration Process

Purpose : Process to register a new member

User : All Users

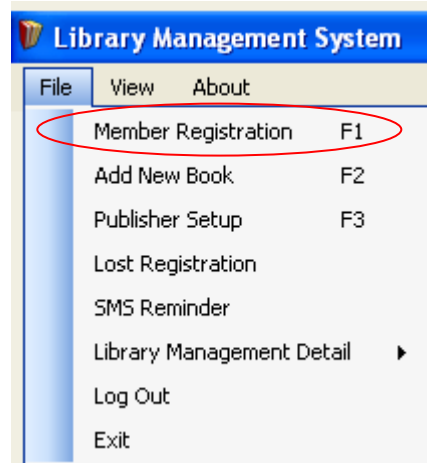



Figure 4.1 Print Screen of steps opening Member Registration form

- ✚ User can open the member registration form through File – Member Registration.
- ✚ The alternative and shortcut way to open the member registration form is pressing F1 key.

Member Registration

Please fill in member information

	Member ID	M0006
	Name	Tan Chaur Chuan
	IC. No.	880704-35-5263
	Phone No.	04-3598526
	E-Mail	Susan@gmail.com
	Password	XXXXXXXX
	Confirm Password	XXXXXXXX

Address 30 jalan gembira

Register Date 3/10/2011

Take Photo

Add Clear All Close

Figure 4.1 Print Screen for member registration form

- ✚ The member ID in this form is auto generated.
- ✚ Name input should not contain any numeric character.
- ✚ IC. No. format should be xxxxxx-xx-xxxx.
- ✚ Phone No. format should be xxx-xxxxxxx or xx-xxxxxxx.
- ✚ Email address format should be xxx@xx.xxx
- ✚ The confirm password input must be same with password input.
- ✚ User must get the softcopy of photo from member and put the photo in the directory that create in early time which is C:\Pictures. After that user may select the member photo from the directory by pressing the Take Photo button.
- ✚ Clear all button will perform the function that clear all the text box input.
- ✚ Add button is a button that checking the user input and complete the process.

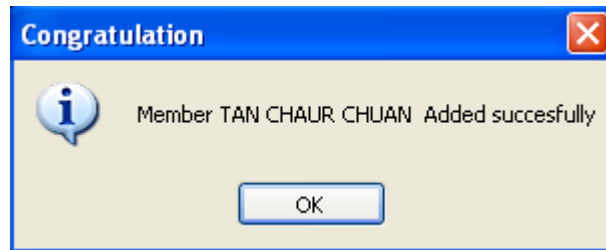


Figure 4.2 Print Screen for messagebox notification after register a member

- ✚ This is the message box notification after the member registration process completed.

5. Add new book process

Purpose : Process to register a new member

User : All Users

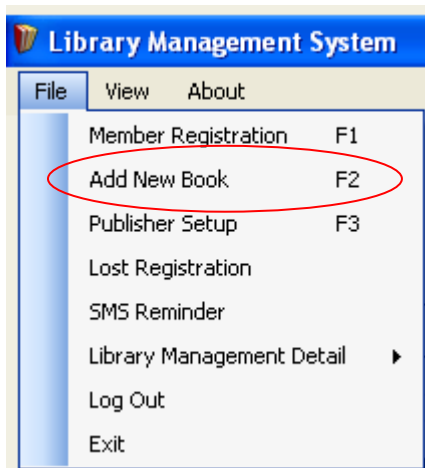


Figure 5.1 Print Screen for how to show Add Book Form

- ✚ User can open the Add Book form through File – Add New Book
- ✚ The alternative and shortcut way to open the form is pressing F2 key.

Figure 5.2 Print Screen for Add New Book form

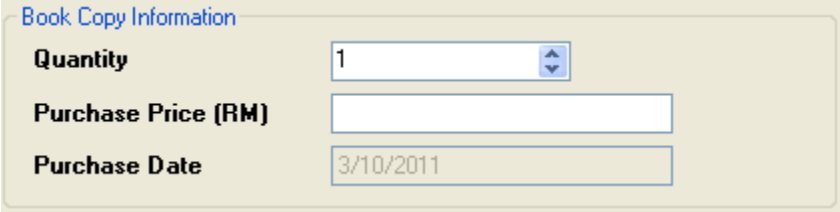
- ✚ In this form, user required to key in all the information.
- ✚ For ISBN, user can scan the book ISBN bar code. The length of ISBN no is 13 digits.
- ✚ User can select the category throughout the drop down list.

PublisherID	Publisher
P0001	Keattheone publisher
P0002	chuan publisher
P0003	chuna chuan

Figure 5.2 Print Screen for Add New Book form

- ✚ For publisher, user can press the button beside to show to publisher form.

- ✚ From publisher searching form, whoever the user select may insert into the textbox under Add new book.



Book Copy Information

Quantity	<input type="text" value="1"/>
Purchase Price (RM)	<input type="text"/>
Purchase Date	<input type="text" value="3/10/2011"/>

Figure 5.3 Print Screen for Book Copy Information

- ✚ After insert the book detail such as ISBN and title, user need to key in the quantity of book purchased and the purchased price.

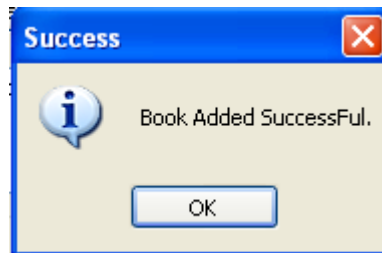


Figure 5.4 Print Screen for Message box notification

- ✚ The message box will show after complete checking and validating all the input information. If there is any input data which not match the requirement or blank, other message box will prompt out to notified user.

6. Publisher Maintenance

Purpose : Process to register a new member

User : All Users

Publisher ID	Publisher
P0001	Keattheone publisher
P0002	chuan publisher
P0003	chuna chuan

Figure 6.1 Print Screen for Publisher maintenance form

- To add the publisher, user click 'Add' button and the list view will be disabling.
- The publisher will be showed when user adds the new book.
- When user wants to edit the publisher name, user can select a publisher from list view then click 'Edit' button.
- After user press the 'Edit' button, the Edit button's text will change to 'Save'.
- The publisher ID is not allowed to edit and user can only change the publisher name.
- After change the publisher name, user can press 'Save' button to update the information.

7. Book Maintenance Form

Purpose : An interface to maintain the book's information

User : All Users

The screenshot shows a 'Book Information' window with two main sections. Section 1 (Listview A) is a search table with columns 'ISBN' and 'Title'. Section 2 (Listview B) is a detail form for a selected book.

ISBN	Title
12345678...	The Lord Of The Ri...
45891264...	Happy Hour
58496135...	Handphone King
97719858...	thank you
97815871...	Routing Protocols ...

ISBN No.	5849613526524
Book Title	Handphone King
Category	Technology
Publisher	chuan publisher
Author	Malaysian Phone
Language	Chinese
Description	Show latest handphone detail
Bar Code	
Purchase Price	
Purchase Date	

ISBN	Bar Code	Title
5849613526...	584961352652401	Handphone Ki...
5849613526...	584961352652402	Handphone Ki...

Figure 7.1 Print Screen for book maintenance form

- In figure 7.1, Section 1 shows the search function. User can filter the book based on ISBN, book title, category, author or publisher. User can enter the search keyword at the search textbox. The keyword can be either one character of the book information.
- When user select one book of from the list view on Listview A, the selected book's information will show at Section 2 and the book copies information of the selected book will show at Listview B.

- ✚ When user select one book from Listview B, the book copy information will show at Section 3.

Book Information

Book

ISBN

ISBN	Title
12345678...	The Lord Of The Ri...
45891264...	Happy Hour
58496135...	Handphone King
97719858...	thank you
97815871...	Routing Protocols ...

Book Information

ISBN No. 5849613526524

Book Title Handphone King

Category Technology

Publisher chuan publisher

Author Malaysian Phone

Language Chinese

Description Show latest handphone detail

Bar Code

Purchase Price

Purchase Date

ISBN	Bar Code	Title
5849613526...	584961352652401	Handphone Ki...
5849613526...	584961352652402	Handphone Ki...

Book Listview

Book Copy Listview

Generate BarCode Add New Save View All Books Close

Figure 7.2 Print Screen of book maintenance form in Edit Book information format

- ✚ This is the form's look when user press Edit button while select one book from Book Listview. User can edit the book information but not book copy information.
- ✚ The Edit button's text will change to Save in edit mode.

Book Information

Book

ISBN

ISBN	Title
12345678...	The Lord Of The Ri...
45891264...	Happy Hour
58496135...	Handphone King
97719858...	thank you
97815871...	Routing Protocols ...

Book Information

ISBN No. 5849613526524

Book Title Handphone King

Category Technology

Publisher chuan publisher

Author Malaysian Phone

Language Chinese

Description Show latest handphone detail

Bar Code 584961352652401

Purchase Price 50

Purchase Date 2/16/2011

ISBN	Bar Code	Title
5849613526524	584961352652401	Handphone
5849613526524	584961352652402	Handphone

Generate BarCode Add New Save

View All Books Close

Figure 7.3 Print Screen of book maintenance form in Edit Book Copy information

- ✚ When user selects one item from Book Copy list view and click Edit button. The editable information is only limited to purchase price.

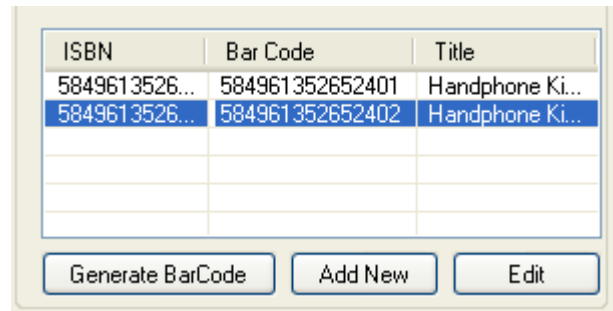


Figure 7.4 Print Screen of Generate Barcode Button

- To generate a bar code of the book, user must first select one book from book copy list view. The bar code generated will be depends on which book user select.

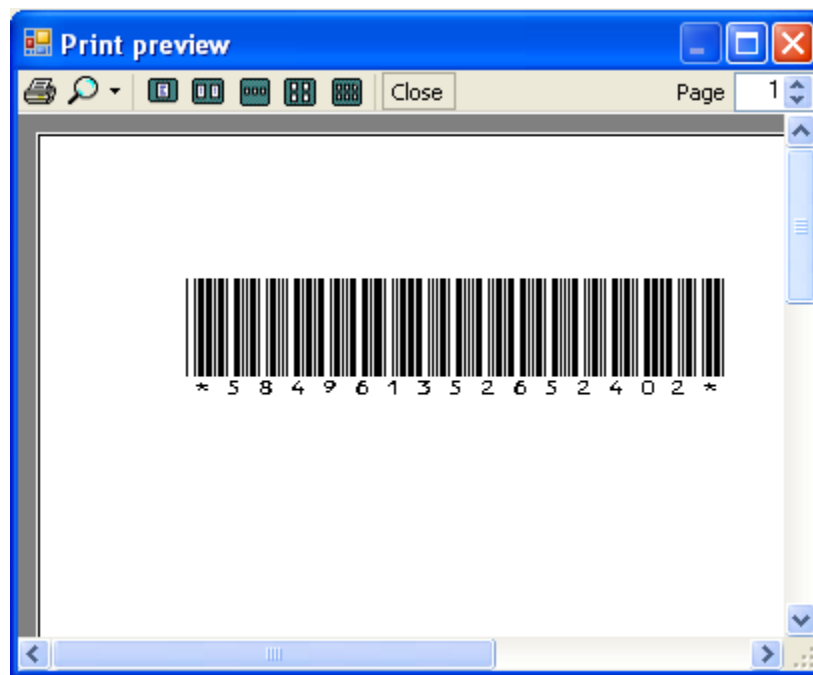


Figure 7.5 Print Screen of generated bar code

- The bar code generated is in print preview format. If user wants to print out the bar code label, user needs to press print button which included in the print function by default.

8. Member Maintenance form

Purpose : To maintain the member record

User : All users

Member Information

Member

ID

ID	Name
M0001	Ooi Yee Neng
M0002	Chan Cheang Hau
M0003	Koh Yee Keat
M0004	tan chen chen
M0005	tan tan
M0006	Tan Chaur Chuan

Member Information

Member ID M0006

Name Tan Chaur Chuan

IC. No. 880704-35-5263

Phone No. 04-3598526

E - Mail Susan@gmail.com

Address 30 jalan gembira

Register Date 3/10/2011 **Expired Date** 3/10/2012

Add Edit View All Members

Membership Renewal Print ID Card Close

Figure 8.1 Print Screen of member maintenance interface

- ✚ When user select one of the member from list view, the member's detail will showed at the textbox provided.
- ✚ In this member maintenance form, user can edit, print ID card, member renewal and also view the report to show all members.

Figure 8.2 Print Screen of member maintenance interface in edit mode

- ✚ When user click edit, the editable field will become enable such as name, IC no, phone number, email and address. The member id is not allowed to change because it is unique identifier.
- ✚ After user finish edit the information, user press Save to update the information.

Figure 8.3 Print Screen of Search function in member maintenance interface

- Similar to the search function in book maintenance, user can filter the data by ID or member name. The keyword we enter must be a character within the targeted information.

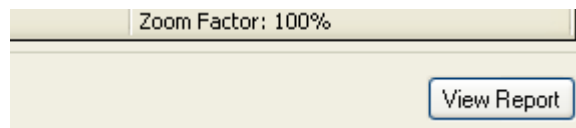


Figure 8.3 Print Screen of View report button on Report Control

- When user clicks View All Member, the report control will show out. User is required to click View Report button on the report control.

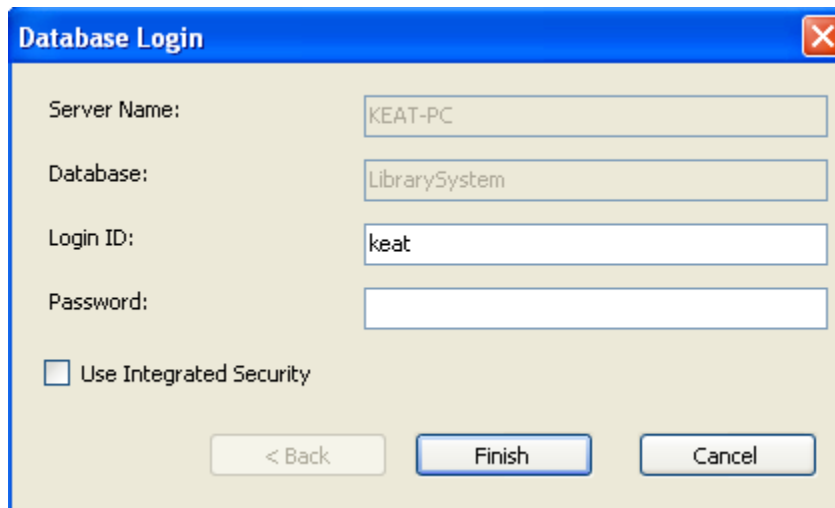


Figure 8.3 Print Screen of Database Login on Report Control

- User is required to login the database by inserting the database password. Without authorization password, normal librarian is not allowed to view the report.

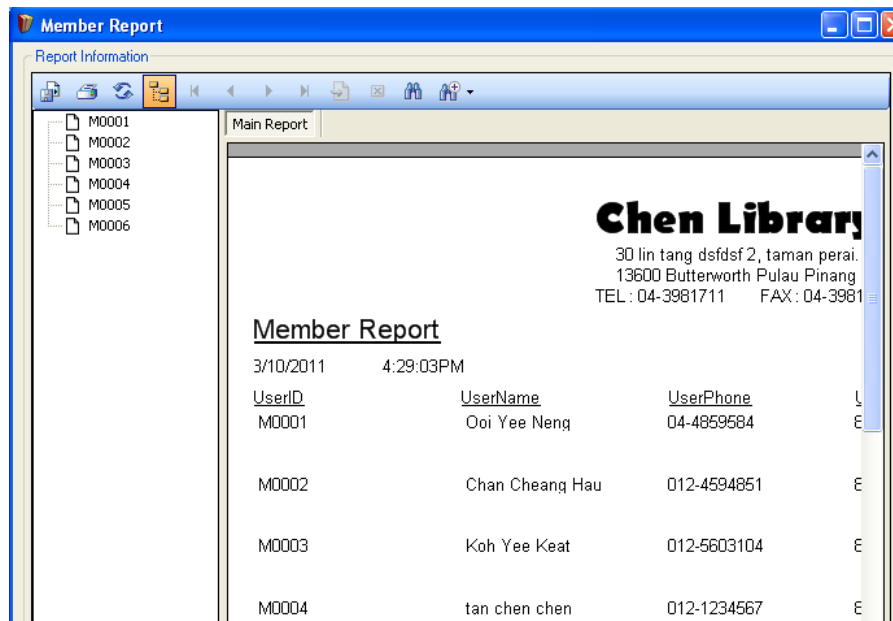


Figure 8.3 Print Screen of View all Member Report Control

- ✚ This is the crystal report which shows all members to user. User can print out the member report by clicking the print button in the report control.

9. Employee Maintenance Form

Purpose : To maintain about the authentication for employee to log in the system

User : Admin staff

The screenshot shows a window titled "Employee Management" with a blue title bar and standard window controls (minimize, maximize, close). The window is split into two main panes. The left pane, titled "Employee List", contains a search box for "Employee ID:" and a table with columns "ID" and "Name". The right pane, titled "Employee Information", contains several text input fields for "Employee ID", "Name", "IC. No.", "Contact No.", "E-Mail", and "Address", along with a dropdown menu for "Position" currently set to "Employee". At the bottom of the right pane are three buttons: "Add", "Edit", and "Close".

ID	Name
E0001	Low Yeon...
E0002	Lim Yu Jie
E0003	tan ching L...
E0004	pikachu
M0001	Tan Chaur...
M0002	Chan Kar ...
M0003	Koh Yee ...

Figure 9.1 Print Screen of Employee Maintenance Form

- ✚ In this form, user can search the employee based on employee ID.
- ✚ When user clicks one of the employees, the employee's information will be shown in the text box at right hand part.
- ✚ User can click the Edit button to change to employee information.

10. Report

Purpose : To let admin to view the report of the book transaction that happens on particular date.

User : Admin

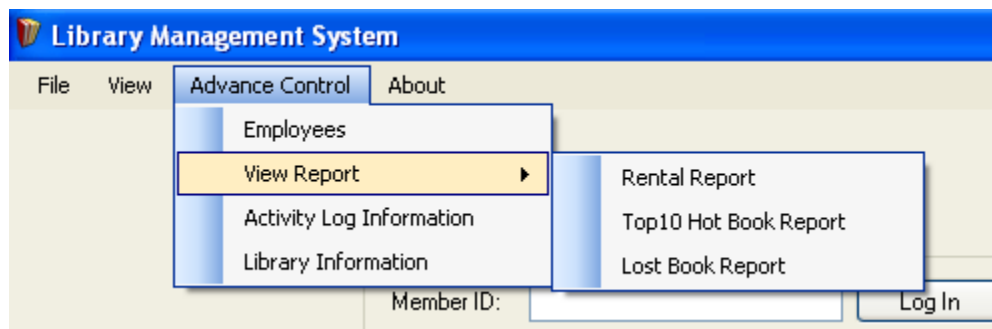


Figure 10.1 Print Screen of Advance Control Label

- ✚ When admin user log in the system, the Advance Control will appear.
- ✚ This control enables admin to view different kind of report.

Member ID	Barcode ID	Date Rent	Date Due	Date Return	Fine(RM)	Status
M0001	584961352652402	16/02/2011	02/03/2011	16/02/2011	RM0.00	A
M0002	978158713204901	16/02/2011	02/03/2011	16/02/2011	RM400.00	L
m0004	584961352652402	16/01/2011	02/02/2011	16/02/2011	RM15.00	A

Figure 10.2 Print Screen of Book Transaction Report

- ✚ In this book transaction report, admin can either view Rent Report or Return report which happens on particular Date.
- ✚ Admin can select a selected day by using the date control.
- ✚ The highlighted book means the book has been lost.



Figure 10.3 Print Screen of Book Transaction Report

✚ This is the sample print preview of the return report.

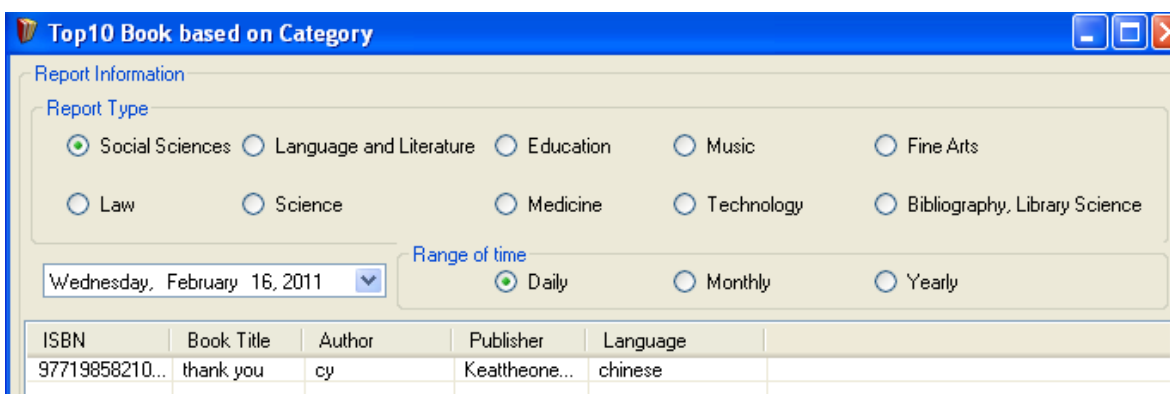


Figure 10.4 Print Screen of Top 10 report Control

- ✚ Admin can view the Top10 book based on category.
- ✚ The Top10 is based on the top rental rate's book.
- ✚ If admin wants to see the monthly report for February, admin can select any day within February from date control and select monthly. The result will be filtered based on category and in February.



Figure 10.5 Print Screen of Sample print out of top10 report

Time Occured	Employee...	Employee Name	Activity
3/2/2011 10:04:32 PM	M0001	Tan Chaur Chuan	Book Title The Lord Of The Ring with barcodeID 12345678912...
3/2/2011 10:13:53 PM	m0001	Tan Chaur Chuan	User m0001 has logged in into the system
3/4/2011 3:27:18 PM	M0001	Tan Chaur Chuan	User M0001 has logged in into the system
3/5/2011 12:15:15 PM	m0001	Tan Chaur Chuan	User m0001 has logged in into the system
3/5/2011 3:51:13 PM	m0001	Tan Chaur Chuan	User m0001 has logged in into the system
3/5/2011 3:52:09 PM	M0001	Tan Chaur Chuan	M0001 has renew the membership.
3/5/2011 3:56:01 PM	M0001	Tan Chaur Chuan	Edit personal information of MemberID M0002
3/5/2011 5:19:13 PM	M0001	Tan Chaur Chuan	Book Title thank you with barcodeID 977198582100301 register...
3/5/2011 7:25:30 PM	m0001	Tan Chaur Chuan	User m0001 has logged in into the system
3/5/2011 8:53:10 PM	m0001	Tan Chaur Chuan	User m0001 has logged in into the system
3/5/2011 8:53:27 PM	M0001	Tan Chaur Chuan	Information of Employee E0003 has been updated
3/5/2011 8:53:37 PM	M0001	Tan Chaur Chuan	Information of Employee E0004 has been updated
3/8/2011 6:07:18 PM	m0001	Tan Chaur Chuan	User m0001 has logged in into the system
3/10/2011 5:06:46 AM	E0001	Low Yeong chun	User E0001 has logged out from the system
3/10/2011 1:13:10 PM	E0001	Low Yeong chun	New Member TAN CHAUR CHUAN has been added
3/10/2011 1:46:18 PM	E0001	Low Yeong chun	5 book(s) with ISBN 4589126452378 was new registered into da...
3/10/2011 3:58:31 PM	E0001	Low Yeong chun	Edit detail of book with ISBN 5849613526524
3/10/2011 4:02:40 PM	m0001	Tan Chaur Chuan	User m0001 has logged in into the system
3/10/2011 4:04:06 PM	m0001	Tan Chaur Chuan	User m0001 has logged in into the system
3/10/2011 4:25:34 PM	M0001	Tan Chaur Chuan	Edit personal information of MemberID M0006
3/10/2011 4:27:01 PM	M0001	Tan Chaur Chuan	User M0001 has logged in into the system
3/10/2011 4:45:55 PM	M0001	Tan Chaur Chuan	User M0001 has logged out from the system
3/10/2011 4:47:46 PM	m0001	Tan Chaur Chuan	User m0001 has logged in into the system
2/16/2011 5:23:51 PM	m0001	Tan Chaur Chuan	User m0001 has logged in into the system
3/4/2011 5:37:21 PM	M0001	Tan Chaur Chuan	Edit detail of book with ISBN 9781587132049
3/6/2011 4:22:13 PM	m0001	Tan Chaur Chuan	User m0001 has logged in into the system
3/10/2011 4:54:20 AM	M0001	Tan Chaur Chuan	User M0001 has logged in into the system
3/10/2011 4:57:09 AM	M0001	Tan Chaur Chuan	User M0001 has logged in into the system
3/10/2011 4:57:12 AM	M0001	Tan Chaur Chuan	User M0001 has logged out from the system
3/10/2011 4:57:53 AM	e0001	Low Yeong chun	User e0001 has logged in into the system
3/10/2011 4:57:58 PM	M0001	Tan Chaur Chuan	Edit detail of book with ISBN 9771985821003

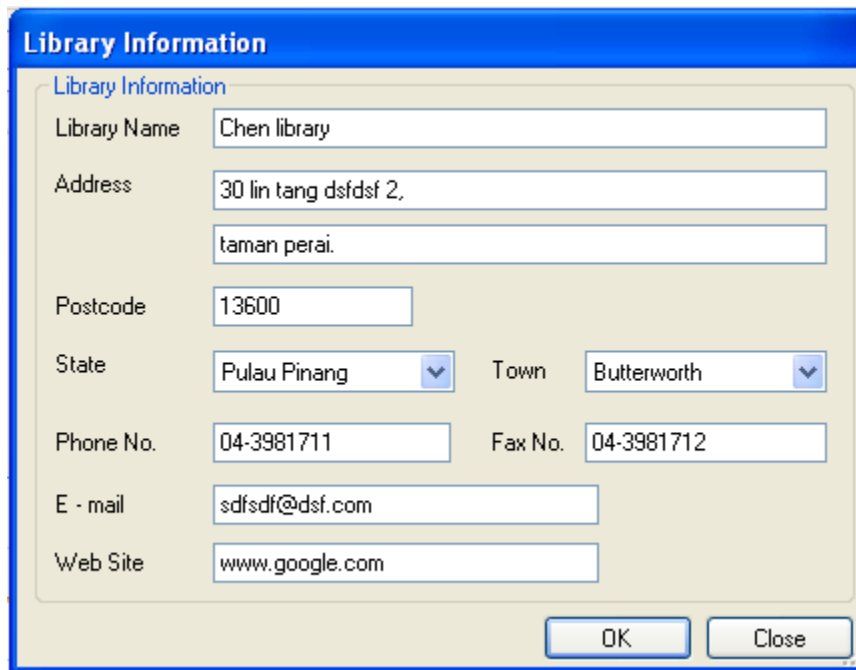
Figure 10.6 Print Screen of Activity log

- ✚ This is the activity log file where system will record down all the activities occurred in the system such as user login, new data insert or update information.
- ✚ Admin can check the activity log when system crash.

11. Library Detail

Purpose : store the library information which used in generate report header.

User : admin



The screenshot shows a 'Library Information' dialog box with the following fields and values:

Field	Value
Library Name	Chen library
Address	30 lin tang dsidsf 2, taman perai.
Postcode	13600
State	Pulau Pinang
Town	Butterworth
Phone No.	04-3981711
Fax No.	04-3981712
E - mail	sdfsdf@dsf.com
Web Site	www.google.com

Figure 11.1 Print Screen of Library Information Form

- ✚ When admin user first log in into the system, system will prompt the library detail form and force admin to insert the library information.
- ✚ The library information will be used to generate the report header.

Project Progress Report 1

Report No. : 1	Date : 6 October 2010
From : 3.30pm	To : 4.30pm
Project Title : Library Management System	
1. Progress Made (since the last meeting)	
Pass up first project specification to check by supervisor.	
2. Critical Evaluation	
a. Problems Encountered	
Due to my system is not purposely created for targeted library, I don't know what should be wrote at company background. The module part not complete.	
b. Steps You Have Taken To Resolve Them	
After ask supervisor's opinion, I get the idea on what to write at company background part. The system I developed is for common library and my system contains the basic function that all libraries must have.	

Project Progress Report 2

Report No. : 2	Date : 20 October 2010
From : 4pm	To : 5pm
Project Title : Library Management System	
1. Progress Made (since the last meeting)	
After edited on the project specification, I pass up the latest project specification with enhancement on module part and other's content.	
2. Critical Evaluation	
a. Problems Encountered	
For edited project specification, there do not have any problems occur on it. It is the project specification that I had made changes on the previous project specification which is does not contain enough detail about the module that we write for the project. Besides that, while doing this project specification, I not so understand how to write it.	
b. Steps You Have Taken To Resolve Them	
After submit the latest version of project specification to supervisor, I try to add in more detail information into the parts I have done.	

Project Progress Report 3

Report No. : 3	Date : 17 December 2010
From : 11.30pm	To : 12pm
Project Title : Library Management System	
1. Progress Made (since the last meeting)	
In last meeting, I have pass up the project specification. In this system preview meeting, I show my system's interface design.	
2. Critical Evaluation	
a. Problems Encountered	
For system preview, what I should show is full system preview. But due to I start the development process late, I only show interface design. I not yet complete database design and also coding.	
b. Steps You Have Taken To Resolve Them	
After finish meeting with supervisor, I start design my database and coding to ensure that I can pass up the full system preview on next meeting. Promise to pass up full system preview on 25 Jan 2011.	

Project Progress Report 4

Report No. : 4	Date : 25 Jan 2011
From : 3.00pm	To :4.00pm
Project Title : Library Management System	
1. Progress Made (since the last meeting)	
Pass up full system preview to let supervisor comment on it.	
2. Critical Evaluation	
a. Problems Encountered	
There are too less management report that can be viewed by admin staff. Supervisor asks me to add in more management report. The report need provide with print function.	
b. Steps You Have Taken To Resolve Them	
I add in Top 10 Book report. In addition, all report is able to print out.	

Project Progress Report 5

Report No. : 5	Date : 9 February 2011
From : 11pm	To : 12pm
Project Title : Library Management System	
1. Progress Made (since the last meeting)	
Show supervisor the enhanced admin report and the bar code reader module.	
2. Critical Evaluation	
a. Problems Encountered	
Management report need enhanced so that user can filter the data for daily, monthly, yearly.	
b. Steps You Have Taken To Resolve Them	
Enhance the admin report for Top10 Book so that user can check out the information for Top10 book in particular week, day or year. In addition, the Top10 book can be filter by category also.	

Project Progress Report 6

Report No. : 6	Date : 17 February 2011
From : 3.00pm	To : 5.00pm
Project Title : Library Management System	
1. Progress Made (since the last meeting)	
Project testing with moderator.	
2. Critical Evaluation	
a. Problems Encountered	
<ul style="list-style-type: none"> - Report need to add in report header, generated time and date - Member module need to add in email information - Staff Module need to add in contact information such as phone and email - Some button linkage is not functioning 	
b. Steps You Have Taken To Resolve Them	
Make enhancements based on moderator's comment and fixed the bug.	

Project Progress Report 7

Report No. : 7	Date : 6 October 2010
From : 3.00pm	To : 5.00pm
Project Title : Library Management System	
1. Progress Made (since the last meeting)	
Show supervisor the latest system with has fixed the bug and enhanced with moderator's comment.	
2. Critical Evaluation	
a. Problems Encountered	
There are no any comments from supervisor after final testing.	
b. Steps You Have Taken To Resolve Them	
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