



Book Rental Information System

By

Ms. Patcharee Purachit

Final Report of the Three - Credit Course
CS 6998 System Development Project

Submitted in Partial Fulfillment
of the Requirements for the Degree of
Master of Science
in Computer Information Systems
Assumption University

November 1999

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Project Title Book Rental Information System


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Academic Year November 1999

The Graduate School of Assumption University has approved this final report of the three-credit course, CS 6998 System Development Project, submitted in partial fulfillment of the requirements for the degree of Master of Science in Computer Information Systems.


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November 1999

ABSTRACT

Nowadays, there are various kinds of rental businesses. Every organization grows in terms of size, complexity, and specialization. The current rental service system is manual and seems to be simple but has many problems. The demand and needs for reliable, accurate, timely and economical information by members and staff members also grow at a faster rate than in the past. So the computerized system for information is more important today.

This system is developed to improve the work efficiency and capability of providing the service on time plus providing the accurate information about the book and rental service. The scope of this project, Book Rental Information System, is mainly involved in developing computerized system replace manual operations. The new system is providing the better and more efficient way to keep accurate record in order to provide faster transaction to member on time. This project aims at providing a computerized system to the staff members in the bookshop to carry out their work both rental service and statistical report for more efficiently and accurately to meet the increasing revenue.

The new system proposed is developed in accordance with the System Analysis and System Design techniques. The new system project discusses the user requirements, system design, hardware and software requirements, cost and benefits analysis, security and control and also includes the design of the input and output screen. This system has been successfully tested and implemented on Microsoft Access.

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I. INTRODUCTION

1.1 Background of the Project

There are many book rental service businesses nowadays. Most of the book rental services still use manual system for managing the system because in the past the computers are so expensive for a little bookshop. However, today, technology is more and more developed and increases at the same time. The prices of computers are decreasing. It is possible for little bookshops to use computers to manage the system in place of the manual system. The capabilities of the book rental information system have to generate better quality such as providing faster service and information service to customers. Therefore, the book rental information system is becoming increasingly complicated.

The main responsibilities of the book rental information system are to generate revenue and make a higher profit for the business. The process cycle of the book rental service may include rental service transaction, returning transaction and providing information to inquires, and giving service to the customers who use the service and the information service from any company. The book rental service transaction should provide faster information service and adequate information to make higher service volume provided to customers. And the book rental information system should generate reports for the management to update and perform periodic record review.

1.2 Objectives of the Project

The aim of the project is to develop a computerized information system to support the book rental information system. The objectives of the project are as follows:

1. To study the general processes of the existing system of book rental service and to design the new process by using computer-based information system to facilitate the process and solve various problems.
2. To develop and implement software for a new book rental information system in order to collect document, provide fast retrieved, and generate high benefits.
3. To provide accurate and up-to-date information for all of the book rental information systems.
4. To provide reports to help the management for effective planning and decision-making.
5. To minimize the hidden cost stemmed from wasted time, human errors in business operation, data redundancy, and unstable record.

1.3 Scope of the Project

The project covers major aspects of book rental service operation that include the following:

1. To computerize all necessary information sources and flows into a computer-based information system.
2. To replace the existing manual system by a more efficient computerized system.
3. To develop a more efficient book rental service process by using new developed software.

1.4 Project Plan

The project plan is represented in terms of Gantt Chart shown in figure 1.1



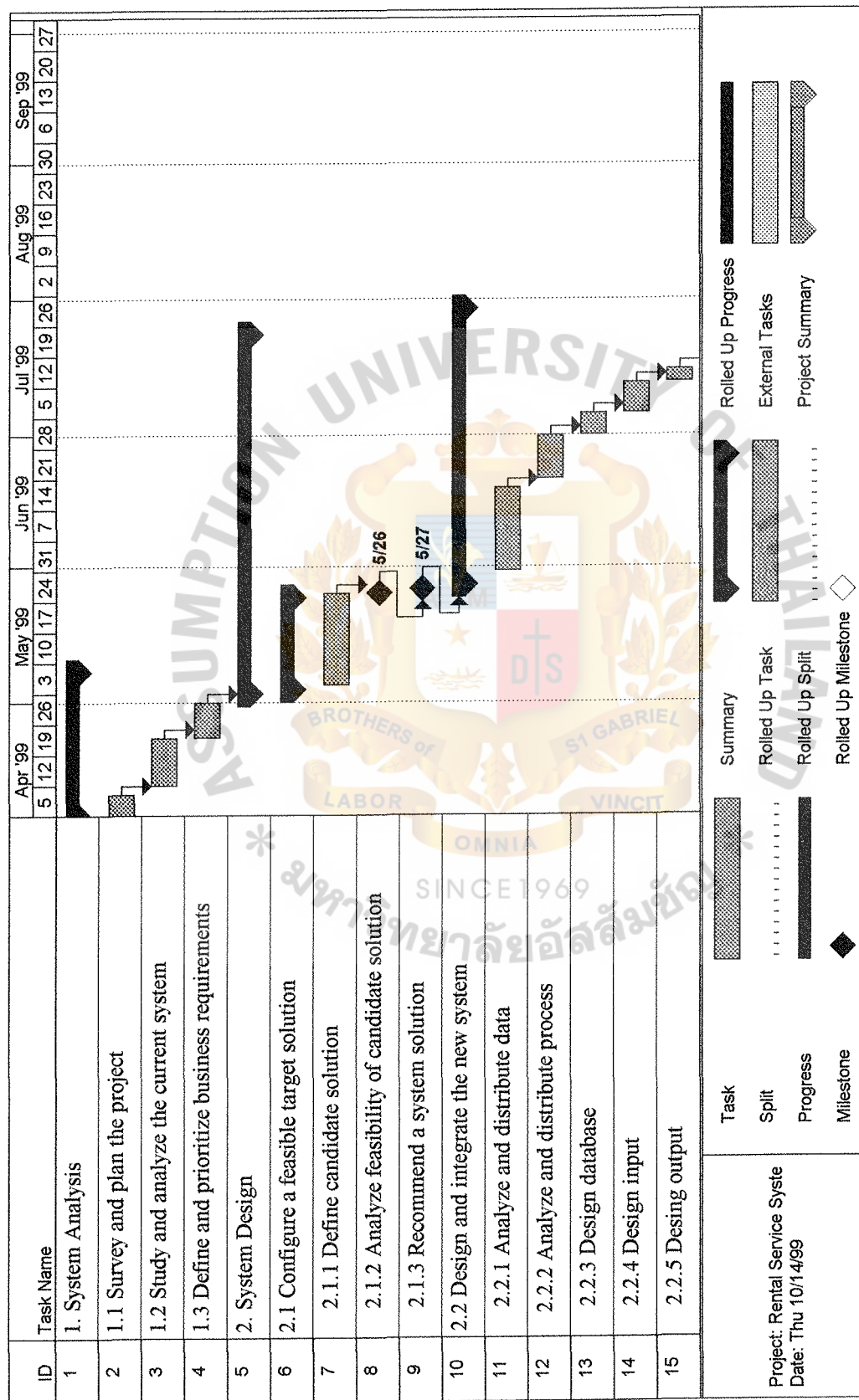


Figure 1.1. Project Plan of Book Rental Information System.

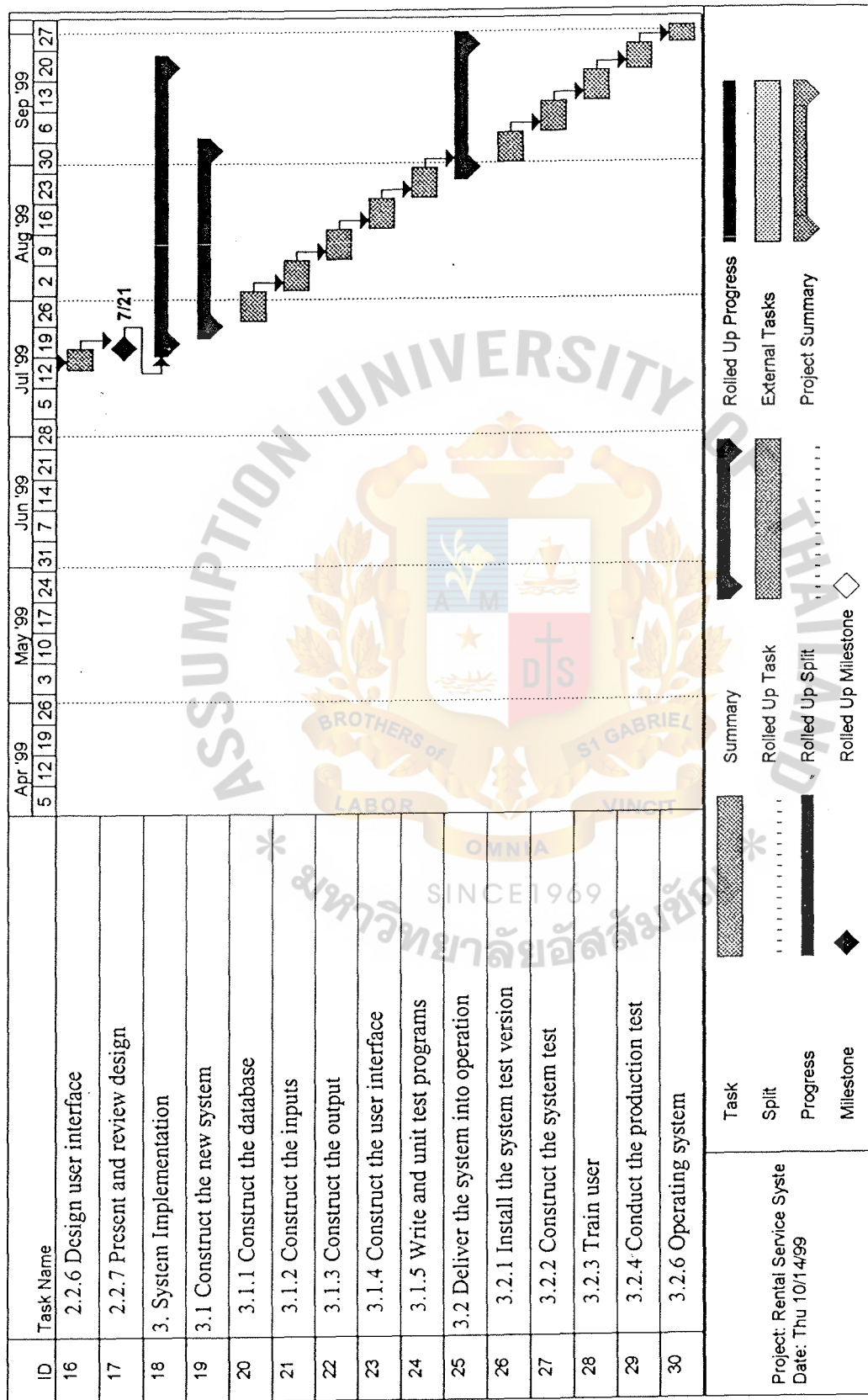


Figure 1.2. Project Plan of Book Rental Information System (continue).

II. THE EXISTING SYSTEM

2.1 Background of the Company

TABO Bookshop was established in April 1997 and is located at 30/3 Phahonyothin Soi 2, Phahonyothin Road, Phayathai, Samsennai, Bangkok 10400. Its business is to provide a book rental service to the registered members.

Business functions of TABO Bookshop are divided into three main areas operated by the following sections. The major sections are shown in figure 2.1.

1. Member Service Section: This section is in charge of
 - Member Service: Responsible for member registration and maintaining all information of registered members.
 - Rental Service: Responsible for keeping all rental information for each member such as rental date, book name, rental fee, etc.
2. Account and Finance Section: Responsible for the receivable and payable of the company, collecting accounting information for auditing at the end of each month.
3. Inventory Section: Responsible for keeping all information of all books and book rental transactions in the company.

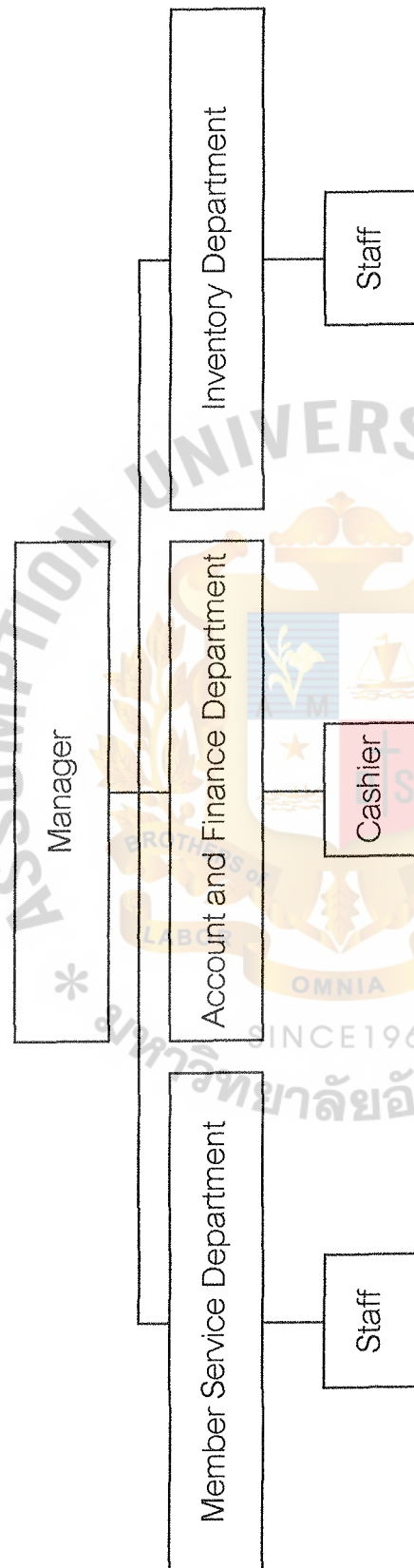


Figure 2.1. Organization Chart of TABO Bookshop.

TABO Bookshop provides books for rent to customers. There are various kinds of books such as cartoons, magazines, novels, short stories, and miscellaneous. The customer has to register for membership with the bookshop first with 100 baht membership fee, provides his/her personal information in the application form, and shows his/her identity card or driving license or student ID card. The member will receive a member card that has the member ID that is needed for book rental. The member is able to rent a maximum of 5 books each time. They must pay for 10% of the price of the book first. After the first payment, they must pay for the rental book everyday since return it. All information of transactions will be sent to the account and finance section to deal with the payment and fee.

The current book rental system manually keeps all the information record in the book. They separate three kinds of books. There are member, book list and rental books.

2.2 Existing Business Function

The existing business functions of TABO Bookshop are manual that staff members manage all rental transaction records shown in figures 2.2 and 2.3.

There are 4 main functions in the existing business:

1. Member Registration
2. Book Registration
3. Rental Service System
4. Collect Payment

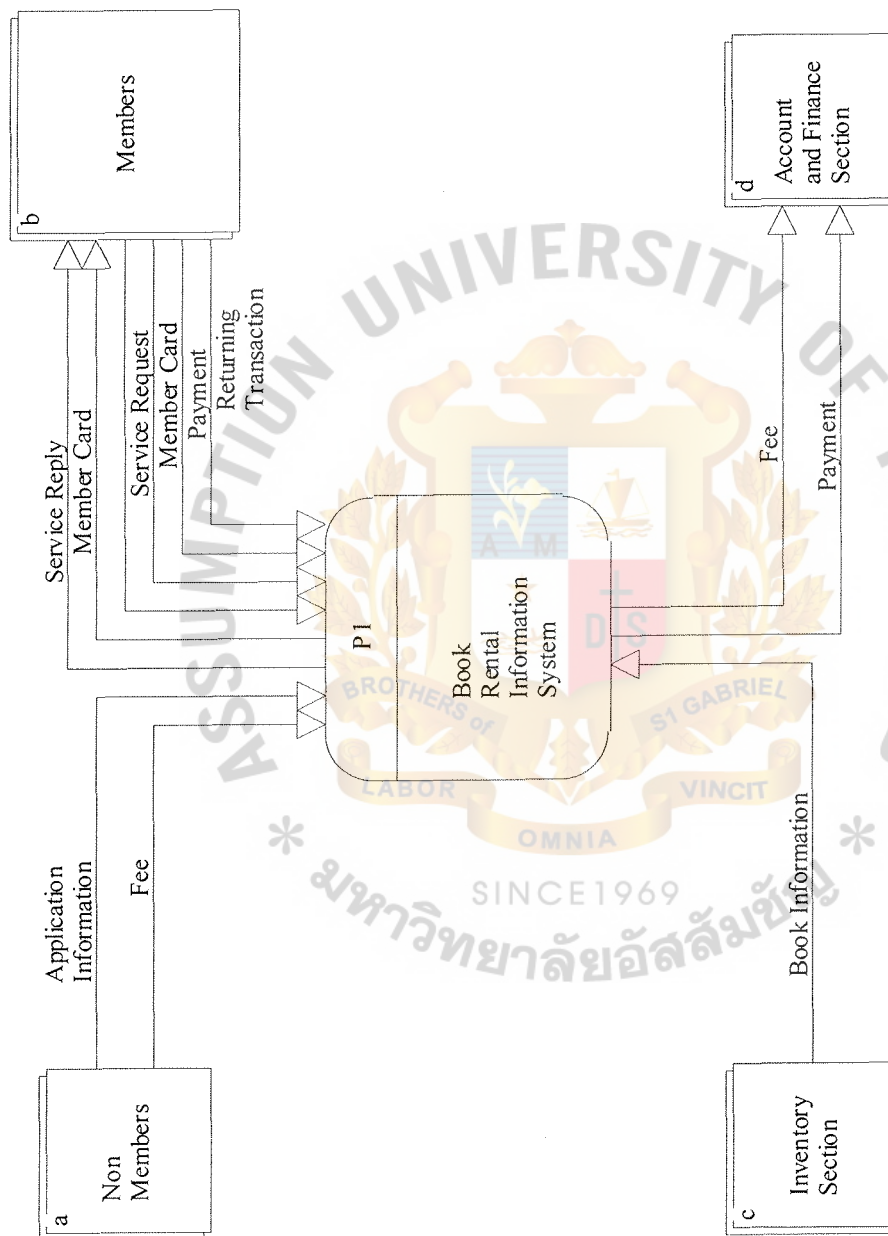


Figure 2.2. Context Diagram of the Existing System.

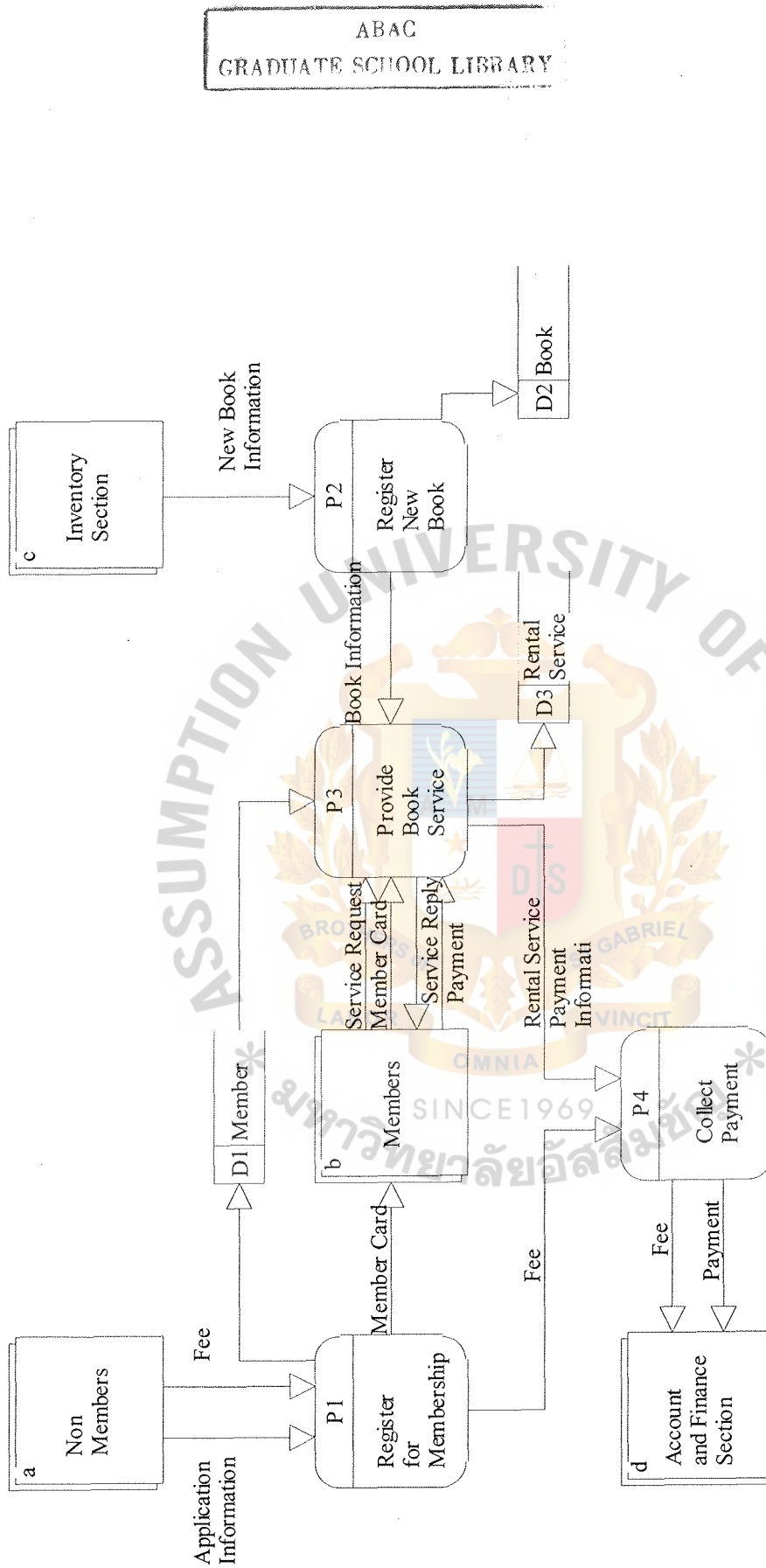


Figure 2.3. Data Flow Diagram Level 0 of the Existing System.

1. Member Registration

The member registration is prepared before the member start to use the book rental service in order to control all the transactions.

- The customer or non-members will fill the application form for registration and show their ID card or Driving License or Student ID card plus 100 baht for membership fee.
- The staff members keep record in the member book.
- The staff members will give a member card with the member ID to the new member.
- The format of the member card and the member information record in the member book can be seen in figure 2.4 below;



Figure 2.4. Member Card.

Table 2.1. Member Book.

Date	Member ID	Name	Address	Telephone
19/02/39	0007	Ms. Patcharee Purasachit	30/13 Phahonyothin Soi 2, Phayathai, Bangkok, 10400	279-5501
24/02/39	0008	Ms. Pattamon Uttamote	128/3 Jaransanitwong Rd., Bangplad, Bangkok, 10700	424-7108

2. Book Registration

This function is used to record the books in the file after they arrive. The staff members will record the book items in separate books.

The staff members classify the items, identify the item number and put records into the book lists. The bookshop has divided the books into categories such as cartoons, novels, magazine, etc. The item books or book lists comprised of receive date, book number, book name copy and price.

Table 2.2. Book Lists.

Receive Date	Book Number	Book Name	Copy	Price
15/04/40	001	Angel	1	80.00
15/05/40	002	Delite	1	80.00

3. Rental Service System

The general regulations of TABO Bookshop are:

- Membership fee is a one time payment, customers are then a life time member. They must renew the card if they lose it.
- Membership fee will not be refunded.
- In case a member has lost the member card, a fee of 100 baht will be charged for a replacement.
- The member is able to rent a maximum of 5 books each time.
- In case members scratch or tear the books, members must purchase at the full value of that book.

More details are as follows:

a. Rent Service

- The staff members verify the member ID from the member card.
- The staff members will fill the rent date, and book names then calculate the rent fees. After that the staff members will ask the member to sign his signature on the rental book.

Table 2.3. Rental Book.

Rental Date	Book Name	Rental Fee	Signature	Return Date	Signature
05/05/40	Angel	8.00		10/05/40	

b. Book Return Service

The steps for providing returning service are as follows:

- The staff members find the rental record in the rental book to check the return date.
- The staff members check that the name of the returned book and the item name on the rental book match.
- The staff will calculate the fine based on the number of days for which the book is late. (10% of the book multiplied by the number of rental day)

c. Information Inquiry Service

When the members would like to know some information about the books, they can ask from the information service of the bookshop. The information service provides the general information about books, rental fee, fines, general regulations, etc.

4. Collect Payment

After the staff calculates the rental fee from the members, it is the responsibility of the staff members of the finance and account section that will handle the payment transaction and record such transaction in the accounting book.

2.3 Current Problems and Areas for Improvement

2.3.1 Current Problems

The existing system is a manual system. Therefore, there are many problems that occur in the book rental information system as follows:

1. Quality of each record

- Data are redundant and not updated.
- There are too many data inconsistency of incorrectly typing and misunderstanding while recording the data.
- There is a lack of statistic report to support the decision-making process.
- It is difficult to collect the necessary record for creating reports.
- The files that keep all records in the bookshop have not been backed up and only one user can access it at the same time.
- The record of the book has not been grouped together with the same type so it is hard to find the record.

2. Staff members take much time for the following tasks:

- Checking all available books in the bookshop.
- Finding the required book in the bookshop.
- Giving the information about the book for member.
- Finding any record takes much time because the records are not grouped together.
- Collecting too many data is inconvenient and takes much time.

3. Human errors can occur from:

- Typing or writing incorrect record.
- Calculating incorrect payment.
- Providing incorrect or misunderstood information to the member.

4. The process of book rental service operation is very slow.
5. The rental books are not suitable for recording the data in the long term such as the books maybe lost, torn, wet, etc.
6. There is a lack of good planning

The report that shows the trends of the bookshop is done manually and randomly. There is not a systematic planning so information base is almost useless for decision-making, forecasting, and controlling process.

2.3.2 Areas for Improvement

For this section, we try to understand the existing problems and try to find the ways to improve the current situation and solve the problems.

The following items are the criteria need to be developed:

1. Making more efficiency in collecting, distributing data, and permanent record files.
2. The record files should have a back up system to prevent loss of data and have the security to prevent unauthorized people from changing the record.
3. Providing faster transaction and information for members.
4. Reduce the staff members' workload and human errors by using the computer-based systems.
5. To reduce the work of printing, inputting data in worksheet and letting the computer generate many printouts. It makes the work correct and faster than using the manual system.
6. Collect the statistical information using the computer-based system will keep all the information in the database and retrieve the information in the report form in the required format.

7. The computer information system provides more reliable and correct information that produces the statistical reports to support the decision making and forecasting trend for the manager.
8. Using the computerized system to make more systematic work for ease in developing online Internet in the future.



III. THE PROPOSED SYSTEM

3.1 User Requirements

This is the user requirements or system specifications of proposed system after interviewing the relevant users and managers for analyzing existing system that must be achieved. It contains a narrative description of the new system that users and manager require in the proposed system.

1. The proposed system must be easy to use, should not be difficult to learn and provide faster transaction to the members and users.
2. All records in the proposed system are centralized and updated.
3. All record files are permanent, have back up copies, and secure.
4. The staff members take less time to obtain the required information from the member.
5. The proposed system allows multiple users to access the database at the same time.
6. The proposed system can generate reports that show the statistical information and trends for better decision making.
7. The computer system enables the staff to check the book information whether it is available in the bookshop or who has rented the book.
8. The input and output screens are designed in a user-friendly format that is easy for new users to learn.
9. The language to be used is natural and the ways to understand will be easy in order that only minimal training is necessary to use the program.

3.2 System Design

The system design categories are divided into the following parts:

3.2.1 Design of Input Screen

The input screen provides the convenience for staff members to key in the data to the form. The input screen should keep the screen simple, create an attractive screen, have good layout, keep forms easy to fill out, ensure that the forms meet the purpose and design forms to assure accurate completion.

The input screen is the user interface designs for the proposed system that is shown in Appendix F.

3.2.2 Design of Output Screen

The output screen will display the data for reference of printing reports. The output screen should keep the screen simple and create an attractive screen. The output reports are represented in Appendix G.

3.2.3 Design of Context Diagram and Data Flow Diagram

The Context Diagram of the proposed system represents an overview of the rental service system. It depicts the relationship between the rental book service system with each external entity. Because the system must keep track of all the number of books that member has rented, the external entity Member has the most data flow in and out of it. The Context Diagram should be kept relatively simple.

The Data Flow Diagram at level 0 represents the major activities for the Book Rental Information System. Each process is analyzed to determine the data required and the output produced. The proposed system's Context Diagram and Data Flow Diagram level 0 are shown in figures 3.1 and 3.2 and for more details see in Appendix A.

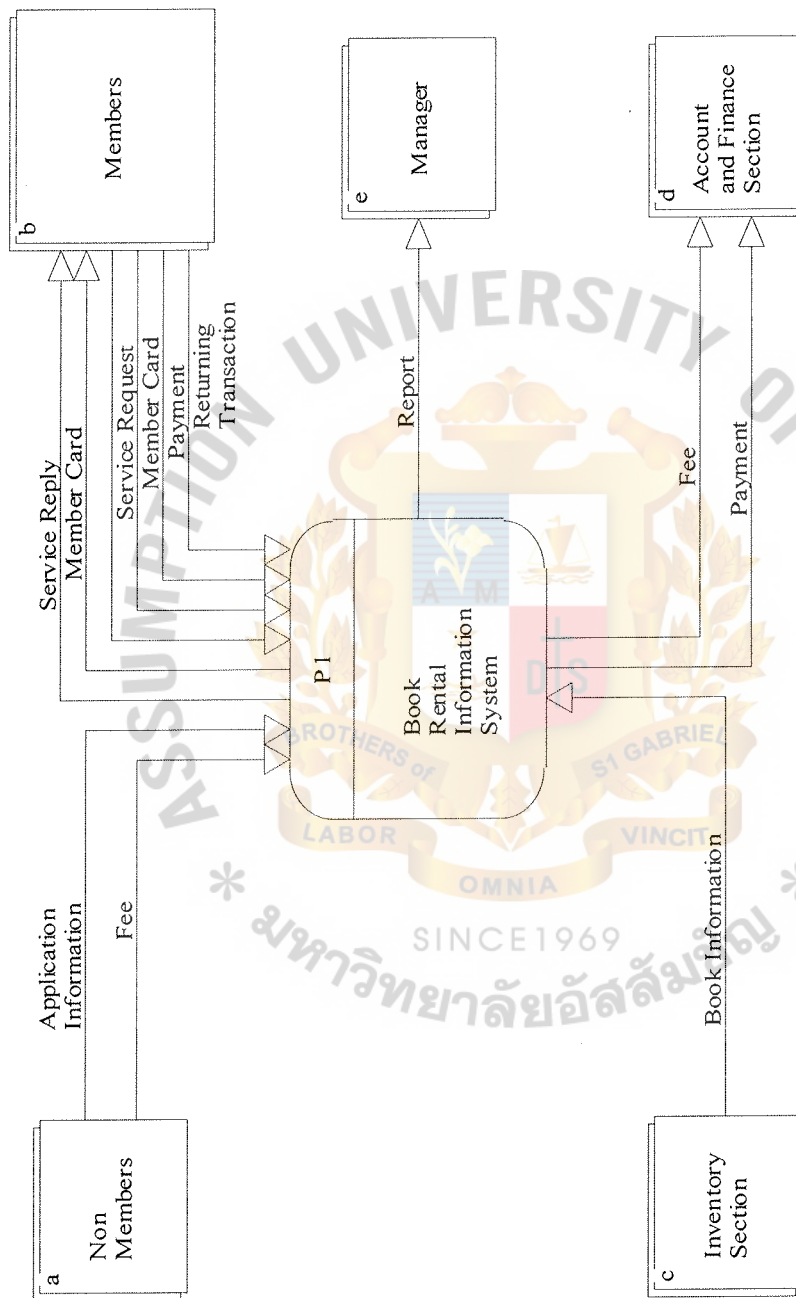


Figure 3.1. Context Diagram of the Proposed System.

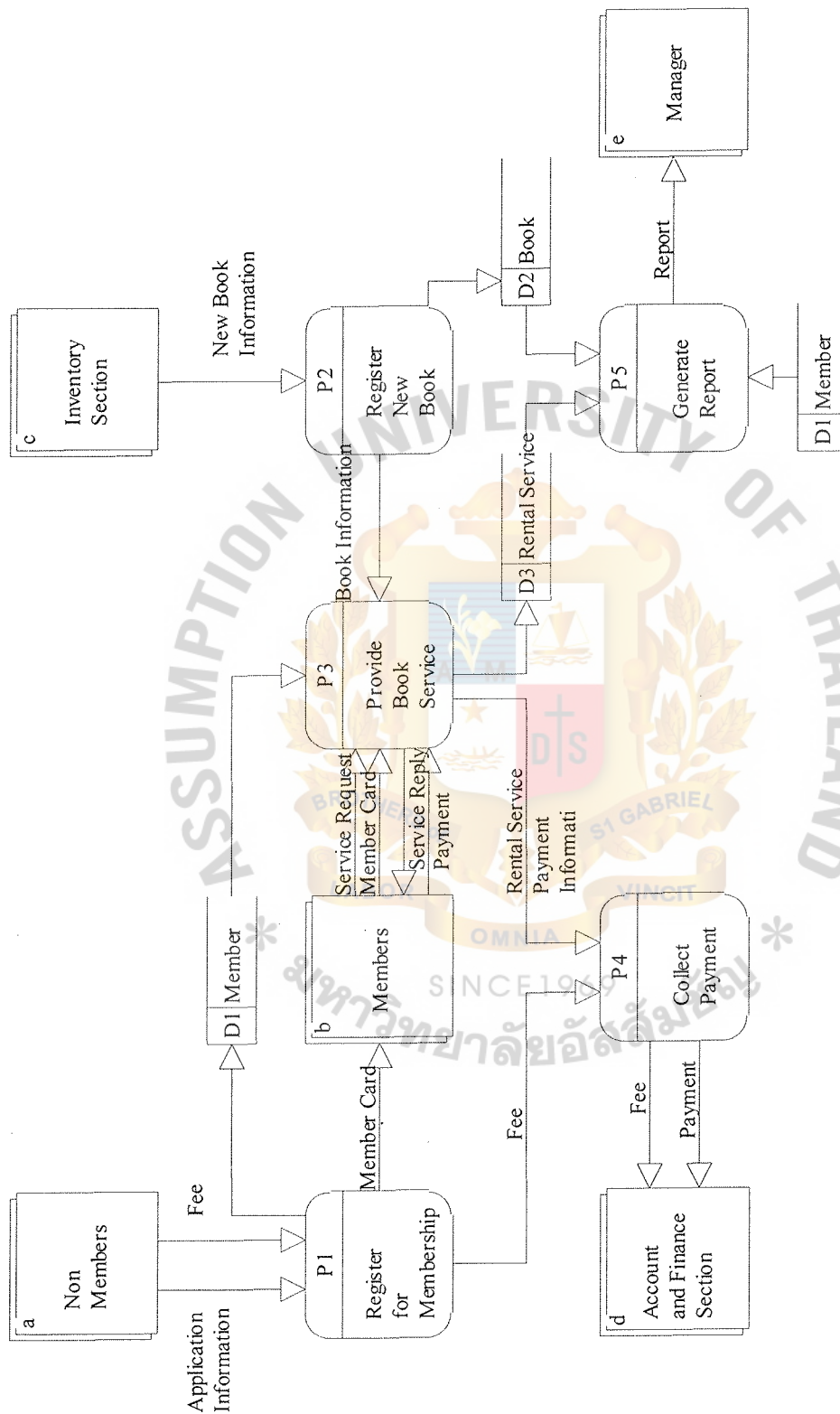


Figure 3.2. Data Flow Diagram Level 0 of the Proposed System.

The functions of the proposed system can be summarized as follows.

Process 1. Register Member

The customers who would like to rent the book from the bookshop should be registered to the bookshop first. They should fill in the application forms for providing the information and paying the fee to the bookshop. After that, the staff members will keep the information in the member file for further transactions and keep the records of the new members. They will print the member cards that have the member IDs, member names, and date of issue. The member cards will be shown every time the members would like to borrow the books.

Process 2. Register New Book

Once the bookshop gets the new books, it will keep the information about the books and assign IDs to them such as book names, publisher names, prices, dates of issue, etc. in the book file and classify the type of books later.

Process 3. Provide Book Service

This process provides the rental, returning and information service to the members. Before the staff members provide each service, the bookshop has the process to check the status of the members to prevent unauthorized members by examining the member cards and dates of borrow the books by checking the members, books, and rental service files.

Process 4. Collect Payment

The collect payment process deals with all the financial transaction in the bookshop. This process computes the amount of all payments by using rental service payment information and creates receipt to the member. The staff members will keep records of the receipt information to check later.

Process 5. Generate Report

The staff members will collect all the necessary transaction in the bookshop to create the required reports. The staff members should be generating reports such as monthly rental service report, monthly late return or any required information from the manager using all files of the record in the bookshop.

3.2.4 Design of Data Dictionary

The data dictionary of the proposed system contains information about data and procedures, information about the data maintained by the system including data flows, data structures, data elements, and data stores. Data dictionary is represented in Appendix B.

3.2.5 Design of File

The design of files includes decision about the nature and contents of the files itself. It shows the field name, type of field name, length of field name, and number of decimal of field name. The file layout is presented in Appendix H.

3.2.6 Design of Program Specification

The program specification design describes the transformation of the system for input and output file and the processing of the computer software. In designing the computer software, it is important to ensure that the structure of the software is divided into modules to permit suitable testing and validation to make sure the procedures are correct. The actual program produced must perform all the tasks and in the manner intended for the application.

The process specification provides further description of element-level processes as shown in Appendix C.

3.3 Hardware and Software Requirements

3.3.1 Hardware Requirements

The present hardware can be used for keeping only the details of the book information. To prepare for increasing performance in the near future, all hardware list that should be in the TABO Bookshop are listed below:

1. File server (1 unit)

- Pentium III 450 MHz.
- 128 MB SDRAM PC-100
- 8.4 GB. HDD Ultra DMA/66
- Floppy Disk Drive 1.44 MB
- PCI Sound Yamaha and Boston Acoustic 635
- CD-ROM 45X Speed
- Modem 56K V.90/ LAN card on board
- Serial Mouse
- Keyboard Multimedia
- DVD 5X Sony
- Monitor 17" NEC V700
- Medium Tower Case 235 watts.

2. Workstations (2 units)

- Pentium II 400 MHz.
- 64 MB SDRAM PC-100
- 6.4 GB. HDD Ultra DMA/66
- Floppy Disk Drive 1.44 MD
- 3D PCI Digital Stream 128 and Final Sparker 120 watt.
- CD-ROM 45X Speed

- 56K Rockwell Internal V.90
- Serial Mouse
- Keyboard Win98
- Monitor 15" Sony Super Trinitron
- Final ATX Middle Tower Case

3. Printer

- HP DeskJet 810 C (1 unit)
- Hp LaserJet 1100 (1 unit)

4. UPS (1 unit)

- UPS Leonie Green II – 500 VA

5. Network Peripherals

- 3 COM Super Stack II (Hub) 10:12 ports
- HP JetDirect Ex plus printer server, 1 serial ports

6. Cabling

- UTP Cable
- RJ-45 Connector

3.3.2 Software Requirements

The present software has to be upgraded to new version and added more software for Book Rental Information System for TABO Bookshop. All the software list for the new system are listed below:

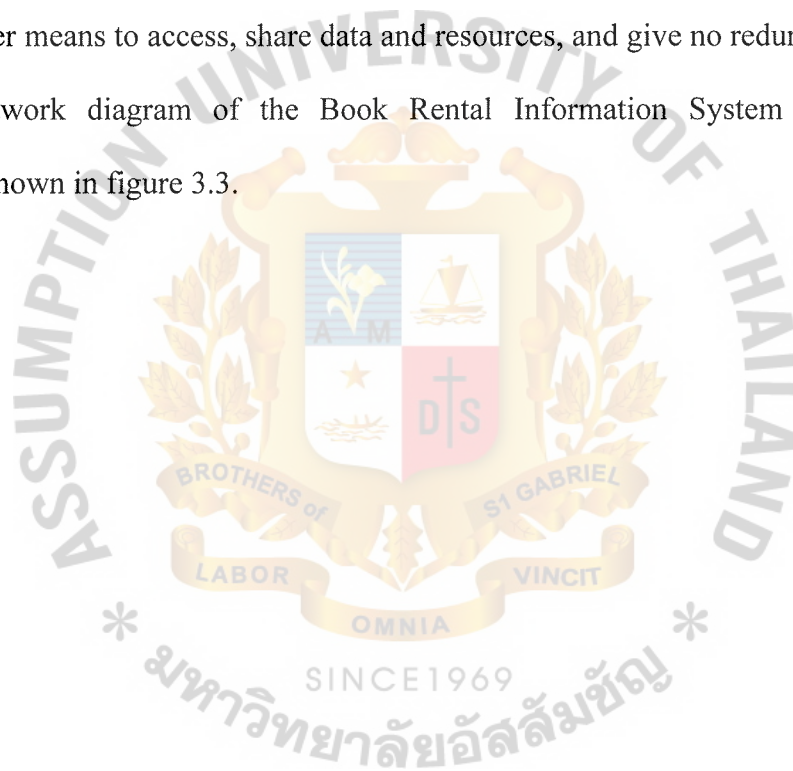
1. Operating systems – Windows98 Thai Edition
2. Microsoft office for Windows98 Thai Edition Professional
3. Network operating systems – Microsoft Windows NT Ver 4.0
4. Microsoft SQL Server Version 7.0

3.4 Data Communication and Network

The existing system of TABO Bookshop is a manual system to manage the work. Now we will design a computer-based system to use automatically full functions for their work. So in the future, if the staff members want some details or information of each book or member, they can search for that information from the computer at their place.

We decide to use the work group feature of Windows for the new system. It will provide a better means to access, share data and resources, and give no redundancy.

The network diagram of the Book Rental Information System for TABO Bookshop is shown in figure 3.3.



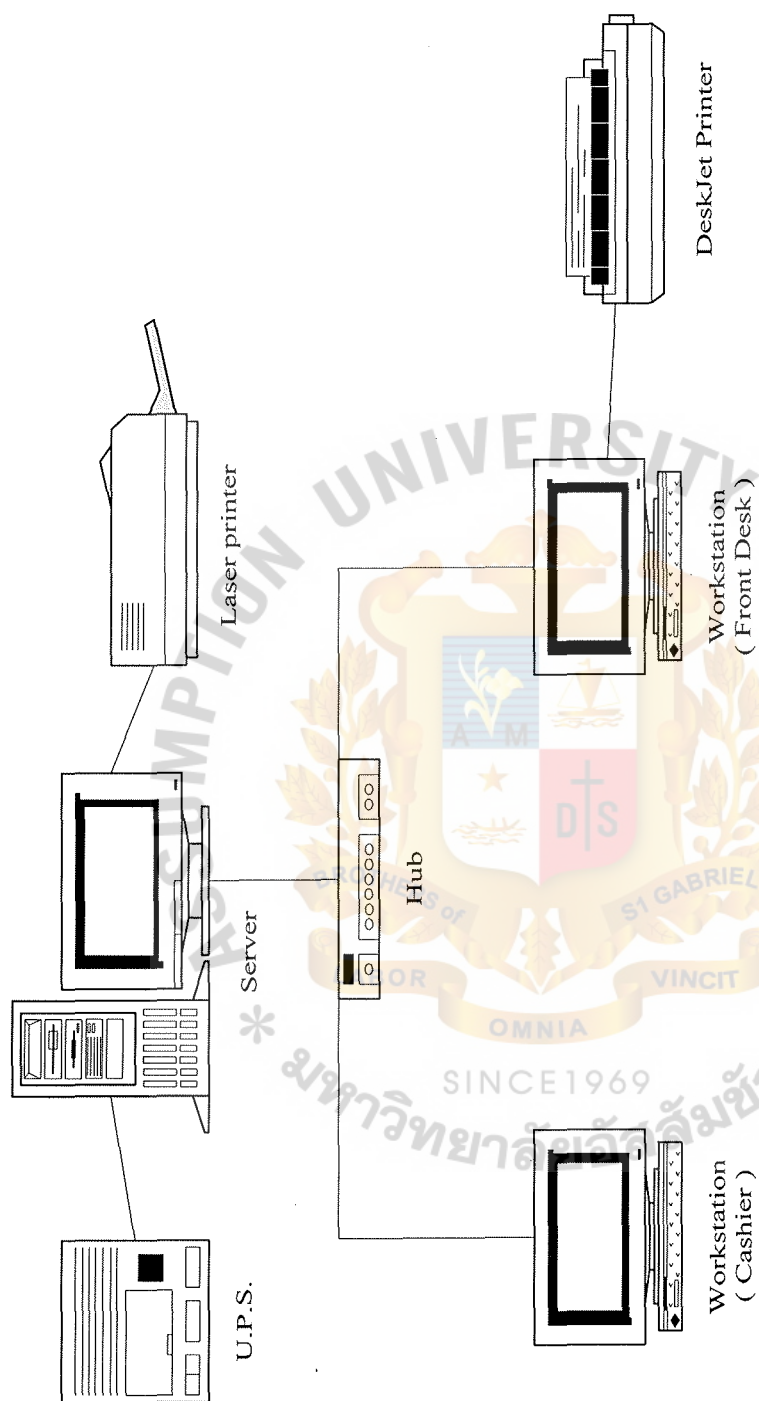


Figure 3.3. Network Configuration of the Proposed System.

3.5 Security and Control

TABO Bookshop will be more complex when changed from the manual system to the computerized. Security and control are very important when a computer-based information system is involved. It encompasses not only the day-to-day protection of the computer hardware and software but also the data integrity, data privacy, safeguarding of all physical facilities, and avoidance of disastrous losses. Many of the security controls attempt to prevent or detect unauthorized access to data, computer equipment, or other physical facilities. Other security controls are corrective in nature since they enable losses of data or facilities to be recovered or reconstructed. Some security controls are highly technical and sophisticated especially when providing security for centralized database and data communication networks.

The risk and threat to the computer system are any advanced situation or unfortunate event that would interrupt the service operations of the bookshop.

The security and controls may include:

1. Protecting data from unauthorized person's access.
 - Use Log-in name and Password before entering the system.
 - Force users to change password within a specific time.
2. Preventing the loss of data or errors from any accident that may destroy the files.
 - Staff members have to back up the important information to prevent damaging in the file in the hard disk and use recovery of any destroyed or error on the files.
 - Use UPS (Uninterruptible Power Supply) to supply power in stead of the main electricity supply.

- The source documents will be stored in a secure cabinet that is located outside the bookshop in order to prevent unauthorized changes and to prevent loss of source documents due to a natural disaster such as a fire or flood.
3. To assure data completeness and accuracy starting from input to output.
- Check list report
 - Edit report
 - Data entry must be double-checked and verified. The manager should review all forms of authorization signatures.
 - The historical and current data reports must be kept in categorized file for managerial planning.
 - The formats for reports should include a proper heading, the data prepared, and the date printed for ease reference.
4. To assure right function for each level users.
- Set menu for each user to log into the system depending on related function tasks.
5. A virus-checking program will be installed for scanning virus before running any program. Service information system will update the virus checking every 6 months.

3.6 Cost and Benefit Analysis

3.6.1 Cost Analysis

To consider the financial aspects of the new system that is to be implemented, cost comparison should be made between the existing system and the proposed system. Cost analysis of the proposed system should be considered on the investment costs, implementation costs, and annual operating costs.

1. Investment Costs

Hardware Specification:		Total (Baht)
1) File server	1 Unit*50,000	50,000
<ul style="list-style-type: none"> - Pentium III 450 MHz. - 128 MB SDRAM PC-100 - 8.4 GB. HDD Ultra DMA/66 - Floppy Disk Drive 1.44 MB - PCI Sound Yamaha and Boston Acoustic 635 - CD-ROM 45X Speed - Modem 56K V.90/ LAN card on board - Serial Mouse - Keyboard Multimedia - DVD 5X Sony - Monitor 17" NEC V700 - Medium Tower Case 235 watts. 		
2) PC workstation	2 Units*40,000	80,000
<ul style="list-style-type: none"> - Pentium II 400 MHz. - 64 MB SDRAM PC-100 - 6.4 GB. HDD Ultra DMA/66 - Floppy Disk Drive 1.44 MD - 3D PCI Digital Stream 128 and Final Sparker 120 watt. - CD-ROM 45X Speed - 56K Rockwell Internal V.90 - Serial Mouse - Keyboard Win98 		

- Monitor 15" Sony Super Trinitron		
- Final ATX Middle Tower Case		
3) Printer		
- HP DeskJet 810 C	1 Unit*8,130	8,130
- Hp LaserJet 1100	1 Unit*20,950	20,950
4) UPS		
- UPS Leonic Green II – 500 VA	1 Unit*3,500	3,500
5) Network Peripherals		
- 3 COM Super Stack II (Hub) 10;12 ports	1 Unit*8,500	8,500
- HP JetDirect Ex Plus Printer Server	1 Unit*5,500	5,500
6) Cabling		
- UTP Cable	10 Units*300	3,000
- RJ-45 Connector		
	Total Hardware Cost	179,580
Software Specification		Total (Baht)
1) Operating systems – Windows98 Thai Edition		5,500
2) Microsoft office for Windows98 Thai Edition Professional		25,000
3) Network operation systems – Windows NT Server Ver 4.0		6,450
4) Norton Anti Virus		3,500
	Total Software Cost	40,450
	Total Investment Cost	220,030
2. Implementation Costs		
- Software development and training cost		40,000
	Total Implementation Costs	40,000

3. Annual Operating Costs

- Paper	3,000
- Diskettes	2,500
- Stationary	12,000
- Maintenance costs (per year)	10,000
- Miscellaneous costs	5,000
Total Annual Operating Costs	32,500

3.6.2 Benefits Analysis

Benefits analysis is the method for evaluating the proposed computer information system. The benefit of the Book Rental Information System is not only that it increases the efficiency of the service but also many more things can be gained from the proposed system. The probability can be projected in both tangible and intangible benefit as follows:

1. Tangible Benefits

Tangible benefits can be measured in value. Tangible benefits are realized when the proposed system is projected to make or save money of this bookshop.

- Reduction of stationary and paper cost	25,000
- Reduction of human labor	
- Salary	1 Person*5,000 Baht
	100,000
- Reduction of overtime	20,000
- Increase efficiency in processing	50,000
Total Tangible Benefits	195,000

2. Intangible Benefits

Intangible benefits are benefits that accrue in the organization due to the information system that are difficult to measure but are important. The proposed system provides the intangible benefits as follows.

- Improve the decision-making process
- Reduce the risk of errors that can be made by human
- Reduce the volume of paper work produced and handled
- Faster information retrieval
- Reduce time and salary for staff work
- Smooth the operations
- Provide on time, accurate and efficient operations

Table 3.1 shows the comparison costs of the proposed and the existing system and figure 3.4 in the form of graph. It shows that the cost of the proposed system is rather higher than that of the existing system at the earlier period but just about two years. The cost of proposed system will decline to meet the cost of the existing system because there is higher requirement of records. The operation requires more staff members, and the cost of staff will be increased in the existing system. For the proposed system, more money seems to be spent than for the existing system. In reality, for the long term, the cost is so high in the first investment and will come down year by year because only the operation staffs are required to handle all the operations.

Table 3.1. Cost Comparison between the Existing System and the Proposed Systems.

Description	1 st year	2 nd year	3 rd year	4 th year	5 th year
Proposed System					
Computer Cost					
- Hardware Costs	179,580	0	0	0	0
- Software Costs	40,000	0	0	0	0
- Maintenance	15,000	16,500	18,000	19,500	21,000
- Training	30,000	20,000	15,000	12,000	10,000
Peopleware	264,000	290,400	319,440	351,384	386,522
Stationary	47,500	49,875	52,370	54,987	57,736
Total Cost	576,080	376,775	404,810	437,871	475,258
Existing System					
Office salary	395,000	434,500	477,950	525,745	578,320
Office equipment	75,000	81,000	87,480	94,500	102,037
Total Cost	470,000	515,500	565,430	620,245	680,357

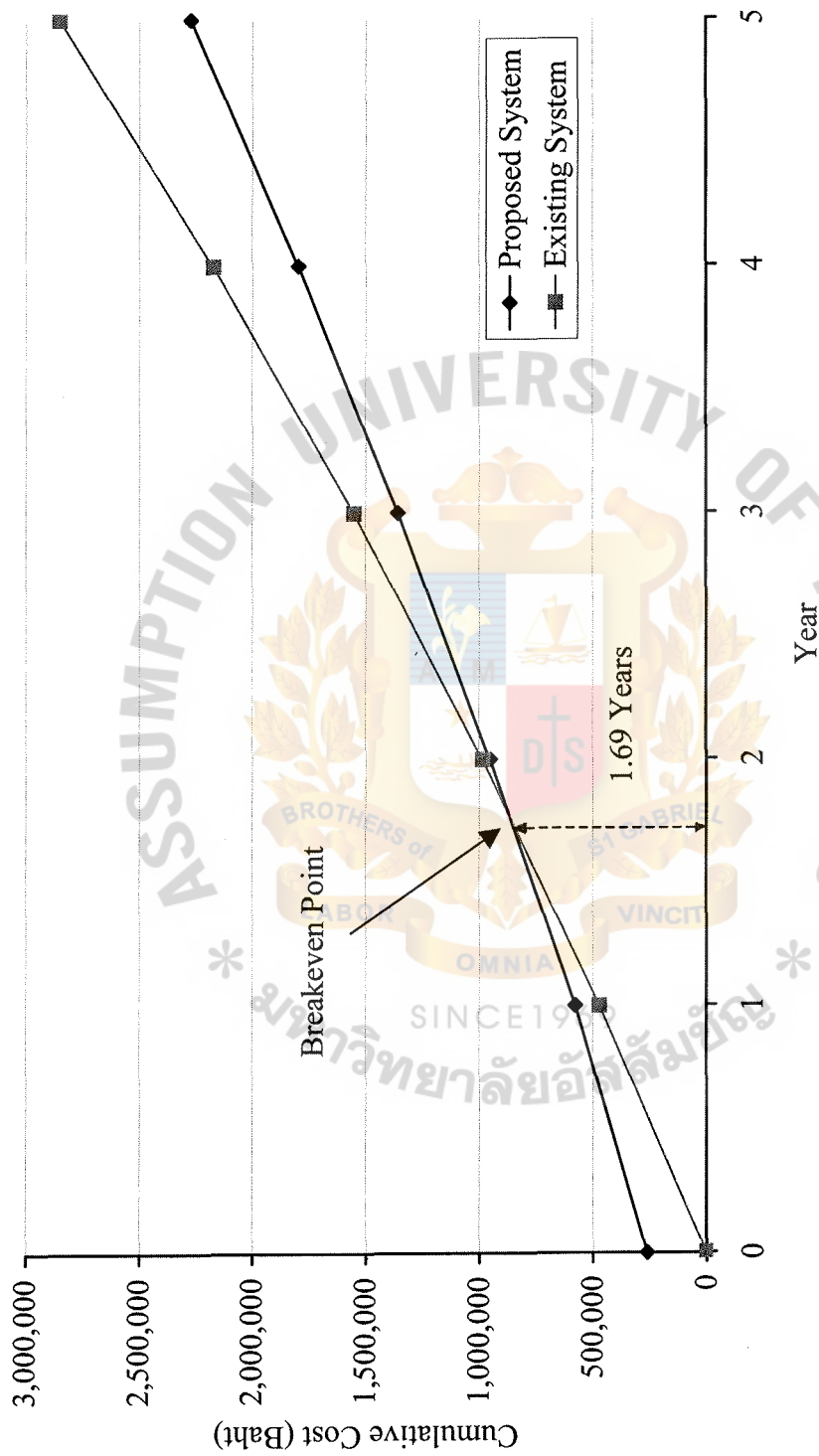


Figure 3.4. Cost Comparison between the Existing System and the Proposed System.

3.6.3 Payback Analysis

There are many well-known techniques for comparing the costs and benefits of the proposed system. For this project, payback analysis is suitable.

System development costs are incurred long before benefits begin to accrue so it will take time for the benefits to overtake the costs. The payback period is the number of years required to accumulate earnings sufficient to cover the investment cost. The payback period formula is shown as follows.

$$P = \frac{I}{(1-T) R}$$

Where

P	=	Payback Period
I	=	Initial or Investment Cost
R	=	Annual Saving realized by investment
T	=	Tax Rate in percent (30%)

The payback period of the proposed system can be calculated as follow.

$$\begin{aligned} I &= 220,030 + 40,000 \\ &= 260,030 \text{ Baht} \end{aligned}$$

$$\begin{aligned} R &= 195,000 - 32,500 \\ &= 162,500 \text{ Baht} \end{aligned}$$

$$\begin{aligned} P &= \frac{I}{(1-T) R} \\ &= \frac{260,030}{(1-0.3)(162,500)} \\ &= 2.28 \text{ Years} \end{aligned}$$

The payback period of the proposed system is 2.28 Years.

Table 3.2 shows the payback analysis for the proposed system. The cumulative lifetime costs and the benefits are gradually increasing over the six-year period because the operating costs are being incurred. Lifetime benefits will overtake the lifetime costs between years 2 and 3. By charting the cumulative lifetime time-adjusted costs and benefits as shown in figure 3.5. It can be estimated that the benefit will cover the cost approximately 2.28 years after the proposed system begins operating.

Net Present Value (NPV)

Net Present Value is a sophisticated capital budgeting technique that is calculated by subtracting the project's initial investment from the present value of cash inflows discounted at a rate to the firm's cost of capital.

Costs are represented by negative cash flows while benefits are represented by positive cash flows. Table 3.3 shows net present value of the proposed system. If the sum of the discounted benefits is positive, the investment is good and vice versa.

Table 3.2. Payback Analysis for the Proposed System.

Cash flow description	Year 0	1 st year	2 nd year	3 rd year	4 th year	5 th year
Development cost	-260,030					
Operation & Maintenance cost	0	-32,500	-35,500	-37,500	-40,000	-42,500
Discount factor for 12%	1.000	0.893	0.797	0.712	0.636	0.567
Time-adjusted cost	-260,030	-29,023	-28,294	-26,700	-25,440	-24,098
Cumulative time-adjusted costs over life time	-260,030	-289,053	-317,346	-344,046	-369,486	-393,584
Benefits derived from operation of new system	0	195,000	220,000	245,000	252,000	265,000
Discount factor for 12%	1.000	0.893	0.797	0.712	0.636	0.567
Time-adjusted cost	0	174,135	175,340	174,440	160,272	150,255
Cumulative time-adjusted costs over life time	0	174,135	349,475	523,915	684,187	834,442
Cumulative life time time-adjusted cost+benefit	-260,030	-114,918	32,129	179,869	314,701	440,859

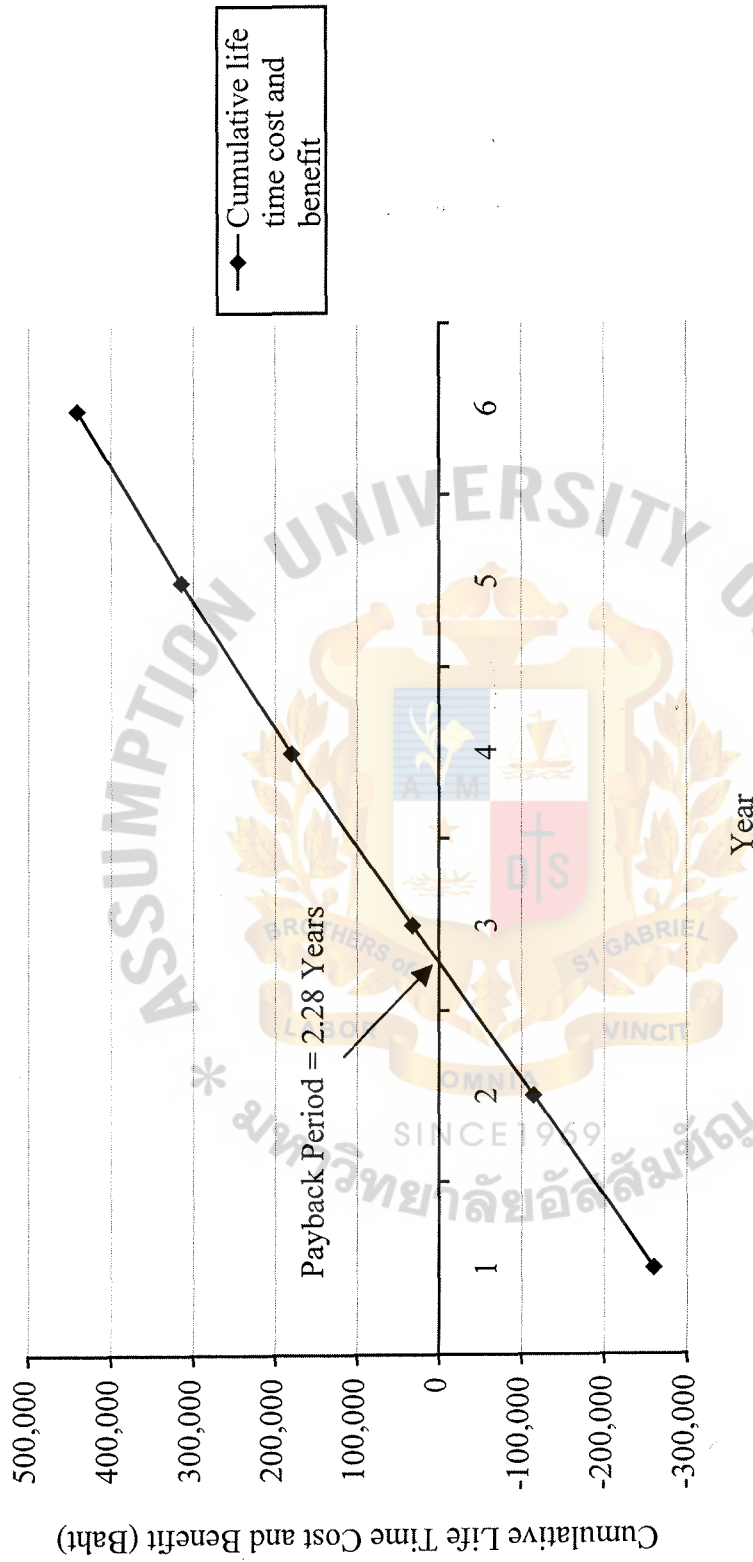


Figure 3.5. Payback Analysis for the Proposed System.

Table 3.3. Net Present Value for the Proposed System.

Cash flow description	Year 0	1 st year	2 nd year	3 rd year	4 th year	5 th year	Total
Development cost	-260,030						
Operation & Maintenance cost	0	-32,500	-35,500	-37,500	-40,000	-42,500	
Discount factor for 12%	1.000	0.893	0.797	0.712	0.636	0.567	
Present value of annual costs	-260,030	-29,023	-28,294	-26,700	-25,440	-24,098	
Total present value of lifetime cost							-393,584
Benefits derived from operation of new system	0	195,000	220,000	245,000	252,000	265,000	
Discount factor for 12%	1.000	0.893	0.797	0.712	0.636	0.567	
Present value of annual costs	0	174,135	175,340	174,440	160,272	150,255	
Total present value of lifetime cost							834,442
Net Present Value of proposed system							440,858

IV. PROJECT IMPLEMENTATION

4.1 System Implementation

The system implementation will begin after the manager agrees with the proposal outlining the new system. The system implementation can be the most frustrating time of the project due to problems that were not discovered during the development. The users may have new requirements after using new system. So development team should be prepared for these problems and be prepared for the possible modifications of program too.

4.1.1 Testing

After the system is implemented, the company will have a review to determine whether the system is meeting expectations and where improvements are needed. To check whether the proposed system can be compatible and suitable for the existing problem or not, there are many activities to test the proposed system.

- Network testing: To test the new computer networks after we built the network according to the network design requirements.
- Database testing: This task must immediately precede the other programming activities because databases are the resources shared by computer programs.
- Program testing: Program testing should be defined after the entire program has been written.

4.1.2 Training

Training must involve the capability to support staffs' familiarization with the new system and general basic tasks system. The staff members must know the method and processes in order to succeed in their work. They must also know the method to solve the non-serious problem of operation, malfunctions and how to detect these problems.

Training can be performed one by one. However, group training is generally preferred to save time and encourages group learning possibilities. For TABO Bookshop, there are several staff members who work with this new system so we will train them one by one for specific tasks later. But we will use group training to train the principle or the basic of how to use the computer such as turn on/off the computer, save information to diskette and so on.

4.1.3 Conversion

Conversion is the process of changing the old system to the new system and evaluating the project experience and final system. There are four conversion methods of handling systems conversion: abrupt cut-over, parallel, location, and staged conversion. This project selects the use of parallel system method. This method converts the old system to the new system carefully since the bookshop did not have a computer system before but has just the manual system.

The existing system of the TABO Bookshop is manual operation. Therefore it should be converted step by step to prevent all works stop immediately due to unsuitable process. We must give the staff members' time to be familiar with the computerized system and for their training. The parallel conversion of both the old and the new systems is operated for sometime period. This is done to ensure that all major problems in the new system have been meet and solved before the old system is discarded. Parallel conversion minimizes the risk of major flaws in the new system causing irreparable harm to the business. Parallel conversion is suitable for changing from the manual system to the computerized system, although it increases the cost of running the two systems over some period and consumes more time with double workload of staff members. When the staff can run the new system smoothly and all major problems can be solved, the double workloads will be reduced.

V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

TABO Bookshop is a rental bookshop that provides rental services for many kinds of books. Most rental service systems nowadays are still manual systems. Because of decreasing price of computers, at the same time, technology grows rapidly, it is time for the rental service system to change from the manual system to the computerized system to make more benefits. In order to be leader in the increasing competitive market, TABO Bookshop should try new system that helps to reduce unnecessary cost and existing problems that usually occur in the manual system.

From the study of existing system of TABO Bookshop, manual system causes problems of inputting inaccurate and redundant data, consume more time to provide service to the member. The current system keeps all records in books that are not suitable for security. There is no back up and only one staff can access records at the same time. It is difficult for staff members to get important information to make effective report to show statistical trends. Therefore, the manager has not required report that shows enough information to help provide better decision-making and make future plan for the bookshop.

In proposed system, a computerized system is recommended to the management to help in solving all defined problems. To have it done, it requires automation of system that is providing database for all records in the bookshop such as members, books, and rental service transactions. The accomplishment of system is to increase member's satisfaction in providing faster transaction and reduce the cost of paper work, processing time and human labor.

The system has been developed in-house by using Microsoft Access that is matured technology and easy to use and understand. So it is guaranteed that the system

implementation and support will operate smoothly. The database management system will bring Window NT server in to use.

5.2 Recommendations

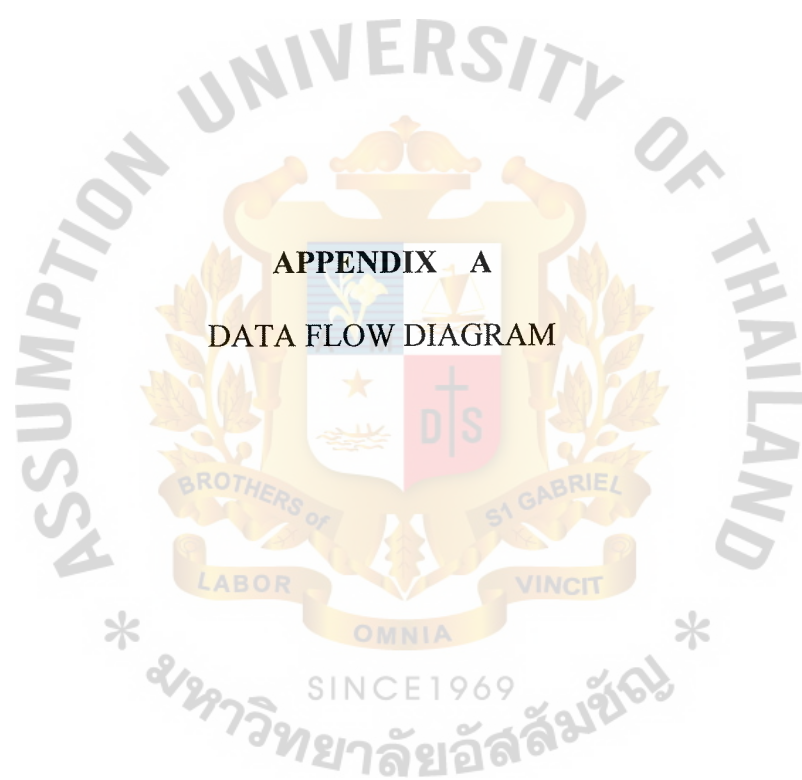
For this project, Book Rental Information System has designed a network only in the bookshop in order to share the system information. However, in the future, the bookshop may extend to have other branches or develop system for on-line service.

The use of e-commerce nowadays has continuously been growing with the popularization of the Internet. It can bring profits to small business as well as big ones. Anyway, people do not trust the Internet and are concerned with security completely. For TABO Bookshop, it is possible to setting up an e-commerce site but it just started for computerized system and not perfected yet. So it will spend for a time to improve their system and prepared for service management in delivery and return books. Furthermore, TABO Bookshop will use bar code for inputting data that will reduce human errors and faster transaction.

The new system definitely changes staffs' operation from manual to computerized system. Most of staff may resist a new system at first. In order to make conversion easier, the manager should make the users have positive attitudes to a new system and provide more training courses to cause familiarization soon. Manager should provide two sessions of training, one for skillful staff and the other for inexperienced staff.

In addition, the bookshop must improve its security system. It should be careful about unauthorized personal accessing the confidential information. The hardware and software should be checked periodically to resolve the problems in time.

The bookshop should prepare all the time for special problems caused by the computer. It should have capable staffs that have sufficient knowledge of computer technology to deal with the problems that may stop the service transaction.



APPENDIX A
DATA FLOW DIAGRAM

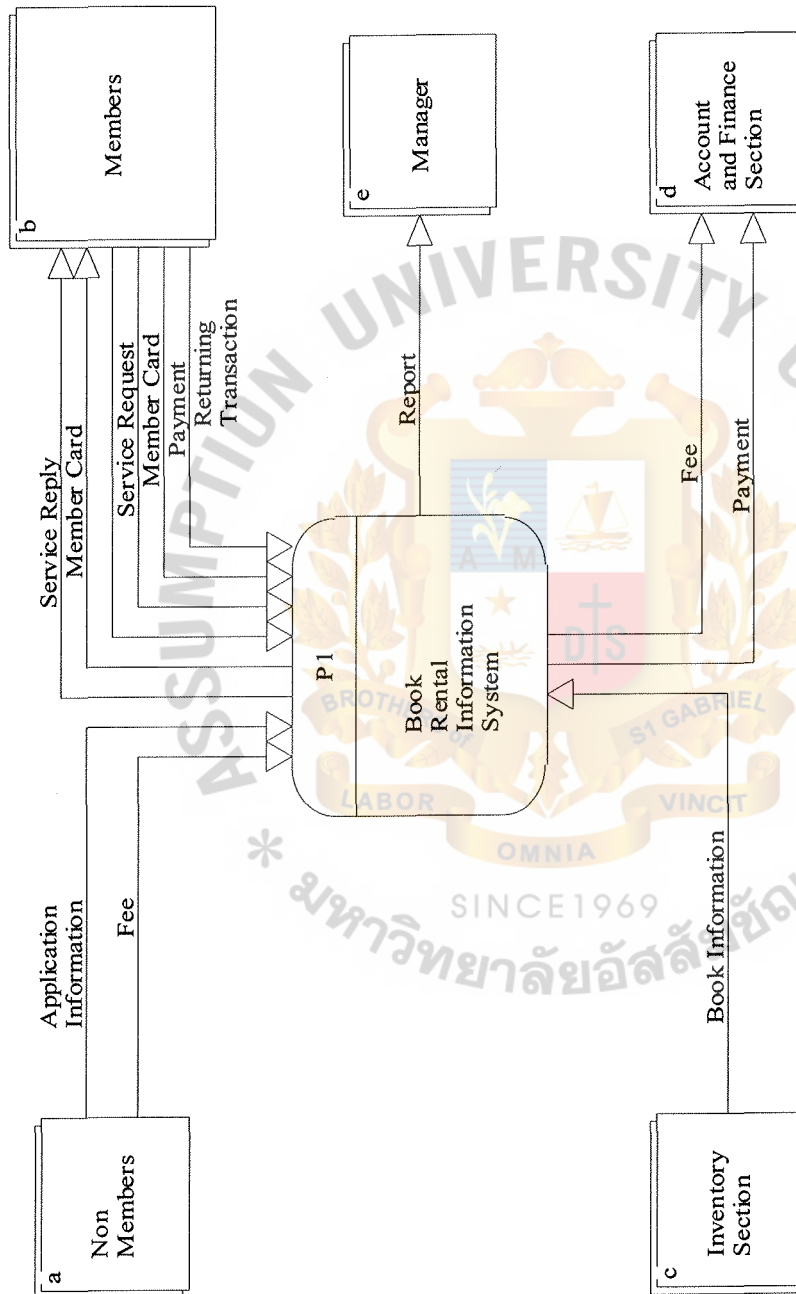


Figure A.1. Context Diagram of the Proposed System.

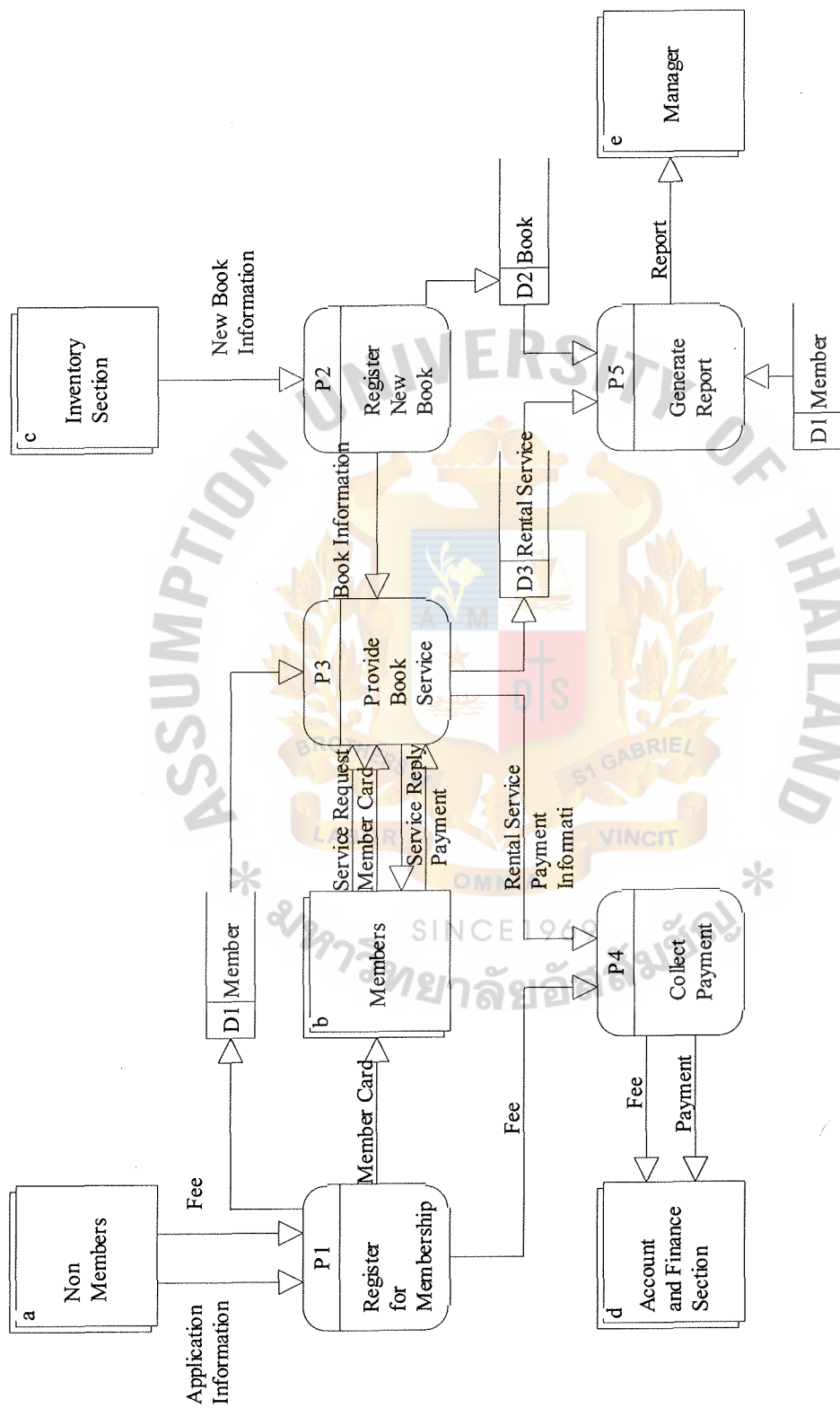


Figure A.2. Data Flow Diagram Level 0 of the Proposed System.

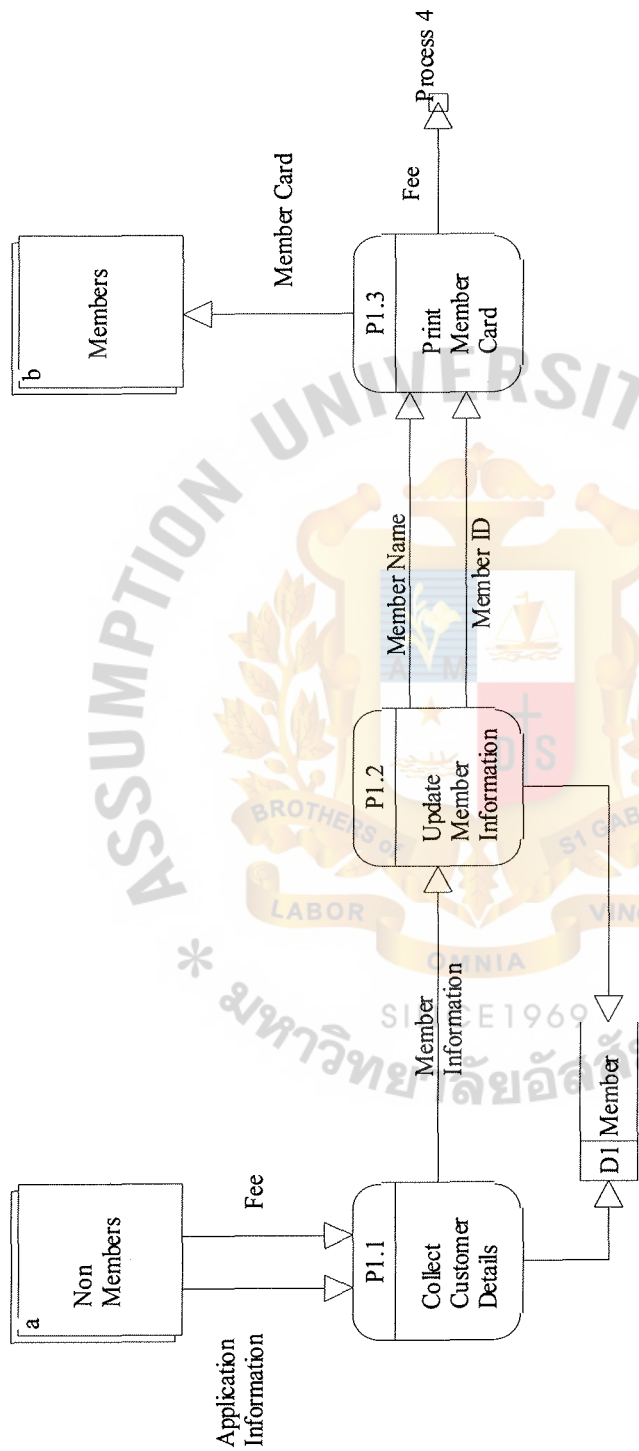


Figure A.3. Data Flow Diagram Level 1 of the Proposed System.

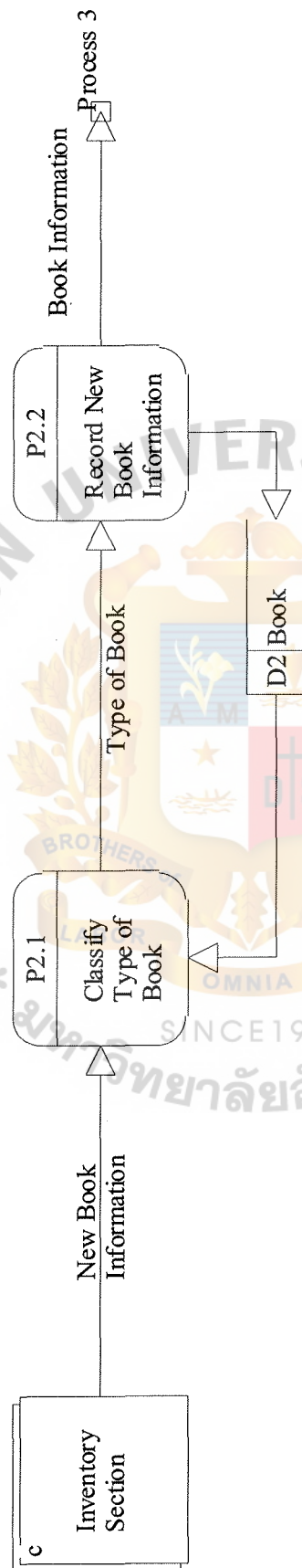


Figure A.4. Data Flow Diagram Level 1 of the Proposed System.

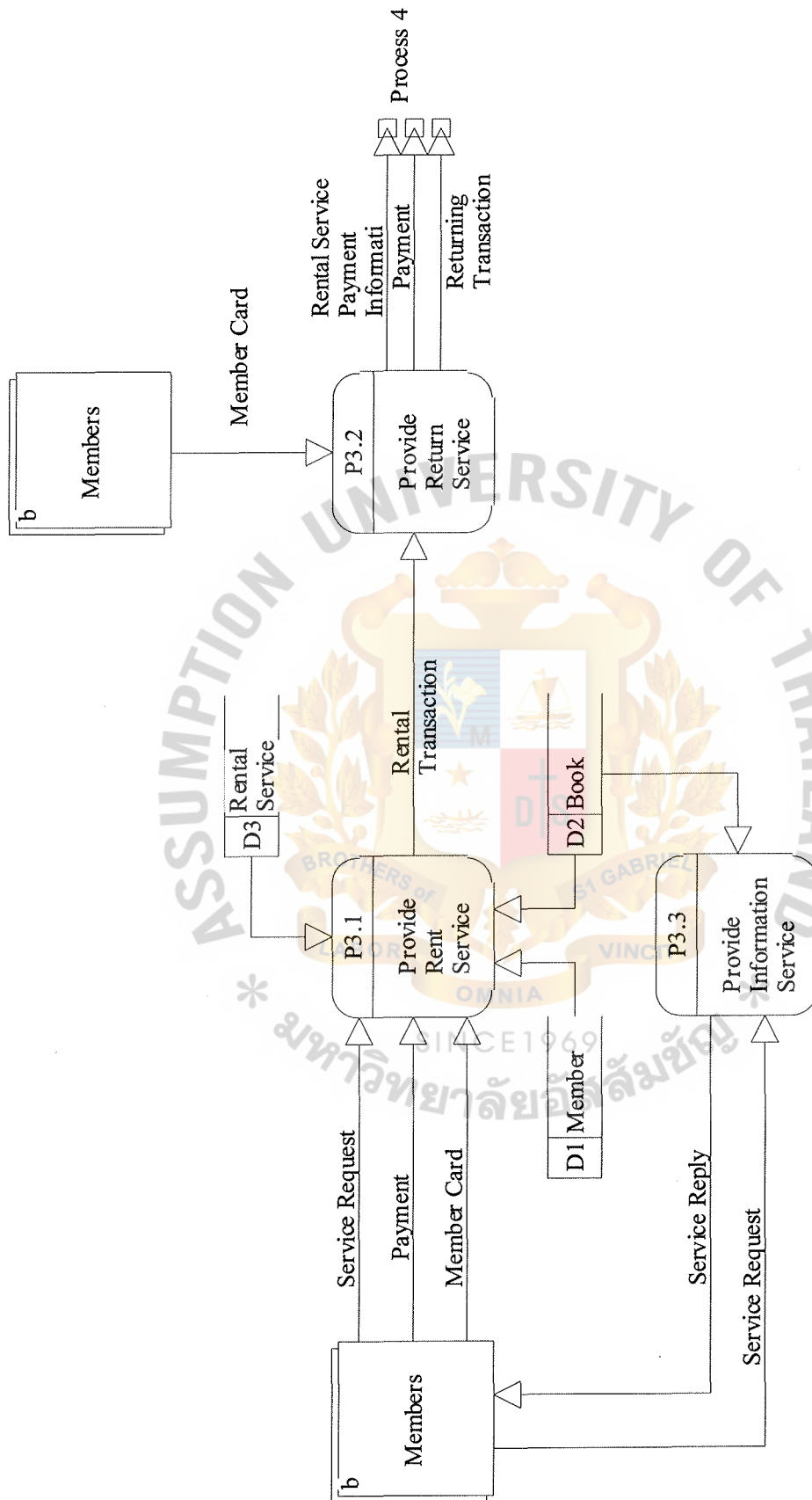


Figure A.5. Data Flow Diagram Level 1 of the Proposed System.

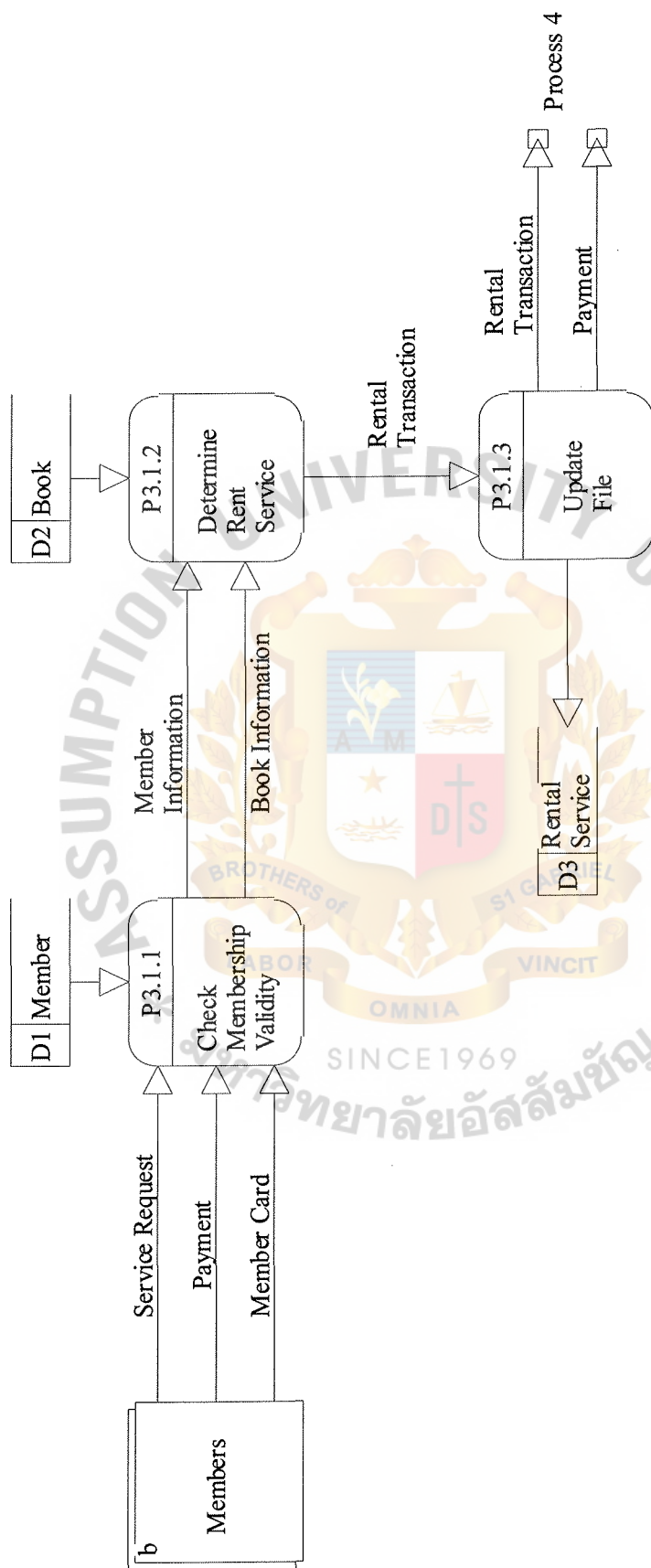


Figure A.6. Data Flow Diagram Level 2 of the Proposed System.

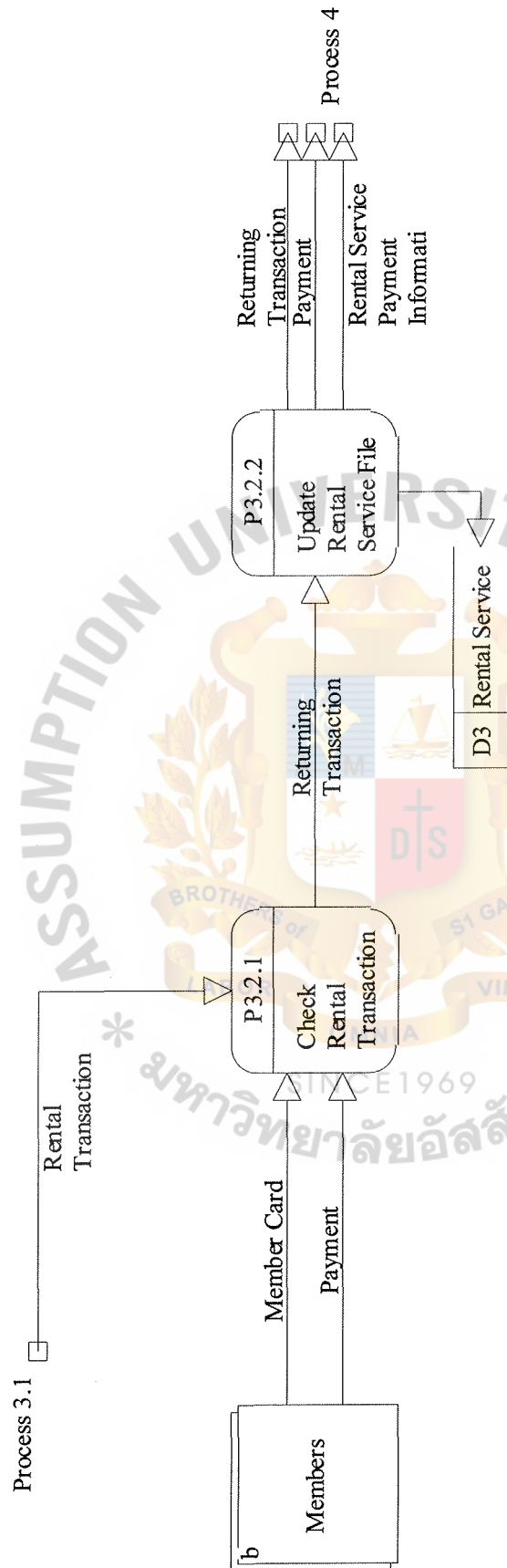


Figure A.7. Data Flow Diagram Level 2 of the Proposed System.

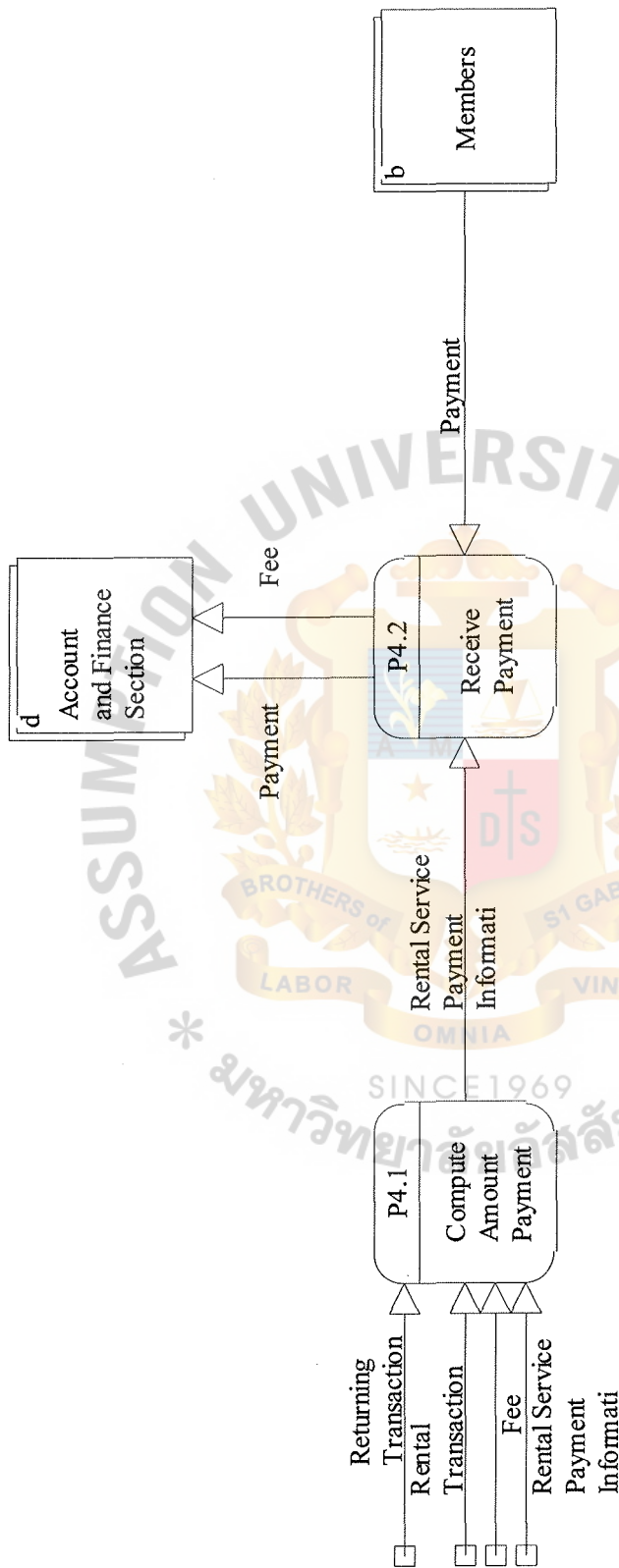


Figure A.8. Data Flow Diagram Level 1 of the Proposed System.



APPENDIX B
DATA DICTIONARY

DATA DICTIONARY

Account and Finance Section

External Entity

Description: The section responsible for all receiving incomes and the expenses of the bookshop.

Application Information

Data Flow

Description: The application form provides for customer who would like to be a member of the bookshop to fill in the information.

Book Information

Data Flow

Description: The information about books in the bookshop such as book name, book ID, date received, publisher name, price, etc.

Book Rental Service System

Process

Description: The system that provides book rental service to member of the bookshop by using the computer.

Books

Data Store

Description: The file that stores information about books in the bookshop such as book name, book ID, date received, publisher name, price, etc.

Check Rental Transaction

Process

Description: The process that checks the status of the rental book and the rental transaction of member.

Collect Customer Details

Process

Description: The process that collects information of customer who would like to be a member of the bookshop from the application form.

Collect Payment

Process

Description: The process that receives money from member and keeps record of all financial transactions.

Compute Amount Payment

Process

Description: The process that computes the amount of money that member has to pay to the bookshop.

Determine Rent Service

Process

Description: The process that determines rental service to member from rental service file.

Fee

Data Flow

Description: The money that customer who would like to be a member of the bookshop must pay only once they apply.

Generate Report

Process

Description: The process that generates reports by gathering all the information from the entire file to present periodically required report to the manager.

Information Service Reply

* Data Flow

Description: The information that the bookshop replies to members who request about books.

Information Service Request

Data Flow

Description: The information that member would like to know about books and request from the bookshop.

Inventory Section

External Entity

Description: The section responsible for checking and keeping books in stock.

Manager

External Entity

Description: The owner of the bookshop that sets objective, target of each strategy to manage maximum benefit, and regulations of the bookshop.

Member

External Entity

Description: The customers who has already applied and paid fee to the bookshop.

Member Card

Data Flow

Description: A card that shows the privilege of only members to rent, return and retrieve information of books in the bookshop.

Member ID

Data Flow

Description: The key of member that represents member's information. It provides faster transaction.

Member Information

Data Flow

Description: The information about member status in the bookshop such as member name, member ID, address, telephone number, sex, date issue, etc.

Member Name

Data Flow

Description: Name of member kept in a file and member card to provide faster transaction with member ID.

Members

Data Store

Description: The file that stores member information of the bookshop such as member ID, member name, address, telephone number, sex, date of issue, etc.

New Book Information

Data Flow

Description: The information of new books that come into the bookshop such as book name, publisher name, etc.

Non Member

External Entity

Description: The customer who does not apply or pay fee for membership yet.

Payment

Data Flow

Description: The money that member has to pay for rental book to the bookshop.

Print Member Card

Process

Description: The process that provides a member card to register the members after they have already applied and paid the membership fees to the bookshop.

Provide Book Service

Process

Description: The process that provides service to member such as rental book, return book and provides information about the books.

Provide Information Service

Process

Description: The process that gives information about the required book that member requests.

Provide Rent Service

Process

Description: The process that provides rental service to member who needs the book.

Provide Return Service

Process

Description: The process that provides return transaction. The member will bring member card and book to verify the return transaction.

Receive Payment

Process

Description: The process that the bookshop receives money of rental, and returned book from members.

Record New Book Information

Process

Description: The process that keeps records about information of the new book that has just come into the bookshop.

Register for Membership

Process

Description: The process which customers apply to be members of the bookshop.

The bookshop keeps records of the new members and prints out member cards.

Register New Book

Process

Description: The process that records information of the new books that come into the bookshop.

Rental Service

Data Store

Description: The file that keeps record of rental, returning transaction of each member in the bookshop.

Rental Service Payment Information

Data Flow

Description: The information about payment comes from rental service of member.

Rental Transaction

Data Flow

Description: The information of rental service transaction that occurs in the bookshop such as date of rent, book ID.

Report

Data Flow

Description: The information of all transactions in the bookshop that the manager requests.

Returning Transaction

Data Flow

Description: The information about returning service transaction that occurs in the bookshop.

Service Reply

Data Flow

Description: The information and process that the bookshop provides to members who request.

Service Request

Data Flow

Description: The information and process requested from member.

Type of Book

Data Flow

Description: The information about the type of new books that have just come into the bookshop.

Update File

Process

Description: The process that provides file to be updated all the time when some transactions change.

Update Member Information

Process

Description: The process to update information of members when some members will change some information.

Update Rental Service File

Process

Description: The process that updates returning status of members after members return books.

Valid Checking Member

Process

Description: The process that checks the status of members before the staff members will provide rental service to them.



APPENDIX C
PROCESS SPECIFICATION

PROCESS SPECIFICATION

Process 0 Book Rental Service System

Location:

Context (CONTEXT)

Input Flows:

Book Information

Application Information

Fee

Returning Transaction

Service Request

Payment

Member Card

Output Flows:

Report

Fee

Payment

Member Card

Service Reply

Process 1 Register Member

Location:

DFD level0 (0)

Input Flows:

Application Information

Fee

Output Flows:

Fee

Member Card

Process 1.1 Collect Customer Details

Location:

Process1 (1)

Input Flows:

Application Information

Fee

Output Flows:

Member information

Process 1.2 Update Member Information

Location:

Process1 (1)

Input Flows:

Member information

Output Flows:

Member name

Member ID

Process 1.3 Print Member Card

Location:

Process1 (1)

Input Flows:

Member name

Member ID

Output Flows: *

Member Card



Process 2 Register New Book

Location:

DFD level0 (0)

Input Flows:

New Book Information

Output Flows:

Book Information

Process 2.1 Classify Type of Book

Location:

Process2 (2)

Input Flows:

New Book Information

Output Flows:

Type of Book

Process 2.2 Record New Book Information

Location:

Process2 (2)

Input Flows:

Type of Book

Output Flows:

Book Information

Process 3 Provide Book Service

Location:

DFD level0 (0)

Input Flows:

Book Information

Service Request

Payment

Member Card

Output Flows:

Service Reply

Rental Service Payment Information

Process 3.1 Provide Rent Service

Location:

Process3 (3)

Input Flows:

Service Request

Payment

Member Card

Output Flows:

Rental Transaction

Process 3.1.1 Valid Checking Member

Location:

Process 3.1 (3.1)

Input Flows:

Service Request

Payment

Member Card

Output Flows:

Book Information

Member information

Process 3.1.2 Determine Rent Service

Location:

Process 3.1 (3.1)

Input Flows:

Book Information

Member information

Output Flows:

Rental Transaction

Process 3.1.3 Update File

Location:

Process 3.1 (3.1)

Input Flows:

Rental Transaction

Output Flows:

Rental Transaction Information

Process 3.2 Provide Return Service

Location:

Process3 (3)

Input Flows:

Member Card

Rental Transaction

Output Flows:

Payment

Returning Transaction

Rental Service Payment Information

Process 3.2.1 Check Rental Transaction

Location:

Process 3.2 (3.2)

Input Flows:

Returning Transaction

Member Card

Overdue Information

Rental Transaction

Output Flows:

Returning Transaction

Process 3.2.2 Update Rental Service File

Location:

Process 3.2 (3.2)

Input Flows:

Returning Transaction

Output Flows:

Payment

Rental Service Payment Information

Process 3.3 Provide Information Service

Location:

Process3 (3)

Input Flows:

Service Request

Output Flows:

Service Reply

Process 4 Collect Payment

Location:

DFD level0 (0)

Input Flows:

Fee

Rental Service Payment Information

Output Flows:

Receipt

Fee

Payment

Process 4.1 Compute Amount Payment

Location:

Process4 (4)

Input Flows:

Fee

Rental Transaction

Returning Transaction

Rental Service Payment Information

Output Flows:

Rental Service Payment Information

Process 4.2 Receive Payment

Location:

Process4 (4)

Input Flows:

Payment

Rental Service Payment Information

Output Flows:

Fee

Payment

Process 5 Generate Report

Location:

DFD level0 (0)

Input Flows:

Member Information

Book Information

Rental Server Information

Output Flows:

Report



APPENDIX D
ENTITY RELATIONSHIP DIAGRAM AND STRUCTURE CHART



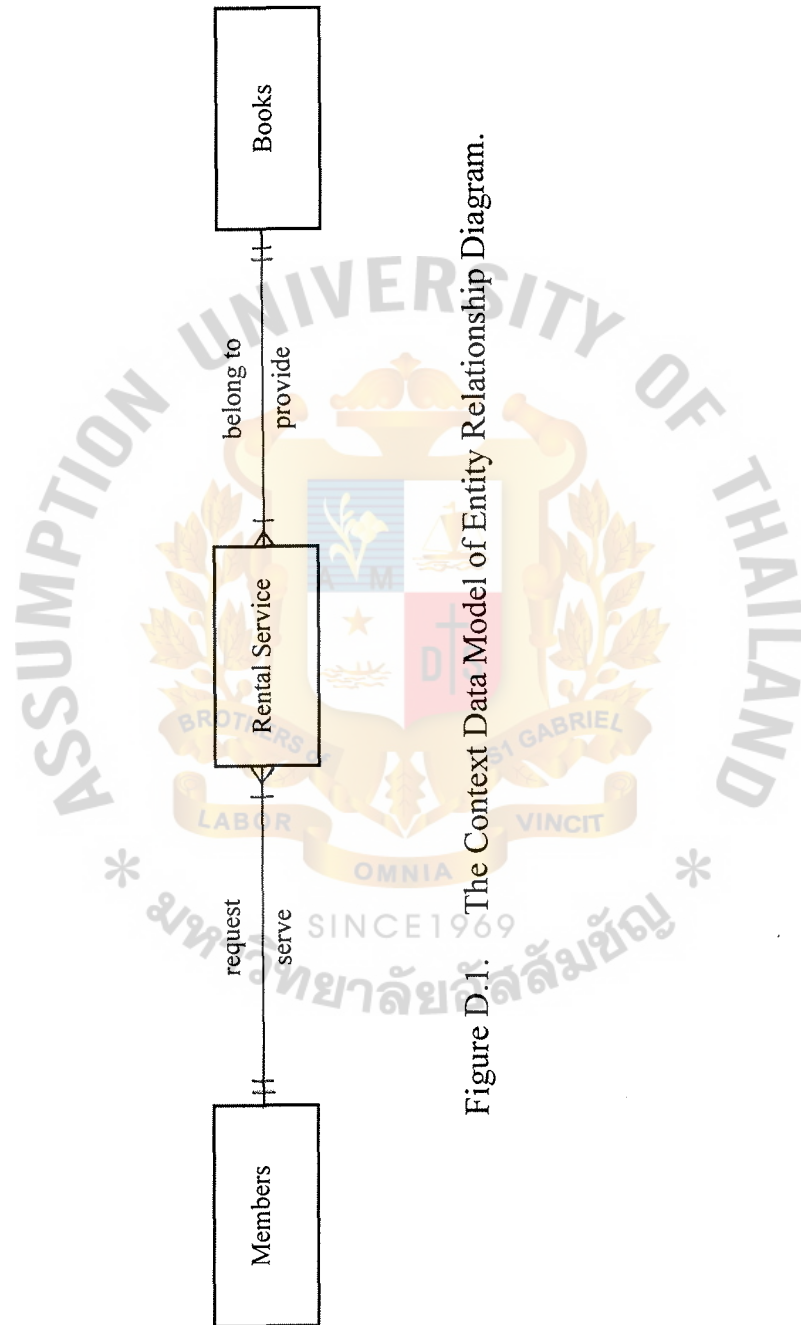


Figure D.1: The Context Data Model of Entity Relationship Diagram.

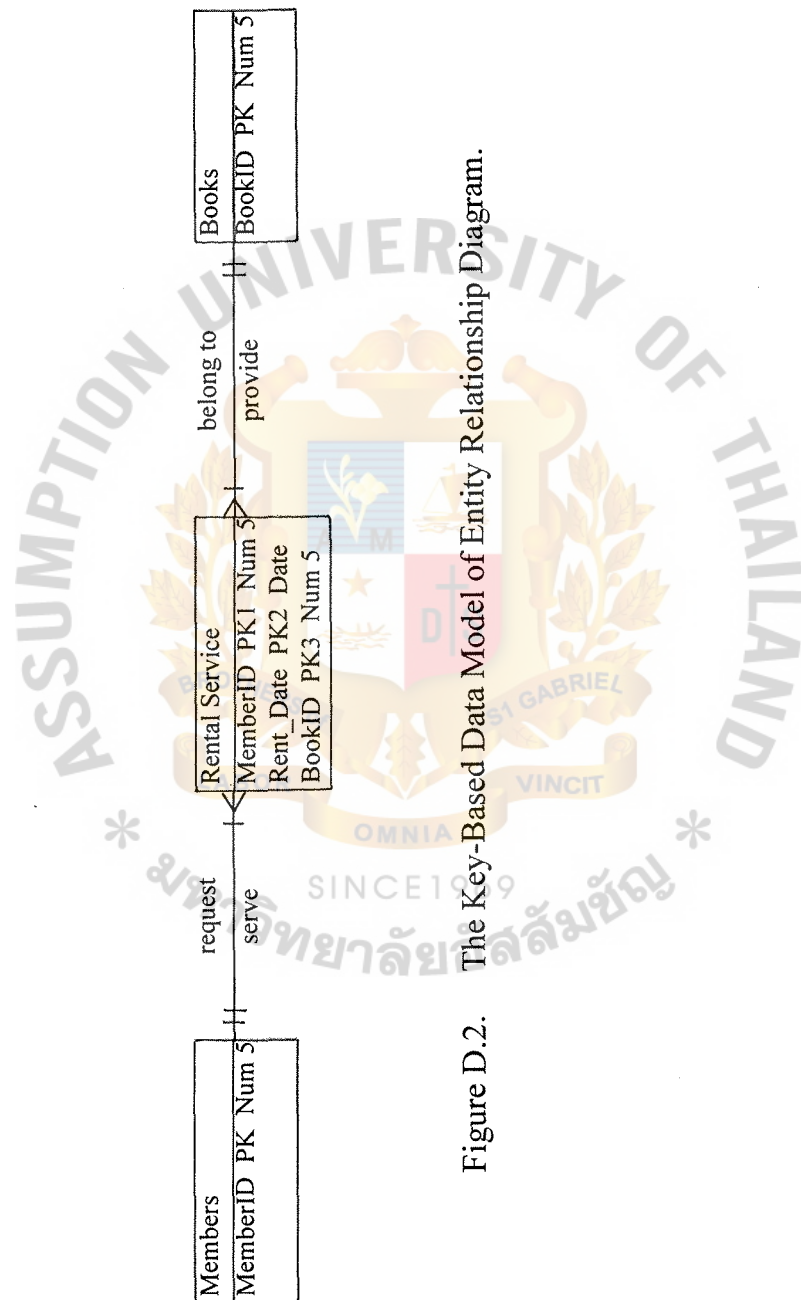


Figure D.2. The Key-Based Data Model of Entity Relationship Diagram.

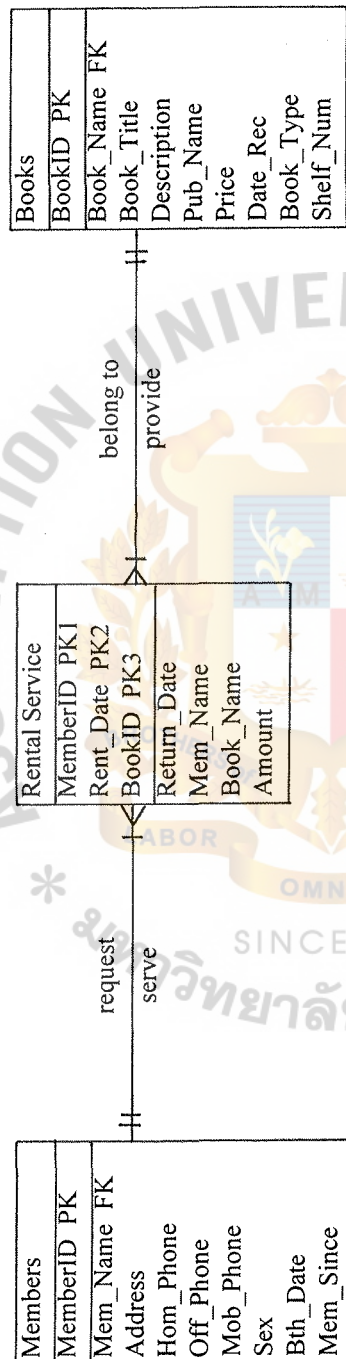


Figure D.3. The Fully Attribute Data Model of Entity Relationship Diagram.

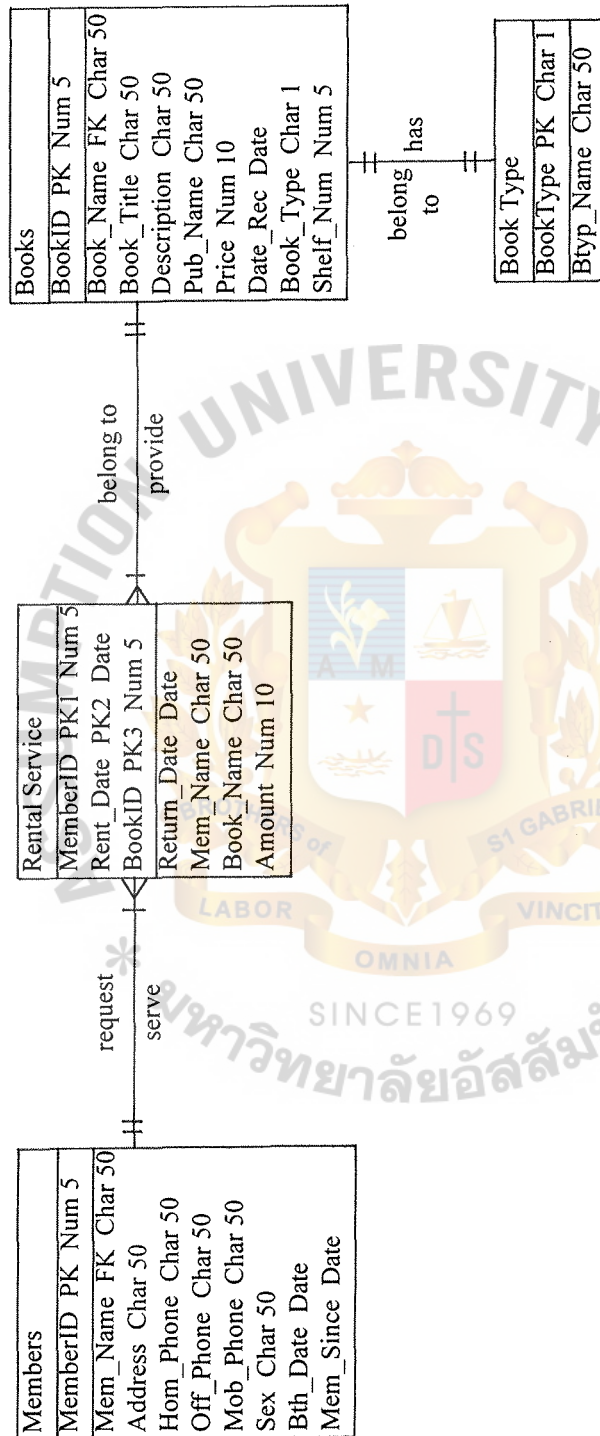
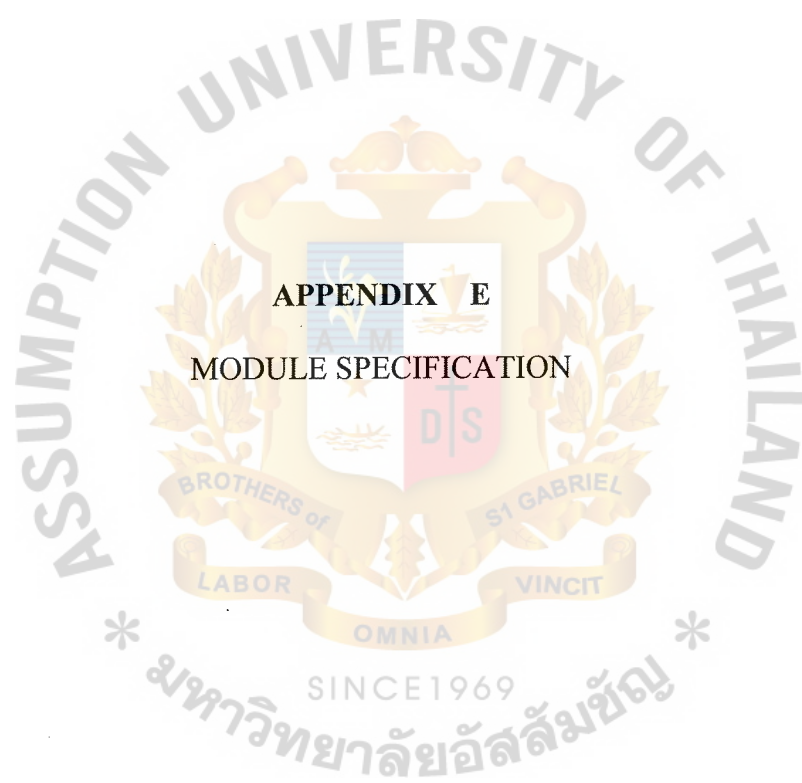


Figure D.4. Entity Relationship Diagram at Third Normal Form.



APPENDIX E
MODULE SPECIFICATION

MODULE SPECIFICATION

Rental Service System (M1)

Module

Module Description: The system that provides book rental service to members by using the computerized system.

Location:

Structure Chart

Calls: Provide Rent Service (Module)

Passed Couples:

Service Request (Data Couple)

Returned Couples:

Rental Transaction (Data Couple)

Calls: Update Rental Service File (Library Module)

Passed Couples:

Member Information (Data Couple)

Book Information (Data Couple)

Rental Transaction (Data Couple)

Return Transaction (Data Couple)

Returned Couples:

Report (Data Couple)

Calls: Provide Information Service (Module)

Passed Couples:

Service Request (Data Couple)

Returned Couples:

Service Reply (Data Couple)

Calls: Get Book Information (Library Module)

Returned Couples:

Book Information (Data Couple)

Calls: Get Member Information (Library Module)

Returned Couples:

Member Information (Data Couple)

Calls: Provide Return Service (Module)

Passed Couples:

Rental Transaction (Data Couple)

Returned Couples:

Returning Transaction (Data Couple)

Get Member Information (M2)

Library Module

Module Description: Retrieve information of members who request the service.

Location:

Structure Chart

Called by: Rental Service System (Module)

Returned Couples:

Member Information (Data Couple)

Get Book Information (M3)

Library Module

Module Description: Retrieve information of required books.

Location:

Structure Chart

Called by: Rental Service System (Module)

Returned Couples:

Book Information (Data Couple)

Provide Rent Service (M4)

Module

Module Description: The process that provides rental services to members who made request.

Location:

Structure Chart

Called by: Rental Service System (Module)

Passed Couples:

Service Request (Data Couple)

Returned Couples:

Rental Transaction (Data Couple)

Calls: Valid Checking Member (Module)

Passed Couples:

Member Information (Data Couple)

Returned Couples:

Service Request (Data Couple)

Calls: Determine Rent Service (Module)

Passed Couples:

Service Request (Data Couple)

Returned Couples:

Rental Transaction (Data Couple)

Valid Checking Member (M5)

Module

Module Description: The process that checks current status of members before the staff members will provide the rental service.

Location:

Structure Chart

Called by: Provide Rent Service (Module)

Passed Couples:

Member Information (Data Couple)

Returned Couples:

Service Request (Data Couple)

Determine Rent Service (M6)

Module

Module Description: The process that determines the rental service to members from the rental service file.

Location:

Structure Chart

Called by: Provide Rent Service (Module)

Passed Couples:

Service Request (Data Couple)

Returned Couples:

Rental Transaction (Data Couple)

Provide Return Service (M7)

Module

Module Description: The process that provides return transaction when members would like to return books.

Location:

Structure Chart

Called by: Rental Service System (Module)

Passed Couples:

Rental Transaction (Data Couple)

Returned Couples:

Returning Transaction (Data Couple)

Calls: Check Rental Transaction (Module)

Passed Couples:

Rental Transaction (Data Couple)

Returned Couples:

Returning Transaction (Data Couple)

Check Rental Transaction (M8)

Module

Module Description: The process that checks current status of book and rental transaction of members.

Location:

Structure Chart

Called by: Provide Return Service (Module)

Passed Couples:

Rental Transaction (Data Couple)

Returned Couples:

Returning Transaction (Data Couple)

Provide Information Service (M9)

Module

Module Description: The process that provides requested information from members.

Location:

Structure Chart

Called by: Rental Service System (Module)

Passed Couples:

Service Request (Data Couple)

Returned Couples:

Service Reply (Data Couple)

Update Rental Service File (M10)

Library Module

Module Description: The process that updates all needed information that involves the rental service transaction after provide service to members.

Location:

Structure Chart

Called by: Rental Service System (Module)

Passed Couples:

Member Information (Data Couple)

Book Information (Data Couple)

Rental Transaction (Data Couple)

Return Transaction (Data Couple)

Returned Couples:

Report (Data Couple)

Book Information

Data Couple

Location:

Structure Chart

Returned From: Get Book Information (Library Module)

Returned To: Rental Service System (Module)

Passed From: Rental Service System (Module)

Passed To: Update Rental Service File (Library Module)

Member Information

Data Couple

Location:

Structure Chart

Returned From: Get Member Information (Library Module)

Returned To: Rental Service System (Module)

Passed From: Rental Service System (Module)

Passed To: Update Rental Service File (Library Module)

Passed From: Provide Rent Service (Module)

Passed To: Valid Checking Member (Module)

Rental Transaction

Data Couple

Location:

Structure Chart

Returned From: Provide Rent Service (Module)

Returned To: Rental Service System (Module)

Passed From: Rental Service System (Module)

Passed To: Provide Return Service (Module)

Passed From: Rental Service System (Module)

Passed To: Update Rental Service File (Library Module)

Returned From: Determine Rent Service (Module)

Returned To: Provide Rent Service (Module)

Passed From: Provide Return Service (Module)

Passed To: Check Rental Transaction (Module)

Report

Data Couple

Location:

Structure Chart

Returned From: Update Rental Service File (Library Module)

Returned To: Rental Service System (Module)

Return Transaction

Data Couple

Location:

Structure Chart

Passed From: Rental Service System (Module)

Passed To: Update Rental Service File (Library Module)

Returning Transaction

Data Couple

Location:

Structure Chart

Returned From: Provide Return Service (Module)

Returned To: Rental Service System (Module)

Returned From: Check Rental Transaction (Module)

Returned To: Provide Return Service (Module)

Service Reply

Data Couple

Location:

Structure Chart

Returned From: Provide Information Service (Module)

Returned To: Rental Service System (Module)

Service Request

Data Couple

Location:

Structure Chart

Passed From: Rental Service System (Module)

Passed To: Provide Rent Service (Module)

Passed From: Rental Service System (Module)

Passed To: Provide Information Service (Module)

Returned From: Valid Checking Member (Module)

Returned To: Provide Rent Service (Module)

Passed From: Provide Rent Service (Module)

Passed To: Determine Rent Service (Module)



APPENDIX F

USER INTERFACE DESIGN AND USER MANUAL

Figure F.1. Login Screen.

Login Screen

- Screen Definition

Login TABO Entertainment Shop System

Verify login user ID and Password from user-oriented access control

- Input

User ID and Password

- Command Buttons

Logon

Verify login user ID and password, if correct access to program

Exit

Exit TABO Entertainment Shop System

- Output

Access to Program



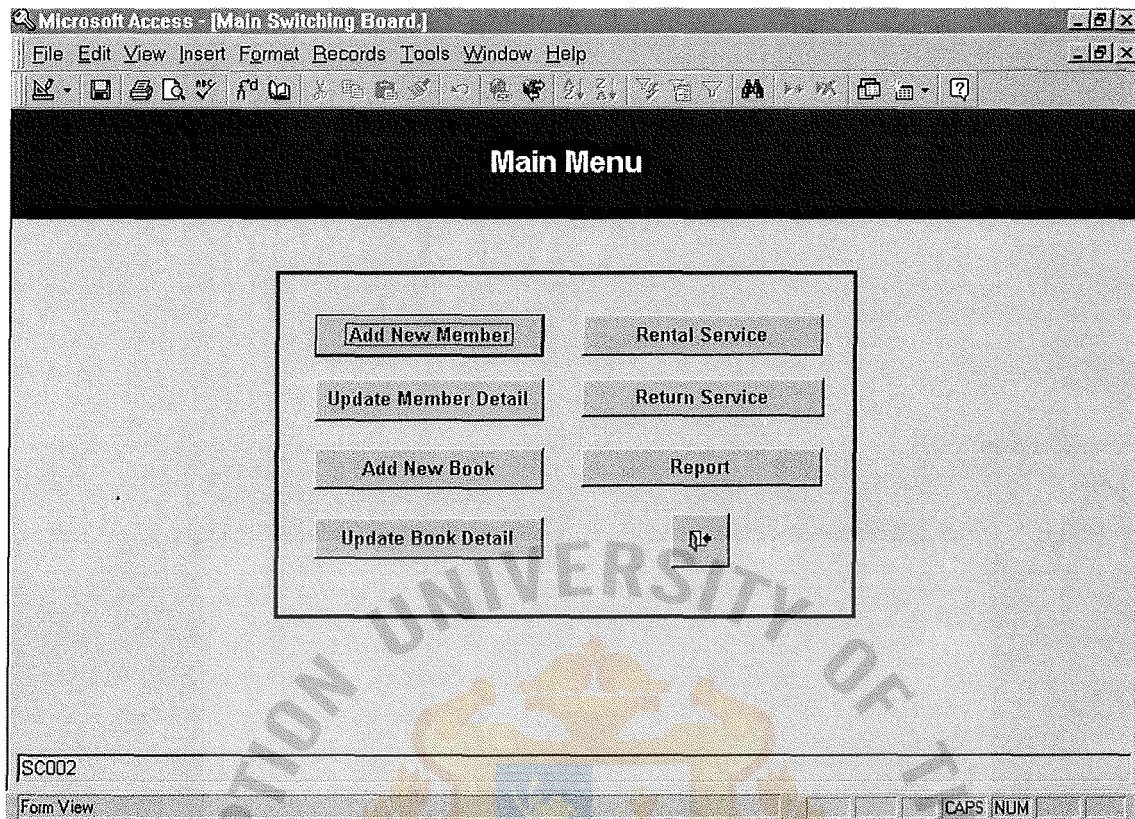


Figure F.2. Main Menu Screen.

Main Menu Screen

- Screen Definition *

Main screen of TABO Entertainment Shop, accessing to Add New Member, Update Member Detail, Add New Book, Update Book Detail, Rental Service, Return Service, or Exit

- Input

Click a required button from the Main Menu Screen to access a required information

- Command Buttons

Add New Member	Access to add new member information screen
Update Member Detail	Access to update current member information screen
Add New Book	Access to add new book information screen
Update Book Detail	Access to update current book information screen
Rental Service	Access to rental service screen
Return Service	Access to return service screen
Report	Access to report screen
Exit	Exit from program

- Output

Access to a required screen



Microsoft Access - [Member detail Form]

File Edit View Insert Format Records Tools Window Help

Add New Member Form

Member ID	
Member Name	
Address	
Homephone	
Officephone	
Mobilephone	
Sex	
BirthDate	
Member Since	9/11/99

Member Card Save

SC003

Form View

Figure F.3. Add New Member Screen.

Add New Member Screen

- Screen Definition *

Add new member information

- Navigation

Select Add New Member button from Main Switching Board Screen

- Input

Detail of new member

Member ID and date of being member will be generated automatically when you input member information

- Command Buttons

Member Card	Print preview of Member card
Save	Save new member information
Exit	Exit to Main Menu Screen

- Output

Member card

Shows information of members on screen and saves data into database



Update Member Form

Search by Member Name:

Member ID	10001
Member Name	Patcharee Purasachit
Address	30/13 Phahonyothin Soi 2, Phayathai, Bangkok, 10400
Homephone	279-4404
Officephone	-
Mobilephone	01-8111454
Sex	Female
BirthDate	27/4/74
Member Since	1/12/97

SC004
Record: 1 of 5
Form View
CAPS NUM

Figure F.4. Update Member Detail Screen.

Update Member Detail Screen

- Screen Definition
 - Show and update the current member information
- Navigation
 - Click Update Member Detail button from Main Menu Screen
- Input
 - New information of current member
 - Click drop-down list to select required member or click Show All button to see all member records

- Command Buttons

Show All	Show all member information records
Exit	Exit to Main Menu Screen
Member Card	Print preview member card
Save	Save new information of current member
Delete	Delete member information record

- Output

Show current member information on screen and update new information into database



The screenshot shows a Microsoft Access window titled 'Microsoft Access - [Books detail form]'. The menu bar includes File, Edit, View, Insert, Format, Records, Tools, Window, and Help. The toolbar contains various icons for database operations. The main form area is titled 'Add New Book Form'. It features a list of fields on the left: Type, Book ID, Book Name, Book Title, Description, Publisher Name, Price, Date Receive, and Shelf Number. Each field has a corresponding input area on the right. The Price field is set to 0.00, Date Receive is 9/11/99, and Shelf Number is 0. A 'Save' button is located next to the Shelf Number field. The status bar at the bottom displays 'SC005' and a message 'Please select type of book'.

Figure F.5. Add New Book Screen.

Add New Book Screen

- Screen Definition *

Add information of new book

- Navigation

Click Add New Book button from Main Menu Screen

- Input

Book information by selecting type of book first then Book ID and date of receive will generate automatically

- Command Buttons

Save

Save new book information

Exit

Exit to Main Menu Screen

- Output

Show information of books on screen and save data into database



Update Book Form

Search by Book Type : Show All Records

Search by Book ID :

Book ID	C1001
Book Name	หนังสือการ์ตูน
Book Title	
Description	ภาค 1 อสูรน้อยรันแซ่ เล่ม 5
Publisher Name	หมึกจีน
Book Type	Cartoon
Price	40.00
Date Receive	1/2/97
Shelf Number	2

Save Delete

SC006
Record: 1 of 34
Form View CAPS NUM

Figure F.6. Update Book Detail Screen.

Update Book Detail Screen

- Screen Definition *
 - Show and update current book information
- Navigation
 - Click Update Book Detail button from Main Menu Screen
- Input
 - New information of current books
 - Click drop-down list to search by book type or by book ID to see current book information

- Command Buttons

Show All Records	Show all book information records
Exit	Exit to Main Menu Screen
Save	Save new information of current books
Delete	Delete current book information record

- Output

Show current books information on screen and update new information into database



INPUT BOOK FOR RENT

Click Here To Exit STOP

Input Member ID

Rental Date BookID Book Name

10001 Patcharee Purasachit

Rental Service List

Rental Dat	Book ID	Book Name
9/11/99		

Calculate

SC007

Form View CAPS NUM

Figure F.7. Rental Service Screen.

Rental Service Screen

- Screen Definition

Data entry about book rental transaction of each member

- Navigation

Click Rental Service button from Main Menu Screen

- Input

Member ID by clicking drop-down list to select member ID then old rental transaction (Rental Date, Book ID, and Book Name) will appear on top-right section of screen

Book ID or Book Name by clicking drop-down list to select required book in rental service list section for new rental transaction

Click Calculate Payment Button to calculate first payment of new book rental service

- Command Buttons

Calculate Payment

Access to Rent Payment Screen

Stop

Exit to Main Menu Screen

- Output

Show book rental transaction for each member on screen and save new data into database



Microsoft Access - [qryCalculateRent]

File Edit View Insert Format Records Tools Window Help

View

RENT PAYMENT

Click Here To Exit

STOP

10001 Patcharee Purasachit

Book ID	Book Name	Rental Date	Payment
C1008	ชุดสายถนนแห่งปารณนา	9/11/99	3
C1011	สำนักทางพิภพ	9/11/99	3
C1010	สำนักทางพิภพ	9/11/99	3
M1005	แพรว	9/11/99	8

TOTAL AMOUNT 17

SC008

รหัสหนังสือ

CAPS NUM

Figure F.8. Rental Payment Screen.

Rental Payment Screen

- Screen Definition
 - Calculate and show first payment of book rental service of each member
- Navigation
 - Click Calculate Payment button from Rental Service Screen
- Input
 - Null
- Command Buttons
 - Stop
 - Exit to Rental Service Screen

- Output

Show list of rental books (Book ID, Book Name, Rental Date, and Payment), total first payment of book rental service for each member and save new rental service transaction into database



Microsoft Access - [qryReturn]

File Edit View Insert Format Records Tools Window Help

Return Service Click Here To Exit STOP

Search Member ID

Patcharee Purasachit

Rental Date	Book ID	Book Name	
22/9/99	C1007	ขอเพียงใจที่รัก	🔔
9/11/99	C1008	สุดสายถนนแห่งปราณนา	🔔
9/11/99	C1010	ด้านต่างพิภพ	🔔
9/11/99	C1011	ด้านต่างพิภพ	🔔
9/11/99	M1005	แพรว	🔔
22/9/99	M1009	Angel	🔔
19/9/99	S1002	หมวดป๊อป	🔔
			🔔

Calculate Return Amount

SC009

วันที่ให้ยืมหนังสือ

CAPS NUM

Figure F.9. Return Service Screen.

Return Service Screen

- Screen Definition *

Show old book rental transaction of each member

- Navigation

Click Return Service button from Main Menu Screen

- Input

Member ID by clicking drop-down list to select Member ID then old book rental transaction (Rental Date, Book ID, and Book Name) will be appear in below section

Click Bell button for returning each book

Click Calculate Return Amount to calculate amount payment of return book

- Command Buttons

Bell

Delete return book

Calculate Return Amount

Access to Return Payment Screen

Stop

Exit to Main Menu Screen

- Output

Show old book rental transaction for each member on screen and save new data into database




Microsoft Access - [qryCalculateReturn]

File Edit View Insert Format Records Tools Window Help

View

RETURN PAYMENT

Click Here To Exit ***** 

Member ID

10001 Patcharee Purasachit

Rental Date	Book ID	Book Name	Payment
19/9/99	S1002	หมวดนิยาย	892.5
22/9/99	C1007	ข้อเท็จจริงที่หักพัง	144
22/9/99	M1009	Angel	336
TOTAL AMOUNT			1372.5

SC010

วันที่ให้ยืมหนังสือ

CAPS NUM

Figure F.10. Return Payment Screen.

Return Payment Screen

- Screen Definition
 - Calculate and show rental payment of return books for each member
- Navigation
 - Click Calculate Return Amount button from Return Service Screen
- Input
 - Null
- Command Buttons
 - Stop
 - Exit to Return Service Screen

- Output

Show list of return books (Rental Date, Book ID, Book Name, and Payment), total amount payment of book rental service for each member and save new rental service transaction into database



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GRADUATE SCHOOL LIBRARY

Figure F.11. Report Screen.

Report Screen

- Screen Definition *
 - Preview and print selected report
- Navigation
 - Click Report button from Main Menu Screen
- Input
 - Member ID by clicking drop-down list for member transaction report
 - Begin Date and End Date for transaction report

- Command Buttons

Member Transaction	Report about book rental service for each member
Member Information	Report about information of all members in the shop
Book Information	Report about information of all books in the shop
Popular Books	Report about frequently book lists
Revenue Report	Report about total revenue during time period
New Member Report	Report about new member information during time period
New Book Report	Report about new book information during time period
Stop	Exit to Main Menu Screen

- Output

Show data on screen and/or print preview required report



Member Transaction

MI4210



Rental Date by Month

September 1999

MemberID

10001

Rental Date	Book ID	Book Name	Return Date	Amount
16/9/99	C1003	Cipher	22/9/99	42
16/9/99	C1006	test	17/9/99	120
17/9/99	C1002	วัยรักเปปเปอร์มินต์	17/9/99	2
17/9/99	C1003	Cipher	22/9/99	36
17/9/99	C1005	ทดสอบ	22/9/99	300
17/9/99	C1010	ลำนํ้าต่างพิภพ	17/9/99	3
17/9/99	C1012	ลำนํ้าต่างพิภพ	17/9/99	3
19/9/99	M1005	แพรว	22/9/99	32
19/9/99	S1002	หมวดป๊อป		0
22/9/99	C1007	ขอเพียงใจที่พักพิง		0
22/9/99	M1009	Angel		0

Figure G.1. Member Transaction Report.

Member Information

MI4210



Member ID	Member Name	Address	Homephone	Officephone	Mobilephone	Sex	MemberSince
10001	Patcharee Purasachit	30/13 Phahonyothin Soi 2, Phayathai, Bangkok, 10400	279-4404	-	01-8111454	Female	1/12/97
10002	Pattamon Uttamote	12/31 Jaransanitwong 71, Bangplad, Bangkok, 10700	424-7701	-	01-4554111	Female	15/1/97
10003	Witcha Utenpitakkun	124 Phahonyothin 94, Bangken, Bangkok, 10540	561-1154	245-9987	01-6442781	Male	30/1/97
10004	Nawarat Panitpibun	30/5 Sailom Condominium, Soi Sailom, Phahonyothin Road, Phayathai, Bangkok, 10400	616-5524	586-1245	01-4554778	Female	17/9/99
10005	Nontapun Tuntimontri	138 Ladproud 87, Ladproud Road, Bangkok, 10500	538-4474	-	01-2457441	Female	17/9/99

Figure G.2. Member Information Report.

Book Information

BI4210



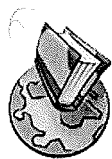
Book Type **Cartoon**

Book ID	Book Name	Book Title	Description	Publisher Name	Price	Date Receive
C1001	รันเซ่ที่รัก		ภาค 1 อสูรน้อยรันเซ่ เล่ม 5	หมึกจีน	40.00	1/2/97
C1002	วัยรักแปดเปอร์เซ็นต์		ภาค 1 เล่ม 1 ฉบับรวมเล่ม	สยามอินเตอร์คอมเมิกส์	25.00	15/3/97
C1003	Cipher		No. 12 Scene 11. Riptide	วิบูลย์กิจ	60.00	1/1/97
C1004	ปริศนาหุ้ญสูง		เล่ม 1	วิบูลย์กิจ	30.00	15/1/97
C1005	ทดสอบ	test	test	test	500.00	10/9/99
C1006	test	test	test	test	600.00	10/9/99
C1007	ขอเพียงใจที่รัก		จบในฉบับ	วิบูลย์กิจ	30.00	10/9/99
C1008	สุตสาณนแห่งปรารถนา	Memorial Street		วิบูลย์กิจ	30.00	10/9/99

Figure G.3. Book Information Report.

New Member Information

NMI4210



Member ID	Member Name	Address	Homephone	Officephone	Mobilephone	Sex	Member Since
10001	Patcharee Purasachit	30/13 Phahonyothin Soi 2, Phayathai, Bangkok, 10400	279-4404	-	01-8111454	Female	1/12/97
10002	Pattamon Uttamote	12/31 Jaransanitwong 71, Bangplad, Bangkok, 10700	424-7701	-	01-4554111	Female	15/1/97
10003	Witcha Utenpitakkun	124 Phahonyothin 94, Bangken, Bangkok, 10540	561-1154	245-9987	01-6442781	Male	30/1/97
10004	Nawarat Panitpibun	30/5 Sailom Condominium, Soi Sailom, Phahonyothin Road, Phayathai, Bangkok, 10400	616-5524	586-1245	01-4554778	Female	17/9/99

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Figure G.4. New Member Information Report.

New Book Information

NBI4210



Book ID	Book Name	Book Title	Description	PublisherName	Price	DateReceive
C1002	วัยรักเปปเปอร์มินต์		ภาค 1 เล่ม 1 ฉบับรวมเล่ม	สยามอินเตอร์คอมิกส์	25.00	15/3/97
C1004	พริกขี้หนูสู้รัง		เล่ม 1	วิบูลย์กิจ	30.00	15/1/97
C1005	ทดสอบ	test	test	test	500.00	10/9/99
C1006	test	test	test	test	600.00	10/9/99
C1007	ขอเพียงใจที่รักฟัง		ฉบับในฉบับ	วิบูลย์กิจ	30.00	10/9/99
C1008	สุตสายนนแห่งปราวรณนา	Memorial Street		วิบูลย์กิจ	30.00	10/9/99
C1009	ลำนํ้าต่างพิภพ		เล่ม 1	วิบูลย์กิจ	30.00	10/9/99
C1010	ลำนํ้าต่างพิภพ		เล่ม 2	วิบูลย์กิจ	30.00	10/9/99
C1011	ลำนํ้าต่างพิภพ		เล่ม 3	วิบูลย์กิจ	30.00	14/9/99
C1012	ลำนํ้าต่างพิภพ		เล่ม 3	วิบูลย์กิจ	30.00	17/9/99

Figure G.5. New Book Information Report.

Popular Books

PB4210



Book ID	Book Name	Frequency NO.
C1007	ขอเพียงใจที่รัก	4
C1003	Cipher	3
C1010	ลำนํ้าต่างพิภพ	3
C1012	ลำนํ้าต่างพิภพ	2
C1005	ทดสอบ	2
C1006	test	2
C1002	วัยรักเปปเปอร์มินต์	2
C1008	สุดสายถนนแห่งปรารถนา	1
C1009	ลำนํ้าต่างพิภพ	1
M1004	Fitness	1
S1004	หลากหลายชีวิต ปริญญา ปานประดับ	1
M1005	แพรว	1
M1007	ทดสอบระบบ	1
M1009	Angel	1
M1010	Delite	1
M1013	หญิงไทย	1

Figure G.6. Popular Book Report.



APPENDIX H

FILE LAYOUT

Table H.1. Member Layout.

Number	Field Name	Data Type	Length	Default
1	Member ID	Numeric	5	Null
2	Member Name	Character	50	Null
3	Address	Memo		Null
4	Homephone	Character	50	Null
5	Officephone	Character	50	Null
6	Mobilephone	Character	50	Null
7	Sex	Character	50	Null
8	Birth Date	Date		Null
9	Member Since	Date		Null

Table H.2. Book Layout.

Number	Field Name	Data Type	Length	Default
1	Book Type	Character	1	Null
2	Book ID	Numeric	5	Null
3	Book Name	Character	50	Null
4	Book Title	Character	50	Null
5	Description	Character	50	Null
6	Publisher Name	Character	50	Null
7	Price	Numeric	10	Null
8	Date Receive	Date		Null
9	Shelf Number	Numeric	5	Null

Table H.3. Rental Service Layout.

Number	Field Name	Data Type	Length	Default
1	Member ID	Numeric	5	Null
2	Member Name	Character	50	Null
3	Rental Date	Date		Null
4	Book ID	Numeric	5	Null
5	Book Name	Character	50	Null
6	Payment	Numeric	10	Null

BIBLIOGRAPHY

1. Date, C.J. An Introduction to Database System (6th Edition), Addison Wesley, 1995.
2. Kendall, Kenneth E. and Kendall E. Julie, System Analysis and Design (2nd Edition), Prentice Hall, Inc., 1992.
3. Kenneth C. Laudon and Jane P. Laudon, Management Information Systems (5th Edition), Prentice Hall, Inc., 1996.
4. Jeffrey J. Whitten and Lonnie D. Bentley, System Analysis and Design Methods (4th Edition), McGraw-Hill Companies, Inc., 1998.
5. Loshin Pete, Paul Murphy, Electronic Commerce: Online Ordering and Digital Money (2nd Edition), Rockland, MA: Charles River Media, 1997.
6. Ravi Kalakota, Andrew B. Whinston. Electronic Commerce: a Manager's Guide, Reading, MA: Addison-Wesley, 1997.

