

A Leasing Information System for S.P.K. Samudprakan Co., Ltd.

by

Mr. Monchai Rompopipath

A Final Report of the Six-Credit Course
CS 6998 - CS 6999 System Development Project

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

November 2002

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Project Title	A Leasing Information System for S.P.K. Samudprakan Co., Ltd.
Name	Mr. Monchai Rompopipath
Project Advisor	Assoc.Prof.Dr. Suphamit Chittayasothorn
Academic Year	November 10, 2002

The Graduate School of Assumption University has approved this final report of the six-credit course, CS 6998 – CS 6999 System Development Project, submitted in partial fulfillment of the requirements for the degree of Master of Science in Computer Information Systems.


Approval Committee:




(Assoc.Prof.Dr. Suphamit Chittayasothorn)
Advisor



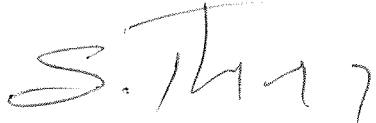
(Prof.Dr. Srisakdi Charmonman)
Chairman



(Air Marshal Dr. Chulit Meesajjee)
Dean and Co-advisor



(Asst.Prof.Dr. Vichit Avatchanakorn)
Member



(Assoc.Prof. Somchai Thayarnyong)
MUA Representative

November 10, 2002

ABSTRACT

This study covers the analysis, partial design and partial implementation of a computerized leasing information system in a finance company. The study emphasizes the design of leasing information at both operational and management level to improve the performance of work, increase the revenue and decrease the loss.

For the operational level the system provides functions to help users to record, maintain, and inquiry data as well as performing batch calculation. The system provides output forms for them to keep as documents, sending them to relevant departments and reporting to the management for use as control and decision information

S.P.K. Samudprakan Co., Ltd. is a small company that offers the leasing for customers of M.C. Paknum motor Co., Ltd. that is a HONDA motorcycle dealer company. The current existing system of S.P.K. Samudprakan Co., Ltd. is based on the manual system. Most data are stored on paper, while some parts are kept in the Microsoft Access and Excel, and stored in the file server. It requires many administrative staffs to maintain the system, and has to face the general problems of manual system, which are error-prone and having a high maintenance cost.

The new proposed information system will be developed to replace manual system with a two-tiered Local Area Network topology system. All data are kept in the database sever, Microsoft SQL Server 7.0 on Microsoft Widows 2000 Server and Windows 98 for Client, and are accessed through the Client/Server computing. The interface is implemented through a GUI design in Microsoft Visual Basic 6.0. It will reduce the number of administrative staffs, solve the problem of manual system and more importantly considerably improve the processing time or leasing transactions. ✓

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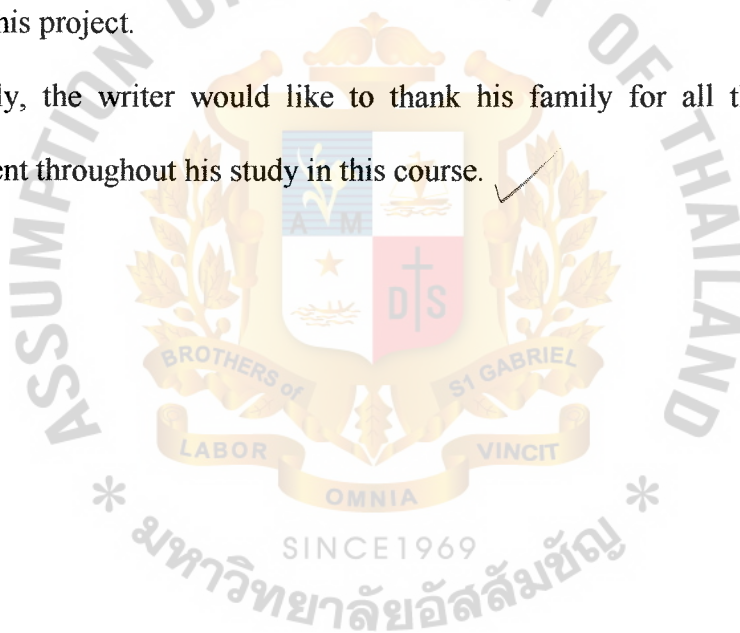


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I. INTRODUCTION

1.1 Background of Project

S.P.K. Samudprakan Finance company has now emerged as one of the financial institute's fast growing. Key factors which have brought about the high growth rates include the business success and the people's better attitude toward finance. Investment is an activity that generates profit to the company while others are saving expense, better underwriting, etc.

Lending investment is one policy which continues to carry on its excellent marketing operations such as housing loan, construction project loan, car and motorcycle leasing, etc. Most companies keep expanding their business in order to meet the market demand. The computer information is being used to serve all levels of management to get the timely, accurate and relevant data in operation and to help in decision making process.

To gain profit from this type of investment, the leasing department of the company needs a system to operate and effectively control the hire purchase. The project is to establish a computer based information system for leasing department in finance company. It provides information to the operational and management level. It provides a set of the daily process scheduling for other departments. It also improves the service level to the increasing number of customers in a more effective and efficient manner than the current one.

1.2 Objectives of the Project

The objective of this project is to improve the leasing department of S.P.K. Samudprakan Co., Ltd. by applying the leasing information management system to generate effective leasing information in order to accomplish the following goals:

- (1) To study and analyze the existing leasing information for S.P.K. Samudprakan Co., Ltd.
- (2) To enhance the effectiveness of leasing information system for S.P.K. Samudprakan Co., Ltd.
- (3) To analyze the problems and propose a solution to improve the current information system in terms of consistency, accuracy, timeliness, economy and relevance. .
- (4) To design and develop a new information system to incorporate the above solutions.

1.3 Scope of the Project

This project is mainly concerned with the leasing department that covers the following areas:

- (1) Creating a database of information system for leasing department to store, retrieve, and modify the customer data as well as their customer contract information. The system will be able to generate documents for both internal and external concerned such as management, users, accounting department, customers, insurance companies, etc.
- (2) Support information for leasing planning which leasing manager will select the available resources to calculate interest.
- (3) The system must be able to provide information in processing information to leasing department.
- (4) Support all statistical reports to managing director.
- (5) Improving the processing time with accurate information for leasing department.
- (6) To give accurate information for management to make a right decisions.

1.4 Deliverables

- (1) Project Introduction
 - (a) Background of the Project
 - (b) Objectives of the Project
 - (c) Scope of the Project
- (2) The Existing System Analysis
 - (a) Background of the Organization
 - (b) Existing System Function
 - (c) Current Problems and Recommended Areas for Improvement
 - (d) Analysis of the Existing System
 - (e) User Requirements
- (3) The Proposed System
 - (a) Candidate Solutions and Feasibility Analysis
 - (b) Data Modeling
 - (c) Process Modeling
 - (d) Cost/Benefit Analysis
- (4) System Design
 - (a) Database Design
 - (b) Structure Chart
 - (c) Input Design
 - (d) Output Design
 - (f) Process Specification
 - (g) Proposed System Configuration

- (5) Project Implementation
 - (a) Overview of Project Implementation
 - (b) The Conclusion Phase
 - (c) The Delivery Phase
- (6) Conclusions and Recommendations

1.5 Project Plan

This project plan of S.P.K. Samudprakan Co., Ltd.: Production Information Management System is given in Figure 1.1.



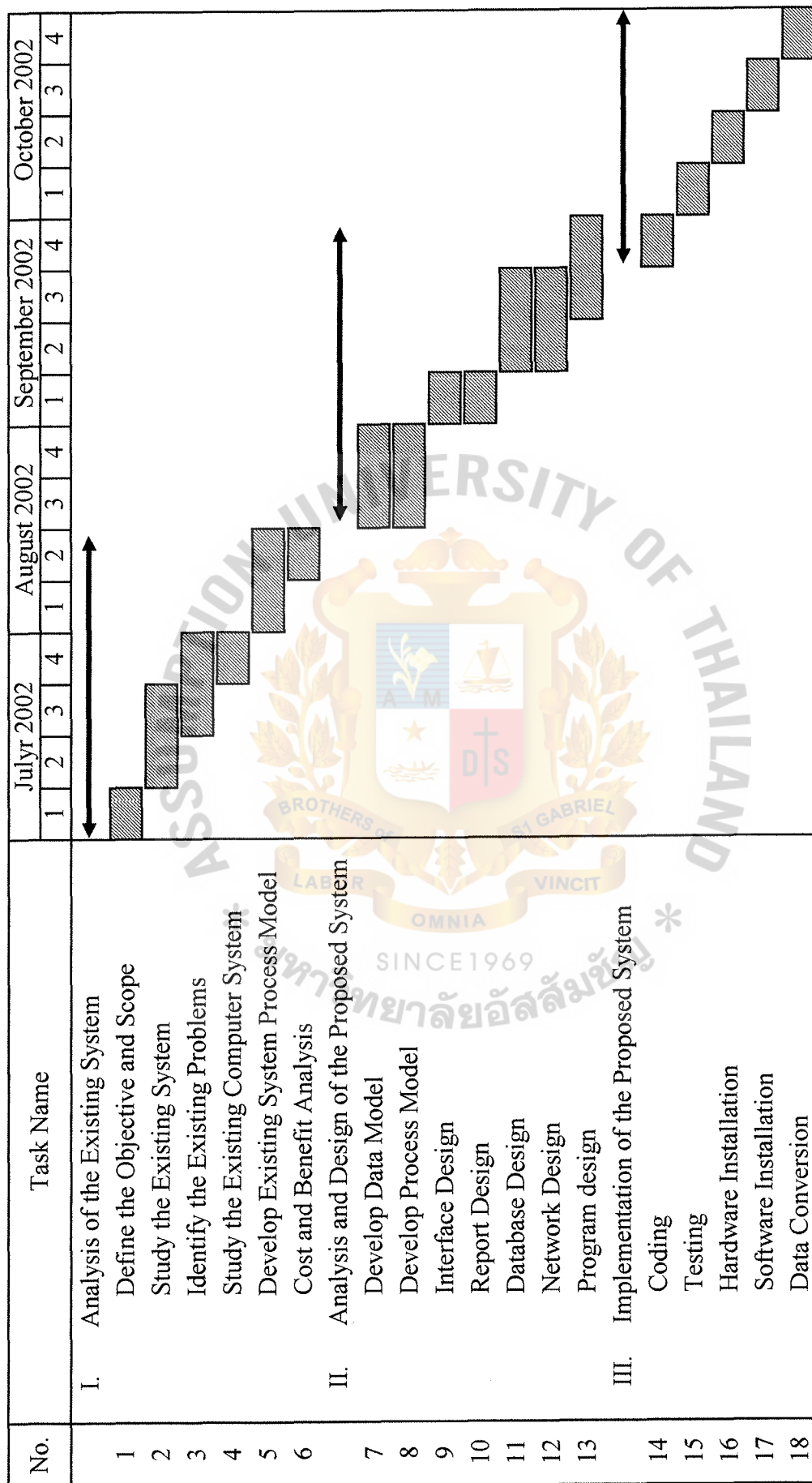


Figure 1.1. Project Plan of Leasing Information System.

II. THE EXISTING SYSTEM

2.1 Background of the Organization

S.P.K. Samudprakan Co., Ltd. was established in October 2001 with an initial registered capital of 4 million baths. Due to the resulting spurt in growth of its business lines, on February 2002, the company increased its capital to 10 million baths. And the company plans to expand its capital to 18 million baths in January 2003 to support the expansion of its business and customers

S.P.K. Samudprakan Co., Ltd. is a sub-company of M.C. Paknum Co., Ltd. which is a dealer of HONDA motorcycle for customers that was established in 1989. Nowadays, S.P.K. Samudprakan Co., Ltd. employs 14 workers

Location:

S.P.K. Samudprakan Co., Ltd., land stands on an area of 168 square meters of land in 95, Sayluad, Paknum, Muang District, Samudprakarn Province.

The Organization of S.P.K. Samudprakan Co., Ltd. consists of four main departments.

(1) Marketing Department

The department handles all orders from all customers that customers ordered through sales representative, telephone and fax.

(2) Personal Department

The department is responsible for all employee information of an organization such as payroll, recruiting and training.

(3) Leasing Department

The department is responsible for analysis and checking all customers information such as history of customer.

(4) Accounting and Finance Department

The department deals with all jobs such as making general accounting standard, budgeting, financial analysis and Financial Statements.

The organization chart will be shown in Figure 2.1.



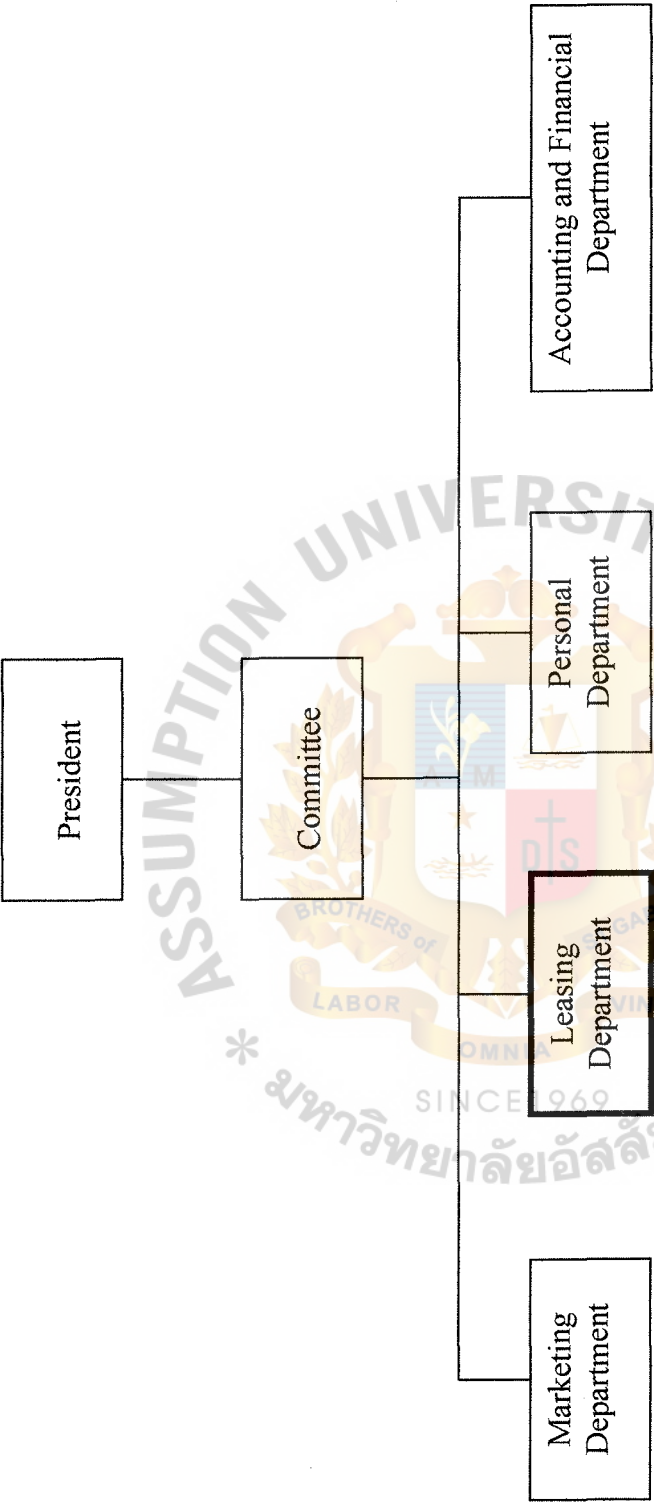


Figure 2.1 Organization Chart of the S.P.K. Samudprakan Co., Ltd.

2.2 Existing System Functions

The existing system is a manual system and sometime uses MS-word to prepare reports and documents.

The total picture of information flow among the leasing system and related components are shown in Figure 2.2. There are four external components; customer, marketing department, account/finance department and leasing department.

The existing system functions include:

- (1) Providing approve customer
- (2) Providing follow customer payment
- (3) Providing issue contract amount
- (4) Providing receive the installment and interest amount
- (5) Providing prepare reports

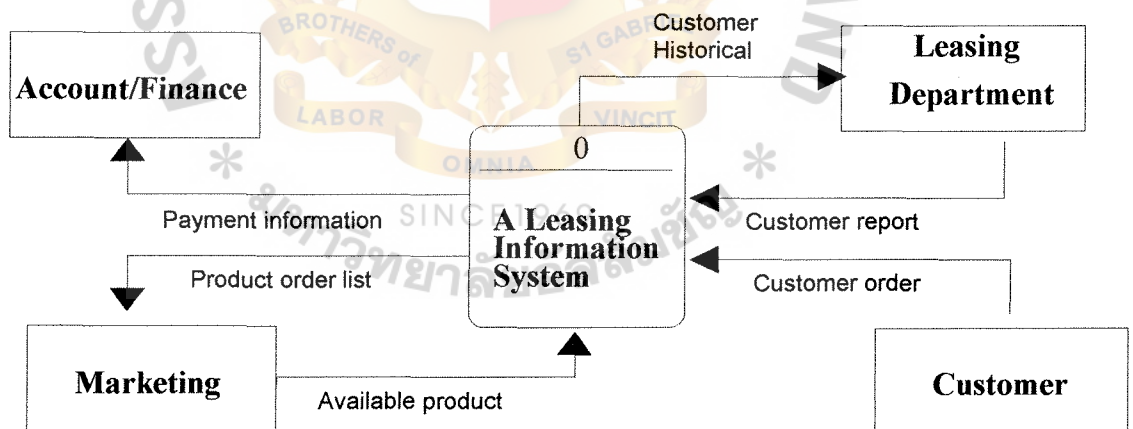


Figure 2.2 Context diagram of the existing system

2.3 Current Problems and Recommended Areas for Improvement

The current problems and areas of the existing system are as follows:

1. It is difficult to calculate installment value and interest amount.
2. Lost of control such as customers pay cheque to the collector who go out for collecting the debt. And then the collector will issue temporary receipts and send the cheque back to account/finance department. This has to use more time to pass documents and we cannot know that the cheque will really be honoured at the bank for company's account on the next day.
3. It has insufficient accurate information and no data security.
4. It is difficult to gather up-to-date information and to prepare over due notice.
5. It is more time consuming to prepare the up-to-date report such as preparing worksheet for realized income report manually.
6. It has to use more employees to work for a job that leads to more expenses and then result to decline in profit and resigning of employees due to work load.
7. Customers must wait too long time for services.
8. Some problems had occurred from external causes such as changes in government law, competitive factor within the leasing market.

2.4 Analysis of the Existing System

There are five processes for the existing system as shown in data flow diagram level 0 in figure 2.3

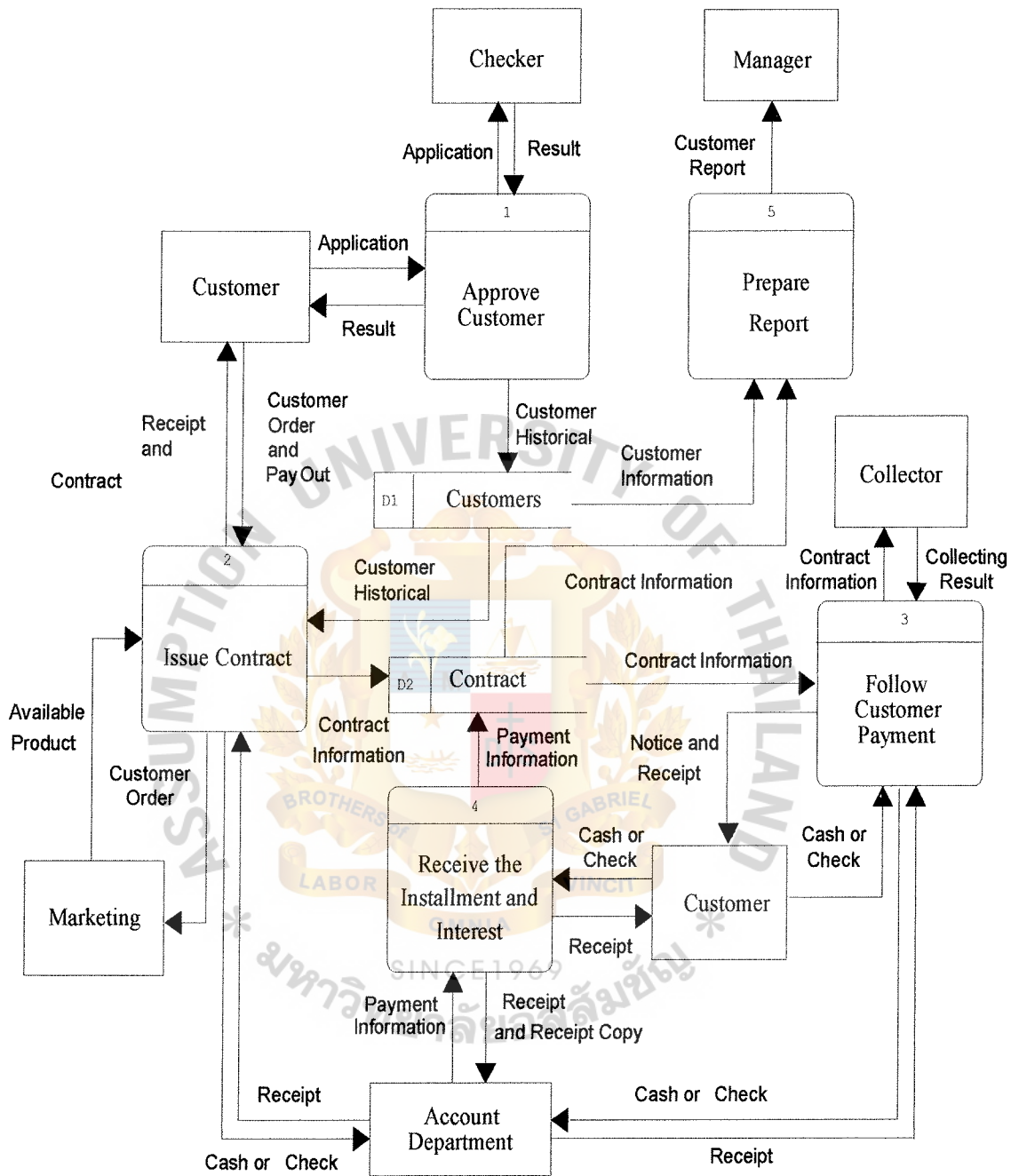


Figure 2.3. Data flow diagram of existing system.

Five processes of data flow diagram level 0 of the existing system are as follows:

Process 1.0 Approve customer

- (1) Analyze the application
- (2) Comment and send application to the manager to authorize
- (3) Inform customer (installment, interest rate, approve or reject)

Process 2.0 Issue contract

- (1) Collect customer payment

Process 3.0 Follow customer payment

- (1) Control and follow due processing
- (2) Send cash/cheque to account/finance department

Process 4.0 Receive the installment and interest amount

- (1) Receive the installment and interest amount

Process 5.0 Prepare report

- (1) Prepare MIS reports to leasing department
- (2) Prepare statement to customer

2.5 User Requirements

User requirements are derived from analyzing the existing system as follows:

2.5.1 Operational requirements

- (1) Add, edit customer information and motorcycle collateral
- (2) Automatic calculating installment and interest amount
- (3) Account receivable control
- (4) Account payable control
- (5) Input/Output tax control
- (6) Documentation control
- (7) Accounting file interface

2.5.2 Middle level requirements

- (1) Account receivable aging analysis
- (2) Income/expense amortizing
- (3) Lending performance
- (4) Collection performance

2.5.3 Top management requirements

- (1) Profit/loss analysis
- (2) Information inquiries



III. THE PROPOSED SYSTEM

3.1 Candidate Solutions and Feasibility Analysis

3.1.1 Define Candidate Solutions

It is very rare that a problem can be solved by a unique solution so the question of uniqueness obviously needs to be pointed out. Therefore, we will have to produce a set of different solutions, distinct (with similarities if required) to answer and satisfy the needs of the proposed system. Three candidate solutions are proposed below:

The First Candidate Solution

The first candidate solution is the most basic of the proposed solution. It is based on a Client/Server method of data processing to enable a good data sharing in the system. It is proposed to figure basic input devices such as keyboard and mouse and good quality output devices such as 17 inches terminals along with printer for high printout quality. The number of printers suggested is two units.

All programs (application software) will be purchased as already existing package software solution, for example Ms. Office suite. Using such reliable commercial software package can render (minimal) development without losing too much on quality. It is also true that less programming has to be involved and thus the solution can be implemented within a shorter interval of time.

Even if the application software is to be as described above, some software tools are to be needed anyway, and the choice here is to use Ms. Access for customization of package. This feature will provide a better report writing and integration.

All the application software will be running on the server featuring Ms. Windows 2000 and Ms. Windows 98 for the clients. They all will be Pentium CPU based chips.

The storage device, fairly satisfactory for the size of the system we wish to implement in this project, consists of a server with Ms. SQL DBMS with 200 GB arrayed capacity.

This candidate solution should cover the computerization of the production information processes system along with production order system and customer data.

The main benefit of this candidate solution number one is the fact that it is quite easy and fast to implement due to the use of commercial application software and the little need of programming. Another advantage resulting from that solution is that it will certainly be interesting in terms of investment (of course a further study of economic feasibility is needed to confirm that statement).

The Second Candidate Solution

This alternative solution is similar to the first solution proposed previously in some points and differs in some other. Like the first solution, it relies on a Client/Server method of data processing to preserve data sharing. It also uses keyboard and mouse as input devices.

The output devices are now changed to a single laser printer (HP) connected to all terminals (and server) through a simple LAN network figuring a basic BUS configuration since we do not have so many terminals and the probability of collision is quite small. This will necessitate the use of a HUB to manage the network. We will keep the same 17 inches terminal screens.

The application software used is again some already made package solution such as Ms. Office but we add here some web page designer packages such as Front-page 2000 and also E-mail management such as Ms. Outlook. The Software is proposed because we care in this solution of the future ability of the system to use the World Wide Web or Electronic mail to contact suppliers or customers.

The software tools needed will be eventually identical to the first proposed solution, that is to say Ms Visual C++ and Ms. Access for customization of package to provide report writing and integration with the addition of Visible Analyst v.7.5 and Internet Explorer 5 or Netscape Navigator 4.6 (or later) for Internet browsing capacities.

The Servers and Workstations choice is the same as the first candidate solution, that is, Ms Windows 2000 and Ms Windows 98 clients (all Pentium CPU based chips).

The storage devices keep a server with Ms. SQL server DBMS with 200 GB arrayed capability.

The portions of the system being computerized are the production information processes system along with production order system and customers order and data.

The benefits of this second proposed solution obviously include those of the first candidate solution but will feature supplementary benefits because it has the ability to support Internet connections for further growth and implementation of web pages for a better customer service or E-mail exchange with suppliers for faster orders or requests.

The Third Candidate Solution

This solution is the most complete of the three candidates proposed in this project. Like the previous two solutions, it relies on a Client/Server method of data processing to preserve data sharing. It also uses keyboard and mouse as input devices.

The output devices are three Laser quality printers (HP) and Dot Matrix printer on a Bus LAN topology along with 17 inches terminal screens.

The application software will be a custom solution, a web designer software package (Ms. Front-page 2000) and E-mail management software (Ms. Outlook).

Software tools needed are Ms Visual Basic 6.0, Visible Analyst v7.5, Internet Explorer 5 or Netscape Navigator 4.6 or higher with the addition of Crystal Report developer edition v.8.50 report editing tools.

The servers and workstations are again identical to the two previous solutions: Ms. Windows 2000 and Ms. Windows 98 clients with Pentium CPU based chips.

The storage device is still Ms SQL Server Database Management System with 200 GB arrayed capability as candidates one and two.

The portion of the system to be computerized is the production information processes system along with production order system and customer orders and suppliers data.

The benefits of that solution are therefore multiple and include a better design of the proposed system through custom programming applications and features development of the system through better network communication capability such as the Internet and E-mail and finally a better report and data analysis tool using data for ad-hoc operations as well as decision making.

Table 3.1 shows a summary of the three solutions described previously. This table is called the “Candidate Matrix”.

Table 3.1. Candidate Solutions Matrix.

Characteristics	Candidate 1	Candidate 2	Candidate 3
Portion of system computerized	Production information processes system, production order system and customer data	Production information processes system, production order system and customers order and data	Same as candidate 2 and more efficient report editing and ad-hoc queries.
Benefits	Since the packages used are all purchased, it can be implemented within a short period of time. Programming involved will be minimal and thus reduce complexity and cost.	Same as candidate 1 plus ability to support internet connection for further implementation of Web pages or E-mail exchange with suppliers and customer.	Fully support the business requirements and scope of the proposed system and also features of further development of network capabilities like Web browsing and E-mail
Servers and Workstations	Ms. Windows 2000 professional and Ms. Windows 98 Clients.	Same as candidate 1.	Same as candidate 1.
Software Tools Needed	Ms. Access for customization of package to provide report writing and integration. Visible Analyst v7.5.	Ms. Access and Ms. Visual C++ for customization of packages, Visible Analyst v.7.5. and Internet Explorer v.5 or higher (or Netscape Navigator).	Ms. Visual Basic 6.0, Visible Analyst v.7.5, Internet Explorer v.5 or higher (or Netscape Navigator) and Crystal Report v.8.50.
Application Software	Package solution such as Ms. Office Suite.	Package solution (Ms. Office). E-mail management Software package.	Custom solution (based on proposed commercial products). E-mail management application.
Method of Data Processing	Client/Server	Same as candidate 1.	Same as candidate 1.
Output Devices and Implications	(2) HP Laser printer and 17 inches SVGA terminal screen.	Single HP Laser printer on and intranet LAN network.	(3) HP Laser printer and Dot Matrix printer on and intranet LAN network.
Input Devices and Implications	Keyboard and Mouse.	Same as candidate 1.	Same as candidate 1.
Storage Devices and Implications	Ms. SQL Server 7 with 200 GB arrayed capability.	Same as candidate 1.	Same as candidate 1.
Processes and Data Distribution	SYS LINK 10/100Mbps SURECOM HUB 16 ports 10/100 SW	Same as candidate 1.	Same as candidate 1.

3.1.2 Analyze Feasibility of Alternative Solutions

Giving some candidate solutions could seem enough for a simple system or even more complicated. But what about the choice we shall make? What about the best choice that suits our organization?

To answer those questions, let's study the feasibility of each proposed solutions.

The feasibility aspects considered for this project will cover four areas in accordance with the system owner and the system analyst:

- (1) Operational feasibility to describe to what degree will be the candidate solutions to benefit the organization.
- (2) Technical feasibility to describe the maturity, availability and desirability of the computer technology needed to support the candidate solution.
- (3) Economic feasibility to help weigh the cost and benefit of each alternative candidate through the analysis of the Payback Period, Net Present Value or Return on investment.
- (4) Schedule feasibility to estimate how long the candidate solution will take to design.

According to size of the organization, its everyday transactions and the fact that the existing system has been running on an entire manual system, the weight attributed to the operation feasibility is set to be 30%, the weight attributed to technical feasibility is set to 25%, the weight attributed to economic feasibility is set to 40% and finally the weight for schedule feasibility will be 5%.

The summary of that study is shown in Table 3.2 and is called the "Feasibility Matrix" table.

Table 3.2. Feasibility Matrix of Candidate Solutions.

Feasibility Criteria	Weight	Candidate 1	Candidate 2	Candidate 3
Operational Feasibility Functionality:		This solution Partially supports the requirements of the business and the different processes involved in every day transactions.	This solution will fully support the business requirements since it includes all advantages of candidate 1 plus the ability to manage the order form customer.	Same as candidate 2. plus more efficient tool for ad-hoc query.
Political:	30%	The organization will definitely take benefit of the implementation and users will also get easier working conditions. Score: 80	Score: 90	Score: 95
Technical Feasibility Technology:		Technology involved is currently well known and quite simple to implement.	Same as candidate 1 and Case Tool users are reasonably easy to find.	Same as candidate 2.
Expertise:	25%	Need to hire some VBA experts for possible modifications requirements.	Need to hire some C++ experts for possible modifications requirements.	Ms. Visual Basic experts seem to be easier to find than C++ experts and is a mature technology. Score: 90
Economic Feasibility Cost to develop: Payback Period: Net Present Value: Detail Calculations:	40%	521,000 Baht 1 Year 5 Months 3,084,461.95 Baht See Cost/Benefit Analysis Score: 95	556,000 Baht 1 Year 11 Months 3,049,461.95 Baht See Cost/Benefit Analysis Score: 90	596,000 Baht 2 Years 3,009,461.95 Baht See Cost/Benefit Analysis Score: 85
Schedule Feasibility:	5%	Less than 3 months Score: 90	Approximately 6 months Score: 75	Approximately 5 months Score: 80
Ranking:	100%	86.5	85.5	89

Remarks: the details of the calculation performed for the economic feasibility (Existing system cost, Development Cost, Payback Period and Net Present value) have been done using Microsoft Excel and are shown (for each candidate solution) later in this paper.

3.1.3 Choice of the Solution

After the feasibility study has been done, recommending a solution is obviously rendered easier and also definitely more justified. From the ranking of the feasibility matrix, we can decide and consider that the candidate solution 3 is the best choice.

Each candidate solution will be stored in the data repository and the candidate 3 will then have to be presented to the steering committee for further proposal.

3.2 Data Modeling

All the diagrams shown in this paper are realized using a CASE tool software called “Visible Analyst” version 7.5.

3.2.1 Context Data Model

The first data model will consist of the simplest one called the context model and will represent only the entities and their relationships. The entities chosen for the system are the entities:

- | | |
|---------------------------|--|
| (1) Customer: | The entity refers to the customer of S.P.K.
Samudprakan Co., Ltd. |
| (2) Card: | Card that customer use to be a reference |
| (3) Motorcycle: | The entity refers to the product itself. |
| (4) Registering_Province: | Province of register book that customer registering |
| (5) Staff: | Staff of S.P.K. Samudprakan Co., Ltd. who has a
duty to make and control the contract |

- (6) Contract: Contract that customer make with S.P.K.
Samudprakan Co., Ltd.
- (7) Receive_Instalment: Receiving of instalment in leasing processing.
- (8) Contract_Customer: This table record customer status in the contract.

The corresponding diagram representing the context data model is shown in Figure 3.1.

3.2.2 Key-Based Data Model

The next data modeling is the elaboration of the Key-Based Entity Relationship Diagram by identifying keys (primary keys, foreign keys and alternate keys) of each entity type. The diagram is shown in Figure 3.2.

3.2.3 Fully Attributed Data Model

The next and last step is the elaboration of the fully attributed data model by:

- (1) Identifying the remaining data attributes.
- (2) Updating the key-based ERD with those new attributes.

The diagram is shown in Figure 3.3. The repository (Data Dictionary) is also attached (in the Appendix F) for better reference and information about data types, entity types and relationships.

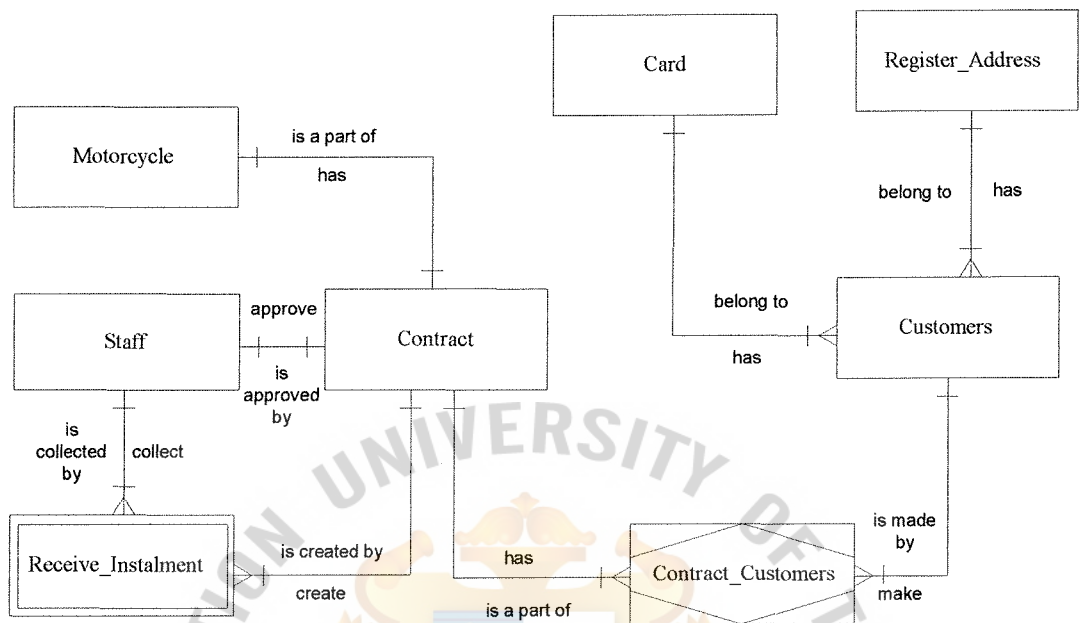


Figure 3.1. Context Data Model of the Propose System.

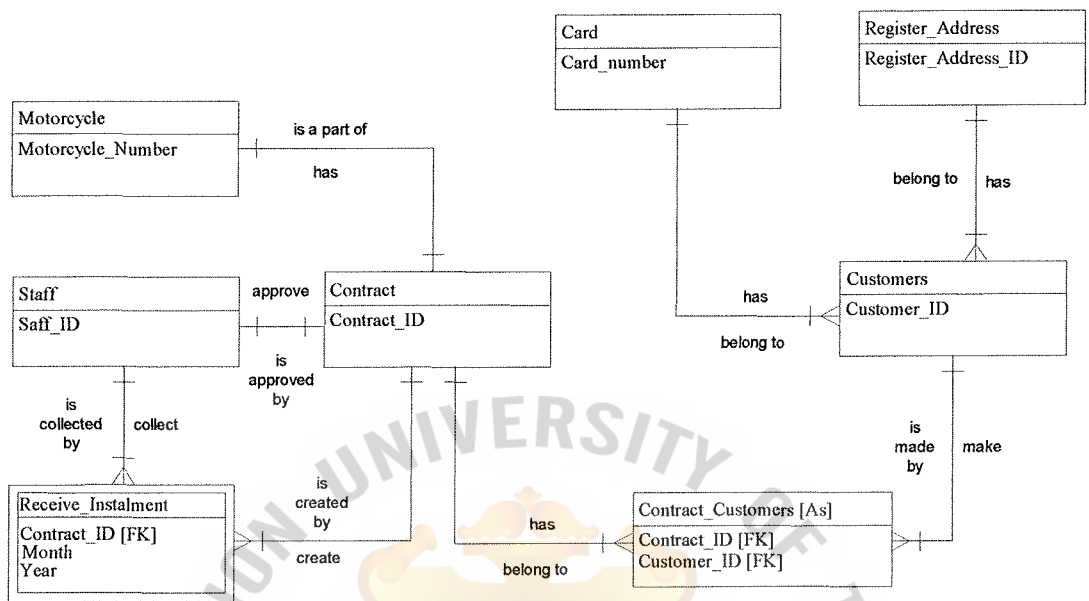


Figure 3.2. Key-Base Data Model of the Propose System.

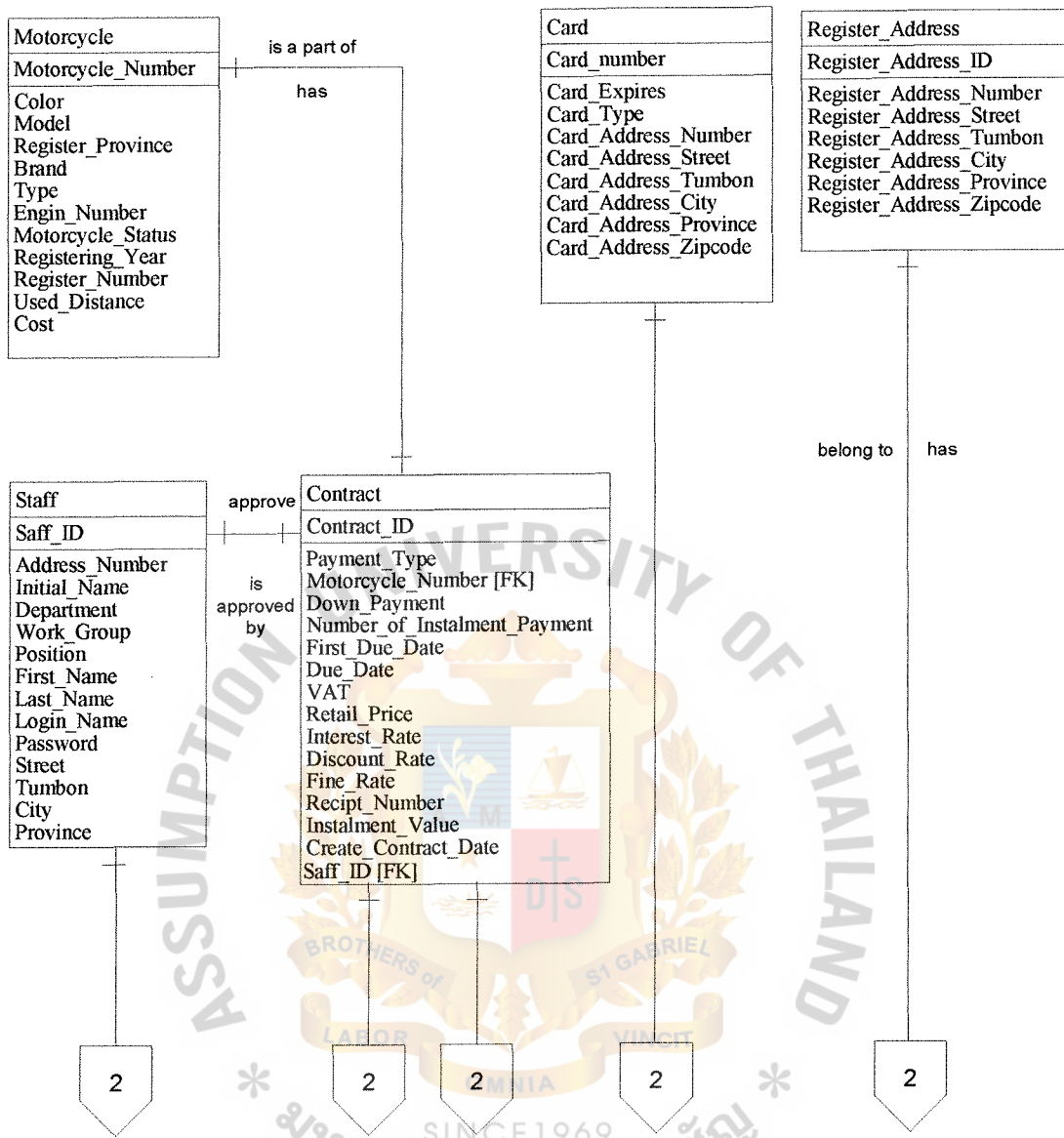


Figure 3.3. Fully Attributed Data Model of the Propose System.

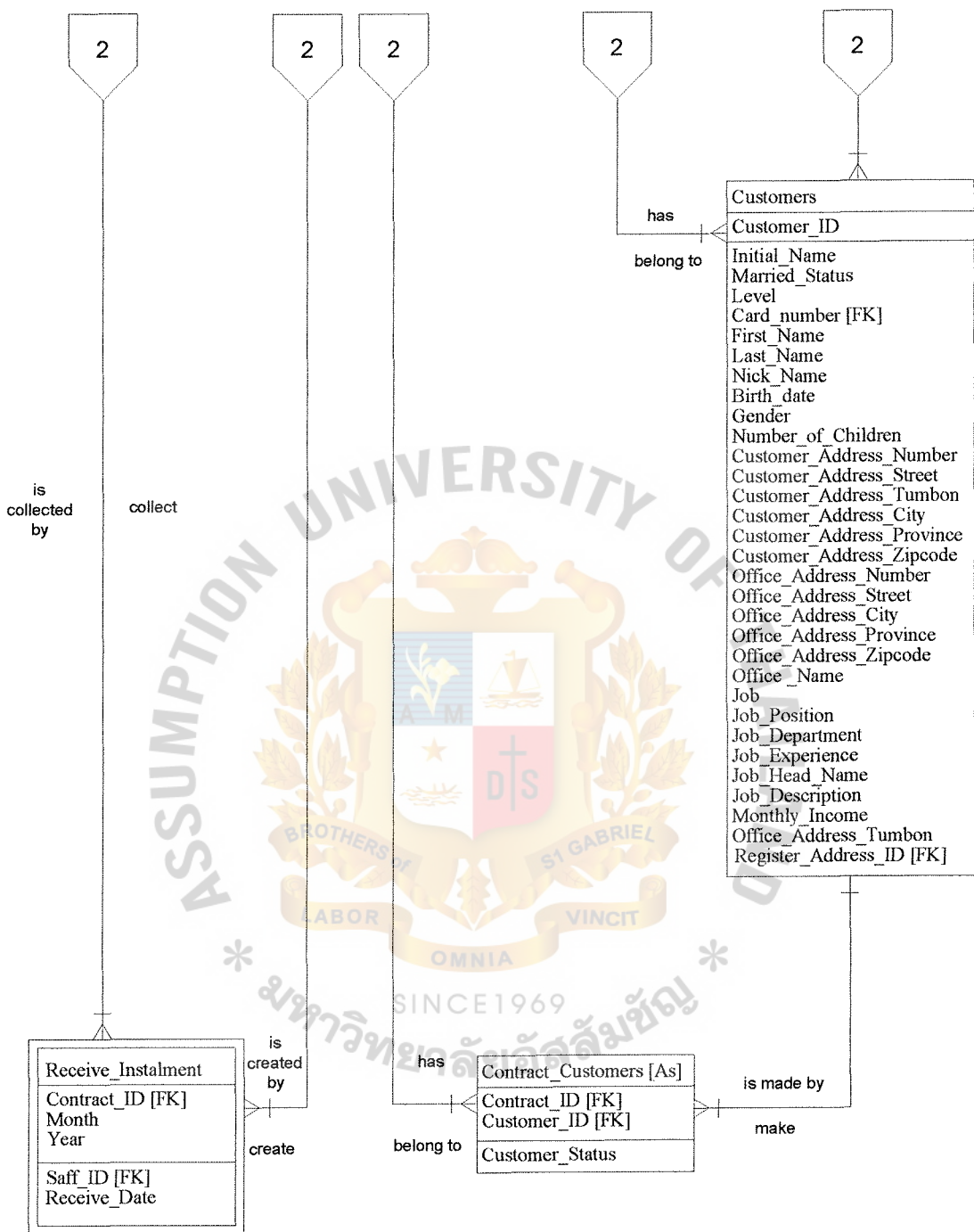


Figure 3.4. Fully Attributed Data Model of the Propose System (Continued).

3.3 Process Modeling

In the previous section, the data modeling has been performed and is concerned with data independently from how that data are captured and used, often referred as “data at rest”. This section will proceed into one more step of the system analysis and will emphasize on the process-modeling phase by showing how the data will be captured and used, often referred to as “data in motion”.

3.3.1 Context Diagram

The context diagram is constructed to establish the initial project's scope. It shows the system as a whole in correlation with its environment defined as the external entities involved. It is shown in Figure 3.4.

3.3.2 Function Decomposition Diagram

The functional decomposition diagram (FDD) is constructed from the organization functional areas of the system and will emphasize the decomposition of the whole system into sub-systems or sub-functions till reaching primitive events. It is obvious that the choice of this decomposition (and therefore the selection of the sub functions) is up to the discretion of the system analyst and is not unique for a given project. It is probable that the FDD has to be changed after more checking and discussion (through Joined Application Development JAD) during system design. This functional decomposition diagram is depicted in Figure 3.5.

3.3.3 Data Flow Diagrams

The functional decomposition diagram is used to draw the higher-level data flow diagrams are drawn and map the sub-systems, sub-functions and primitive events. They are shown in Figure 3.6. to Figure 3.14.

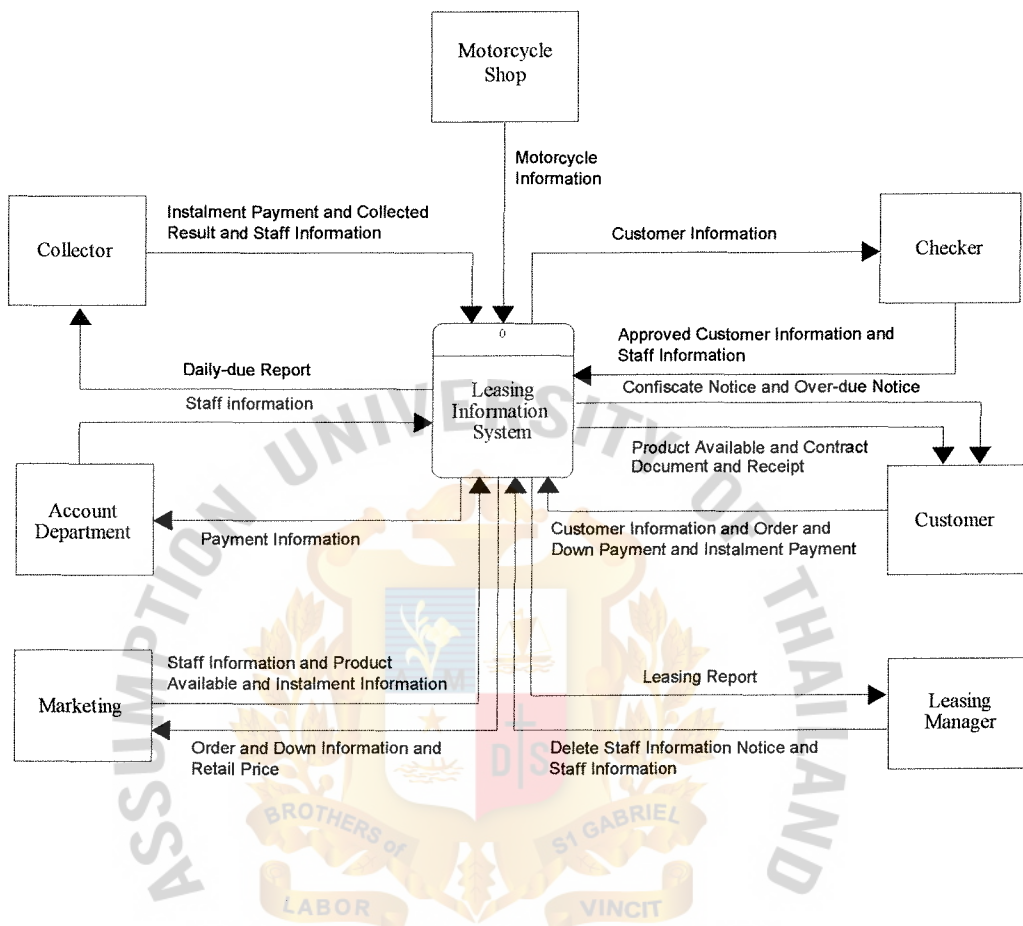


Figure 3.5. Context Diagram of Leasing Information System.

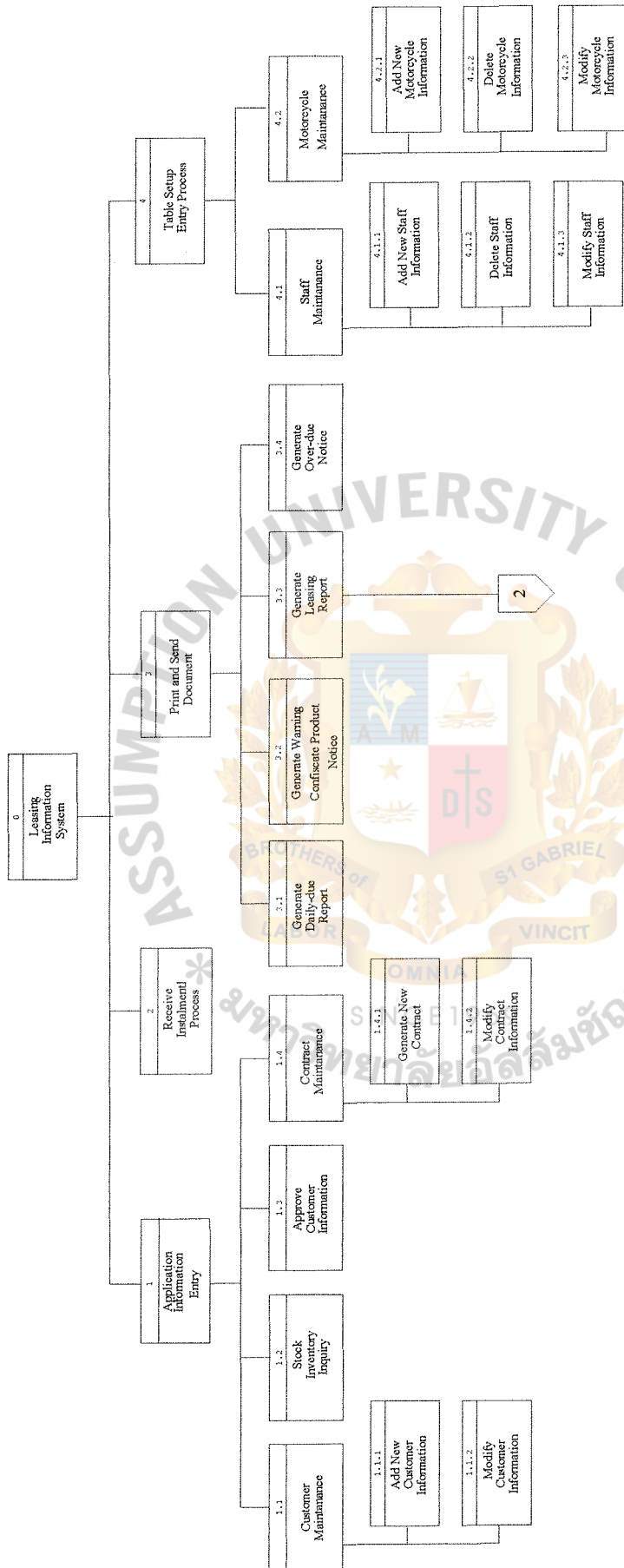


Figure 3.6. Decomposition Diagram of the Propose System.

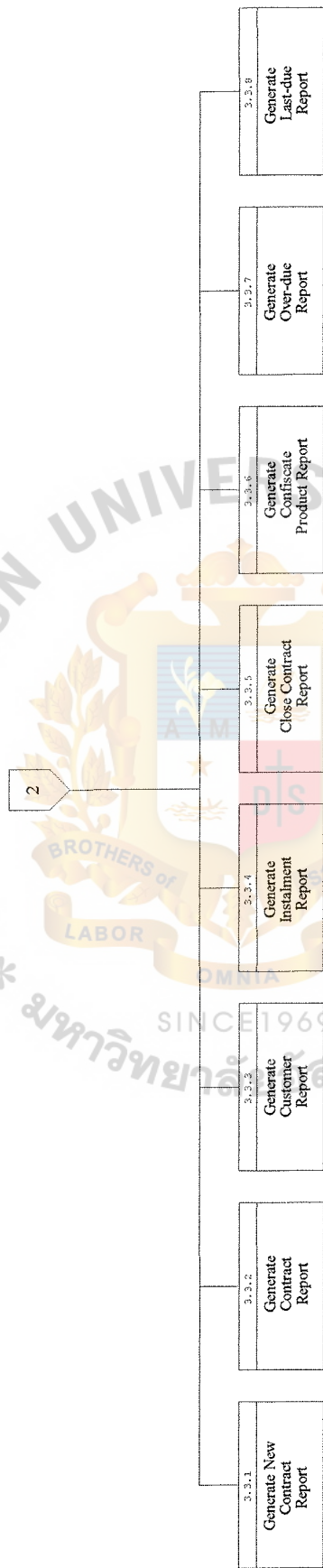


Figure 3.7. Decomposition Diagram of the Propose System (Continued).

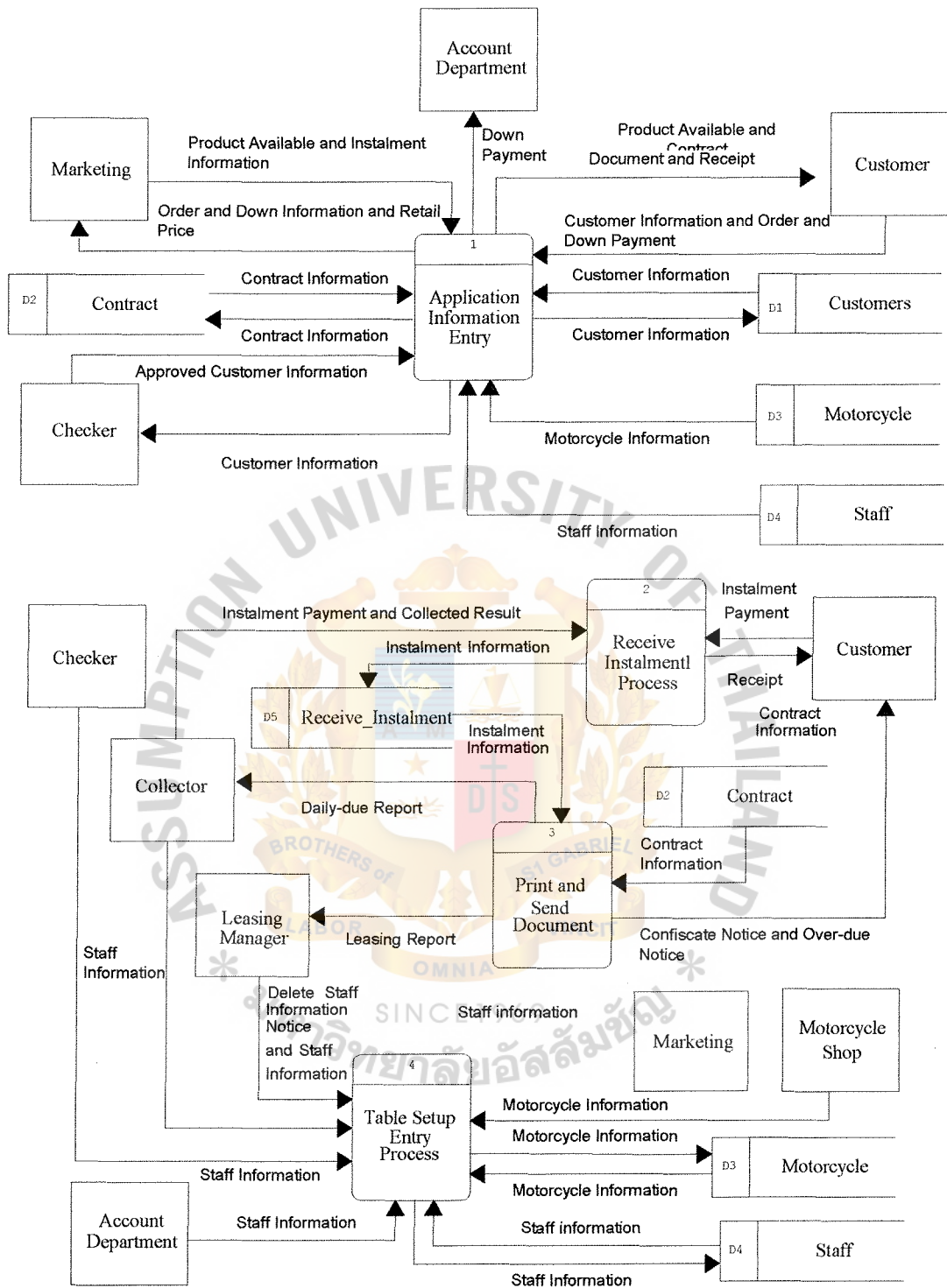


Figure 3.8. Level 0 Data Flow Diagram of Leasing Information System.

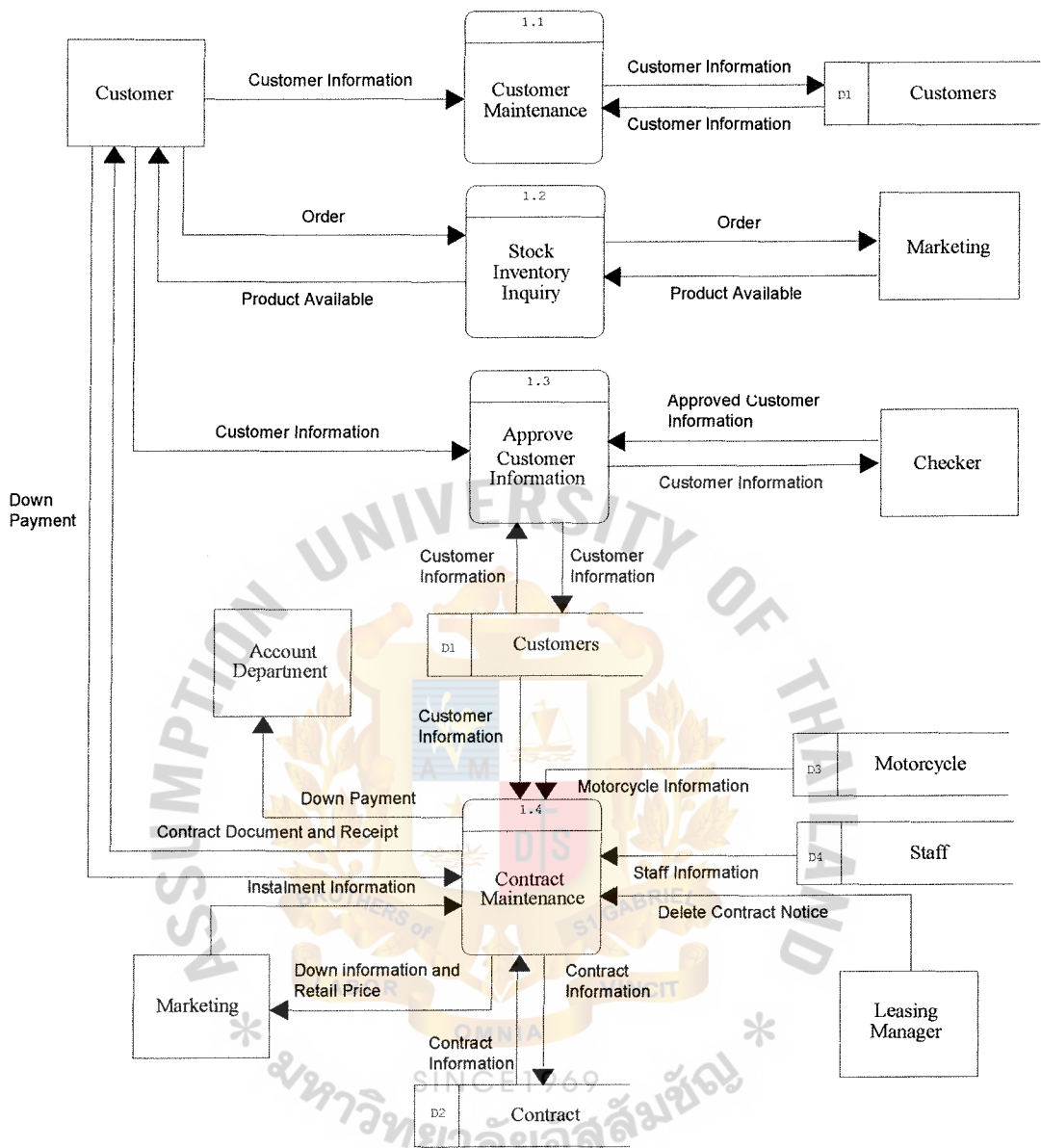


Figure 3.9. Level 1 Data Flow Diagram of Application Information Entry.

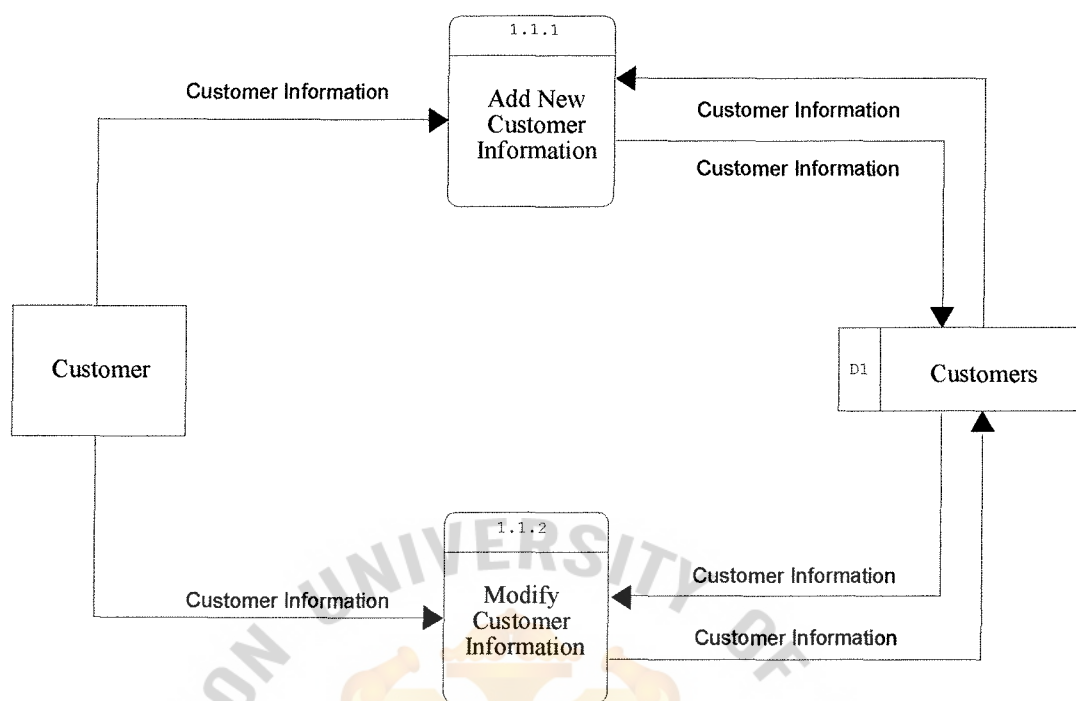


Figure 3.10. Level 2 Data Flow Diagram of Customer Maintenance.

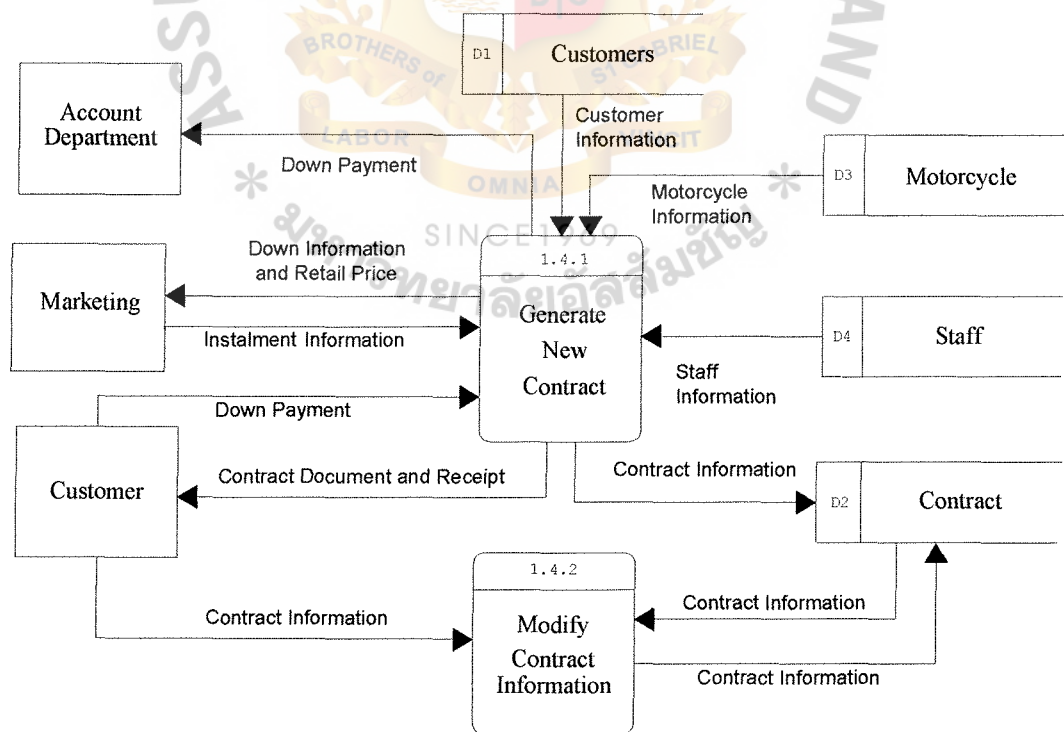


Figure 3.11. Level 2 Data Flow Diagram of Contract Maintenance.

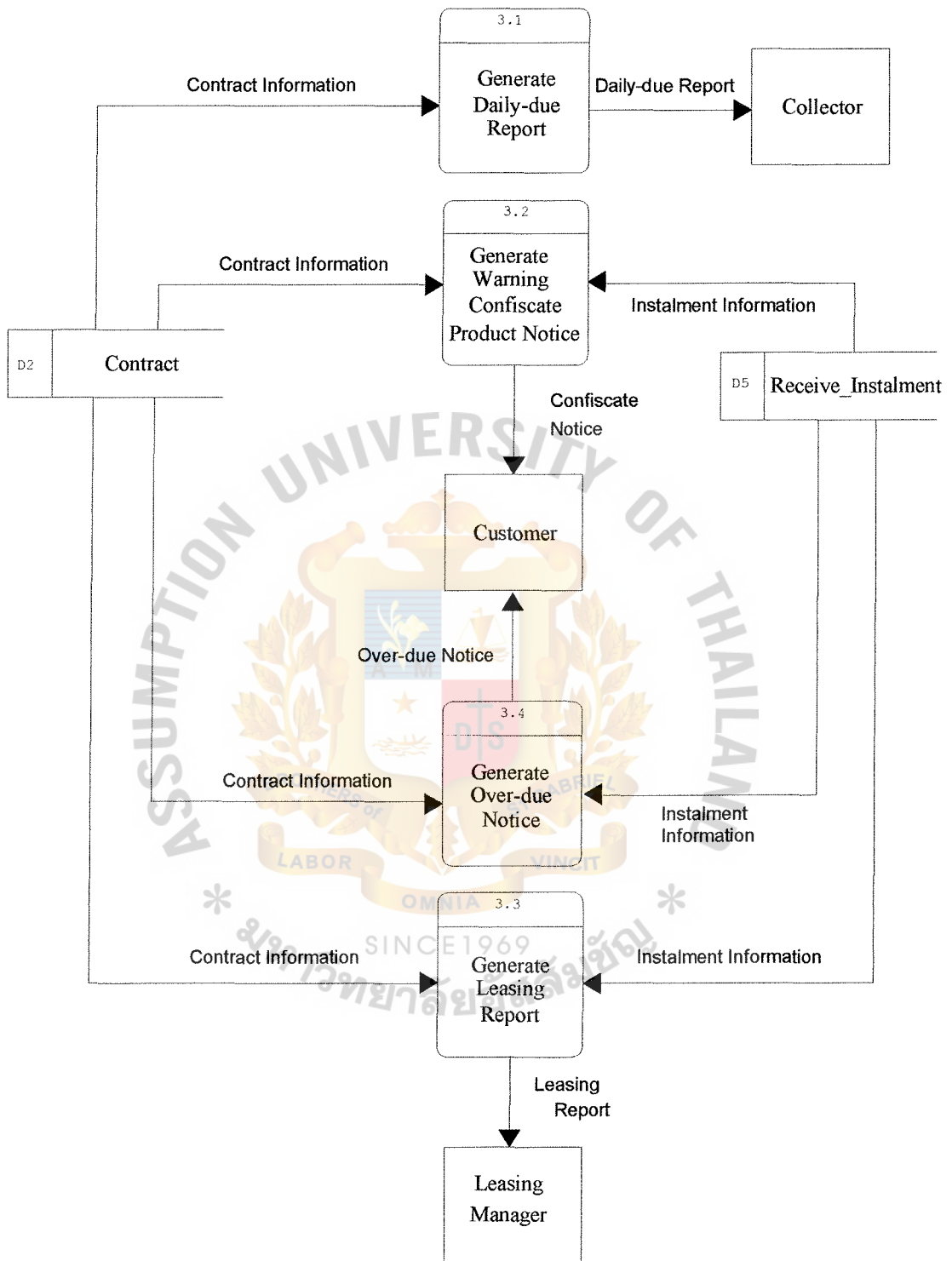


Figure 3.12. Level 1 Data Flow Diagram of Print and Send Document.

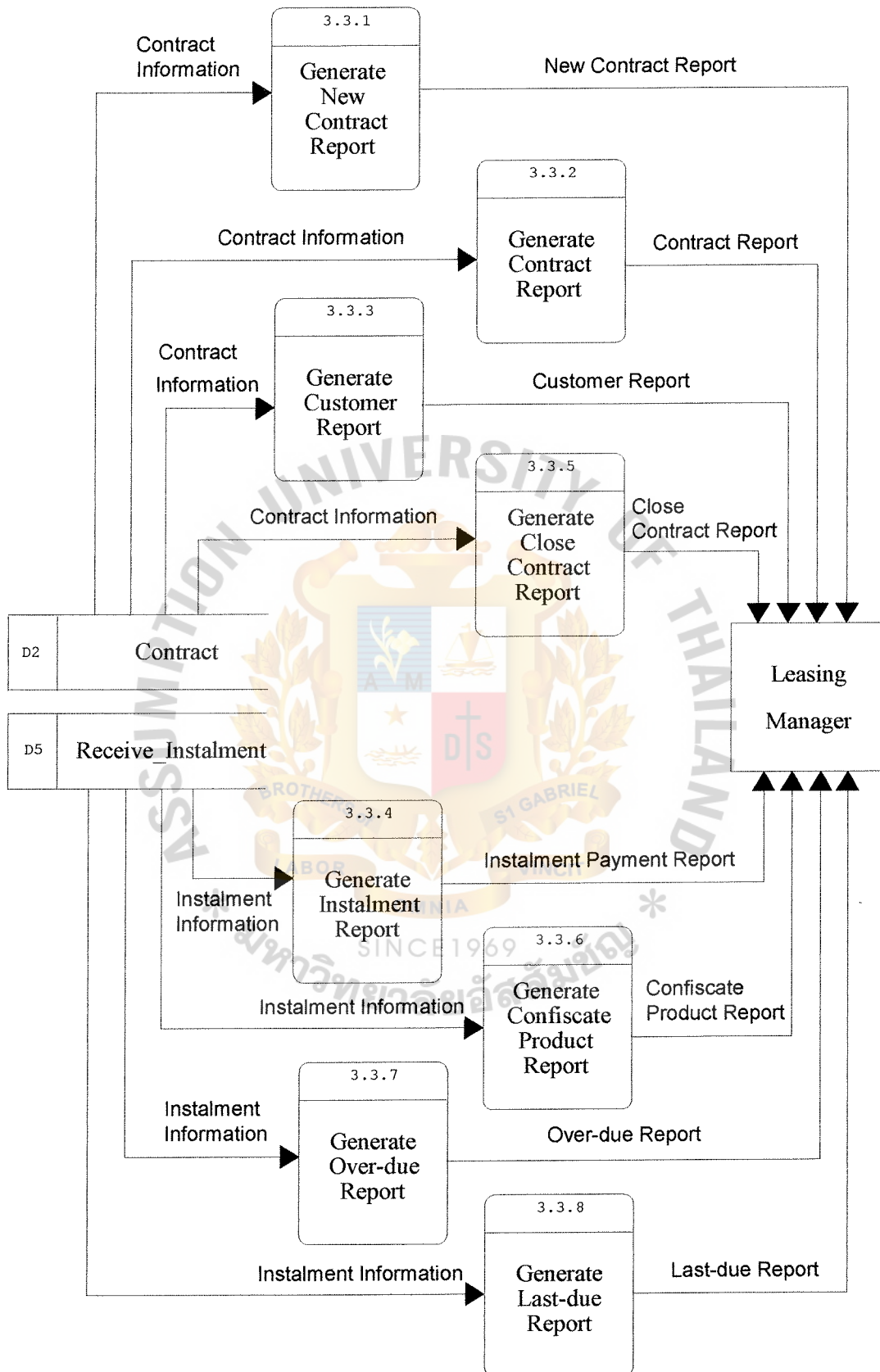


Figure 3.13. Level 2 Data Flow Diagram of Generate Leasing Report.

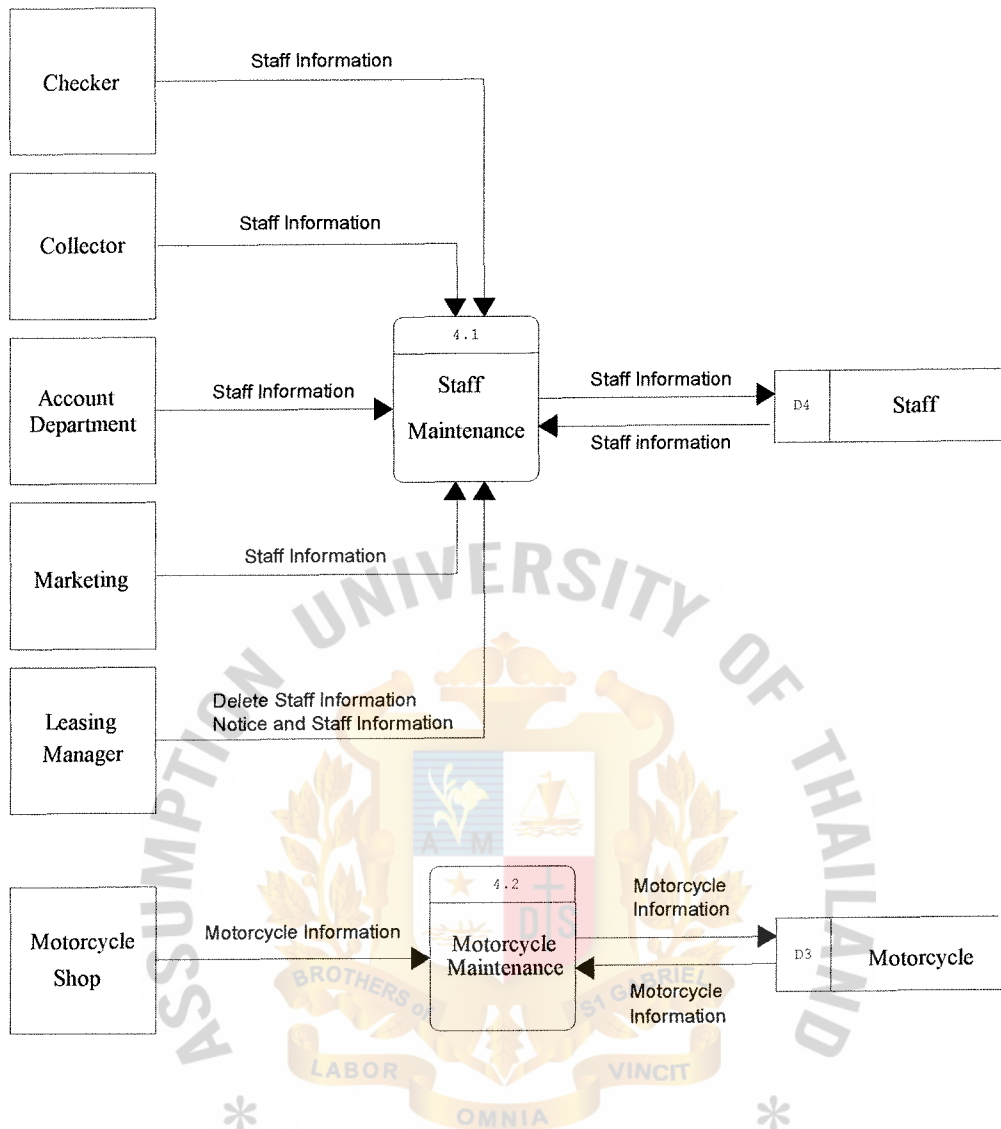


Figure 3.14. Level 1 Data Flow Diagram of Table Setup Entry Process.

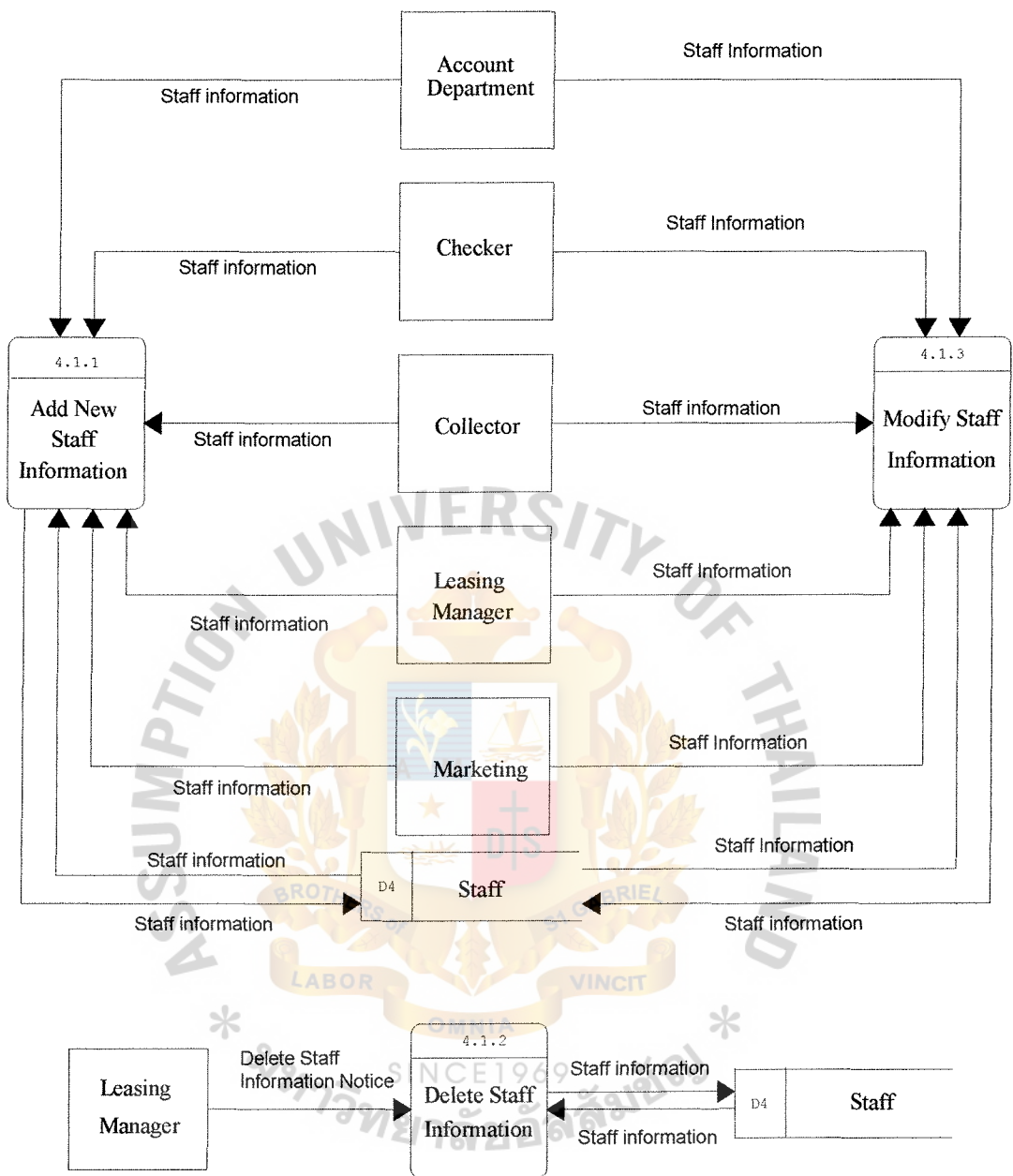


Figure 3.15. Level 2 Data Flow Diagram of Staff Maintenance.

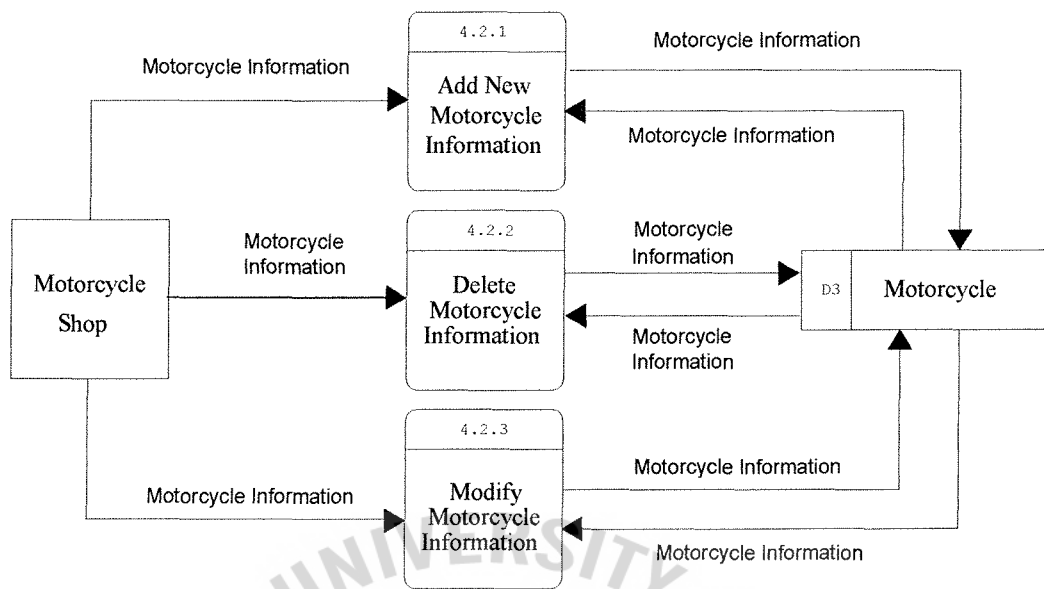


Figure 3.16. Level 2 Data Flow Diagram of Motorcycle Maintenance.

3.4 System Design

The actual development of a system is simplified if a thorough system analysis has been performed. System design is defined as the tasks that focus on the specification of a detailed computer-based solution. System design focuses on the technical or implementation concerns of the leasing information system.

The identification of input data will lead to clerical specifications and the designing of forms for this purpose. A database or procedural process leading to storage is required. Normally, the change in input required to produce a desired output will lead to the construction of a database and a determination of the size of the database. A clear statement of the flow and computational evaluations that information must undergo will not only enhance the programming of the system, but will also lead to the selection of requisite equipment required to satisfy the system design. The largest single activity in the design of a leasing information system is usually in program development. A logical flow and control is designed to ensure a proper input and output from the system. Next is the system interface design. The output, input and user interface or dialogue is what the end-user work with; so it is designed based on the opinion regarding an easy-to-learn and easy-to-use interface for the proposed leasing system.

(a) Database Design

One of the system design tasks is to develop the corresponding database design specifications. Database is the shared resource and a collection of interrelated files. The purpose of this task is to prepare technical design specifications for a database that is adaptable to future requirements and expansion. Database design is the process of translating logical data model, which is the entity relationship diagram (ERD) into physical database schema. Data analysis and normalization are the

techniques for removing impurities from a data model as a preface to designing the database. These impurities can make the database unreliable, inflexible and non-scalable. In this paper, the designed database will be constructed up to the third normal form (3NF) by normalizing at the ERD level. The three-steps of normalization are processed as follows:

- (1) An entity is in first normal form (1NF) if it contains no repeating attributes. (that is, attributes that can have more than one value of a single instance of the entity).
- (2) An entity is in second normal form (2NF) if it contains no partial dependencies (that is, non-key attribute whose value is dependent only on part of the entity's primary key).
- (3) An entity is in third normal form if it contains no derived attributes (that is, calculated or logic-based attributes) or no transitive dependencies (that is, a non-key attribute whose value is dependent on another non-key attribute).

A database schema is the physical model for a database based on the chosen database technology. The rules for transforming a logical data model into a physical database schema are as follows:

- (1) Each entity becomes a table.
- (2) Each attribute becomes a field (column in the table).
- (3) Each primary and secondary key becomes an index into the table.
- (4) Each foreign key implements a possible relationship between instances to the table.

The entity relationship diagram (ERD) in a fully attributed data model that has already been depicted in Figure 3.3. The physical database schema and file layout is shown in Appendix A.

(b) Structured Design

The structured design deals with the size and complexity of a program by breaking up the leasing program into a hierarchy of modules that result in a computer program that is easier to implement and maintain. The primary tool used in structured design is the structure chart. Structure charts are used to graphically depict a modular design of a program. Specially, they show how the program has been partitioned into smaller more manageable modules, the hierarchy and organization of those modules, and the communication interfaces between modules. Structure charts, however do not show the internal procedures performed by the module or internal data used by the module. Appendix B depicts the structure chart for leasing information system program.

(c) User Interface Design

For user interface or dialogue design, the design considered such factors as terminal familiarity, possible errors and misunderstandings that the end-user may have or may encounter, the need for additional instructions or help at the certain points, and screen content and layout. We integrate output and input design into an overall user interface that establishes the dialogue between user and computer. The dialogue determines everything from starting the system or logging into the system, to setting options and preferences, to getting help. And the presentation of the outputs and inputs is also part of the interface. Most of today's user

interfaces are graphical. Recall the basic structure of the graphical user interface (GUI) is provided within the computer operating system. In client/server information systems, the user interface clients is implemented to execute within the PC operating system.

(d) Input Design

For inputs, it is crucial to design the data capture method to be used. The input can be classified according to two characteristics: (1) how the data is initially captured, entered and processed and (2) the method and technology used to capture and enter the data. Most new applications developed uses Graphical User Interfaces (GUI). Inputs are as simple as possible and designed to reduce the possibility of incorrect data being entered. Input controls are also defined to ensure that the data input to the computer is accurate and the leasing information system is protected against accidental and intentional errors and abuse, including fraud. The key points regarding the input design includes the following:

- (1) Data capture is the identification and acquisition of new data to be input.
- (2) A source document is a paper form used to record data that will eventually be input to a computer.
- (1) Data entry is the process of translating the source document into a machine-readable format.
- (2) Data input is the actual entry of data in a machine-readable format into the computer.

The example of input design for the leasing information system is displayed in Appendix C.

(e) Output Design

Transaction outputs is designed as preprinted forms onto which transaction details are printed. Reports and other outputs are usually printed directly onto paper or displayed on the terminal screen. The precise format and layout of the outputs is specified. Finally, internal controls are specified to ensure that the outputs are not lost, misrouted, misused, or incomplete. Moreover, outputs produced by the leasing information system present information to the users, managers, stakeholders, system auditor, etc. and are designed as such a visible component of the system. For the leasing information system, outputs are classified as follows:

- (1) Internal outputs are intended for the staffs, manager and owner, etc. within the company. There are three sub-classes of internal outputs, which are detailed reports, summary reports and exception reports.
- (2) External outputs leave the company. External outputs are confiscate and over-due notice for customers.
- (3) Screen outputs allow reports to be presented in graphical formats. Screen outputs require information on demand and printed out options are added to screen output designs.

Again, most new applications developed use Graphical User Interface (GUI) and outputs are designed as clear and readable as possible and reduce the possibility of misunderstanding or lack on information. The following general principles are important for output design:

- (1) The outputs should be simple to read and interpret.
- (2) The timing of outputs is important.

- (3) The distribution of outputs must be sufficient to assist in all relevant system users.
- (4) The outputs must be acceptable to the system users who will receive and have to operate with them.

The example of output design for the leasing information system is displayed in Appendix D.

3.5 Hardware and Software Requirement

The next concern for the proposed leasing information system is the hardware and software specification to support the new leasing system. Both the hardware and software specification has to be provided based on the budget of the project. The network configuration will change into the Local Area Network (LAN) on the basis of client/server architecture. The computer hardware and other devices are the high powerful specification and compatible for the future technology. The leasing software or program is operating on Windows operating system. The hardware requirement, hardware configuration of the proposed system and software requirement will be shown as follows:

- (a) Hardware Requirement

- (1) Computer Server

- (a) CPU Pentium IV 1.5 GHz
 - (b) Memory 512 MB SDRAM
 - (c) Hard Disk (7200/100) 60 GB
 - (d) 50X Speed CD-ROM
 - (e) Floppy Disk 1.44 MB
 - (f) Integrated Super VGA Graphic Controller
 - (g) 15" Super VGA Color Monitor

- (h) Mouse and Keyboard
- (2) Workstation
 - (a) CPU Pentium III 866 MHz
 - (b) Memory 256 MB SDRAM
 - (c) Hard Disk (7200/100) 10 GB
 - (d) Floppy Disk 1.44 MB
 - (e) SVGA Controller
 - (f) 15" Super VGA Color Monitor
 - (g) Mouse and Keyboard
- (3) Printer
 - (a) Dot Matrix Printer
 - (b) Laser Printer
- (4) Uninterrupted Power Supply (UPS)
 - (a) 1000 VA/280 Watts
 - (b) Back up time 60 minutes at full load
- (5) Hub, LAN-CARD and UTP Line
- (b) Software Requirement
 - (1) Network Operating System
 - (a) Microsoft Windows NT Server for computer server
 - (2) Operating System
 - (a) Microsoft Windows 2000 for each workstation
 - (3) Microsoft Office 2000
 - (4) Microsoft Visual Basic 6.0
 - (5) MS SQL Server for Database Management System

- (1) The verification for user authorization by entering user identification number or user-id and password is required before accessing to the leasing system.
 - (2) The back up and recovery is provided to prevent the loss of data and data damaged from unexpected situation.
 - (3) Verification and validation checking for input data is required.
 - (4) The correctness and timeliness checking for input data is required.
The system should make sure that data is inputted correctly and on time.
 - (5) No direct update is allowed. The user can not update program or change data directly.
 - (6) When operation or program has the error, processing control must be able to tell and correct the error.
 - (7) The retention for output must be set, the system has to be set the time for keeping the contract information or document in the company.
 - (8) When output report has error, the system must be able to tell how to deal with the error.
 - (9) The output report must be checked and signed by leasing staff.
- (b) System Security and Control
- (1) Audit control for system is required. The leasing system should have the features of an audit trail. It means there is a record of a transaction or an event so that the management can tell who performs an activity, when it occurs and what result is produced.
 - (2) The database system is necessary to enforce the security restrictions such as the data will be modified only by the authorized user.

- (3) Database is designed to keep the data integrity and no redundancy.
- (4) There is the Uninterrupted Power Supply (UPS) to prevent the loss of data during power failure.
- (5) The user is able to access through the system within their authorized area only.
- (6) The backup data of the system should be done daily.

3.7 Cost/Benefit Analysis

Economic feasibility has been defined as a cost/benefits analysis.

Costs fall into two categories. There are costs associated with developing the system, and there are costs associated with operating system. System development costs are usually onetime costs that will not recur after the project has been completed consisting of personal costs, computer usage, training, supply costs, duplication costs, equipment costs and cost of any new computer equipment and software. Unlike the system development cost, operating costs tend to recur throughout the lifetime of the system. The costs of operating a system over its useful lifetime can be classified as fixed costs which occur at regular intervals but relatively fixed e.g. software license payment and variable costs which occur in proportion to some usage factor e.g. costs of computer usage which vary with the work load. The existing system cost analysis and the estimation of development costs and operating costs for candidate system solution 1, 2, and 3 from Table 3.1 are displayed as follows:

(1) The existing front office management information system cost analysis.

Table 3.3. Existing System Cost Analysis, Baht.

Cost items	Years				
	1	2	3	4	5
<u>Fixed Cost</u>					
Computer	43,000.00	-	-	-	-
1 units @ 43,000.00					
Printer	35,000.00	-	-	-	-
1 unit @ 35,000.00					
Total Fixed Cost	78,000.00	-	-	-	-
<u>Operating Cost</u>					
<u>Salary Cost:</u>					
Leasing Manger	15,000.00	16,500.00	17,500.00	18,500.00	19,500.00
1 person @ 15,000.00					
Accounting Manger	15,000.00	16,500.00	17,500.00	18,500.00	19,500.00
1 person @ 15,000.00					
Leasing Officer	45,000.00	49,500.00	52,500.00	55,500.00	58,500.00
6 person @ 7,500.00					
Total monthly salary Cost	75,000.00	82,500.00	87,500.00	92,500.00	97,500.00
Total Annual Salary Cost	900,000.00	990,000.00	1,050,000.00	1,110,000.00	1,170,000.00
<u>Office Supplies & Miscellaneous Cost:</u>					
Stationary Per Annual	7,500.00	8,100.00	8,748.00	9,447.84	10,203.67
Paper Per Annual	7,500.00	8,100.00	8,748.00	9,447.84	10,203.67
Oil Per Annual	120,000.00	129,600.00	139,968.00	151,165.44	163,258.68
Rental Per Annual	120,000.00	129,600.00	139,968.00	151,165.44	163,258.68
Utility Per Annual	120,000.00	129,600.00	139,968.00	151,165.44	163,258.68
Miscellaneous Per Annual	144,000.00	155,520.00	167,961.60	181,398.53	195,910.41
Total Annual Office Supplies & Miscellaneous Cost	519,000.00	560,520.00	605,361.60	653,790.53	706,093.77
Total Annual Operating Cost	1,419,000.00	1,550,520.00	1,655,361.60	1,763,790.53	1,876,093.77
Total Existing System Cost	1,497,000.00	1,550,520.00	1,655,361.60	1,763,790.53	1,876,093.77

(2) Estimated Costs for Candidate System Solution 1

Table 3.4 Estimated Projected Cost for Candidate Solution 1 (in Baht).

Cost Item	Description	Amount	Unit Price (Baht/Hr.)	Price (Baht)
1. Development Cost:	1.1 Personal Cost:			
	System Analyst (1200hrs./ea)	1	350.00	42,000.00
	System Designer (120hrs./ea)	1	350.00	42,000.00
	Database Specialist (80hrs./ea)	1	200.00	16,000.00
	Telecommunication Specialist (25 hrs./ea)	1	200.00	5,000.00
	Subtotal 1:			105,000.00
	1.2 New Hardware:			
	Development Server	1	50,000.00	50,000.00
	Clients Computer	5	30,000.00	150,000.00
	Laser Printer	2	35,000.00	70,000.00
	Misc.			20,000.00
	Subtotal 2:			290,000.00
	1.3 New Software:			
	Ms. Windows 2000	1	30,000.00	30,000.00
2. Operating Cost:	Ms. Windows 98	5	20,000.00	100,000.00
	Ms. Office Suite	1	20,000.00	20,000.00
	Visible Analyst Case tool v7.5	1	15,000.00	15,000.00
	Subtotal 3:			165,000.00
	Total Development Cost			560,000.00
	2.1 Personal Cost			
	Technician	1	15,000.00	15,000.00
	System Librarian	1	12,000.00	12,000.00
	Subtotal 1:			27,000.00
	2.2 Maintenance:			
	Hardware Maintenance	1	10,000.00	10,000.00
	Software Maintenance	1	5,000.00	5,000.00
	Subtotal 2:			15,000.00
	2.3 Other Expenses			
	Salaries			720,000.00
	Utilities and other Costs			518,400.00
	Subtotal 3:			1,238,400.00
	Total Operating Cost			1,280,400.00
	Total Project Annual Cost			1,840,400.00

(3) Estimated Costs for Candidate System Solution 2.

Table 3.5 Estimated Projected Cost for Candidate Solution 2 (in Baht).

Cost Item	Description	Amount	Unit Price (Baht/Hr.)	Price (Baht)
1. Development Cost:	1.1 Personal Cost:			
	System Analyst (120hrs./ea)	1	350.00	42,000.00
	System Designer (120hrs./ea)	1	350.00	42,000.00
	Database Specialist (80hrs./ea)	1	200.00	16,000.00
	Telecommunication Specialist (25 hrs./ea)	1	200.00	5,000.00
	Programmer (60hrs./ea)	1	350.00	21,000.00
	Subtotal 1:			126,000.00
	1.2 New Hardware:			
	Development Server	1	50,000.00	50,000.00
	Clients Computer	5	30,000.00	150,000.00
	Laser Printer	1	35,000.00	35,000.00
	Misc.			20,000.00
	Subtotal 2:			255,000.00
	1.3 New Software:			
2. Operating Cost:	Ms. Windows 2000	1	30,000.00	30,000.00
	Ms. Windows 98	5	20,000.00	100,000.00
	Ms. Office Suite	1	20,000.00	20,000.00
	Visible Analyst Case tool v7.5	1	15,000.00	15,000.00
	Ms. Visual C++	1	20,000.00	20,000.00
	Subtotal 3:			185,000.00
	Total Development Cost			566,000.00
	2.1 Personal Cost			
	Technician	1	15,000.00	15,000.00
	System Librarian	1	12,000.00	12,000.00
	Subtotal 1:			27,000.00
	2.2 Maintenance:			
	Hardware Maintenance	1	10,000.00	10,000.00
	Software Maintenance	1	5,000.00	5,000.00
	Subtotal 2:			15,000.00
	2.3 Other Expenses			
	Salaries			720,000.00
	Utilities and other Costs			518,400.00
	Subtotal 3:			1,238,400.00
	Total Operating Cost			1,280,400.00
	Total Project Annual Cost			1,846,400.00

(4) Estimated Costs for Candidate System Solution 3.

Table 3.6 Estimated Projected Cost for Candidate Solution 3 (in Baht).

Cost Item	Description	Amount	Unit Price (Baht/Hr.)	Price (Baht)
1. Development Cost:	1.4 Personal Cost:			
	System Analyst (120hrs./ea)	1	350.00	42,000.00
	System Designer (120hrs./ea)	1	350.00	42,000.00
	Database Specialist (80hrs./ea)	1	200.00	16,000.00
	Telecommunication Specialist (25 hrs./ea)	1	200.00	5,000.00
	Programmer (60hrs./ea)	1	350.00	21,000.00
	Subtotal 1:			126,000.00
	1.5 New Hardware:			
	Development Server	1	50,000.00	50,000.00
	Clients Computer	5	30,000.00	150,000.00
	Laser Printer	1	35,000.00	35,000.00
	Dot Matrix Printer	2	25,000.00	50,000.00
	Misc.			20,000.00
	Subtotal 2:			305,000.00
	1.6 New Software:			
	Ms. Windows 2000	1	30,000.00	30,000.00
	Ms. Windows 98	5	20,000.00	100,000.00
	Ms. Office Suite	1	20,000.00	20,000.00
	Visible Analyst Case tool v7.5	1	15,000.00	15,000.00
	Ms. Visual Basic 6.0	1	30,000.00	30,000.00
	Subtotal 3:			195,000.00
	Total Development Cost			626,000.00
2. Operating Cost:	2.1 Personal Cost			
	Technician	1	15,000.00	15,000.00
	System Librarian	1	12,000.00	12,000.00
	Subtotal 1:			27,000.00
	2.2 Maintenance:			
	Hardware Maintenance	1	10,000.00	10,000.00
	Software Maintenance	1	5,000.00	5,000.00
	Subtotal 2:			15,000.00
	2.3 Other Expenses			
	Salaries			720,000.00
	Utilities and other Costs			518,400.00
	Subtotal 3:			1,238,400.00
	Total Operating Cost			1,280,400.00
	Total Project Annual Cost			1,906,400.00

Benefits normally increase profits or decrease costs, both highly desirable characteristics of a new information system. After this project is finished, the leasing information system for S.P.K. Samudprakan Co., Ltd. will get these benefits. Benefits are classified as tangible or intangible as follows:

(a) Tangible benefits

Tangible benefits are those that can be easily quantified or can be calculated.

- (1) Fewer processing errors. The proposed system operates with more accuracy and completeness.
- (2) Increased throughput. The performance of the proposed system is better. The number of customers that the leasing information system can service per day is increased.
- (3) Decreased response time. The leasing processing time for each customer e.g. process of check motorcycle available reduced. The system responses to the transactions and requests faster.
- (4) Elimination of job steps. The new leasing system is able to provide or operate some works instead of people work so leasing staff can save a lot of time such as new contract report.
- (5) Reduced expenses. The company can reduce a lot of paperwork and documenting involving the customer data and information.

(b) Intangible benefits

Intangible benefits are those benefits believed to be difficult or impossible to quantify.

- (1) Improved customer goodwill. The new leasing system provides quick and efficient services for the customer so the customer will have a good pleasure to the leasing of the company and would like to come back again.
- (2) Improve employee morale. The new system provides more user friendly and accurate data and information so it is convenient for the leasing staff to use and does not have problems to disturb their work.
- (3) Better service to community. The system not only is able to provide services for the customer but also able to provide services for other related departments in the company such as provide information report as required.
- (4) Better decision-making. The system is able to generate more accuracy and deeply in details as required for the reports related to the leasing system e.g. leasing report to the head department in order have enough information to make the decision.

Cost-Effectiveness is the technique to access economic feasibility. There are three popular techniques: payback analysis, return-on-investment (ROI) analysis and net present value. In order to analyze the candidate system 1,2 and 3 by these techniques, we need to refer to the development cost and operating cost in Tables 3.3, 3.4, 3.5 and 3.6 respectively. The payback analysis, return-on-investment (ROI) analysis and net present value for each candidate system are displayed as follows:

Table 3.7. Payback Analysis for Candidate System 1, Baht.

Cost Items	Years					
	0	1	2	3	4	5
Development Cost	-560,000.00	-	-	-	-	-
Operation & maintenance cost	-	-1,280,400.00	-1,370,028.00	-1,465,929.96	-1,568,545.06	-1,678,343.21
Discount factors for 10%	1.00	0.91	0.83	0.75	0.68	0.62
Time-adjusted costs (adjusted to present value)	-560,000.00	-1,165,164.00	-1,137,123.24	-1,099,447.47	-1,066,610.64	-1,040,572.79
Cumulative time-adjusted costs over lifetime	-560,000.00	-1,725,164.00	-2,862,287.24	-3,961,734.71	-5,028,345.35	-6,068,918.14
Existing System Operation Cost	0.00	1,497,000.00	1,616,760.00	1,746,100.80	1,885,788.86	2,036,651.97
Discount factors for 10%	1.00	0.91	0.83	0.75	0.68	0.62
Time-adjusted benefits (current of present value)	0.00	1,362,270.00	1,341,910.80	1,309,575.60	1,282,336.43	1,262,724.22
Cumulative time-adjusted benefits over lifetime	0.00	1,362,270.00	2,704,180.80	4,013,756.40	5,296,092.83	6,558,817.05
Cumulative lifetime time-adjusted cost + benefits	-560,000.00	-362,894.00	-158,106.44	52,021.69	267,747.48	716,002.77
The Payback Period is approximately 2 years 9 months.						
Lifetime ROI = (Estimated lifetime benefits - Estimated lifetime costs) / Estimated lifetime costs = 0.10*100 = 10%						

Table 3.8. Net Present Value Analysis for Candidate System 1, Baht.

Cost Items	Years					
	0	1	2	3	4	5
Development Cost	-560,000.00	-	-	-	-	-
Operation & maintenance cost	-	-1,280,400.00	-1,370,028.00	-1,465,929.96	-1,568,545.06	-1,678,343.21
Discount factors for 10%	1.00	0.91	0.83	0.75	0.68	0.62
Present value of annual costs	-560,000.00	-1,165,164.00	-1,137,123.24	-1,099,447.47	-1,066,610.64	-1,040,572.79
Total present value of lifetime costs	-	-	-	-	-	-
Existing System Operation Cost	0.00	1,497,000.00	1,616,760.00	1,746,100.80	1,885,788.86	2,036,651.97
Discount factors for 10%	1.00	0.91	0.83	0.75	0.68	0.62
Present value of annual benefits	0.00	1,362,270.00	1,341,910.80	1,309,575.60	1,282,336.43	1,262,724.22
Total present value of lifetime benefits	-	-	-	-	-	-
NET PRESENT VALUE OF THIS ALTERNATIVE	-	-	-	-	-	-
The Net Present Value of this candidate system is 716,002.77.						
						716,002.77

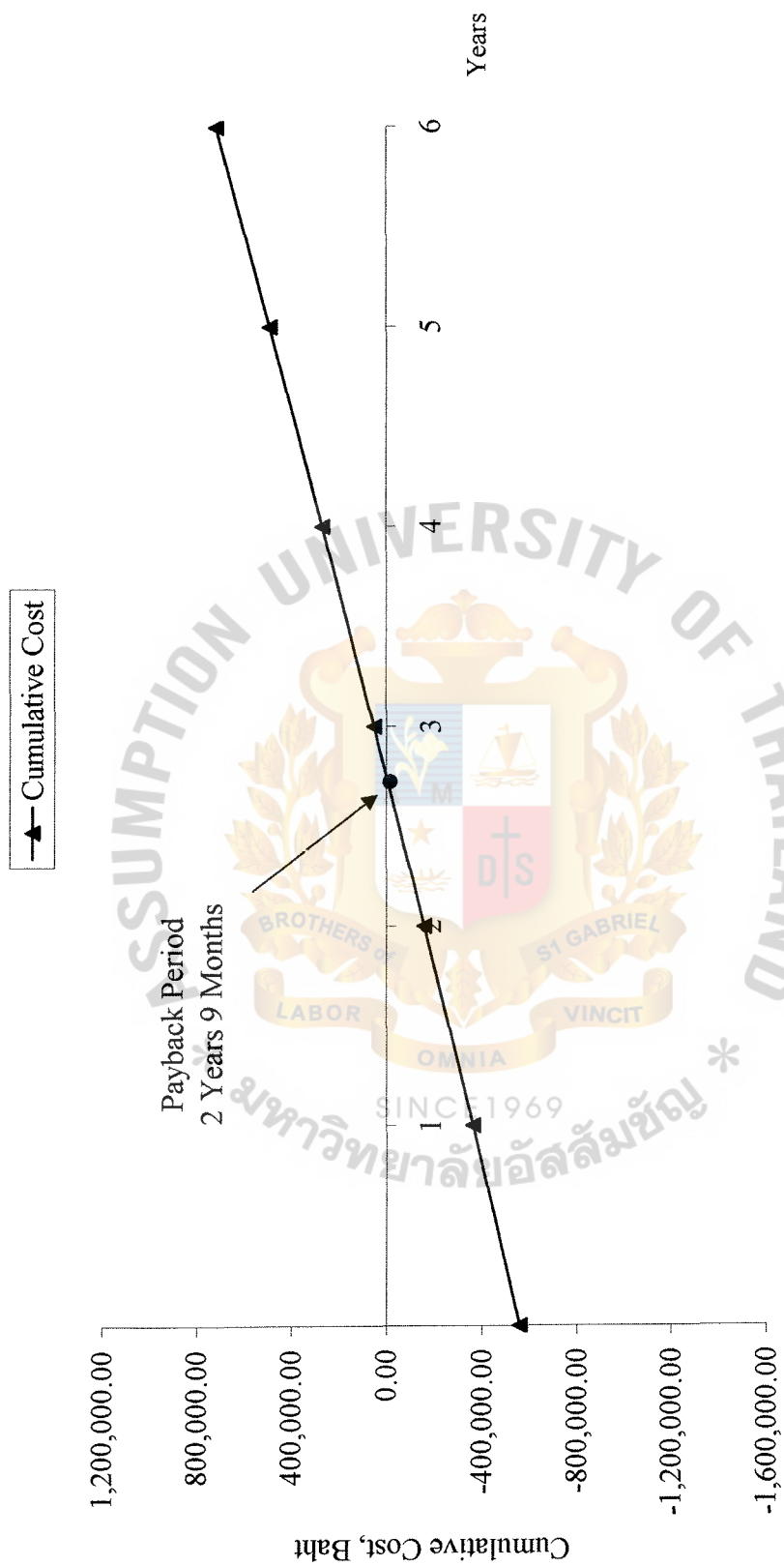


Figure 3.18. Payback Analysis for Candidate System 1.

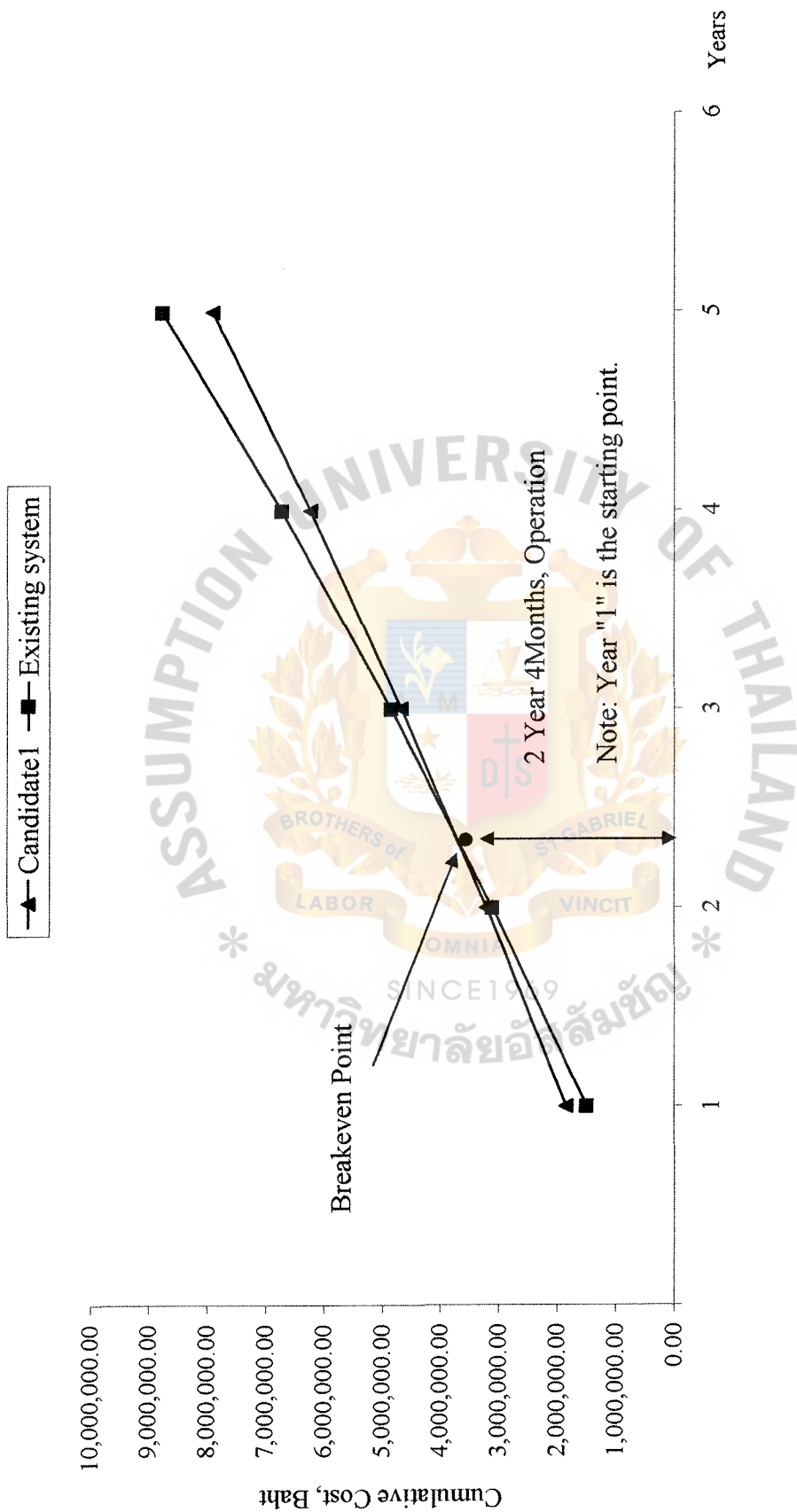


Figure 3.19. Cost Comparison between Existing System and Candidate System 1.

Table 3.9. Payback Analysis for Candidate System 2, Baht.

Cost Items	Years					
	0	1	2	3	4	5
Development Cost	-566,000.00	-	-	-	-	-
Operation & maintenance cost	-	-1,280,400.00	-1,370,028.00	-1,465,929.96	-1,568,545.06	-1,678,343.21
Discount factors for 10%	1.00	0.91	0.83	0.75	0.68	0.62
Time-adjusted costs (adjusted to present value)	-566,000.00	-1,165,164.00	-1,137,123.24	-1,099,447.47	-1,066,610.64	-1,040,572.79
Cumulative time-adjusted costs over lifetime	-566,000.00	-1,731,164.00	-2,868,287.24	-3,967,734.71	-5,034,345.35	-6,074,918.14
Existing System Operation Cost	0.00	1,497,000.00	1,616,760.00	1,746,100.80	1,885,788.86	2,036,651.97
Discount factors for 10%	1.00	0.91	0.83	0.75	0.68	0.62
Time-adjusted benefits (current of present value)	0.00	1,362,270.00	1,341,910.80	1,309,575.60	1,282,336.43	1,262,724.22
Cumulative time-adjusted benefits over lifetime	0.00	1,362,270.00	2,704,180.80	4,013,756.40	5,296,092.83	6,558,817.05
Cumulative lifetime time-adjusted cost + benefits	-566,000.00	-368,894.00	-164,106.44	46,021.69	261,747.48	483,898.91
The Payback Period is approximately 2 years 9 months.						710,002.77
Lifetime ROI = (Estimated lifetime benefits - Estimated lifetime costs) / Estimated lifetime costs = 0.10*100 = 10%						

Table 3.10. Net Present Value Analysis for Candidate System 2, Baht.

Cost Items	Years					
	0	1	2	3	4	5
Development Cost	-566,000.00					
Operation & maintenance cost		-1,280,400.00	-1,370,028.00	-1,465,929.96	-1,568,545.06	-1,678,343.21
Discount factors for 10%	1.00	0.91	0.83	0.75	0.68	0.62
Present value of annual costs	-566,000.00	-1,165,164.00	-1,137,123.24	-1,099,447.47	-1,066,610.64	-1,005,663.25
Total present value of lifetime costs	-	-	-	-	-	-7,080,581.39
Existing System Operation Cost	0.00	1,497,000.00	1,616,760.00	1,746,100.80	1,885,788.86	2,036,651.97
Discount factors for 10%	1.00	0.91	0.83	0.75	0.68	0.62
Present value of annual benefits	0.00	1,362,270.00	1,341,910.80	1,309,575.60	1,282,336.43	1,262,724.22
Total present value of lifetime benefits	-	-	-	-	-	7,790,584.16
NET PRESENT VALUE OF THIS ALTERNATIVE	-	-	-	-	-	710,002.77
The Net Present Value of this candidate system is 710,002.77						

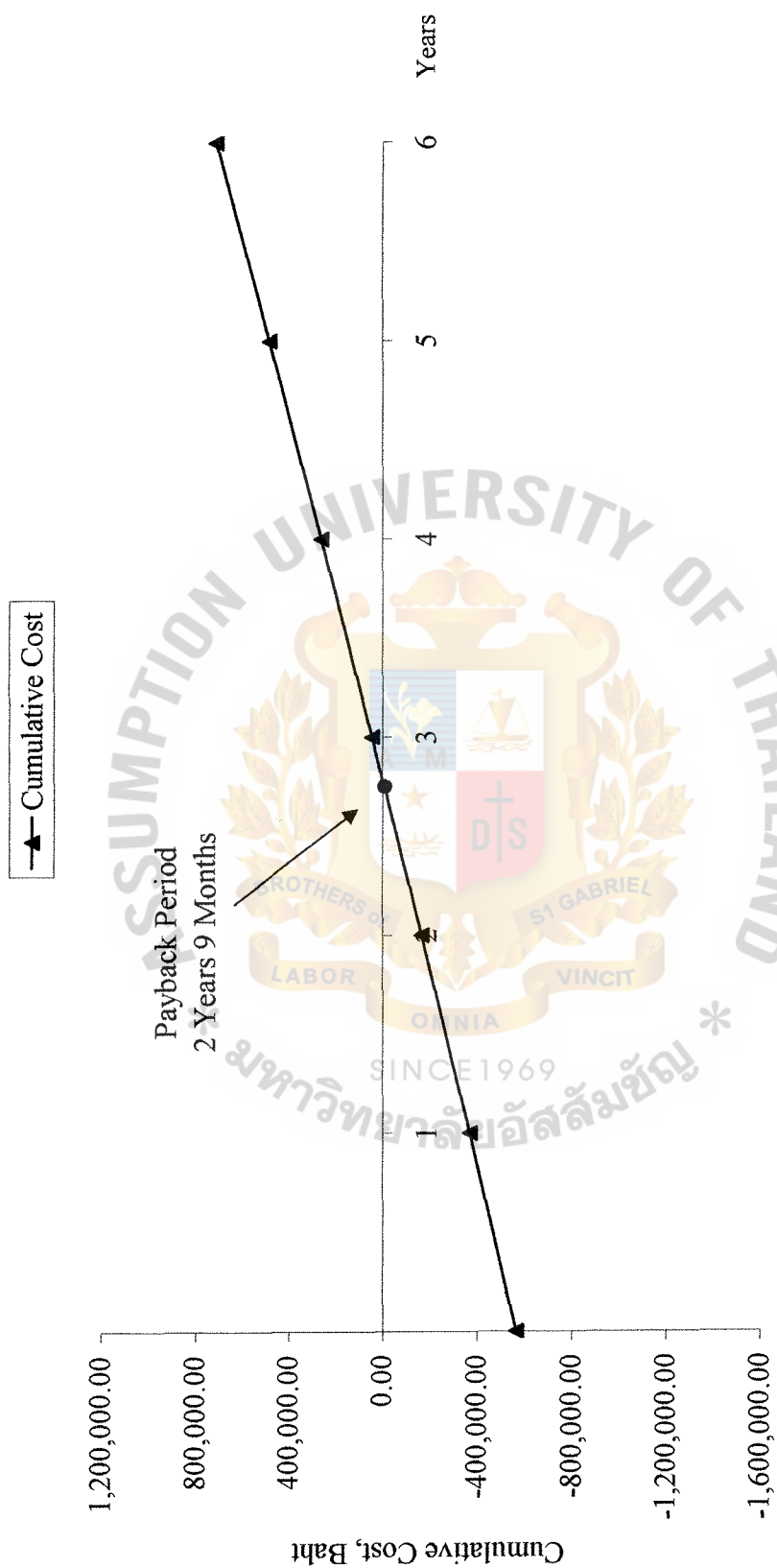


Figure 3.20. Payback Analysis for Candidate System 2.

Table 3.11. Payback Analysis for Candidate System 3, Baht.

Cost Items	Years						
	0	1	2	3	4	5	6
Development Cost	-626,000.00	-	-	-	-	-	-
Operation & maintenance cost	-	-1,280,400.00	-1,370,028.00	-1,465,929.96	-1,568,545.06	-1,678,343.21	-1,795,827.24
Discount factors for 10%	1.00	0.91	0.83	0.75	0.68	0.62	0.56
Time-adjusted costs (adjusted to present value)	-626,000.00	-1,165,164.00	-1,137,123.24	-1,099,447.47	-1,066,610.64	-1,040,572.79	-1,005,663.25
Cumulative time-adjusted costs over lifetime	-626,000.00	-1,791,164.00	-2,928,287.24	-4,027,734.71	-5,094,345.35	-6,134,918.14	-7,140,581.39
Existing System Operation Cost	0.00	1,497,000.00	1,616,760.00	1,746,100.80	1,885,788.86	2,036,651.97	2,199,584.13
Discount factors for 10%	1.00	0.91	0.83	0.75	0.68	0.62	0.56
Time-adjusted benefits (current of present value)	0.00	1,362,270.00	1,341,910.80	1,309,575.60	1,282,336.43	1,262,724.22	1,231,767.11
Cumulative time-adjusted benefits over lifetime	0.00	1,362,270.00	2,704,180.80	4,013,756.40	5,296,092.83	6,558,817.05	7,790,584.16
Cumulative lifetime time-adjusted cost + benefits	-626,000.00	-428,894.00	-224,106.44	-13,978.31	201,747.48	423,898.91	650,002.77
The Payback Period is approximately 3 years 1 month.							
Lifetime ROI = (Estimated lifetime benefits - Estimated lifetime costs) / Estimated lifetime costs = 0.09*100 = 9%							

Table 3.12. Net Present Value Analysis for Candidate System 3, Baht.

Cost Items	Years					
	0	1	2	3	4	5
Development Cost	-626,000.00	-	-	-	-	-
Operation & maintenance cost	-	-1,280,400.00	-1,370,028.00	-1,465,929.96	-1,568,545.06	-1,678,343.21
Discount factors for 10%	1.00	0.91	0.83	0.75	0.68	0.62
Present value of annual costs	-626,000.00	-1,165,164.00	-1,137,123.24	-1,099,447.47	-1,066,610.64	-1,040,572.79
Total present value of lifetime costs	-	-	-	-	-	-
Existing System Operation Cost	0.00	1,497,000.00	1,616,760.00	1,746,100.80	1,885,788.86	2,036,651.97
Discount factors for 10%	1.00	0.91	0.83	0.75	0.68	0.62
Present value of annual benefits	0.00	1,362,270.00	1,341,910.80	1,309,575.60	1,282,336.43	1,262,724.22
Total present value of lifetime benefits	-	-	-	-	-	-
NET PRESENT VALUE OF THIS ALTERNATIVE	-	-	-	-	-	-
The Net Present Value of this candidate system is 650,002.77						650,002.77

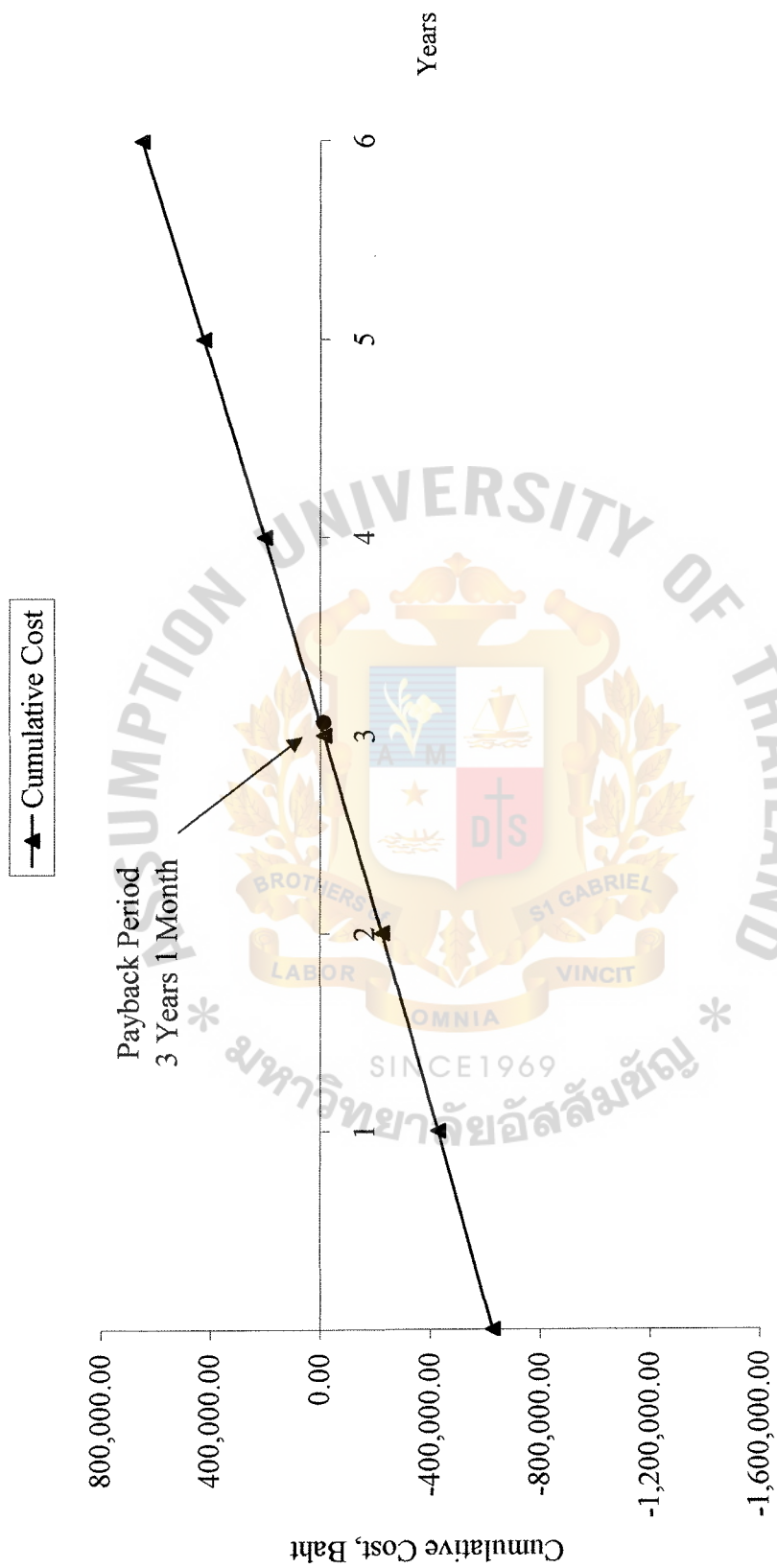


Figure 3.22. Payback Analysis for Candidate System 3.

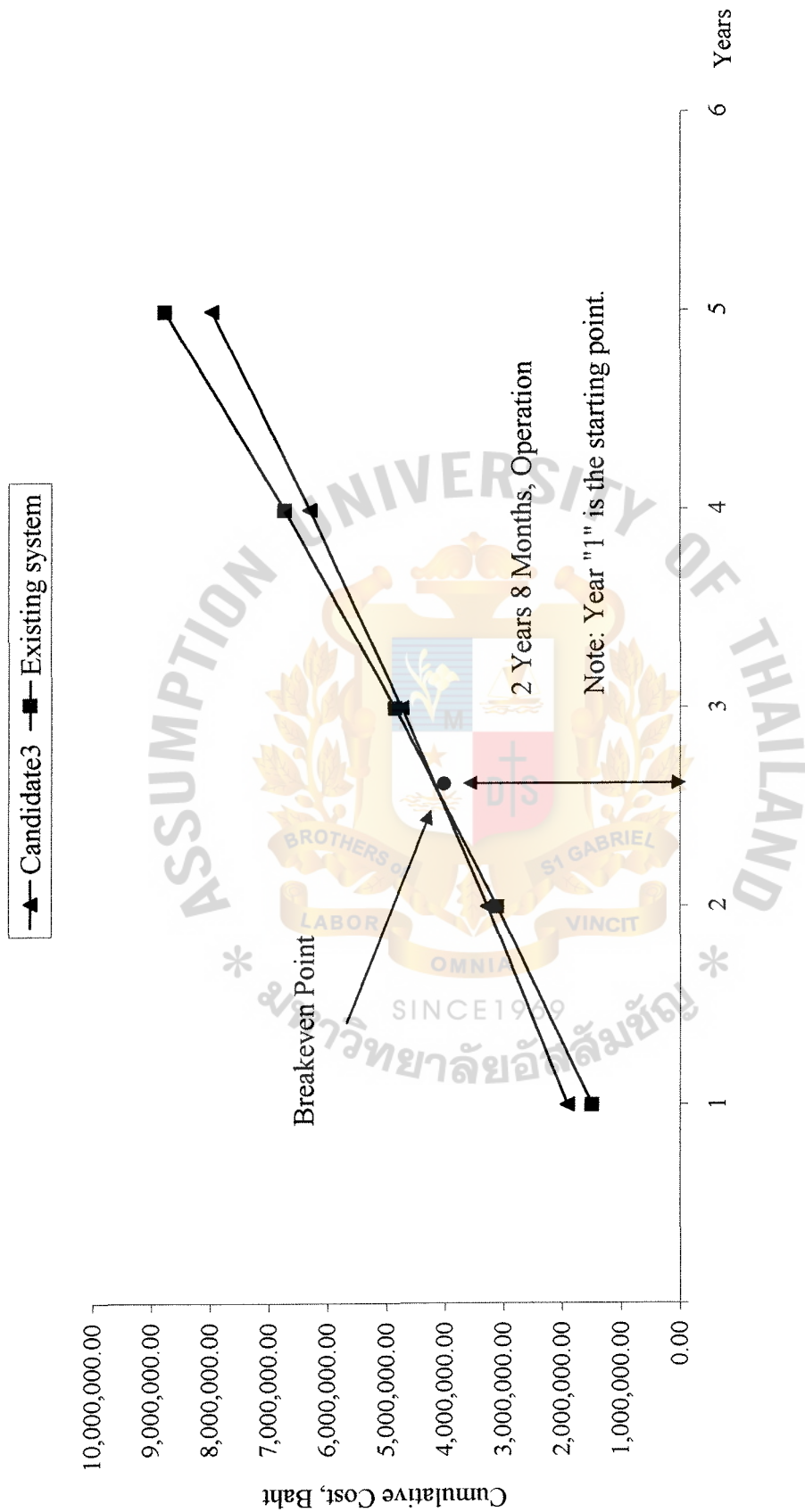


Figure 3.23. Cost Comparison between Existing System and Candidate System 3.

IV. IMPLEMENTATION

4.1 Overview of the Project Implementation

System implementation (or system development) is the construction of the new system and the delivery of that system into leasing operation (meaning day-to-day operation). This is what will be discussed in this part and the discussion will be divided into two parts dealing with construction phase and the delivery phase.

4.2 The Construction Phase

4.2.1 Build and Test Network

The purpose is to build and test new computer networks, here the Local Area Network (LAN) will be constructed and tested as shown in figure 3.15. The deliverable of this activity is the installed network that is placed into operation.

4.2.2 Build and Test Database

The purpose of this activity is to build and test the database used in this project, which is a relational database and a distributed relational database management system. The database design performed during the system design will serve as a prerequisite input (database schema).

Our database will be loaded with sample data (actual data) for testing purposes. The deliverable will be an unpopulated database structure for the new database.

4.2.3. Write and Test New Program

As seen earlier, the use of Visual Basic 6.0. will necessitate the writing of “in-house” programs for new system. This activity will emphasize the writing and testing of the programs. In this phase, there are two levels of testing to be performed:

- (1) Stub testing is the test performed on individual events or modules of a program. The structure charts developed during system design will be the prerequisites.
- (2) Unit or program testing is a test whereby all the events and modules that have been coded and stub tested for a program are tested as an integrated unit; it is the testing of an entire program. The requirements use cases will be the prerequisites.
- (3) A system testing ensures that application programs written and tested in isolation work properly when they are integrated into total system.

4.3 The Delivery Phase

We arrive now at the last system implementation phase of the life cycle, that is deliver the new system into operation. The purpose here is to smoothly convert from the manual system to the computerized system through the following activities:

4.3.1 System Test

We will now test all programs that comprise the new system to ensure they all work together. Real data will be obtained and ensure that different tests have been successfully performed, such as stub testing, unit testing and systems testing.

Finally, any medications done to programs will be recorded in the repository for further reference.

4.3.2 Conversion Plan

Once the successful system test has been completed, we can begin preparations to place the new system into operation. End-user training and documentation will be necessary to help user accommodate to the new system and provide support to users that may have difficulties in using the system.

Since the old system is not computerized at all, the best installation strategy to follow from the existing to the new production information system will be “Parallel conversion. Under this strategy both old and new systems are operated for some time period. This ensures that all major problems in the new system have been solved before the old system is discarded. The final cutover will be abrupt or gradual as portions of the new system are deemed adequate. The benefit of this strategy is the risk minimization.

A system acceptance test is also needed and will comprise of the following:

- (1) A verification testing will run the system in a simulated environment using simulated data (Alpha testing) to find errors and omissions regarding end-user and design specifications.
- (2) A validation testing will run the system in a live environment using real data (Beta testing). During this validation, we will test the system's performance by measuring the response time to meet a normal processing workload, the peak workload processing performance to check if the system can handle the workload during peak hours, a human engineering test to see if the system is as easy to use and learn as anticipated, the back-up and recovery testing by simulating a disaster like a power failure.

Finally, the conversion to the new system can be achieved smoothly and with a serious limitation of problems that could occur.

V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

This system development project aims to produce leasing information system for SPK Samudprakan Co., Ltd. in which the existing system is a manual system. The study proposes the computerized information system to partially replace the manual processing. The proposed information system provides the information for staff in the operational level to improve their performance and the information for the management level to use as control and decision making information.

This study applies the structured analysis and design technique starting from studying the physical existing system, developing logical existing system, analyzing and obtaining user requirements to producing a proposed logical system and finally converts to the physical system.

The data flow diagrams, process specifications, and data stores are used as documentation for the existing and proposed system during the analysis and design phase as shown in chapter 2 and 3. In the physical design, the function design, input/output design, database design, program design and control design are included and documented in chapter 3.

In the implementation phase, this study covers the programming, testing tasks, and the checklist which shown in chapter 3, and the results are shown in the appendix part.

The proposed system's benefits are the improving performance of work in the new contract processing. Other improvements include issuing timely receipts, follow up to decrease the company's loss, meeting user objectives since it is fast, accurate,



APPENDIX A
DATABASE DESIGN

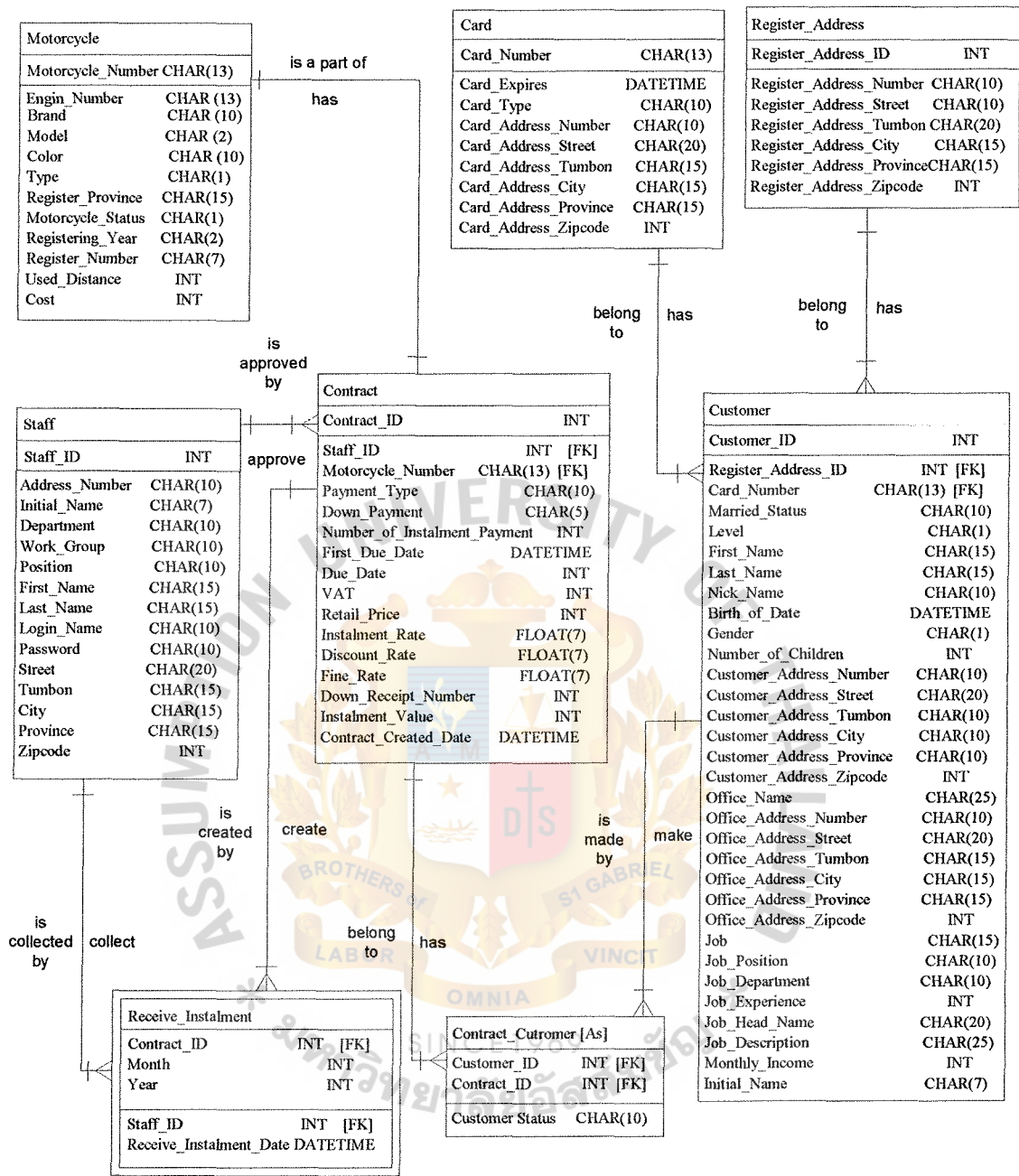


Figure A.1. Leasing Information System Physical Database Schema.

STRUCTURE OF DATABASE TABLE

Table A.1. Structure of Customers Table: Data Store D1.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	Customer_ID	Integer	Y	Y				Primary Key
2	Register_Address_ID	Integer	Y	Y		Contract_Customers		Foreign Key
3	Card_Number	Char(13)	Y	Y				Foreign Key
4	Initial_Name	Char(7)			Y			Attribute
5	Married_Status	Char(10)			Y			Attribute
6	Level	Char(1)			Y			Attribute
7	First_Name	Char(15)						Attribute
8	Last_Name	Char(15)						Attribute
9	Nick_Name	Char(10)			Y			Attribute
10	Birth_of_Date	Date						Attribute
11	Gender	Char(1)			Y			Attribute
12	Number_of_Children	Integer			Y			Attribute
13	Customer_Address_Number	Char(10)						Attribute
14	Customer_Address_Street	Char(20)			Y			Attribute
15	Customer_Address_Tumbon	Char(15)						Attribute
16	Customer_Address_City	Char(15)						Attribute
17	Customer_Address_Province	Char(15)						Attribute
18	Customer_Address_Zipcode	Integer			Y			Attribute
19	Office_Name	Char(25)			Y			Attribute
20	Office_Address_Number	Char(10)			Y			Attribute
21	Office_Address_Street	Char(20)			Y			Attribute
22	Office_Address_Tumbon	Char(15)			Y			Attribute
23	Office_Address_City	Char(15)			Y			Attribute

Table A.1. Structure of Customers Table: Data Store D1 (Continued).

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
24	Office_Address_Province	Char(15)			Y			Attribute
25	Office_Address_Zipcode	Integer			Y			Attribute
26	Job	Char(15)						Attribute
27	Job_Position	Char(10)			Y			Attribute
28	Job_Department	Char(10)			Y			Attribute
29	Job_Experience	Char(2)			Y			Attribute
30	Job_Head_Name	Char(20)			Y			Attribute
31	Job_Description	Char(25)			Y			Attribute
32	Monthly_Income	Integer						Attribute

Table A.2. Structure of Contract Table: Data Store D2.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	Contract_ID	Integer	Y	Y		Receive_Instalment		Primary Key
2	Staff_ID	Integer	Y	Y				Foreign Key
3	Motorcycle_Number	Char(13)	Y	Y				Foreign Key
4	Payment_Type	Char(10)			Y			Attribute
5	Down_Payment	Char(5)						Attribute
6	Number_of_Instalment	Char(2)						Attribute
7	First_Due_Date	Date						Attribute
8	Due_Date	Integer						Attribute
9	VAT	Integer						Attribute
10	Retail_Price	Integer						Attribute
11	Instalment_Rate	Float(5,2)						Attribute

Table A.2. Structure of Contract Table: Data Store D2 (Continued).

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
12	Discount_Rate	Float(5,2)						Attribute
13	Fin_Rate	Float(5,2)						Attribute
14	Down_Receipt_Number	Integer			Y			Attribute
15	Instalment_Value	Integer						Attribute
16	Contract_Created_Date	Date						Attribute

Table A.3. Structure of Motorcycle: Data Store D3.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	Motorcycle_Number	Char(13)	Y	Y		Contract		Primary Key
2	Engin_Number	Char(13)		Y				Attribute
3	Color	Char(10)						Attribute
4	Model	Char(2)						Attribute
5	Brand	Char(10)						Attribute
6	Type	Char(1)						Attribute
7	Register_Province	Char(15)						Attribute
8	Motorcycle_Status	Char(1)						Attribute
9	Registering_Year	Integer			Y			Attribute
10	Register_Number	Char(7)			Y			Attribute
11	Used_Distance	Integer			Y			Attribute
12	Cost	Integer						Attribute

Table A.4. Structure of Staff Table: Data Store D4.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	Staff_ID	Integer	Y	Y		Contract Receive_Instalment		Primary Key
2	Initial_Name	Char(7)			Y			Attribute
3	Address_Number	Char(10)						Attribute
4	Street	Char(20)			Y			Attribute
5	Tumbon	Char(15)						Attribute
6	City	Char(15)						Attribute
7	Province	Char(15)						Attribute
8	Zipcode	Integer			Y			Attribute
9	First Name	Char(15)						Attribute
10	Last Name	Char(15)						Attribute
11	Position	Char(10)			Y			Attribute
12	Department	Char(10)			Y			Attribute
13	Work Group	Char(10)			Y			Attribute
14	Login_Name	Char(10)						Attribute
15	Password	Char(10)						Attribute

Table A.5. Structure of Receive_Instalment Table: Data Store D5.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	Contract_ID	Integer	Y	Y				Primary Key
2	Month	Integer	Y	Y				Foreign Key
3	Year	Integer	Y	Y				Primary Key
4	Staff_ID	Integer			Y			Primary Key
5	Receive Date	Date			Y			Foreign Key
								Attribute

Table A.6. Structure of Register_Address: Data Store D6.

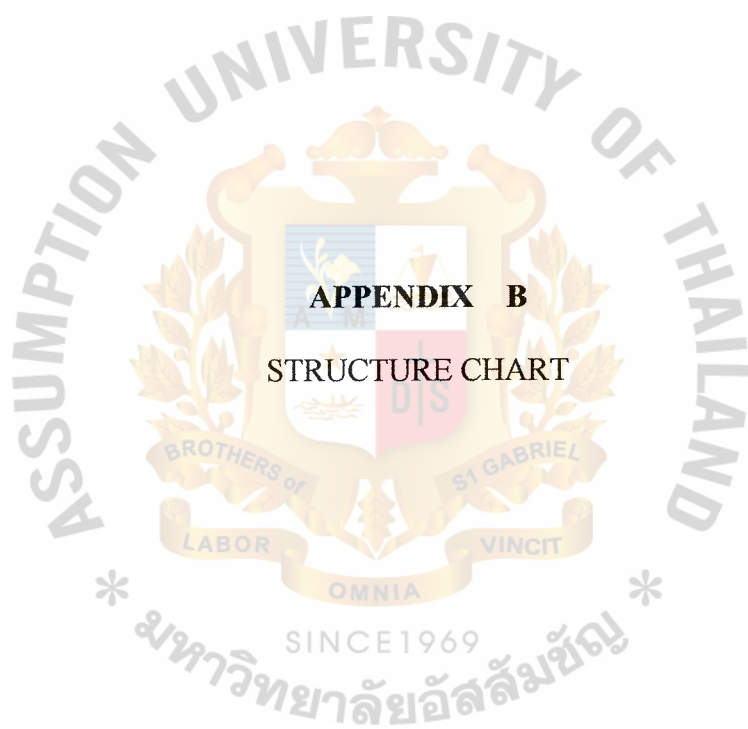
No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	Register_Address_ID	Integer	Y	Y		Customers		Primary Key
2	Register_Address_Number	Char(10)						Attribute
3	Register_Address_Street	Char(20)			Y			Attribute
4	Register_Address_Tumbon	Char(15)						Attribute
5	Register_Address_City	Char(15)						Attribute
6	Register_Address_Province	Char(15)						Attribute
7	Register_Address_Zipcode	Integer			Y			Attribute

Table A.7. Structure of Card Table: Data Store D7.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	Card_Number	Char(13)	Y	Y		Customers		Primary Key
2	Card_Type	Char(10)						Attribute
3	Card_Expire	Date						Attribute
4	Card_Address_Number	Char(10)						Attribute
5	Card_Address_Street	Char(20)			Y			Attribute
6	Card_Address_Tumbon	Char(15)						Attribute
7	Card_Address_City	Char(15)						Attribute
8	Card_Address_Province	Char(15)						Attribute
9	Card_Address_Zipcode	Integer			Y			Attribute

Table A.8. Structure of Contract_ Customers Table: Data Store D8.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	Customer_ID	Integer	Y	Y				Primary Key Foreign Key
2	Contract_ID	Integer	Y	Y				Primary Key Foreign Key
3	Customer_Status	Char(10)						Attribute



APPENDIX B
STRUCTURE CHART

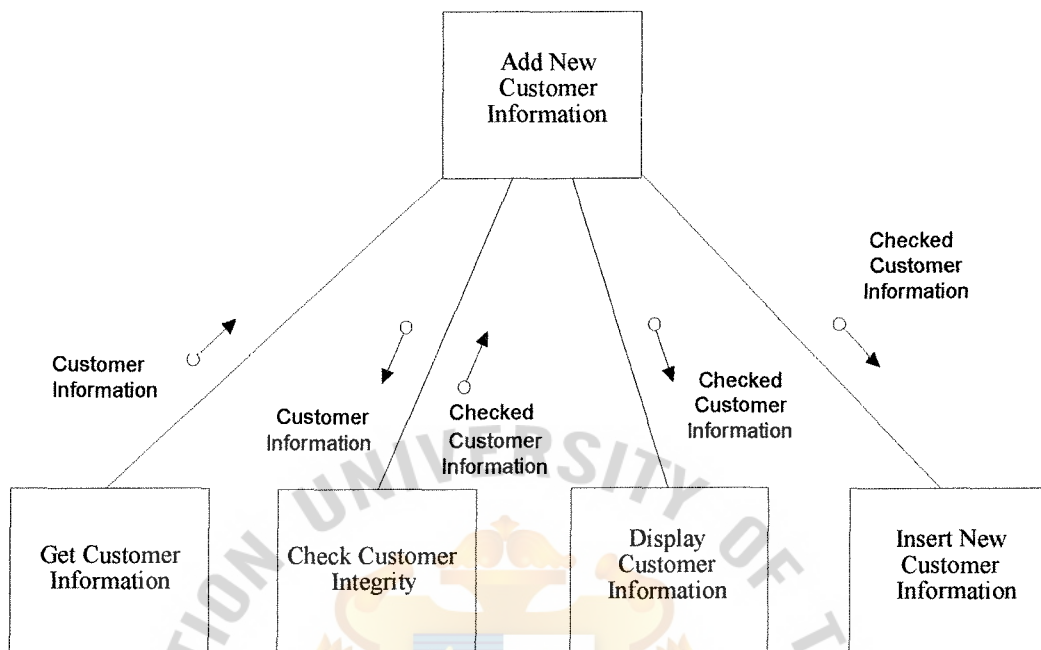


Figure B.1. Structure Chart of Add New Customer Information.

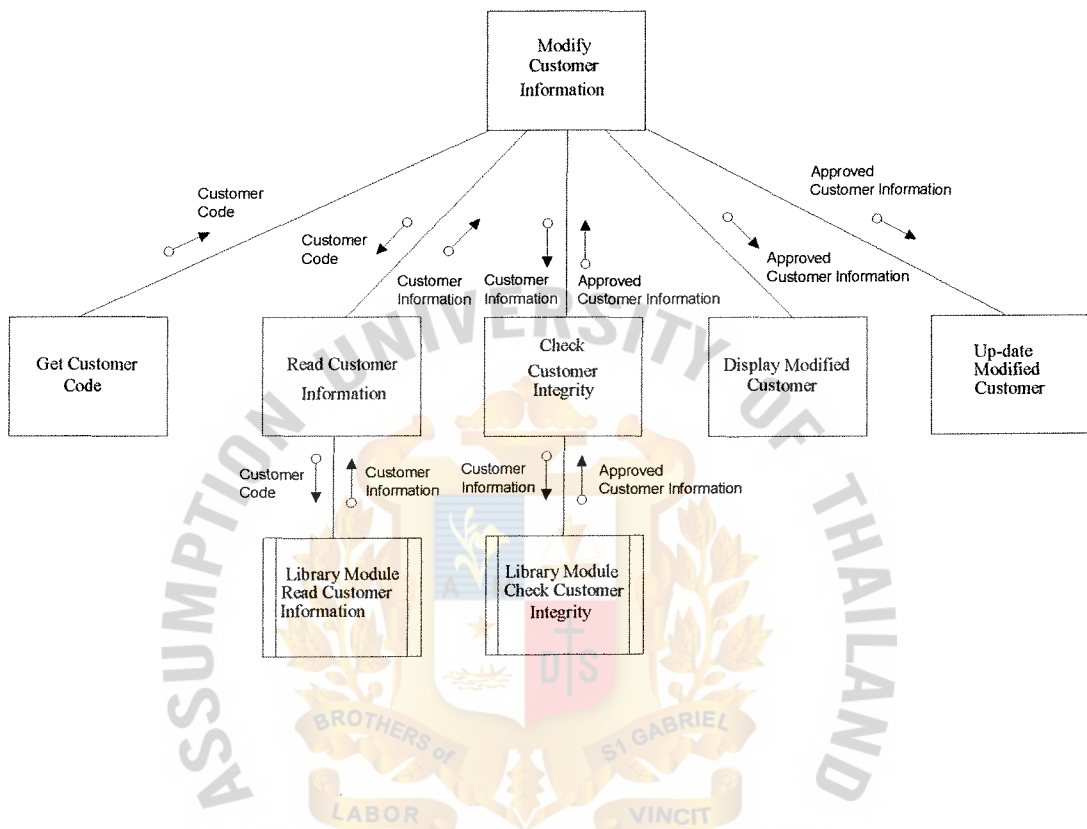


Figure B.2. Structure Chart of Modify Customer Information.

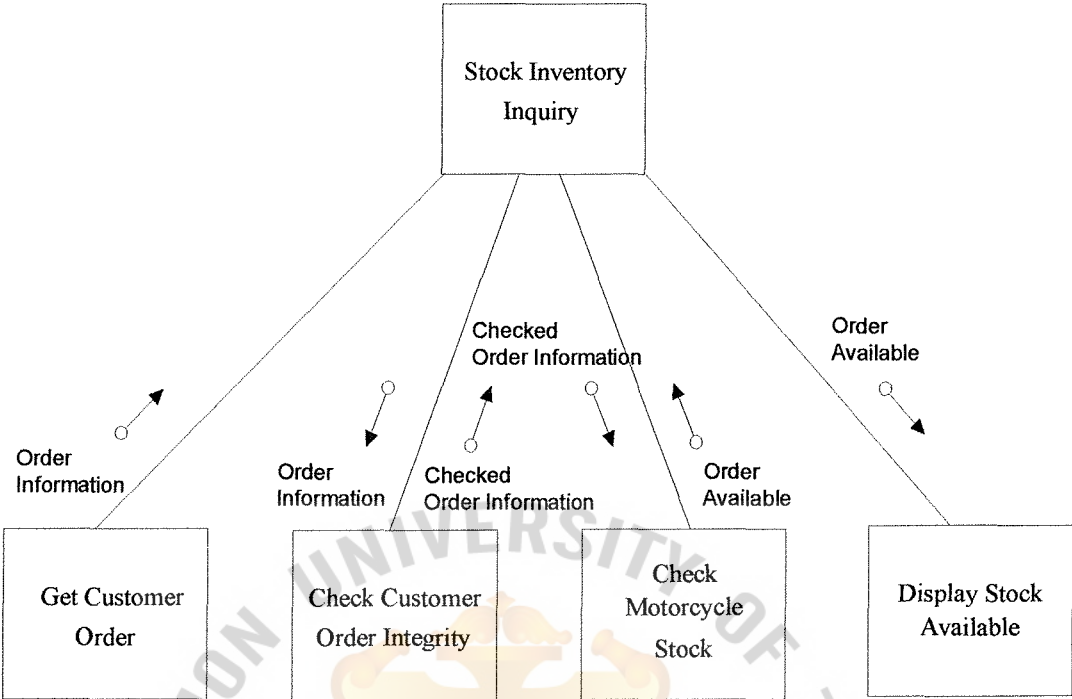


Figure B.3. Structure Chart of Stock Inventory Inquiry.

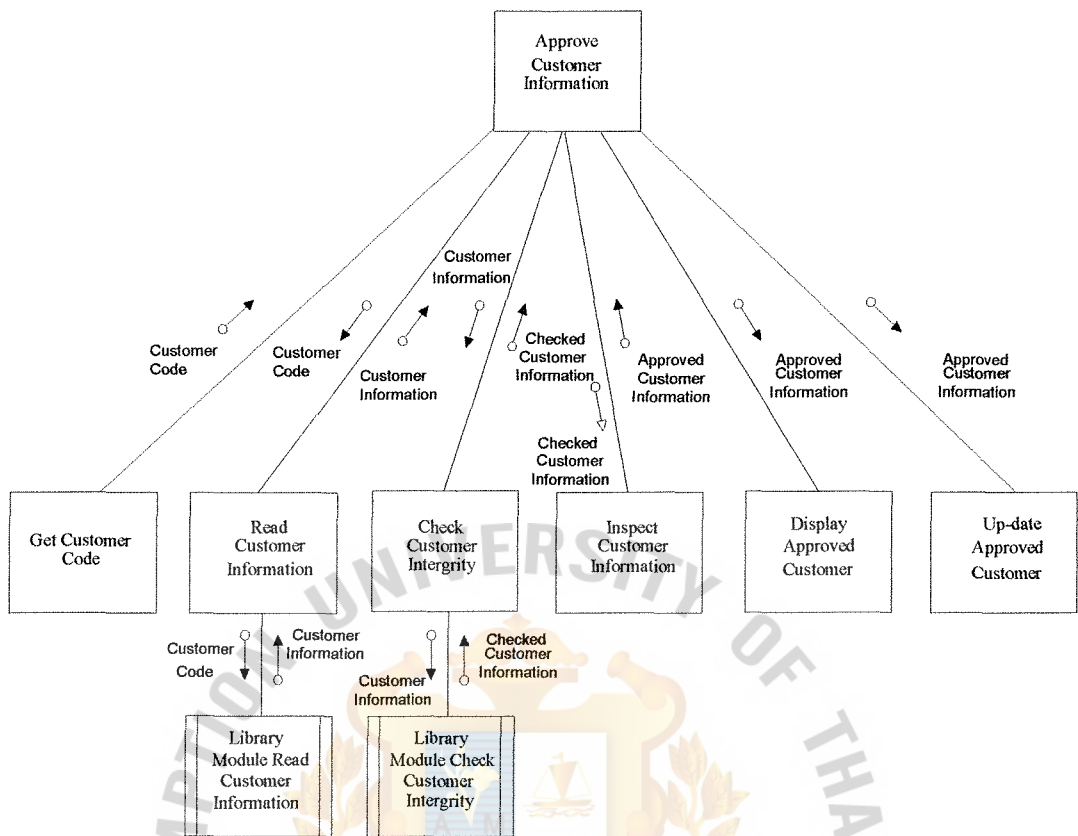
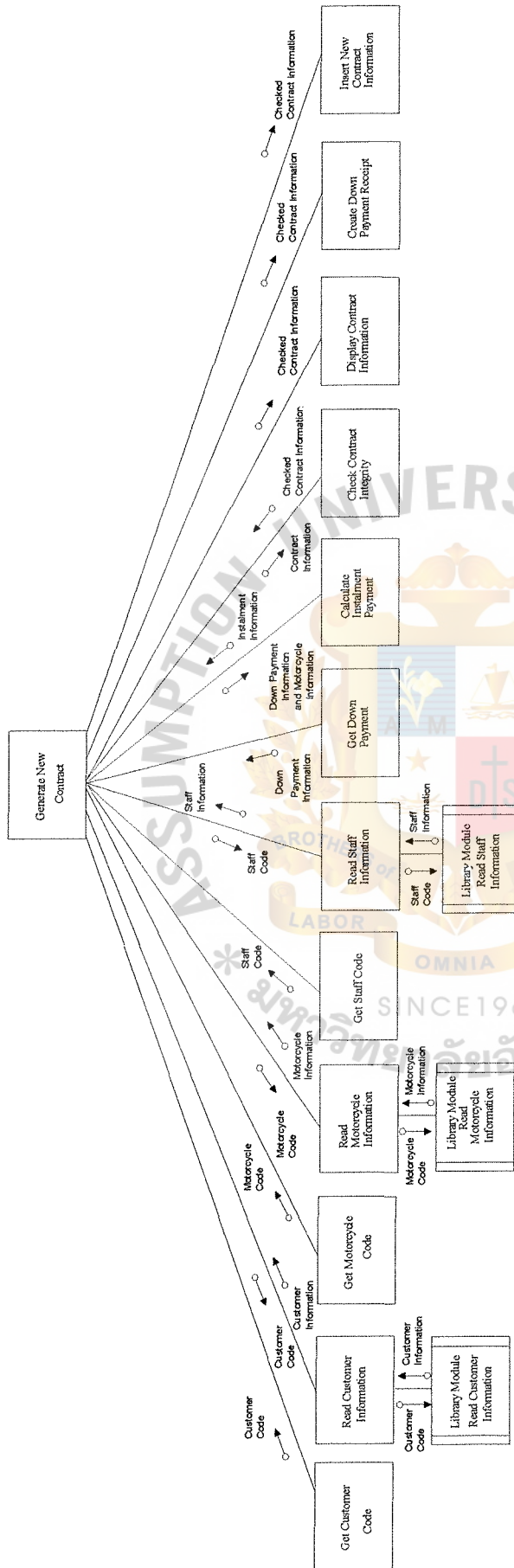


Figure B.4. Structure Chart of Approve Customer Information.



B.5. Structure Chart of Generate New Contract.

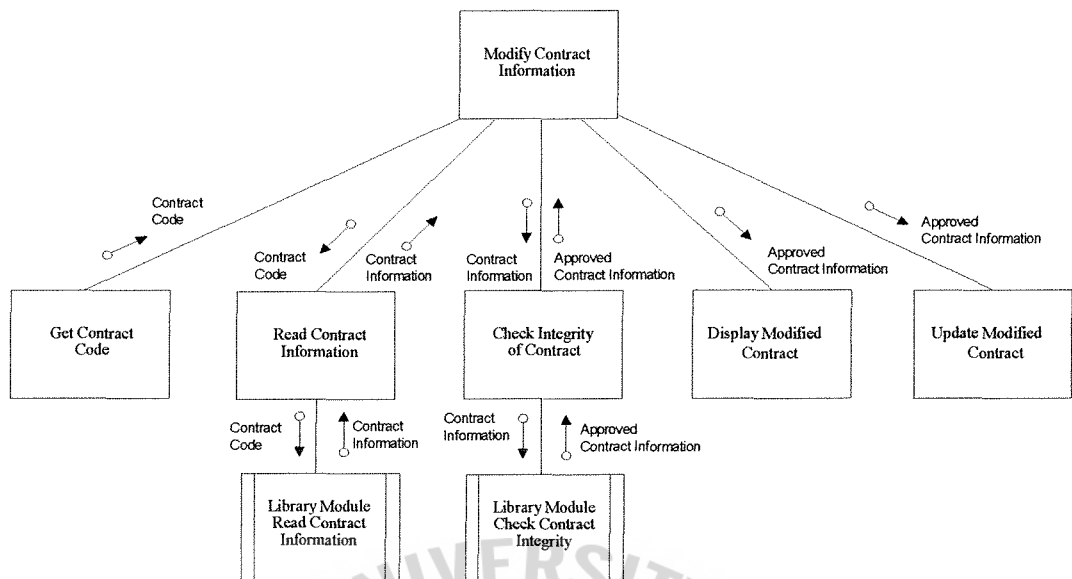
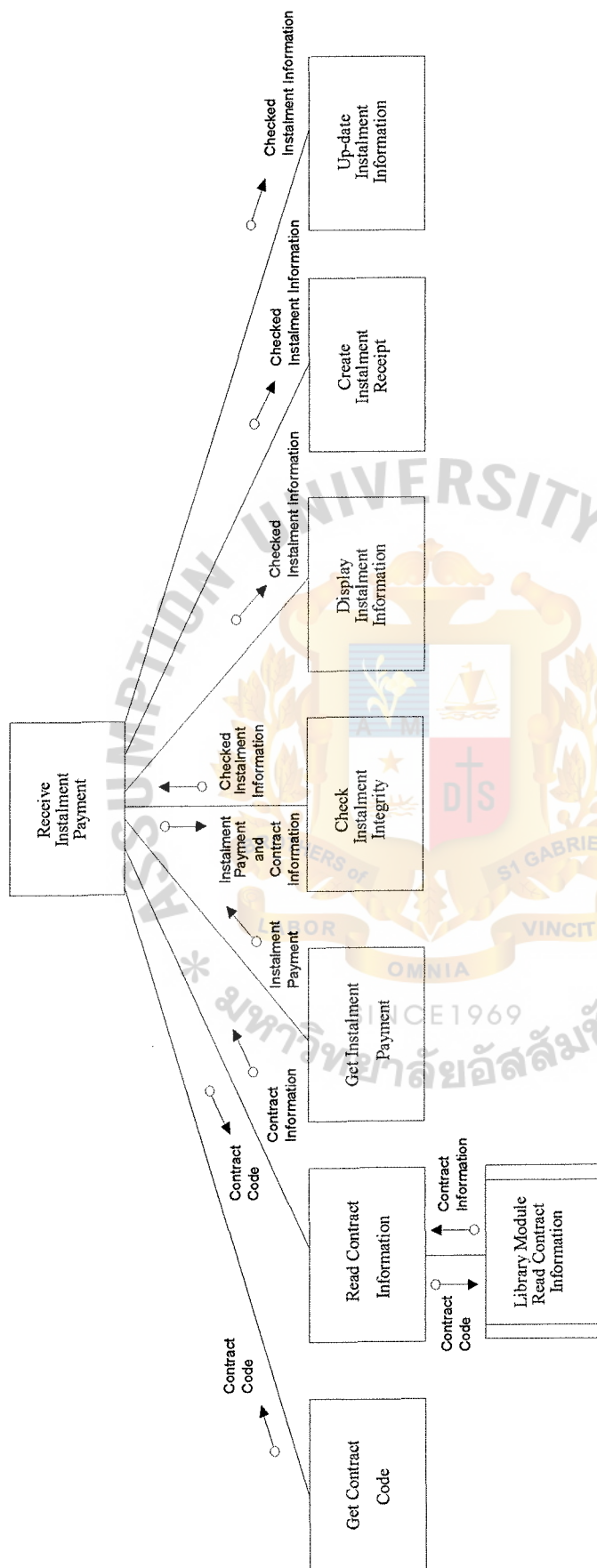


Figure B.6. Structure Chart of Modify Contract Information.



B.7. Structure Chart of Receive Instalment Payment.

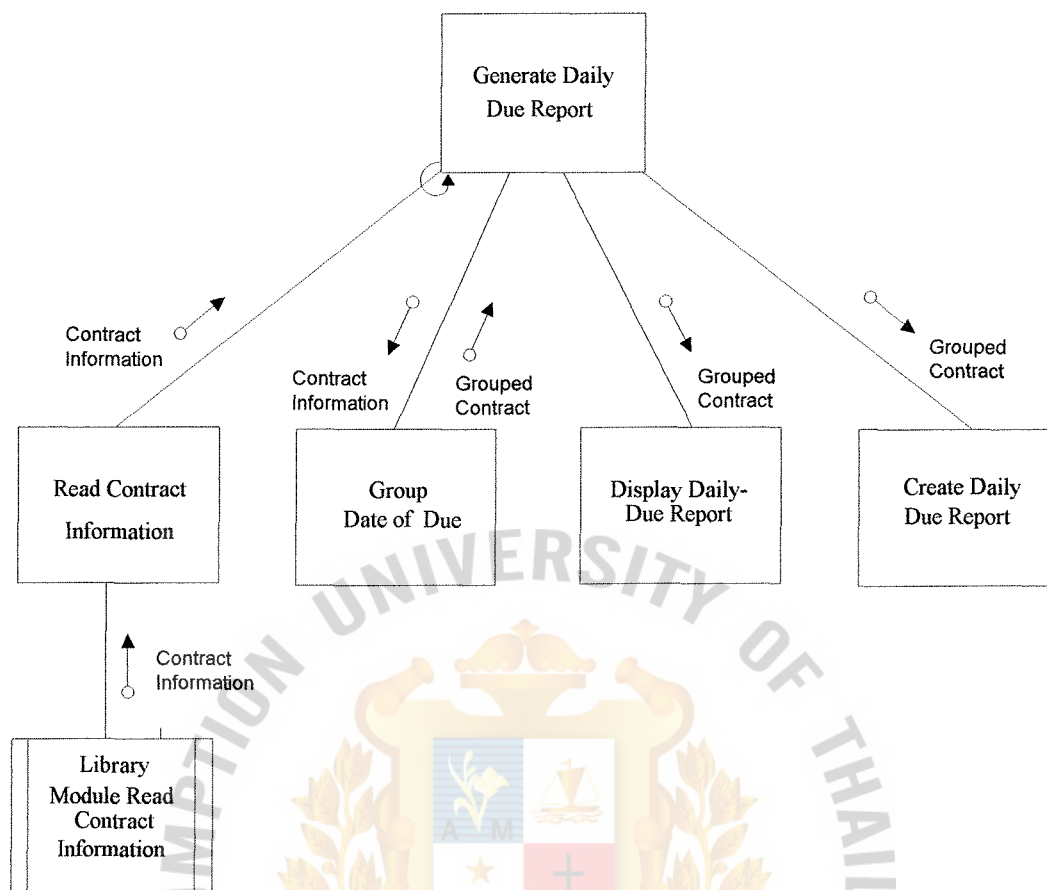


Figure B.8. Structure Chart of Generate Daily Due Report.

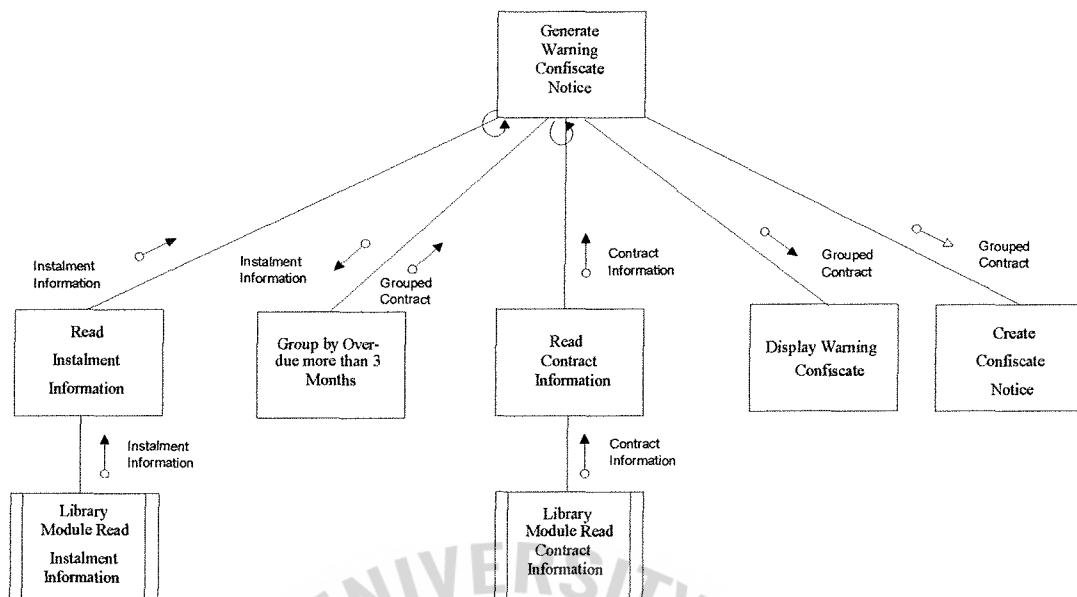


Figure B.9. Structure Chart of Generate Warning Confiscate Notice.

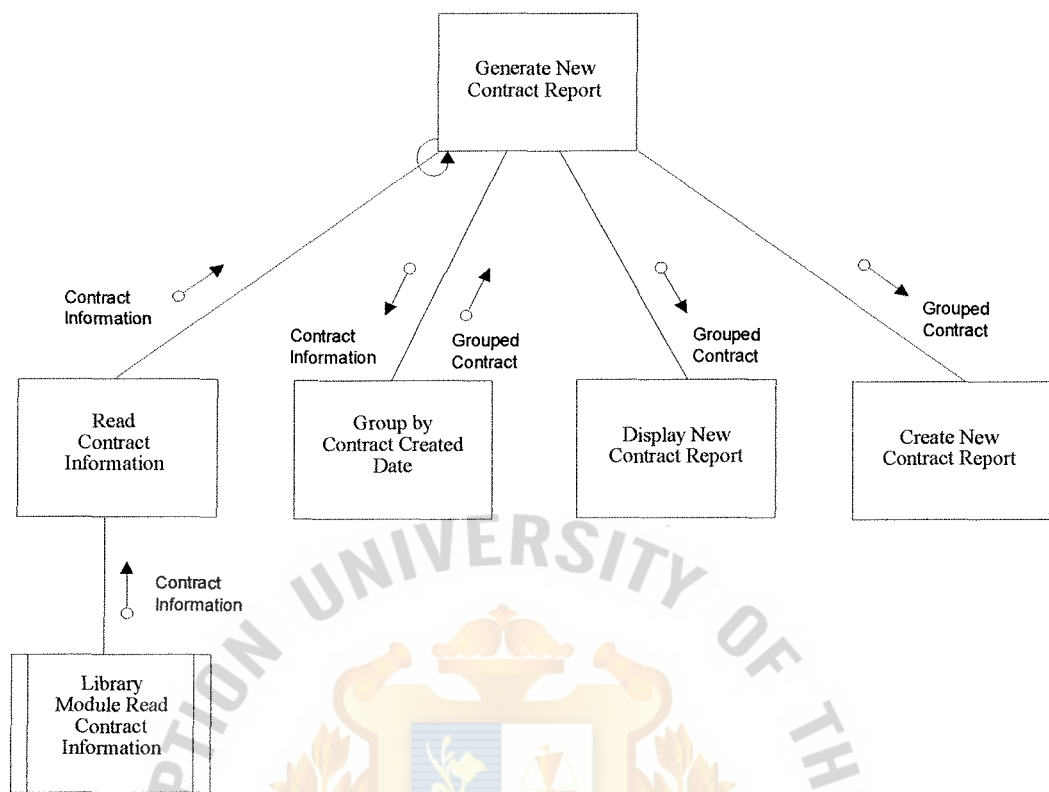


Figure B.10. Structure Chart of Generate New Contract Process.

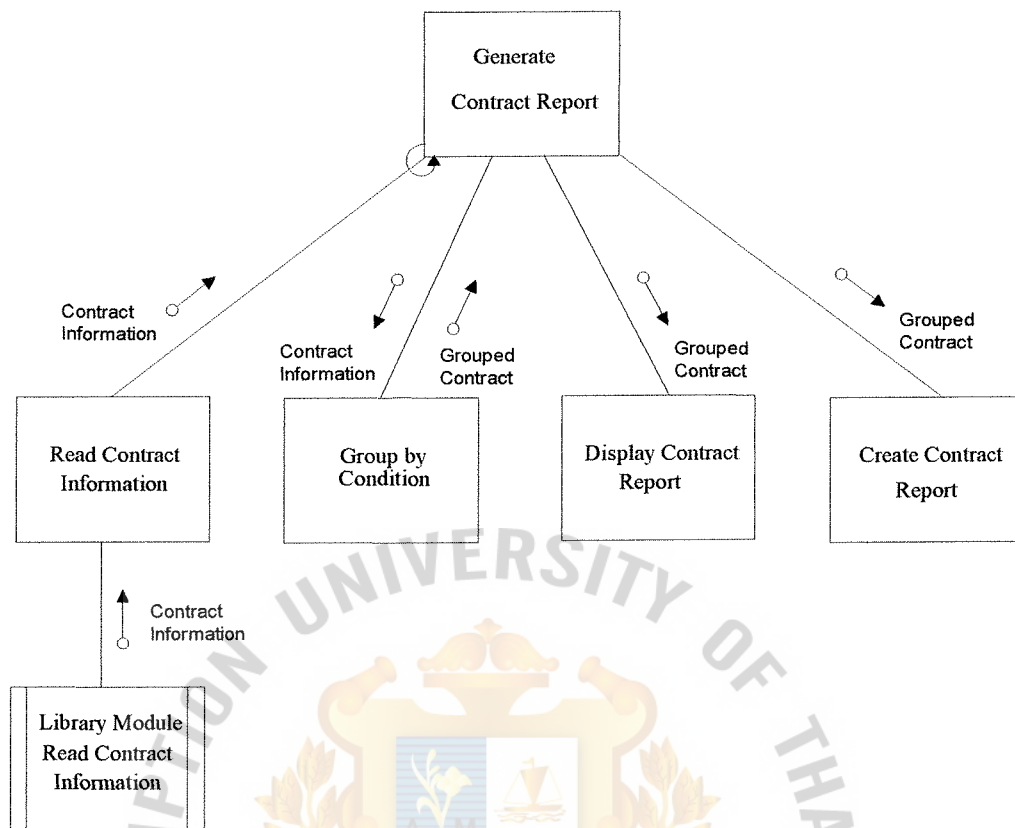


Figure B.11: Structure Chart of Generate Contract Report.

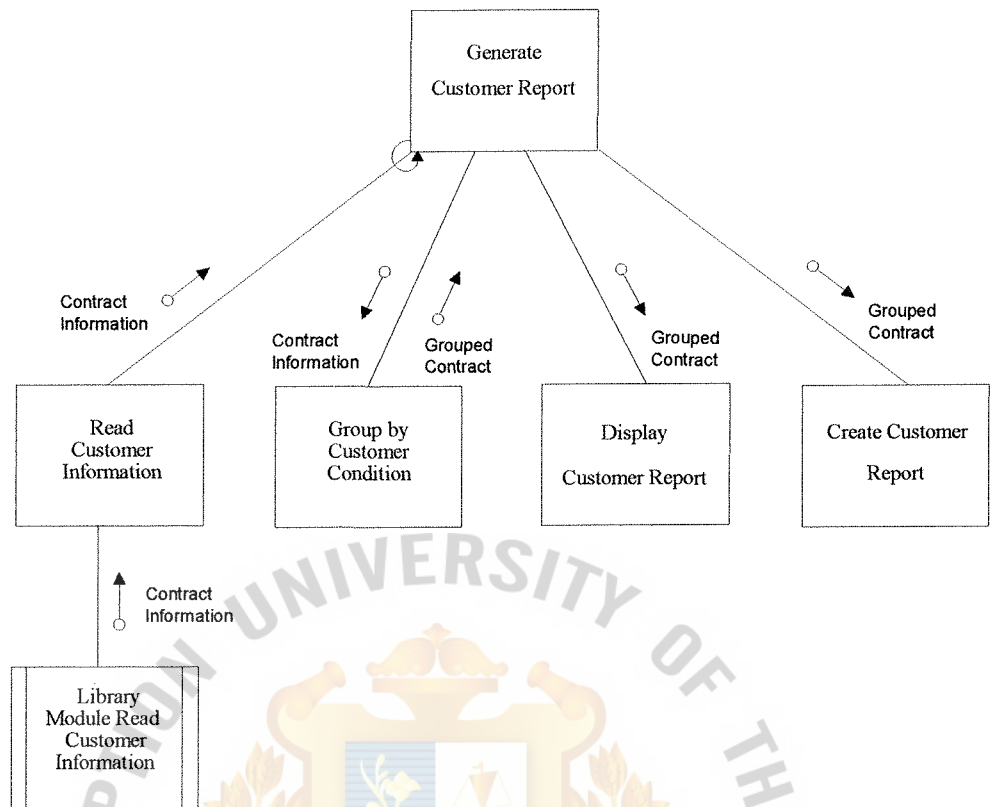


Figure B.12. Structure Chart of Generate Customer Report.

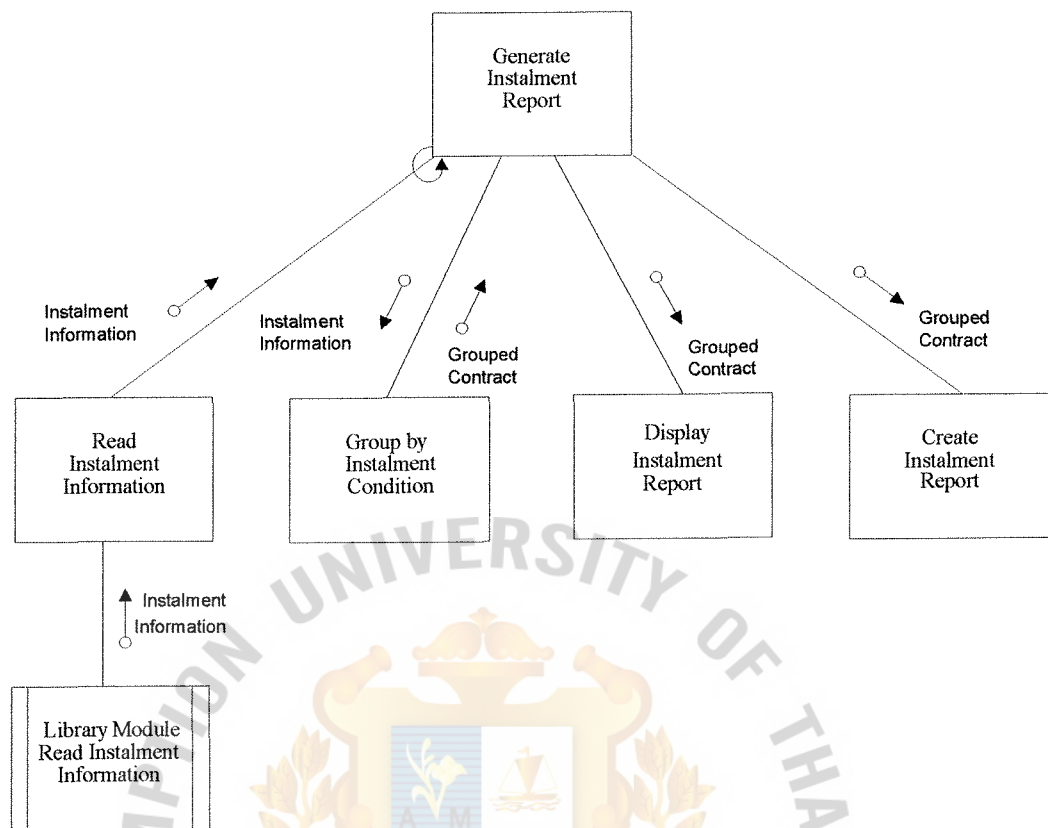


Figure B.13. Structure Chart of Instalment Report.

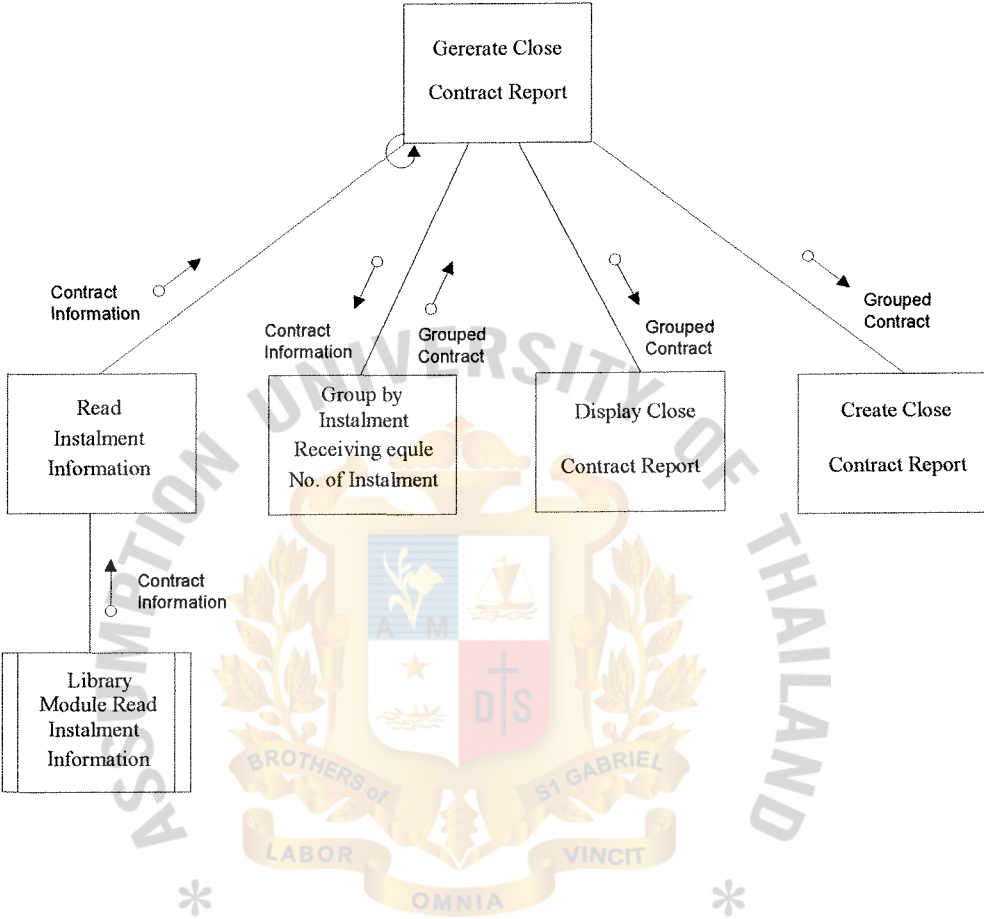


Figure B.14. Structure Chart of Generate Close Contract Report.

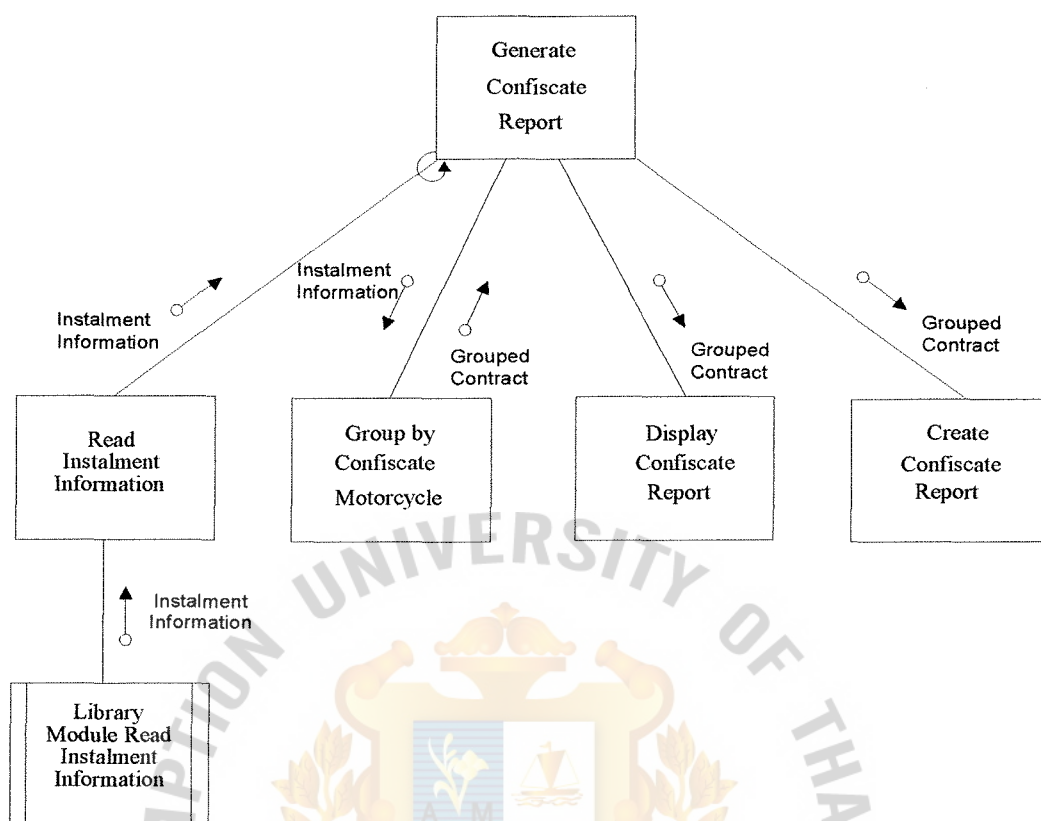


Figure B.15. Structure Chart of Generate Confiscate Report.

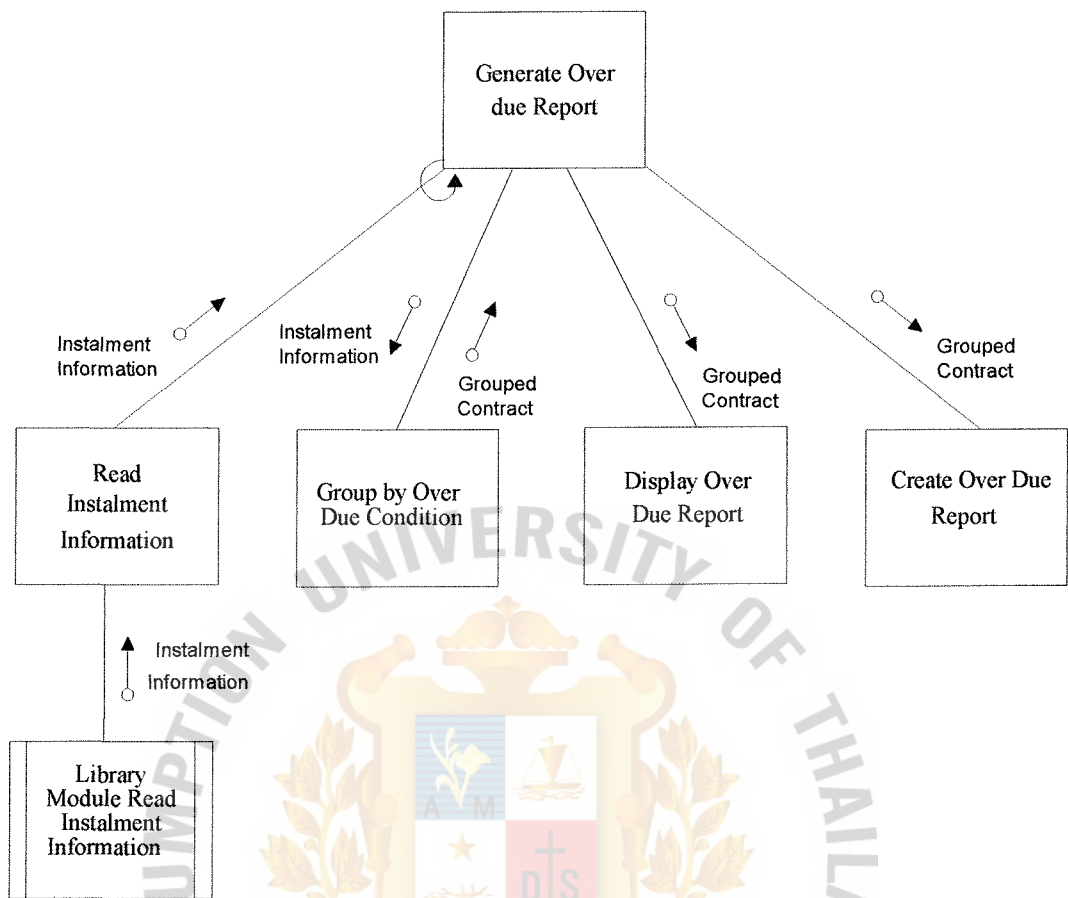


Figure B.16. Structure Chart of Generate Over Due Report.

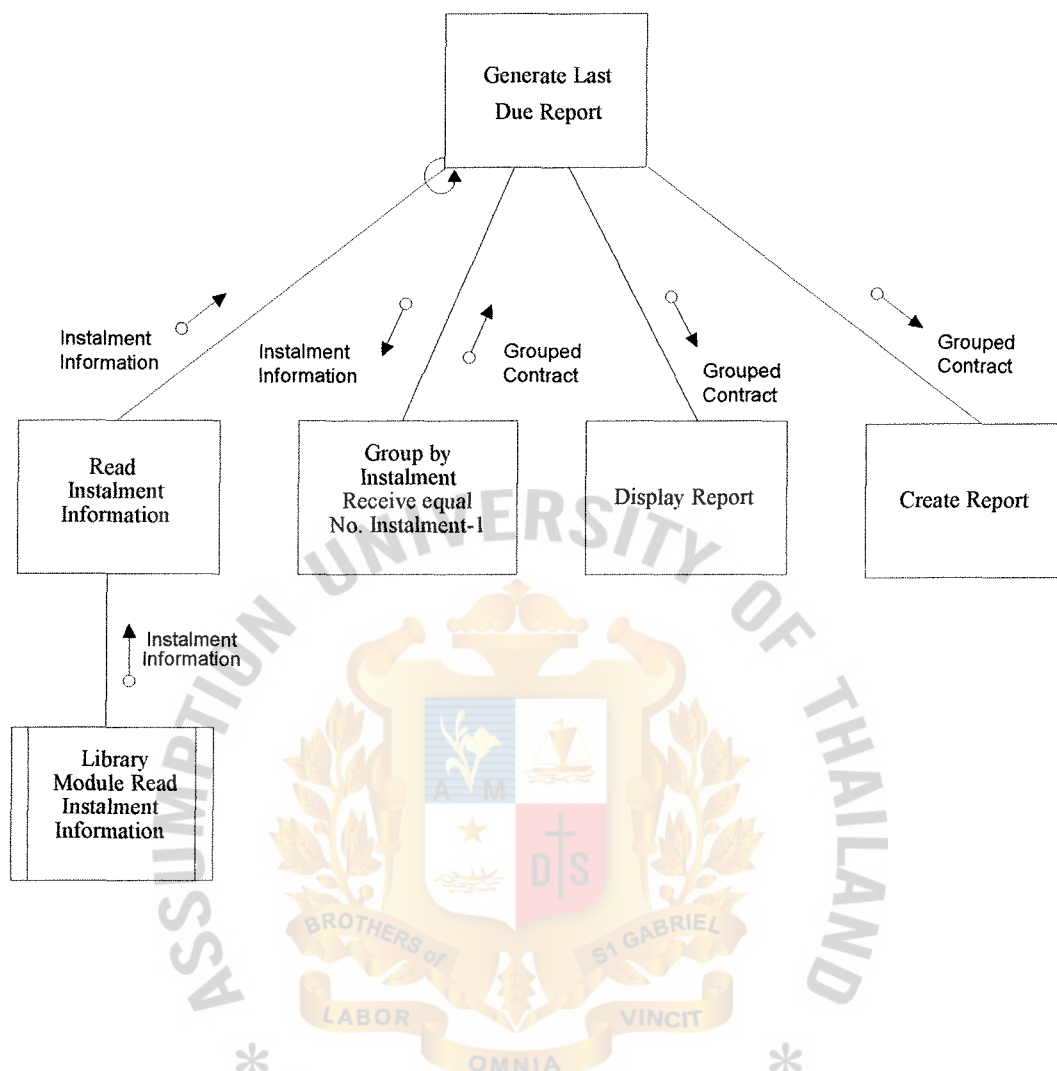


Figure B.17. Structure Chart of Generate Last Due Report.

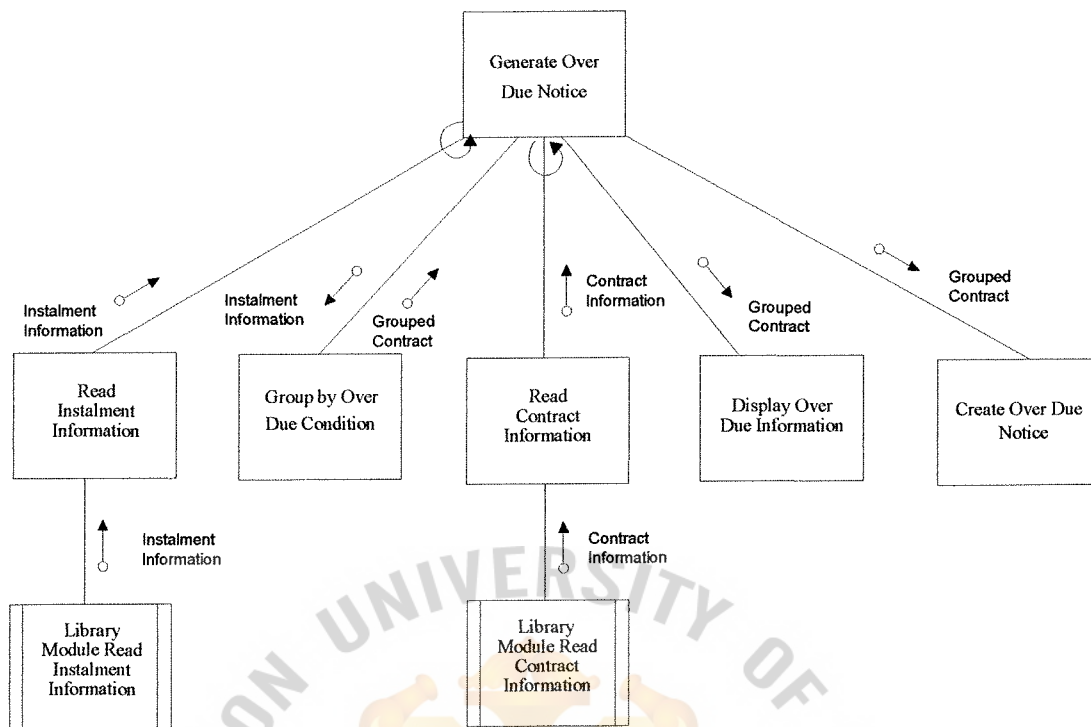


Figure B.18. Structure Chart of Generate Over Due Notice.

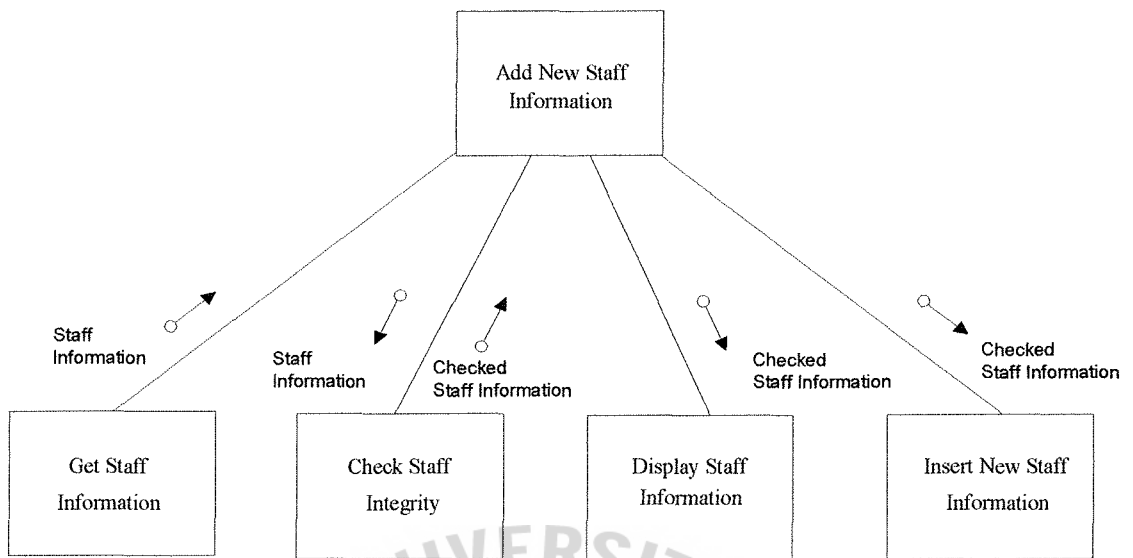


Figure B.19. Structure Chart of Add New Staff Information.

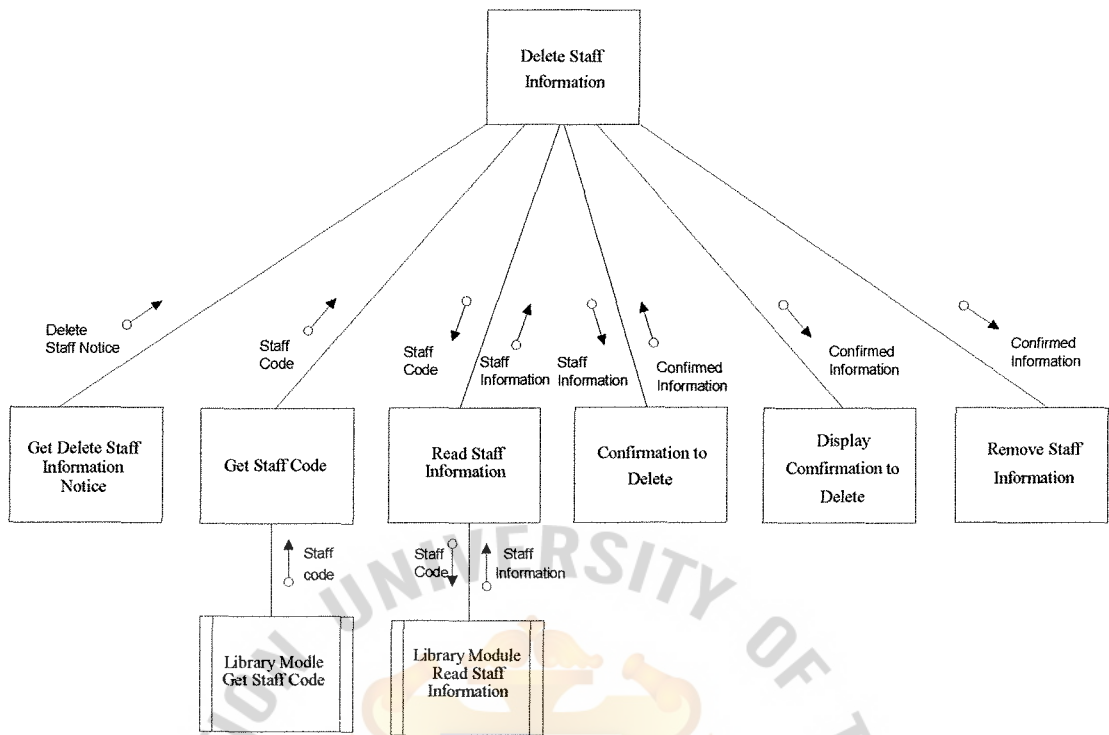


Figure B.20. Structure Chart of Delete Staff Information.

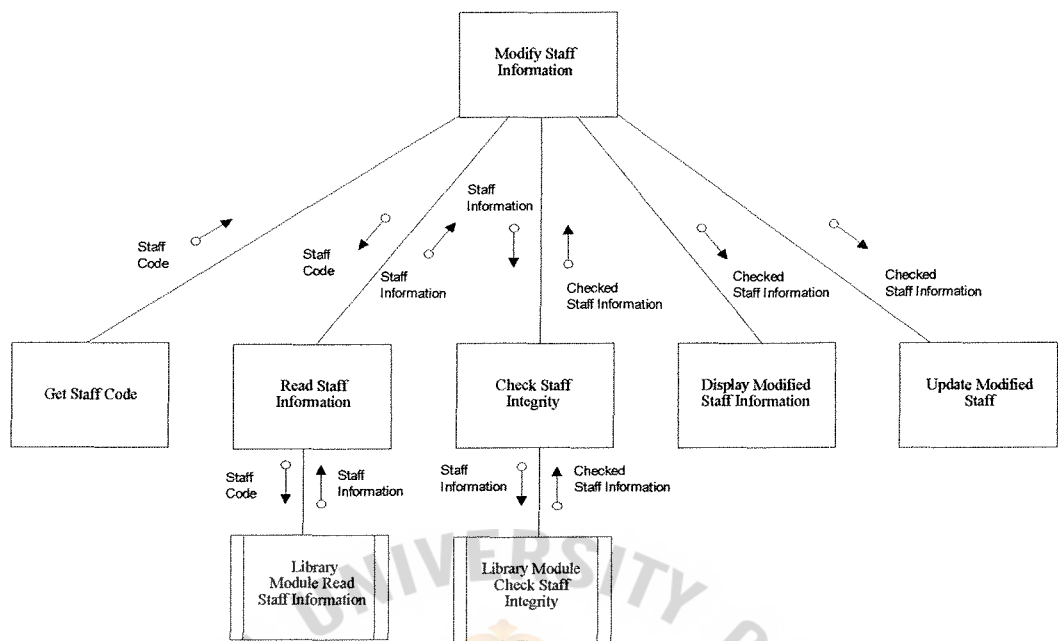


Figure B.21. Structure Chart of Modify Staff Information.

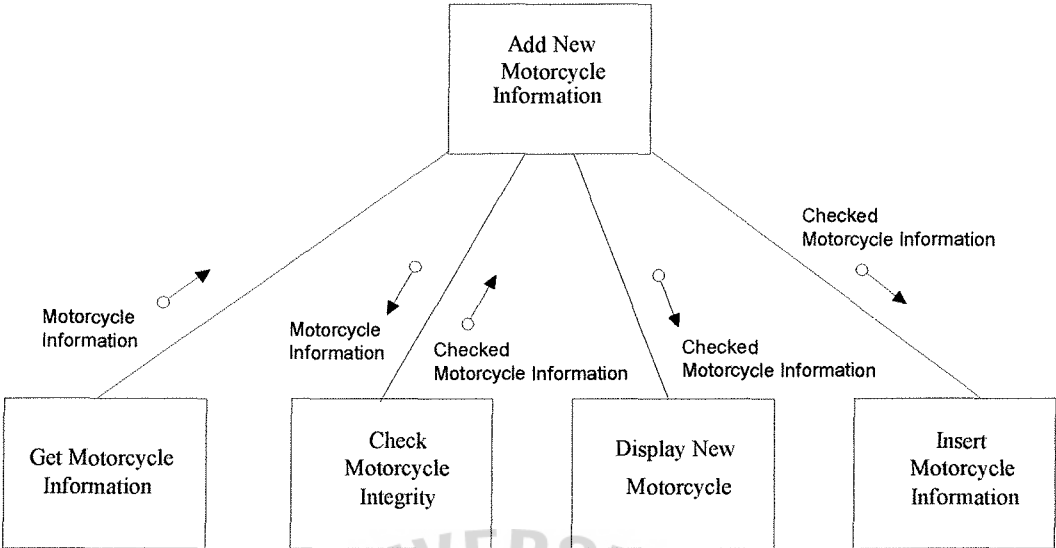


Figure B.22. Structure Chart of Add New Motorcycle Information.

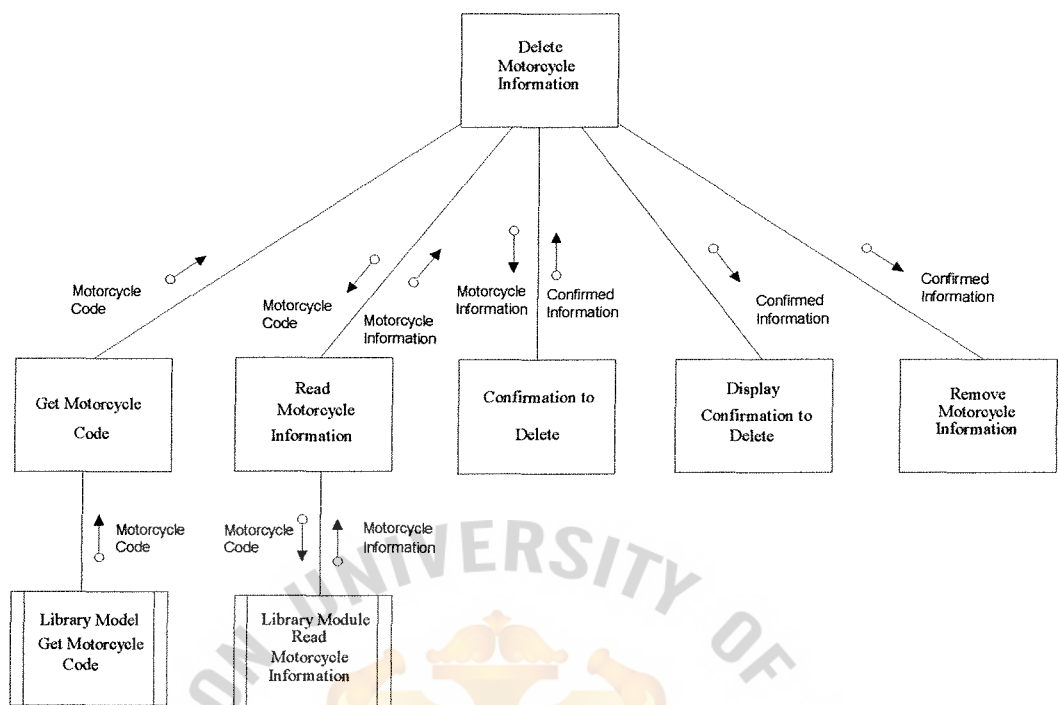


Figure B.23. Structure Chart of Delete Motorcycle Information.

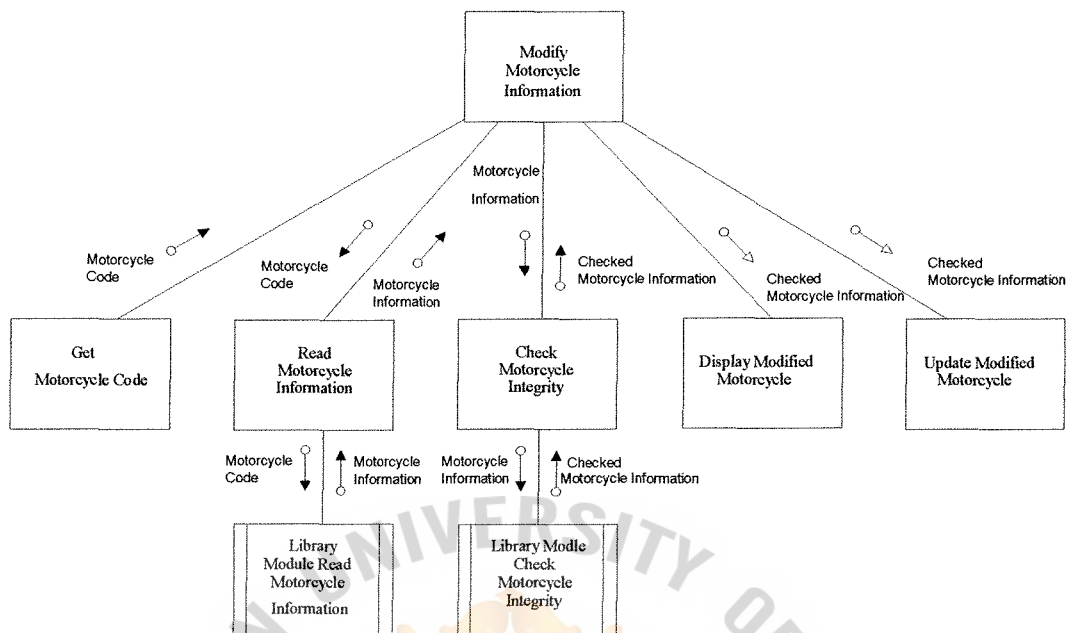


Figure B.24. Structure Chart of Modify Motorcycle Information.



APPENDIX C
INPUT DESIGN



Figure C.1. User Login Screen.

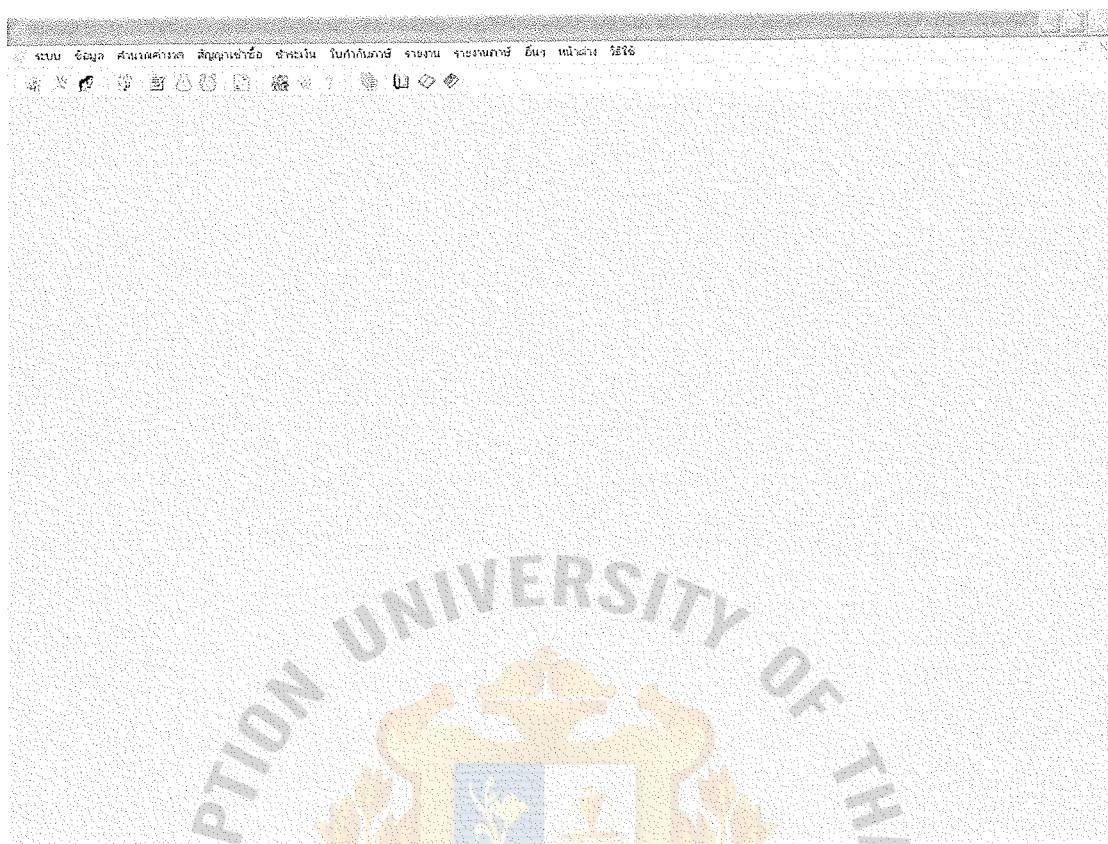


Figure C.2. Main Menu Screen.

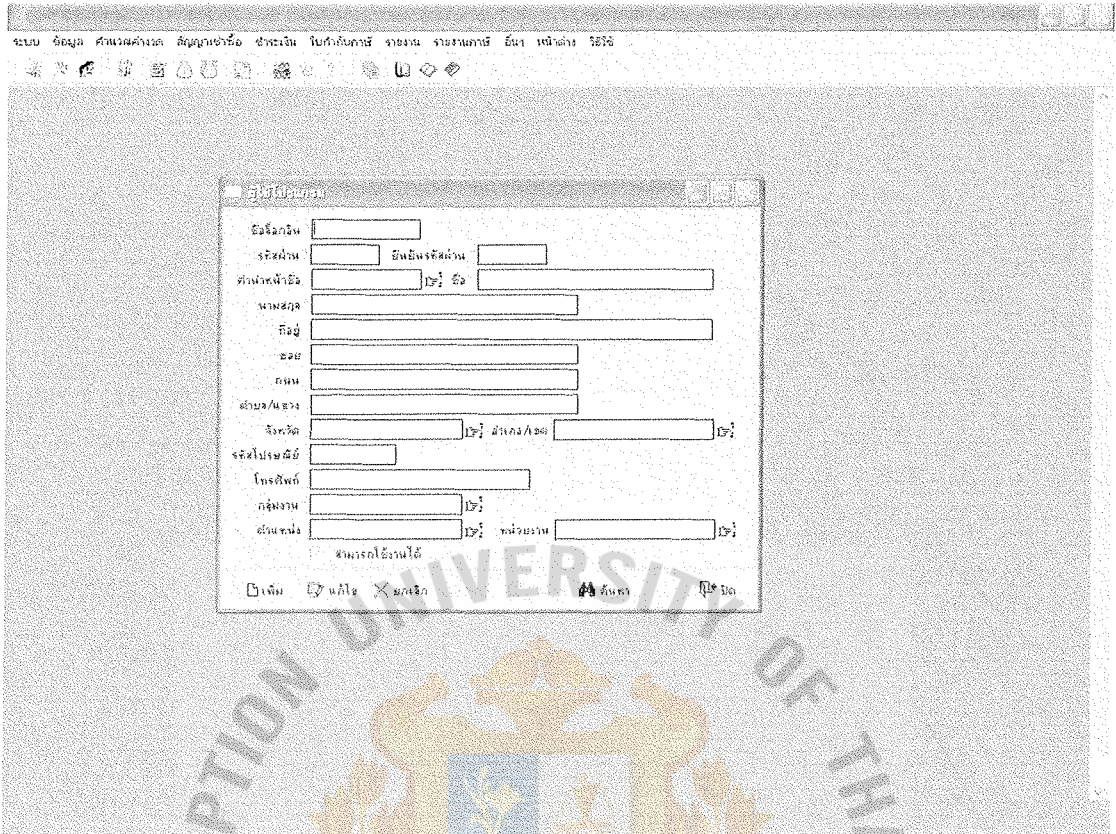


Figure C.3. Input Staff Information Screen.

ระบบ ข้อมูล ศาสนาคริสต์ สังคมศาสตร์ ชีวประวัติ ในด้านอื่นๆ รายงาน รายงานรายชื่ออื่นๆ หน้า 16

ข้อมูลลูกค้า ที่อยู่ ชื่อรายงาน

อาชีพ ส่วนสูง

ส่วนหัว สี

เพศ อายุ

เชื้อชาติ ศาสนา

ภาษา จำนวนบุตร

สัญชาติ รายได้ประจำตัว

ส่วนสูง/น้ำหนัก โทรศัพท์

โทรศัพท์ Fax

ชื่อจริง

ชื่อกลาง ชื่อสกุล

ประเภทกิจการ

รายได้

รายรับ ฐ. 000 บาท รายได้สุทธิ ฐ. 000 บาท ดอกเบี้ย 30

รายได้อื่น ฐ. 000 บาท เงินอื่น บาท

ทรัพย์สิน เงิน สถานะ

บันทึก Cancel

Figure C.6. Input Customer Job Information Screen.

Figure C.7. Generate Contract Information Screen.

ระบบ ข้อมูล ค่าเผื่อค่าคงต สักบุญเข้าชื่อ ค่าระเงิน ใบกำกับภาษี รายงาน รายงานภาษี สินค้า หน้า 18

ใบกำกับภาษี

• ทำยอดเข้าชื่อ • ใบเสร็จ ใบลด ใบเติมรวมใบลด ใบเติมรวม

ใบกำกับภาษีเลขที่ วันที่ใบกำกับภาษี 20/2/2545 สัญญาเลขที่

จังหวัด มีมูลค่า

ชื่อลูกค้า

สินค้า

หมายเลขเครื่อง หมายเลขเครื่อง รุ่น

รวม	จำนวนเงิน	เลขที่สัญญา
▶		
ยอดรวม	<input type="text"/>	บาท
ภาษีมูลค่าเพิ่ม	<input type="text"/>	บาท
ยอดรวมสุทธิ	<input type="text"/>	บาท

หมายเลข

ผู้ทำรายการ วันที่รับรายการ สถานที่

เพิ่ม ค้นหา ปิด

Figure C.9. Create Payment Receipt Screen.

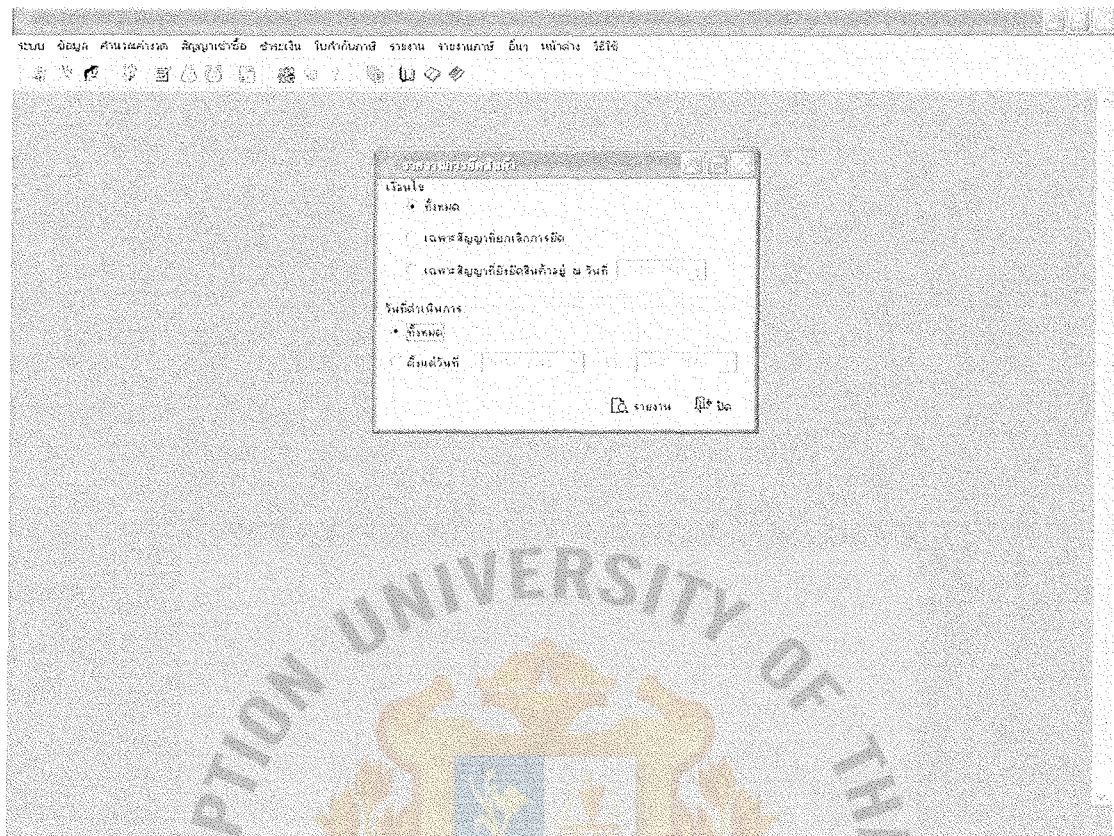


Figure C.11. Generate Confiscate Product Report Screen.

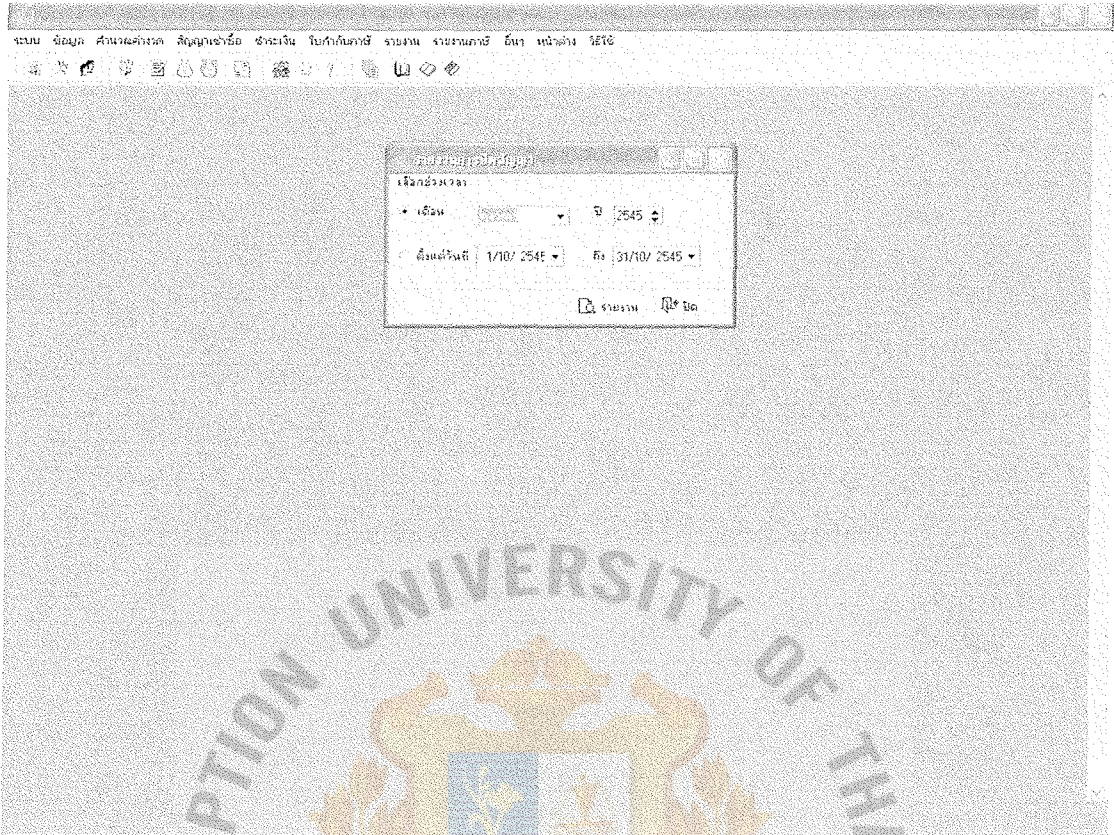


Figure C.12. Generate Close Report Screen.

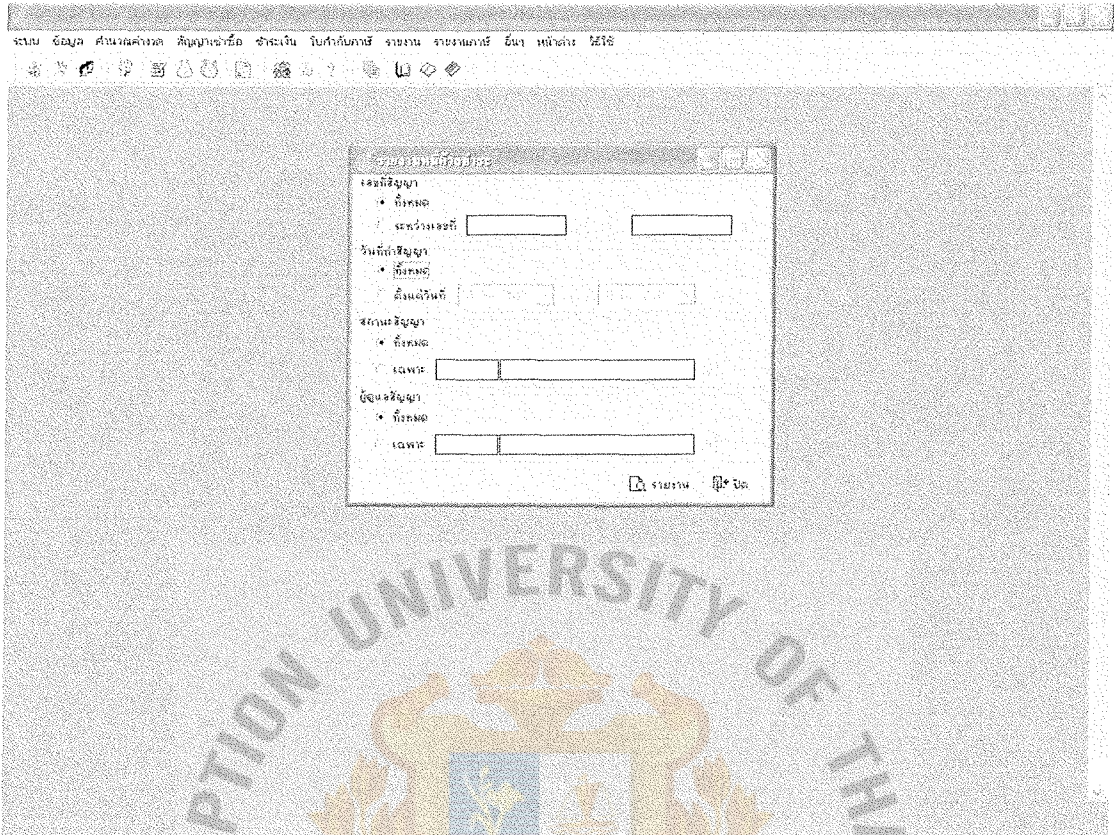


Figure C.13. Generate Contract Report Screen.

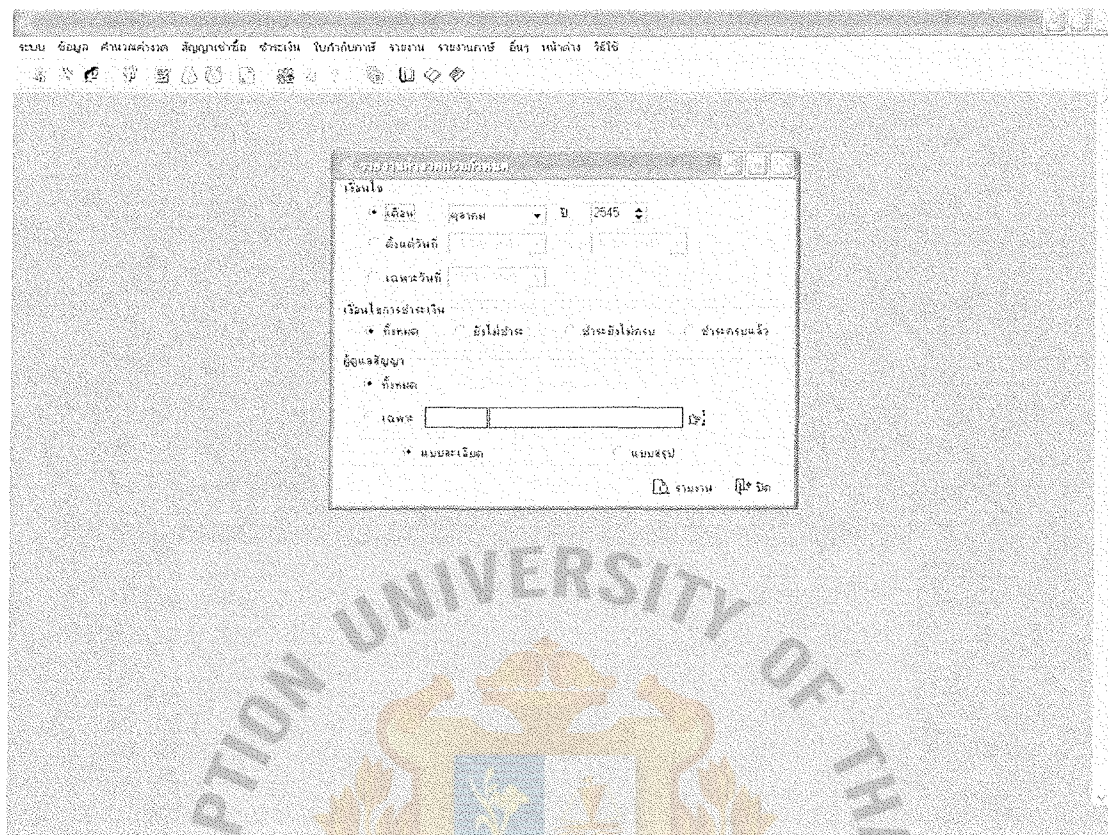


Figure C.14. Gencratc Due Date Report Screen.

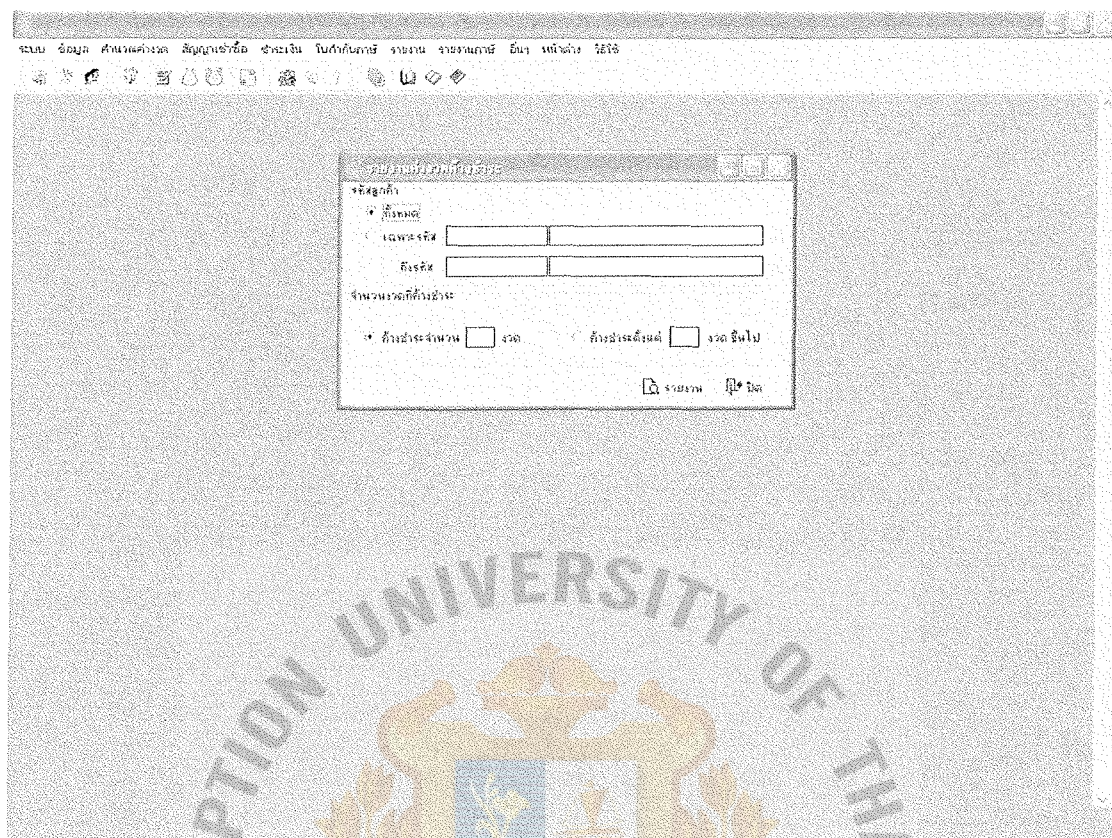


Figure C.15. Generate Over Due Report Screen.



APPENDIX D
OUTPUT DESIGN

บริษัท เอส.พี.เค. สมุทรปราการ จำกัด

95 ถนน สายลวด ต.ปากน้ำ อ.เมือง จ.สมุทรปราการ 10280

โทร 02-7017300-2

No. 0015

วันที่ 1/10/45

ใบเสร็จรับเงิน

ได้รับเงินจาก	นาย อภิสักดิ์ พรหมวิโร	สัญญาเช่าซื้อเลขที่	HP45-00194
ชำระโดย	เงินสด		จำนวนเงิน
รับชำระค่างวด	งวดที่ 5	ประจำเดือน	10
			2,565.00
ค่าปรับล่าช้า			-
รวม			2,565.00

หมายเหตุ

โปรดตรวจสอบยอดเงินในใบเสร็จทุกครั้งว่าเป็นยอดเงินที่ถูกต้อง

ผู้รับเงิน

นาย มนต์ชัย ร่มโพธิ์พัฒนา

Figure D.1. Instalment Receipt.

บริษัท เอส.พี.เค. สมุทรปราการ จำกัด

95 ถนน สายลวด ต.ปากน้ำ อ.เมือง จ.สมุทรปราการ 10280

โทร 02-7017300-2

No. 3105

วันที่ 15/5/45

ใบเสร็จรับเงิน

ได้รับเงินจาก	นาย อภิสักดิ์ พรหมวิโร	สัญญาเช่าซื้อเลขที่	HP45-00194
ชำระโดย	เงินสด		จำนวนเงิน
รับชำระค่าเงินค่าน			6,500.00
ประกันรถยนต์ 2 ปี+พ.ร.บ.+เสื้อ+หมวก			-
รถ HONDA รุ่น ZN110TP เลขเครื่อง 0008842 สี น้ำเงิน			
รวม			6,500.00

ผู้รับเงิน

นาย มนต์ชัย ร่มโพธิ์พัฒนา

Figure D.2. Down Payment Receipt.

วันที่พิมพ์ 31/07/2545 : 14:23		รายงานค่าวงดครงบกำหนด			หน้า 1					
เงื่อนไขการชำระเงิน ทั้งหมด ผู้ดูแลสัญญา ทั้งหมด		ประจำวันที่ 1 กุมภาพันธ์ พ.ศ. 2545								
ลำดับ	วันที่ครบกำหนด	เลขที่สัญญา	ชื่อผู้เข้าซื้อ	งวด	ค้างงวด	VAT	รวม	ชำระแล้ว	คงค้าง	ผู้ดูแลสัญญา
1	25/02/2545	MR045/0033	นาง ชุตาทพร ชัยวิเชียร	1	2,537.38	177.62	2,715.00	0.00	2,715.00	มนต์ชัย วัฒนโพธิ์พัฒน์
2	26/02/2545	MR045/0030	นาง เบญจมาศ สุวรรณนาวัน	1	2,710.28	189.72	2,900.00	0.00	2,900.00	วิมลรัตน์ แสงสมบูรณ์ประกร
จำนวน 2		รายการ	ยอดรวม		5,247.66	367.34	5615.00	0.00	5,615.00	

Figure D.3. Daily-Due Report.

บริษัท เอส.พี.เค. สมุทรปราการ จำกัด

95 ถ. สายลวด ต.ปากน้ำ อ.เมืองสมุทรปราการ จ.สมุทรปราการ 10280 โทร.(02) 7017300-2

วันที่ _____

เรื่อง แจ้งการขายรถยัด

เรียน นายทะเบียนกรมการขนส่งทางบก

ตามที่บริษัท เอส.พี.เค. สมุทรปราการ จำกัด ได้ให้ _____

เราซื้อรถจักรยานยนต์ _____ รุ่น _____ หมายเลขทะเบียน _____

หมายเลขเครื่อง _____ หมายเลขตัวถัง _____ ไปตามสัญญาเราซื้อที่ _____

ต่อมาปรากฏว่าผู้ซื้อดังกล่าวได้คิดค้นไม่ชำระค่าเราซื้อตามสัญญาเป็นเหตุให้สัญญาเราซื้อเลิกกันและ
บริษัทฯ ได้ทำการยึดรถจักรยานยนต์คันที่เราซื้อกลับมาแล้วนั้น

บัดนี้บริษัทฯ ได้จำหน่ายรถจักรยานยนต์คันที่ยึดมาดังกล่าวให้แก่ _____

_____ ไปในราคา _____ บาท

(_____) ตามสำเนาใบเสร็จรับเงิน/ใบกำกับภาษีเลขที่ _____

_____ ลงวันที่ _____ ซึ่งได้แนบมาพร้อมหนังสือฉบับนี้และ

บริษัทฯจะนำส่งภาษีมูลค่าเพิ่มให้แก่สรรพากรแล้วต่อไป

ในการโอนกรรมสิทธิ์ครั้งนี้ หากเกิดข้อโต้แย้งไม่ว่าคดีแพ่งหรืออาญา ทางบริษัทฯ ขอรับผิดชอบแต่
เพียงผู้เดียว

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

SINCE 1969

มหาวิทยาลัยอัสสัมชัญ
บริษัท เอส.พี.เค. สมุทรปราการ จำกัด

Figure D.4. Warning Confiscate Product Notice.

บริษัท เอส.พี.เค. สมุทรปราการ จำกัด

95 ถ. สายลวด ต.ปากน้ำ อ.เมืองสมุทรปราการ จ.สมุทรปราการ 10280 โทร.(02) 7017300-2

วันที่ _____

เรื่อง ให้ชำระค่าเช่าซื้อ

เรียน _____ ผู้เช่าซื้อ

ตามที่บริษัท เอส.พี.เค. สมุทรปราการ จำกัด ได้ให้ _____ ซึ่งต่อไปใน

หนังสือฉบับนี้จะเรียกว่าผู้เช่าซื้อได้ทำการเช่าซื้อรถจักรยานยนต์ _____ รุ่น _____

หมายเลขเครื่อง _____ หมายเลขตัวถัง _____ หมายเลขทะเบียน _____

ตามสัญญาเช่าซื้อเลขที่ _____ วันที่ _____ โดยผู้เช่าซื้อตกลงผ่อนชำระค่าเช่า

เป็นรายเดือนทั้งหมด _____ เดือนๆละ _____ บาทเริ่มชำระตั้งแต่วันที่ _____ และ

ทุกวันที่ _____ ของเดือนถัดไปจนครบกำหนดตามสัญญาเช่าซื้อ

บัดนี้ผู้เช่าซื้อดังกล่าวได้ผิดนัดไม่ชำระค่าเช่าซื้อตามสัญญา

งวดที่ _____	ประจำเดือน _____	เป็นเงิน _____	บาท
--------------	------------------	----------------	-----

งวดที่ _____	ประจำเดือน _____	เป็นเงิน _____	บาท
--------------	------------------	----------------	-----

งวดที่ _____	ประจำเดือน _____	เป็นเงิน _____	บาท
--------------	------------------	----------------	-----

รวมเป็นเงิน _____	บาท
-------------------	-----

ดังนั้นทางบริษัท เอส.พี.เค. สมุทรปราการ จำกัด จึงเรียนมาเพื่อให้ท่านมาทำการชำระค่าเช่าซื้อ

ภายในวันที่ _____

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

บริษัท เอส.พี.เค. สมุทรปราการ จำกัด

หมายเหตุ

- หากท่านได้ทำการชำระในงวดดังกล่าวก่อนที่จะได้รับหนังสือฉบับนี้แล้วทางบริษัทฯ ต้องขออภัยเป็นอย่างสูง
- หากท่านมีข้อสงสัย กรุณาติดต่อกลับมาที่เบอร์โทร(02)7017300-2

Figure D.5. Over-due Notice.

วันที่พิมพ์ 31/07/2545 เวลา 14:18น.			รายงานการทำสัญญาใหม่			หน้า 1
			ตั้งแต่วันที่ 01/05//2545 ถึงวันที่ 07/05/2545			
แบบละเอียด			(ไม่รวมภาษีมูลค่าเพิ่ม)			
ลำดับ	เลขที่สัญญา	วันที่	ชื่อผู้เช่าซื้อ	มูลค่าเช่าซื้อ	เงินคาวน	ยอดผ่อนชำระ
1	MR045/0001	02/05/2545	นาย การุณ ชมภูบุตร	59,366.45	2,618.69	56,747.76
2	MR045/0002	02/05/2545	นางสาว แสงดาว ชวดคำ	50,760.70	3,657.94	47,102.76
3	MR045/0003	02/05/2545	นาย ศรชัย ทองสาย	63,973.01	13,057.01	50,916.00
4	MR045/0004	02/05/2545	นางสาว ปาริชาติ ธารายุทธ	56,425.28	1,920.56	54,504.72
5	MR045/0005	02/05/2545	นางสาว จันทรา จัปปุ	51,823.29	6,991.59	44,831.70
6	MR045/0006	02/05/2545	นาย รัตนา คำย้อม	52,559.81	10,167.29	42,392.52
7	MR045/0007	02/05/2545	นาย สิทธิศักดิ์ สืบสัญญา	50,021.46	18,227.10	31,794.36
8	MR045/0008	02/05/2545	นาง กษิมา คำไธ	59,006.45	2,318.69	56,747.76
9	MR045/0009	02/05/2545	นาง นงราม คำปลิว	46,937.32	2,133.64	44,803.68
10	MR045/0010	02/05/2545	นาย วิมลศักดิ์ รักนางวงศ์	52,479.45	14,180.37	38,299.08
11	MR045/0011	06/05/2545	นาย ยุทธนาวิ ชูไธ	58,700.90	10,252.34	48,448.56
12	MR045/0012	06/05/2545	นาย วิรัตน์ พิสิทธิ์เดชากุล	72,498.19	4,367.29	68,130.90
13	MR045/0013	06/05/2545	นาย สยาม รอดศิริ	51,810.33	4,090.65	47,719.68
14	MR045/0014	06/05/2545	นาย สนธยา หวัดสูงเนิน	39,308.46	2,803.74	36,504.72
15	MR045/0015	07/05/2545	นาย ศิริวัฒน์ เจริญกุลป์	51,810.33	4,090.65	47,719.68
16	MR045/0016	07/05/2545	นาง นาดยา พรรณรักษา	53,172.92	7,528.04	45,644.88
17	MR045/0017	07/05/2545	นาย สุริยะ บุญเลิศ	66,572.85	4,554.21	62,018.64
18	MR045/0018	07/05/2545	นางสาว จันทรา จัปปุ	43,266.39	13,322.43	29,943.96
19	MR045/0019	07/05/2545	นาย กิตติ พัวประเสริฐ	56,974.84	2,133.64	54,841.20
20	MR045/0020	07/05/2545	นาย ศักดิ์พิเชษฐ แสงรุ่ง	62,520.57	4,090.65	58,429.92
21	MR045/0021	07/05/2545	นางสาว อลวย แหสมุทร์	62,520.57	4,090.65	58,429.92
22	MR045/0022	07/05/2545	นางสาว นิษฐา ศิริจันทร์	45,420.56	7,289.72	38,130.84
23	MR045/0023	07/05/2545	นางสาว พรรณี ยะมงคล	33,644.82	2,803.74	30,841.08
24	MR045/0024	07/05/2545	นาง อรุณ ปันดอนทอง	61,644.87	2,429.91	59,214.96
รวมทั้งสิ้น 24 สัญญา เป็นเงิน			1,303,279.82	149,120.54	1,154,159.28	

Figure D.6. New Contract Report.

- 1 สัญญาเลขที่ MR045/0076 ทำสัญญาวันที่ 07 มิถุนายน 2545 เลขที่เครื่อง NF125MDE-0006846 เลขตัวถัง NF125MD-0006846
รหัสลูกค้า HPR-0001-00170 นาย พรชัย ศรีรักยิ้ม คู่สมรส
ผู้ค้าคนที่ 1 HPR-0001-00171 นาย เกรียงศักดิ์ วิชัยดิษฐ์ ผู้ค้าคนที่ 2
- 2 สัญญาเลขที่ MR045/0077 ทำสัญญาวันที่ 07 มิถุนายน 2545 เลขที่เครื่อง NF110TE-0168297 เลขตัวถัง NF110T-0168297
รหัสลูกค้า HPR-0001-00172 นาย สุทธิ เอี่ยมวิเศษ คู่สมรส HPR-0001-00173 นาง สมสมร เอี่ยมวิเศษ
ผู้ค้าคนที่ 1 HPR-0001-00174 นาย สุริยา ฮาตวิเศษ ผู้ค้าคนที่ 2
- 3 สัญญาเลขที่ MR045/0078 ทำสัญญาวันที่ 07 มิถุนายน 2545 เลขที่เครื่อง NF110TE-0168306 เลขตัวถัง NF110T-0168306
รหัสลูกค้า HPR-0001-00175 นาย พิเชต พรหมจักร คู่สมรส
ผู้ค้าคนที่ 1 HPR-0001-00176 นาย จิระพันธ์ เขียวรุ่ง ผู้ค้าคนที่ 2
- 4 สัญญาเลขที่ MR045/0079 ทำสัญญาวันที่ 07 มิถุนายน 2545 เลขที่เครื่อง NF110TE-0166013 เลขตัวถัง NF110T-0166013
รหัสลูกค้า HPR-0001-00177 นาย อำนาจ ดันทองคำ คู่สมรส
ผู้ค้าคนที่ 1 HPR-0001-00178 นาย อนุ ดันทองคำ ผู้ค้าคนที่ 2
- 5 สัญญาเลขที่ MR045/0080 ทำสัญญาวันที่ 10 มิถุนายน 2545 เลขที่เครื่อง FS125CE-0065837 เลขตัวถัง FS125C-0065837
รหัสลูกค้า HPR-0001-00180 นาย วิษณุ ชื่นบาน คู่สมรส
ผู้ค้าคนที่ 1 HPR-0001-00181 นาง เกษณี มูลละม่อม ผู้ค้าคนที่ 2
- 6 สัญญาเลขที่ MR045/0081 ทำสัญญาวันที่ 10 มิถุนายน 2545 เลขที่เครื่อง ZN110TE-0029911 เลขตัวถัง ZN110T-0029911
รหัสลูกค้า HPR-0001-00183 นาย สุรินทร์ อุดมสมบัติรัตนะ คู่สมรส HPR-0001-00184 นางสาว สุนี สินโอฟาร
ผู้ค้าคนที่ 1 HPR-0001-00184 นางสาว สุนี สินโอฟาร ผู้ค้าคนที่ 2
- 7 สัญญาเลขที่ MR045/0082 ทำสัญญาวันที่ 10 มิถุนายน 2545 เลขที่เครื่อง NF125MDE-0004209 เลขตัวถัง NF125MD-0004209
รหัสลูกค้า HPR-0001-00185 นาย สมศักดิ์ นุ่นทองคำ คู่สมรส
ผู้ค้าคนที่ 1 HPR-0001-00186 นาย ประสงค์ นุ่นทองคำ ผู้ค้าคนที่ 2
- 8 สัญญาเลขที่ MR045/0083 ทำสัญญาวันที่ 10 มิถุนายน 2545 เลขที่เครื่อง NF110E-0255050 เลขตัวถัง NF110-0255050
รหัสลูกค้า HPR-0001-00187 นาย สุทิน สุบินตา คู่สมรส HPR-0001-00188 นาง ทองพูน สุบินตา
ผู้ค้าคนที่ 1 HPR-0001-00189 นาย เอลิม งามคณะ ผู้ค้าคนที่ 2
- 9 สัญญาเลขที่ MR045/0084 ทำสัญญาวันที่ 18 มิถุนายน 2545 เลขที่เครื่อง C100MPE-0009630 เลขตัวถัง C100MP-0009630
รหัสลูกค้า HPR-0001-00190 นางสาว วรณะวีร์ ชัดนาค คู่สมรส HPR-0001-00191 นาย อนันต์ หล้าแดง
ผู้ค้าคนที่ 1 HPR-0001-00191 นาย อนันต์ หล้าแดง ผู้ค้าคนที่ 2
- 10 สัญญาเลขที่ MR045/0085 ทำสัญญาวันที่ 18 มิถุนายน 2545 เลขที่เครื่อง ZN110TE-0031951 เลขตัวถัง ZN110T-0031951
รหัสลูกค้า HPR-0001-00192 นาย วีระศักดิ์ สุภาพ คู่สมรส HPR-0001-00193 นางสาว บัวลอย กุดโง้ง
ผู้ค้าคนที่ 1 HPR-0001-00193 นางสาว บัวลอย กุดโง้ง ผู้ค้าคนที่ 2

รวมทั้งสิ้น 10 รายการ

Figure D.7. Contract Report.

รายงานลูกค้าทั้งหมด				
วันที่พิมพ์ 31/07/2545 เวลา 14: 34น. ระหว่างวันที่ 30 พฤษภาคม 2545 ถึง 31 กรกฎาคม 2545				
หน้า 1				
ลำดับที่	รหัสลูกค้า	ชื่อ	วันที่ติดต่อครั้งแรก	ระดับลูกค้า
1	HPR-0001-00170	นาย พรชัย ศรีรักยิ้ม	07/06/2545	ดี
2	HPR-0001-00171	นาย เกรียงศักดิ์ วิชัยดิษฐ์	07/06/2545	ปานกลาง
3	HPR-0001-00172	นาย สุทธิ เอี่ยมวิเศษ	07/06/2545	ปานกลาง
4	HPR-0001-00173	นาง สมสมร เอี่ยมวิเศษ	07/06/2545	ปานกลาง
5	HPR-0001-00174	นาย สุริยา ฮาตวิเศษ	07/06/2545	ปานกลาง
6	HPR-0001-00175	นาย พิเชต พรหมจันทร์	07/06/2545	ปานกลาง
รวมทั้งสิ้น 6 ราย				

Figure D.8. Customer Report.

รายงานการปิดสัญญา				หน้า 1	
				วันที่พิมพ์ : 31/ 07/ 2545: 14:28	
เลขที่สัญญา	ชื่อผู้เช่าซื้อ	วันที่บอกเลิก	หมายเลขเครื่อง	รายละเอียดสินค้า	
MR045/0043	นาย ชิชณุ สระแก้ว	13/05/2545	FS125CE-0056209	ฮอนด้า รุ่น FS125C แบบ – สีแดง	
MR045/0047	นาง นวนมนี แม้นจัน	13/05/2545	ZN110E-0011943	ฮอนด้า รุ่น ZN110 แบบ – สีเขียว	
				จำนวน 2 รายการ	

Figure D.9. Close Contract Report.

รายงานลูกหนี้ค้างชำระ จำนวน 3 งวด					หน้า 1
ณ วันที่ 31/07/2545					
ลูกค้าทั้งหมด					
ชื่อผู้เช่าซื้อ : นาย วีระศักดิ์ สุภาพ (HPR-0001-00192)					
เลขที่สัญญา	วันที่ทำสัญญา	งวดที่ค้าง	วันครบกำหนด	จำนวนเงิน	
MR045/0085	18/06/2545	1	15/05/2545	2,875.00	
MR045/0085	18/06/2545	1	15/05/2545	2,875.00	
MR045/0085	18/06/2545	1	15/05/2545	2,875.00	
จำนวนเงินรวม				8,625.00	
จำนวนเงินรวมทั้งสิ้น				8,625.00	

Figure D.11. Over-due Report.

รายงานลูกหนี้ครบกำหนดชำระงวดสุดท้าย

หน้า 1

ณ วันที่ 31/07/2545

ลูกค้าทั้งหมด

ชื่อผู้เช่าชื่อ : นาย วีระศักดิ์ สุภาพ (HPR-0001-00192)

เลขที่สัญญา	วันที่ทำสัญญา	วันครบกำหนด	จำนวนเงิน
MR044/0085	18/06/2544	15/05/2545	2,875.00



Figure D.12. Last-due Report.



APPENDIX E
PROCESS SPECIFICATION

PROCESS SPECIFICATION

Table E.1. Process Specification of Process 1.1.1.

Items	Description
Process Name:	Add New Customer Information
Data In:	New Customer Information Customer Information
Data Out:	New Customer Information
Process:	(1) Get customer information (2) Check customer information integrity (3) Display customer information (4) Recode new customer information into data store
Attachment:	(1) Customer (2) Data Store D1 (3) Data Store D6 (4) Data Store D7

Table E.2. Process Specification of Process 1.1.2.

Items	Description
Process Name:	Modify Customer Information
Data In:	New Customer Information Customer Information
Data Out:	Updated Customer Information
Process:	(1) Receive customer detail (2) Retrieve customer information from data store (3) Modify existing customer information (4) Display modified customer information (5) Record updated customer information into data store
Attachment:	(1) Customer (2) Data Store D1 (3) Data Store D6 (4) Data Store D7

Table E.3. Process Specification of Process 1.2.

Items	Description
Process Name:	Stock Inventory Inquiry
Data In:	Customer Order Product Available
Data Out:	Order Detail Product Available
Process:	(1) Get order information (2) Check order information integrity (3) Check product available stock (4) Display product available information
Attachment:	(1) Customer (2) Marketing

Table E.4. Process Specification of Process 1.3.

Items	Description
Process Name:	Approve Customer Information
Data In:	Customer Information Approved Customer Information
Data Out:	Customer Information Approved Customer Information
Process:	(1) Get customer detail (2) Retrieve customer information from data store (3) Check customer integrity (4) Inspect customer information (5) Display Approved customer information (6) Update customer information into data store
Attachment:	(1) Customer (2) Checker (3) Data Store D1

Table E.5. Process Specification of Process 1.4.1.

Items	Description
Process Name:	Generate New Contract
Data In:	Customer Information Staff Information Motorcycle Information Down Payment Instalment Information
Data Out:	Down Information Retail Price Down Payment Contract Information Contract Document Down Receipt
Process:	(1) Get customer detail (2) Retrieve customer information from data store (3) Get motorcycle detail (4) Retrieve motorcycle information from data store (5) Get staff detail (6) Retrieve staff information from data store (7) Get down payment information (8) Calculate instalment information (9) Check contract integrity (10) Display contract information (11) Create down payment receipt (12) Insert new contract information into data store
Attachment:	(1) Customer (2) Marketing Department (3) Account Department (4) Data Store D1 (5) Data Store D2 (6) Data Store D3 (7) Data Store D4

Table E.6. Process Specification of Process 1.4.2.

Items	Description
Process Name:	Modify Contract Information
Data In:	New Contract Information Contract Information
Data Out:	Updated Contract Information
Process:	(1) Get contract code (2) Retrieve contract information from data store

	(3) Check contract integrity (4) Display update contact information (5) Update contact information into data store
Attachment:	(1) Customer (2) Data Store D2

Table E.7. Process Specification of Process 2.

Items	Description
Process Name:	Receive Instalment Process
Data In:	Instalment Payment Collected Instalment Result
Data Out:	Instalment Information Receipt
Process:	(1) Get instalment payment (2) Get contract detail (3) Retrieve contract information from data store (4) Check instalment integrity (5) Create instalment receipt (6) Display instalment information (7) Update instalment information into data store
Attachment:	(1) Customer (2) Collector (3) Data Store D5

Table E.8. Process Specification of Process 3.1.

Items	Description
Process Name:	Generate Daily-due Report
Data In:	Contract Information
Data Out:	Daily-due Report
Process:	(1) Receive request for daily due report (2) Retrieve contract information form data store (3) Retrieve and group contact information by due date (4) Display daily due report (5) Create daily due report (6) Print daily due report
Attachment:	(1) Collector (2) Data Store D2

Table E.9. Process Specification of Process 3.2.

Items	Description
Process Name:	Generate Warning Confiscate Product Notice
Data In:	Contract Information Instalment Information
Data Out:	Warning Confiscate Product Notice
Process:	(1) Receive request for confiscate notice (2) Retrieve instalment information from data store (3) Retrieve contract information from data store (4) Generate confiscate notice (5) Display confiscate notice (6) Print out confiscate notice
Attachment:	(1) Customer (2) Data Store D2 (3) Data Store D5

Table E.10. Process Specification of Process 3.3.1.

Items	Description
Process Name:	Generate New Contract Report
Data In:	Contract Information
Data Out:	New Contract Report
Process:	(1) Receive request for new contract report (2) Retrieve contract information form data store (3) Retrieve and group by new contact information (4) Display new contract report (5) Create new contract report (6) Print new contract report
Attachment:	(1) Leasing Manager (2) Data Store D2

Table E.11. Process Specification of Process 3.3.2.

Items	Description
Process Name:	Generate Contract Report
Data In:	Contract Information
Data Out:	Contract Report
Process:	(1) Receive request for contract report (2) Retrieve contract information form data store (3) Retrieve and group by contact condition (4) Display contract report (5) Create contract report (6) Print contract report
Attachment:	(1) Leasing Manager (2) Data Store D2

Table E.12. Process Specification of Process 3.3.3.

Items	Description
Process Name:	Generate Customer Report
Data In:	Contract Information
Data Out:	Customer Report
Process:	(1) Receive request for customer report (2) Retrieve contract information form data store (3) Retrieve and group by customer condition (4) Display customer report (5) Create customer report (6) Print customer report
Attachment:	(1) Leasing Manager (2) Data Store D2

Table E.13. Process Specification of Process 3.3.4.

Items	Description
Process Name:	Generate Instalment Report
Data In:	Instalment Information
Data Out:	Instalment Report
Process:	(1) Receive request for instalment report (2) Retrieve instalment information form data store (3) Retrieve and group by instalment condition (4) Display instalment report (5) Create instalment report (6) Print instalment report
Attachment:	(1) Leasing Manager (2) Data Store D5

Table E.14. Process Specification of Process 3.3.5.

Items	Description
Process Name:	Generate Close Contract Report
Data In:	Contract Information
Data Out:	Close Contract Report
Process:	(1) Receive request for close contract report (2) Retrieve instalment information form data store (3) Retrieve and group by instalment received equal No. of instalment (4) Display close contract report (5) Create close contract report (6) Print close contract report
Attachment:	(1) Leasing Manager (2) Data Store D2

Table E.15. Process Specification of Process 3.3.6.

Items	Description
Process Name:	Generate Confiscate Product Report
Data In:	Instalment Information
Data Out:	Confiscate Product Report
Process:	<ol style="list-style-type: none"> (1) Receive request for confiscate report (2) Retrieve instalment information form data store (3) Retrieve and group by miss instalment more than 3 time (4) Display confiscate report (5) Create confiscate report (6) Print confiscate report
Attachment:	<ol style="list-style-type: none"> (1) Leasing Manager (2) Data Store D5

Table E.16. Process Specification of Process 3.3.7.

Items	Description
Process Name:	Generate Over-due Report
Data In:	Instalment Information
Data Out:	Over-due Report
Process:	<ol style="list-style-type: none"> (1) Receive request for over due report (2) Retrieve instalment information form data store (3) Retrieve and group by miss instalment condition (4) Display over due report (5) Create over due report (6) Print over due report
Attachment:	<ol style="list-style-type: none"> (1) Leasing Manager (2) Data Store D5

Table E.17. Process Specification of Process 3.3.8.

Items	Description
Process Name:	Generate Last-due Report
Data In:	Instalment Information
Data Out:	Last-due Report
Process:	(1) Receive request for last due report (2) Retrieve instalment information form data store (3) Retrieve and group by instalment received equal No. of instalment minus 1 (4) Create last due report (5) Display last due report (6) Print last due report
Attachment:	(1) Leasing Manager (2) Data Store D5

Table E.18. Process Specification of Process 3.4.

Items	Description
Process Name:	Generate Over-due Notice
Data In:	Instalment Information Contract Information
Data Out:	Over-due Notice
Process:	(1) Receive request for over due notice (2) Retrieve instalment information form data store (3) Retrieve and group by miss instalment condition (4) Display over due notice (5) Create over due notice (6) Print over due notice
Attachment:	(1) Customer (2) Data Store 2 (3) Data Store 5

Table E.19. Process Specification of Process 4.1.1.

Items	Description
Process Name:	Add New Staff Information
Data In:	New Staff Information Staff Information
Data Out:	New Staff Information
Process:	(1) Get staff information (2) Check staff information integrity (3) Display staff information (4) Recode new staff information into data store
Attachment:	(1) Staff (2) Data Store D4

Table E.20. Process Specification of Process 4.1.2.

Items	Description
Process Name:	Delete Staff Information
Data In:	Delete Staff Information Notice Staff Information
Data Out:	Staff Information
Process:	(1) Receive staff deleting detail (2) Retrieve existing staff information from data store (3) Cancel existing staff information (4) Recode updated staff information into data store
Attachment:	(1) Leasing Manager (2) Data Store 4

Table E.21. Process Specification of Process 4.1.3.

Items	Description
Process Name:	Process Modify Staff information
Data In:	New Staff Information Staff Information
Data Out:	Update Staff Information
Process:	(1) Receive staff detail (2) Retrieve staff information from data store (3) Modify existing staff information (4) Display modified staff information (5) Record updated staff information into data store
Attachment:	(1) Front Desk (2) Data Store 4

Table E.22. Process Specification of Process 4.2.1.

Items	Description
Process Name:	Add New Motorcycle Information
Data In:	New Motorcycle Information
Data Out:	New Motorcycle Information
Process:	(1) Get motorcycle information (2) Check motorcycle information integrity (3) Display motorcycle information (4) Recode new motorcycle information into data store
Attachment:	(1) Motorcycle Shop (2) Data Store D3

Table E.23. Process Specification of Process 4.2.2.

Items	Description
Process Name:	Delete Motorcycle Information
Data In:	Motorcycle Information
Data Out:	Update Motorcycle Information
Process:	(1) Receive motorcycle deleting detail (2) Retrieve existing motorcycle information from data store (3) Cancel existing motorcycle information (4) Recode updated motorcycle information into data store
Attachment:	(1) Motorcycle Shop (2) Data Store D3

Table E.24. Process Specification of Process 4.2.3.

Items	Description
Process Name:	Modify Motorcycle Information
Data In:	New Motorcycle Information Motorcycle Information
Data Out:	Updated Motorcycle Information
Process:	(1) Receive motorcycle detail (2) Retrieve motorcycle information from data store (3) Modify existing motorcycle information (4) Display modified motorcycle information (5) Record updated motorcycle information into data store
Attachment:	(1) Motorcycle Shop (2) Data Store D2



APPENDIX F
DATA DICTIONARY

DATA DICTIONARY

Address_Number

Data Element

Description:

This column records the address number.

Data element attributes:

Storage Type : Char

Length : 10

Null Type : NotNull

Location:

Entity --> Staff

approve

Relationship

Description:

Staff approved contract. Contract is approve by staff.

Attached Objects:

Staff approve MIN: 1 MAX: many

Contract	[approve]	MIN: 1 MAX: 1
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Foreign Key(s):

Staff 'approve' Contract

Staff ID > Staff ID

On Delete Restrict

On Update Restrict

On Insert of Child Row Restrict

Location : ERD of Leasing

Birth_of_Date**Data Element**

Description:

This column records the birth of date.

Data element attributes

Storage Type : Date

Length : 10

Null Type : NotNull

Location:

Entity --> Customer

Brand**Data Element**

Description:

This column records the brand of motorcycle.

Data element attributes

Storage Type : Char

Length : 10

Null Type : NotNull

Location:

Entity --> Motorcycle

Card**Entity**

Description:

Card that Customer use to reference for making a contract.

Composition:

Card_Number	:	Integer
Card_Expires	:	Date
Card_Type	:	Char
Card_Address_Number	:	Char
Card_Address_Street	:	Char
Card_Address_Tumbon	:	Char
Card_Address_City	:	Char
Card_Address_Province	:	Char
Card_Address_Zipcode	:	Integer

Primary Key:

Index Name : Generated by VAW

Column(s) : Card Number [ASC]

Location : ERD of Leasing

Attached relationships on ERD of Leasing:

has MIN: 1 MAX: many Customers

Card_Address_City

Data Element

Description:

This column records the city name that customer use to be reference address in card.

Data element attributes

Storage Type	:	Char
Length	:	15
Null Type	:	NotNull

Location:

Entity \rightarrow Card**Card_Address_Number**

Data Element

Description:

This column records the address number that customer use to be reference address in card.

Data element attributes

Storage Type : Char

Length : 10

Null Type : NotNull

Location:

Entity \rightarrow Card**Card_Address_Province**

Data Element

Description:

This column records the province name that customer use to be reference address in card.

Data element attributes

Storage Type : Char

Length : 15

Null Type : NotNull

Location:

Entity \rightarrow Card

Card_Address_Street

Data Element

Description:

This column records the street name that customer use to be reference address in card.

Data element attributes

- Storage Type : Char
- Length : 20
- Null Type : Null

Location:

Entity --> Card

Card_Address_Tumbon

Data Element

Description:

This column records the tumbon name that customer use to be reference address in card.

Data element attributes

- Storage Type : Char
- Length : 15
- Null Type : NotNull

Location:

Entity --> Card

Card_Address_Zipcode

Data Element

Description:

This column records the zip code that customer use to be reference address

in card.

Data element attributes

Storage Type : Integer

Length : 5

Null Type : Null

Location:

Entity --> Card

Card_Expires **Data Element**

Data element attributes card expire date.

Storage Type : Date

Length : 10

Null Type : Null

Location:

Entity --> Card

Card_Number **Data Element**

Description:

This column records the card number.

Data element attributes

Storage Type : Char

Length : 13

Null Type : NotNull

Location:

Entity --> Card

Entity --> Customer

Card_Type Data Element

Description:

This column records the type of card.

Data element attributes

Storage Type : Char

Length : 10

Null Type : NotNull

Location:

Entity --> Card

City Data Element

Description:

This column records the city name of staff address.

Data element attributes

Storage Type : Char

Length : 15

Null Type : NotNull

Location:

Entity --> Staff

collect Relationship

Description:

Staff collects instalment. Instalment is collected by staff.

Attached Objects:

Staff	collect	MIN: 1 MAX: many
Receive_Instalment	[collect]	MIN: 1 MAX: 1

Foreign Key(s):

Staff 'collect' Receive_Instalment
Staff_ID ~> Staff_ID

On Delete Restrict

On Update Restrict

On Insert of Child Row Restrict

Location : ERD of Leasing

Color

Data Element

Description:

This column records the color name.

Data element attributes

Storage Type	:	Char
Length	:	10
Null Type	:	NotNull

Location:

Entity ~> Motorcycle

Contract

Entity

Description:

Contract that is made by customer with the company for motorcycle leasing.

Composition:

Staff_ID	:	Integer
Motorcycle_Number	:	Integer
Contract_ID	:	Integer
Payment_Type	:	Char
Down_Payment	:	Integer
Number_of_Instalment_Payment	:	Integer
First_Due_Date	:	Date
Due_Date	:	Integer
VAT	:	Integer
Retail_Price	:	Integer
Instalment_Rate	:	Integer
Discount_Rate	:	Integer
Fine_Rate	:	Integer
Down_Receipt_Number	:	Integer
Instalment_Value	:	Integer
Contract_Created_Date	:	Date

Primary Key:

Index Name	:	Generated by VAW
Column(s)	:	Contract_ID [ASC]

Foreign Key(s):

Motorcycle 'is a part of' Contract

Motorcycle_Number > Motorcycle_Number

On Delete Restrict

On Update Restrict

On Insert of Child Row Restrict

Staff 'approve' Contract

Staff_ID > Staff_ID

On Delete Restrict

On Update Restrict

On Insert of Child Row Restrict

Location : ERD of Leasing

Attached relationships on ERD of Leasing:

[is a part of]	MIN: 1 MAX: 1	Motorcycle
[approve]	MIN: 1 MAX: 1	Staff
create	MIN: 1 MAX: many	Receive_Instalment
has	MIN: 1 MAX: many	Contract_Cutromer

Contract_Created_Date Data Element

Description:

This column records the date that customer make the contract.

Data element attributes

Storage Type	:	Date
Length	:	10
Null Type	:	NotNull

Location:

Entity --> Contract

Contract_Cutromer Associative Entity

Description:

This table record the customer that made a contract.

Composition:

Customer_ID : Integer
Contract_ID : Integer
Customer Status : Char

Primary Key:

Index Name : Generated by VAW
Column(s) : Contract_ID [ASC]
Customer_ID [ASC]

Foreign Key(s):

Contract 'has' Contract_Cutromer
Contract_ID > Contract_ID
On Delete Restrict
On Update Restrict
On Insert of Child Row Restrict
Customer 'make' Contract_Cutromer
Customer_ID > Customer_ID

On Delete Restrict

On Update Restrict

On Insert of Child Row Restrict

Location : ERD of Leasing

Attached relationships on ERD of Leasing:

[make]	MIN: 1 MAX: 1	Customer
[has]	MIN: 1 MAX: 1	Contract

Contract_ID	Data Element
-------------	--------------

Description:

This column records the contract ID.

Data element attributes

Storage Type	:	Integer
Length	:	6
Null Type	:	NotNull

Location:

Entity	-->	Contract
Associative Entity	-->	Contract_Cutromer
Entity	-->	Receive_Instalment

Cost	Data Element
------	--------------

Description:

This column records the cost of motorcycle.

Data element attributes

Storage Type	:	Integer
Length	:	5
Null Type	:	NotNull

Location:

Entity	-->	Motorcycle
--------	-----	------------

create	Relationship
--------	--------------

Description:

Contract create instalment. Instalment is created by contract.

Attached Objects:

Contract	create	MIN: 1 MAX: many
Receive_Instalment	[create]	MIN: 1 MAX: 1

Foreign Key(s):

Contract 'create' Receive_Instalment

Contract_ID > Contract_ID

On Delete Restrict

On Update Restrict

On Insert of Child Row Restrict

Location : ERD of Leasing

Customer

Entity

Description:

This table record customer information of customer who makes a contract.

Composition:

Register_Address_ID	:	Integer
Card_Number	:	Char
Customer_ID	:	Integer
Married_Status	:	Char
Level	:	Char
First_Name	:	Char
Last_Name	:	Char
Nick_Name	:	Char

Birth_of_Date	:	Date
Gender	:	Char
Number_of_Children	:	Integer
Customer_Address_Number	:	Char
Customer_Address_Street	:	Char
Customer_Address_Tumbon	:	Char
Customer_Address_City	:	Char
Customer_Address_Province	:	Char
Customer_Address_Zipcode	:	Integer
Office_Name	:	Char
Office_Address_Number	:	Char
Office_Address_Street	:	Char
Office_Address_Tumbon	:	Char
Office_Address_City	:	Char
Office_Address_Province	:	Char
Office_Address_Zipcode	:	Integer
Job	:	Char
Job_Position	:	Char
Job_Department	:	Char
Job_Experience	:	Integer
Job_Head_Name	:	Char
Job_Description	:	Char
Monthly_Income	:	Integer
Initial_Name	:	Initial_Name

Primary Key:

Index Name : Generated by VAW
Column(s) : Customer_ID [ASC]

Foreign Key(s):

Card 'has' Customer

Card_Number -> Card_Number

On Delete Restrict

On Update Restrict

On Insert of Child Row Restrict

Register_Address 'has' Customer

Register_Address_ID -> Register_Address_ID

On Delete Restrict

On Update Restrict

On Insert of Child Row Restrict

Location : ERD of Leasing

Attached relationships on ERD of Leasing:

make	MIN: 1 MAX: many	Contract_Cutromer
[has]	MIN: 1 MAX: 1	Card
[has]	MIN: 1 MAX: 1	Register_Address

Married_Status

Data Element

Description:

This column records the married status of customer.

Data element attributes

Storage Type : Char
Length : 10

Null Type : NotNull

Location:

Associative Entity --> Contract_Cutromer

Customer_Address_City Data Element

Description:

This column records the city name that customer use to be reachable address.

Data element attributes

Storage Type : Char

Length : 15

Null Type : NotNull

Location:

Entity --> Customer

Customer_Address_Number Data Element

Description:

This column records the address number that customer use to be reachable address.

Data element attributes

Storage Type : Char

Length : 10

Null Type : NotNull

Location:

Entity --> Customer

Customer_Address_Province	Data Element
---------------------------	--------------

Description:

This column records the province name that customer use to be reachable address.

Data element attributes

Storage Type	:	Char
Length	:	15
Null Type	:	NotNull

Location:

Entity	-->	Customer
--------	-----	----------

Customer_Address_Street	Data Element
-------------------------	--------------

Description:

This column records the street name that customer use to be reachable address.

Data element attributes

Storage Type	:	Char
Length	:	20
Null Type	:	Null

Location:

Entity	-->	Customer
--------	-----	----------

Customer_Address_Tumbon	Data Element
-------------------------	--------------

Description:

This column records the tumbon name that customer use to be reachable address.

Data element attributes

Storage Type : Char
Length : 15
Null Type : NotNull

Location:

Entity --> Customer

Customer_Address_Zipcode Data Element

Description:

This column records the zip code that customer use to be reachable address.

Data element attributes

Storage Type : Integer
Length : 5
Null Type : Null

Location:

Entity --> Customer

Customer_ID Data Element

Description:

This column records the customer ID.

Data element attributes

Storage Type : Integer

Length : 6

Null Type : NotNull

Location:

Associative Entity --> Contract_Cutromer

Entity --> Customer

Department

Data Element

Description:

This column records the department name.

Data element attributes

Storage Type : Char

Length : 10

Null Type : NotNull

Location:

Entity --> Staff

Discount_Rate

Data Element

Description:

This column records the discount rate.

Data element attributes

Storage Type : Float

Length : 7

Null Type : NotNull

Location:

Entity --> Contract

Down_Payment

Data Element

Description:

This column records the down payment.

Data element attributes

Storage Type : Integer

Length : 5

Null Type : NotNull

Location:

Entity --> Contract

Down_Receipt_Number

Data Element

Description:

This column records the down receipt number.

Data element attributes

Storage Type : Integer

Length : 5

Null Type : NotNull

Location:

Entity --> Contract

Due_Date

Data Element

Description:

This column records the due date.

Data element attributes

Storage Type : Integer

Length : 2

Null Type : NotNull

Location:

Entity \rightarrow Contract**Engine_Number**

Data Element

Description:

This column records the engine number.

Data element attributes

Storage Type: Char

Length : 13

Null Type : NotNull

Location:

Entity \rightarrow Motorcycle**Fine_Rate**

Data Element

Description:

This column records the fine rate.

Data element attributes

Storage Type : Float

Length : 7
Null Type : NotNull

Location:

Entity --> Contract

First_Due_Date Data Element

Description:

This column records the first due date.

Data element attributes

Storage Type : Date
Length : 10
Null Type : NotNull

Location:

Entity --> Contract

First_Name Data Element

Description:

This column records the first name.

Data element attributes

Storage Type : Char
Length : 15
Null Type : NotNull

Location:

Entity --> Staff

Entity --> Customer

Gender	Data Element
--------	--------------

Description:

This column records the gender.

Data element attributes

Storage Type : Char

Length : 1

Null Type : Null

Location:

Entity --> Customer

has	Relationship
-----	--------------

Description:

Contract has contract_customer. Contract_customer belong to contract.

Attached Objects:

Contract * has MIN: 1 MAX: many

Contract_Cutromer [has] MIN: 1 MAX: 1

Foreign Key(s):

Contract 'has' Contract_Cutromer

Contract_ID > Contract_ID

On Delete Restrict

On Update Restrict

On Insert of Child Row Restrict

Location : ERD of Leasing

has Relationship

Description:

Card belongs to customer. Customer has a card.

Attached Objects:

Card	has	MIN: 1 MAX: many
Customer	[has]	MIN: 1 MAX: 1

Foreign Key(s):

Card 'has' Customer

Card_Number > Card_Number

On Delete Restrict

On Update Restrict

On Insert of Child Row Restrict

Location : ERD of Leasing

has Relationship

Description:

Register address belong to customer. Customer has register address.

Attached Objects:

Register_Address	has	MIN: 1 MAX: many
Customer	[has]	MIN: 1 MAX: 1

Foreign Key(s):

Register_Address 'has' Customer

Register_Address_ID > Register_Address_ID

On Delete Restrict

On Update Restrict

On Insert of Child Row Restrict

Location : ERD of Leasing

Initial_Name

Data Element

Description:

This column records the initial name.

Data element attributes

Storage Type : Char

Length : 7

Null Type : NotNull

Location:

Entity --> Staff

Data Element --> Customer::Initial_Name

Initial_Name

Data Element

Description:

This column records the initial name.

Data element attributes

Domain : Initial_Name

Storage Type : Char

Length : 7

Null Type : Null

Location:

Entity --> Customer

Instalment_Rate	Data Element
-----------------	--------------

Description:

This column records the instalment rate.

Data element attributes

Storage Type	:	Float
Length	:	7
Null Type	:	NotNull

Location:

Entity	-->	Contract
--------	-----	----------

Instalment_Value	Data Element
------------------	--------------

Description:

This column records the instalment value.

Data element attributes

Storage Type	:	Integer
Length	:	5
Null Type	:	NotNull

Location:

Entity	-->	Contract
--------	-----	----------

is a part of	Relationship
--------------	--------------

Description:

Motorcycle is a part of contract. Contract has motorcycle.

Attached Objects:

Motorcycle	is a part of	MIN: 1 MAX: 1
Contract	[is a part of]	MIN: 1 MAX: 1

Foreign Key(s):

Motorcycle 'is a part of' Contract
Motorcycle_Number > Motorcycle_Number

On Delete Restrict

On Update Restrict

On Insert of Child Row Restrict

Location : ERD of Leasing

Job

Data Element

Description:
This column records the job name.

Data element attributes

Storage Type : Char

Length : 15

Null Type : NotNull

Location:

Entity --> Customer

Job_Department

Data Element

Description:
This column records the job department.

Data element attributes

Storage Type	:	Char
Length	:	10
Null Type	:	Null

Location:

Entity	-->	Customer
--------	-----	----------

Job_Description	Data Element
-----------------	--------------

Description:

This column records the job description.

Data element attributes

Storage Type	:	Char
Length	:	25
Null Type	:	Null

Location:

Entity	*-->	Customer
--------	------	----------

Job_Experience	Data Element
----------------	--------------

Description:

This column records the job experience.

Data element attributes

Storage Type	:	Integer
Length	:	2
Null Type	:	Null

Location:

Entity --> Customer

Job_Head_Name **Data Element**

Description:

This column records the name of head job.

Data element attributes

Storage Type : Char
Length : 20
Null Type : Null

Location:

Entity --> Customer

Job_Position **Data Element**

Description:

This column records the job position.

Data element attributes

Storage Type : Char
Length : 10
Null Type : Null

Location:

Entity --> Customer

Last_Name **Data Element**

Description:

This column records the last name.

Data element attributes

Storage Type : Char
Length : 15
Null Type : NotNull

Location:

Entity --> Staff
Entity --> Customer

Level	Data Element
-------	--------------

Description:

This column records the level.

Data element attributes

Storage Type : Char
Length :
Null Type : Null

Location:

Entity --> Customer

Login_Name	Data Element
------------	--------------

Description:

This column records the login name.

Data element attributes

Storage Type : Char
Length : 10
Null Type : NotNull

Location:

Entity --> Staff

make

Relationship

Description:

Customer make contract customer is made by customer.

Attached Objects:

Customer make MIN: 1 MAX: many

Contract_Customer [make] MIN: 1 MAX: 1

Foreign Key(s):

Customer 'make' Contract_Customer

Customer_ID > Customer_ID

On Delete Restrict

On Update Restrict

On Insert of Child Row Restrict

Location : ERD of Leasing

Married_Status

Data Element

Description:

This column records the married status.

Data element attributes

Storage Type : Char

Length : 10

Null Type : Null

Location:

Entity --> Customer

Model	Data Element
-------	--------------

Description:

This column records the model.

Data element attributes

Storage Type : Char

Length : 2

Null Type : NotNull

Location:

Entity --> Motorcycle

Month	Data Element
-------	--------------

Description:

This column records the month.

Data element attributes

Storage Type : Char

Length : 2

Null Type : NotNull

Location:

Entity --> Receive_Instalment

Monthly_Income

Data Element

Description:

This column records the monthly income.

Data element attributes

Storage Type	:	Integer
Length	:	5
Null Type	:	NotNull

Location:

Entity --> Customer

Motorcycle

Entity

Description:

Motorcycle that customer make a leasing with the company.

Composition:

Motorcycle_Number	:	Integer 4
Engin_Number	:	Integer 4
Brand	:	Char
Model	:	Char
Color	:	Char
Type	:	Char
Register_Province	:	Char
Motorcycle_Status	:	Char
Registering_Year	:	Integer 4
Register_Number	:	Char
Used_Distance	:	Integer 4

Cost : Integer 4

Primary Key:

Index Name : Generated by VAW

Column(s) : Motorcycle_Number [ASC]

Location : ERD of Leasing

Attached relationships on ERD of Leasing:

is a part of MIN: 1 MAX: 1 Contract

Motorcycle_Number Data Element

Description:

This column records the motorcycle number.

Data element attributes

Storage Type : Integer

Length : 13

Null Type : NotNull

Location:

Entity --> Motorcycle

Entity --> Contract

Motorcycle_Status Data Element

Description:

This column records the motorcycle status.

Data element attributes

Storage Type : Char

Length : 1

Null Type : NotNull

Location:

Entity --> Motorcycle

Nick_Name

Data Element

Description:

This column records the nick name.

Data element attributes

Storage Type : Char

Length : 10

Null Type : Null

Location:

Entity --> Customer

Number_of_Children

Data Element

Description:

This column records the number of children.

Data element attributes

Storage Type : Integer

Length : 2

Null Type : Null

Location:

Entity --> Customer

Number_of_Instalment_Payment

Data Element

Description:

This column records the number of instalment payment.

Data element attributes

Storage Type : Integer
Length : 5
Null Type : NotNull

Location:

Entity --> Contract

Office_Address_City

Data Element

Description:

This column records the city name of office address.

Data element attributes

Storage Type : Char
Length : 15
Null Type : NotNull

Location:

Entity --> Customer

Office_Address_Number

Data Element

Description:

This column records the number of office address.

Data element attributes

Storage Type : Char
Length : 10

Null Type : Null

Location:

Entity --> Customer

Office_Address_Province

Data Element

Description:

This column records the province of office address.

Data element attributes

Storage Type : Char

Length : 15

Null Type : NotNull

Location:

Entity --> Customer

Office_Address_Street

Data Element

Description:

This column records the street of office address.

Data element attributes

Storage Type : Char

Length : 20

Null Type : Null

Location:

Entity --> Customer

Office_Address_Tumbon

Data Element

Description:

This column records the tumbon of office address.

Data element attributes

Storage Type : Char
Length : 15
Null Type : NotNull

Location:

Entity --> Customer

Office_Address_Zipcode Data Element

Description:

This column records the zipcode of office address.

Data element attributes

Storage Type : Integer
Length : 5
Null Type : Null

Location:

Entity --> Customer

Office_Name Data Element

Description:

This column records the office name.

Data element attributes

Storage Type : Char
Length : 25

Null Type : Null

Location:

Entity --> Customer

Password Data Element

Description:

This column records the password.

Data element attributes

Storage Type : Char

Length : 10

Null Type : NotNull

Location:

Entity --> Staff

Payment_Type Data Element

Description:

This column records the payment type.

Data element attributes

Storage Type : Char

Length : 10

Null Type : NotNull

Location:

Entity --> Contract

Position Data Element

Description:

This column records the position.

Data element attributes

Storage Type : Char
Length : 10
Null Type : Null

Location:

Entity --> Staff

Province

Data Element

Description:

This column records the province.

Data element attributes

Storage Type : Char
Length : 15
Null Type : NotNull

Location:

Entity --> Staff

Receive_Instalment

Entity

Description:

This table records the receive instalment information.

Composition:

Contract_ID : Integer
Staff_ID : Integer

Month	:	Char
Year	:	Integer
Receive_Instalment_Date	:	Integer

Primary Key:

Index Name	:	Generated by VAW
Column(s)	:	Contract_ID [ASC] Month [ASC] Year [ASC]

Foreign Key(s):

Staff 'collect' Receive_Instalment
Staff_ID > Staff_ID
On Delete Restrict
On Update Restrict
On Insert of Child Row Restrict
Contract 'create' Receive_Instalment
Contract_ID > Contract_ID
On Delete Restrict
On Update Restrict
On Insert of Child Row Restrict

Location : ERD of Leasing

Attached relationships on ERD of Leasing:

[collect]	MIN: 1 MAX: 1	Staff
[create]	MIN: 1 MAX: 1	Contract

Receive_Instalment_Date	Data Element
-------------------------	--------------

Description:

This column records the receive instalment date.

Data element attributes

Storage Type : Date
Length : 10
Null Type : Null

Location:

Entity --> Receive_Instalment

Register_Address Entity

Description:

Address that customer registering in house address register.

Composition:

Register_Address_ID : Integer
Register_Address_Number : Char
Register_Address_Street : Char
Register_Address_Tumbon : Char
Register_Address_City : Char
Register_Address_Province : Char
Register_Address_Zipcode : Char

Primary Key:

Index Name : Generated by VAW
Column(s) : Register_Address_ID [ASC]

Location : ERD of Leasing

Attached relationships on ERD of Leasing:

has MIN: 1 MAX: many Customer

Register_Address_City Data Element

Description:
This column records the city name of register address.

Data element attributes

Storage Type : Char
Length : 15
Null Type : NotNull

Location:
Entity --> Register_Address

Register_Address_ID Data Element

Description:
This column records the id of register address.

Data element attributes

Storage Type : Integer
Length : 10
Null Type : NotNull

Location:
Entity --> Register_Address
Entity --> Customer

Register_Address_Number Data Element

Description:

This column records the number of register address.

Data element attributes

Storage Type	:	Char
Length	:	10
Null Type	:	NotNull

Location:

Entity	-->	Register_Address
--------	-----	------------------

Register_Address_Province

Data Element

Description:

This column records the province name of register address.

Data element attributes

Storage Type	:	Char
Length	:	15
Null Type	:	NotNull

Location:

Entity	-->	Register_Address
--------	-----	------------------

Register_Address_Street

Data Element

Description:

This column records the street name of register address.

Data element attributes

Storage Type	:	Char
Length	:	20

Null Type : Null

Location:

Entity -> Register_Address

Register_Address_Tumbon

Data Element

Description:

This column records the tumbon name of register address.

Data element attributes

Storage Type : Char

Length : 15

Null Type : NotNull

Location:

Entity -> Register_Address

Register_Address_Zipcode

Data Element

Description:

This column records the zip code of register address.

Data element attributes

Storage Type : Char

Length : 5

Null Type : Null

Location:

Entity -> Register_Address

Register_Number

Data Element

Description:

This column records the address number that customer registering in house register.

Data element attributes

Storage Type	:	Char
Length	:	10
Null Type	:	NotNull

Location:

Entity	-->	Motorcycle
--------	-----	------------

Register_Province

Data Element

Description:

This column records the province that customer registering in house register.

Data element attributes

Storage Type	:	Char
Length	:	15
Null Type	:	NotNull

Location:

Entity	-->	Motorcycle
--------	-----	------------

Registering_Year

Data Element

Description:

This column records the year that motorcycle registering.

Data element attributes


Null Type : NotNull

Entity --> Motorcycle

Data Element

This column records the retail price.

Null Type : NotNull

Entity  --> Contract

Entity

Staff is a employee of leasing company who has duty that relate with contract.

Initial Name : Char

Department	:	Char
Work_Group	:	Char
Position	:	Char
First_Name	:	Char
Last_Name	:	Char
Login_Name	:	Char
Password	:	Char
Street	:	Char
Tumbon	:	Char
City	:	Char
Province	:	Char
Zipcode	:	Char
Primary Key:		
Index Name	:	Generated by VAW
Column(s)	:	Staff_ID [ASC]
Location	:	ERD of Leasing
Attached relationships on ERD of Leasing:		
approve	MIN: 1 MAX: many	Contract
collect	MIN: 1 MAX: many	Receive_Instalment

Staff_ID

Data Element

Description:

This column records the staff ID.

Data element attributes

Storage Type

:

Integer

Length : 3

Null Type : NotNull

Location:

Entity --> Staff

Entity --> Contract

Entity --> Receive_Instalment

Street **Data Element**

Description:

This column records the street name.

Data element attributes

Storage Type : Char

Length : 20

Null Type : Null

Location:

Entity --> Staff

Tumbon **Data Element**

Description:

This column records the tumbon name.

Data element attributes

Storage Type : Char

Length : 15

Null Type : NotNull

Location:

Entity --> Staff

Type

Data Element

Description:

This column records the type of sticker.

Data element attributes

Storage Type : Char

Length : 1

Null Type : NotNull

Location:

Entity \supset Motorcycle**Used_Distance**

Data Element

Description:

This column records the used distance.

Data element attributes

Storage Type : Integer

Length : 5

Null Type : NotNull

Location:

Entity \rightarrow Motorcycle

VAT

Data Element

Description:

This column records the VAT value.

Data element attributes

Storage Type : Integer

Length : 10

Null Type : NotNull

Location:

Entity --> Contract

Work_Group

Data Element

Description:

This column records the work group.

Data element attributes

Storage Type : Char

Length : 10

Null Type : Null

Location:

Entity --> Staff

Year

Data Element

Description:

This column records the year.

Data element attributes

Storage Type : Integer
Length : 2
Null Type : NotNull

Location:

Entity -> Receive_Instalment

Zipcode **Data Element**

Description:

This column records the zip code.

Data element attributes

Storage Type : Integer
Length : 5
Null Type : Null

Location:

Entity -> Staff

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