



Sales Information System for  
Home Smarter Company

by

Ms. Paritas Soontonmatcha

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

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

July 2003



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## **ABSTRACT**

Home Smarter Company is one of the real estate companies in the real estate business that needs to improve all the systems in to computerization and we have to realize the importance of information for good business.

Further more, to survive among competitors, the developers should set an outstanding strategy that is different from other competitors. Information is the important weapon. The earlier we get the information the sooner we get the benefit. So, computers are used to reduce the time, cost involved and increase productivity, accuracy and efficiency.

The main objective of the development is to create a new system that allows the company to have more opportunity to grow and expand by using a computerized system. This project emphasizes on designing the new system that improves the existing operation and solves the existing problems.

The proposed system is developed in accordance with the system analysis and design techniques. All data are kept in the database server, so the information can be shared among the users. The new system will serve computerized operations and produce input process and generate output more efficiently, therefore it will reduce errors and operation cost.



## ACKNOWLEDGEMENTS

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Her special appreciation is expressed to members, staffs, and secretaries of the school of Computer Information Systems for their assistance during the study at Assumption University.

Finally, her sincere and deepest gratitude is extended to her parents for their infinite love, understanding and care throughout her life and to all others who have helped in the completion of this project.



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## **I. INTRODUCTION**

### **1.1 Background of the Project**

In this project, we would like to propose “Sales Information System” for Real Estate Business which encourages the users to use the booking system and also payment system with convenience and security. Therefore, the introduction of information technology applies to the organizational activities that can make a critical difference in business.

Presently, the major information system of real estate business is the booking system. It is a kind of service system which applies information to provide booking and customer services, and also to provide customer information such as Plot lists and availability, price and sales information, and other related information.

Moreover, the company can use information from the customer and booking information for marketing and for optimizing sales levels.

For Running Business, the company needs to improve all the system into a computerized system and we have to realize the importance of information for good business.

This project uses the structure analysis and design techniques with system development life cycle are considered in the development of the sales information system.

As mentioned above, the Sales Information System can enable users to easily book plots, make contracts, change plots, cancel plots and get the booking documents etc. Besides, it performs with accuracy and fast response time. In addition, we can use the data from the system to generate the reports, such as status reports used to optimize booking levels and sales utilization, and the Sale Report used for marketing and accounting etc. Moreover, it can help the company to predict its future direction.



## **1.2 Objectives of the Project**

After understanding what the current system needs, the proposed system should be put to use.

The objectives of the project on the Sale Information System are as follows:

- (1) To design a computer based information for management, which will improve sales and customer service.
- (2) To provide fast service and interactive system for operation and communication, especially between customer support function and customer / computer support function.
- (3) To generate accurate and meaningful information for management so that it can make better decisions.
- (4) To support sales strategy, as the two strategies are increasing sales volume and reducing product cost, then the new proposed system can serve both these strategies.
- (5) To arrange the report to all levels of management in order to plan the target and to control the way to achieve the goals.

## **1.3 Scope of the Project**

- (1) Consider only the departments involved in sales information system, which are Construction, Finance, Administration, Sales and Director.
- (2) Aim to improve the company's work process in producing various kinds of reports and information processing.
- (3) To manage customers and sales information, which will record and update information such as sales date, customer detail, houses price, sale plots, and house types, etc.



- (4) The main propose of the proposed system is about the Sales Information System, so it will include management of sales information and payment to customers.

#### **1.4 Deliverables**

This report will have the following details:

- (a) Project Introduction
  - (1) Background
  - (2) Objectives
  - (3) Scope
- (b) Description of Exiting System
  - (1) Background of the Organization
  - (2) Exiting Business Function
  - (3) Current Problems
  - (4) Areas for Improvement
- (c) Description of Proposed New System
  - (1) User Requirement
  - (2) Overview of Proposed System
  - (3) System Design
  - (4) Hardware and Software Requirement
  - (5) Cost/Benefit Analysis
- (d) System Implementation Plan
  - (1) Developing the system
  - (2) Testing
  - (3) Training



- (4) Documentation
- (5) Conclusions and Recommendations





## **II. THE EXISTING SYSTEM**

### **2.1 Background of the Organization**

Home Smarter is a joint venture established in 1995 as a limited company and managed a housing project purchased from Teeraparb Co., Ltd., one of Thai Farmers' Bank's subsidiaries.

The principal business of the Company is residential housing development, concentrating particularly on single detached houses. To date, almost all the developments have been in the Greater Bangkok area and its vicinities and in other major cities in Thailand; Chiangmai, Nakornratchasima, Khonkaen and Phuket. At present, the Companies paid-up capital totals 755.2 million baht.

Economic crisis during 1997-1998 resulted in many developers' incapability in delivering houses which were paid by the homebuyers but did not get them. Customers lacked confidence and real estate business was in a totally bad shape. After being successful in recapitalization, one of the Company's major policies of 2000 was to complete the construction of houses before putting them up for sale. This policy best served the need of consumers as well as changed their behavior. They now pledge to buy new houses only when they are completed. The complete-before-sell strategy is therefore inevitable for the housing industry in the future since the developer must have very solid and strong capital as well as accurate and complete marketing research. As a result, the Company currently adopts the complete-before-sell strategy to all of its projects and the result is satisfactory.

For running business, the company needs to improve all the systems into computerization and we have to realize the importance of information for good business. At this time, we start from the step of Booking, which the customer has to



pay for the deposit until the customer can transfer the ownership.

Whenever the customers book, sign contract and transfer the ownership, each step will be recorded and delivered in the form of reports. Those reports include status report, payment record, etc. which can be requested, such as:- daily, monthly, quarterly, and etc. The organization consists of five departments as follows:

(1) Project Division

The division has two main functions, one is for construction work and the other is for servicing the construction work. They control and support the construction and budget of construction cost of each project.

(2) Finance Division

Finance Division is responsible for financial management. This department has functions for setting Financial Planning and Periodic Budget. They are also performing financial statement/reports.

(3) Accounting Division

Accounting Division is responsible for accounting performance. This department has functions internal operation: General Ledger, Account Receivable, Account Payable and Inventory.

(4) Sales and Marketing Division

Sales and Marketing Division has four functions, which are the main roles of company revenue earning. This department has responsibility for setting sales and marketing strategy planning. Moreover, they are also setting sales function procedures. They coordinate with Finance division for customer billing and coordinate with IT work to server customer satisfaction.



(5) Human Resource Division

HR Division has two main functions. Both of manpower and payroll function for planning for Man Power Management, Performing monthly payroll and overtime and providing officer administration, welfare and training.

The organization chart is shown in Figure 2.1.

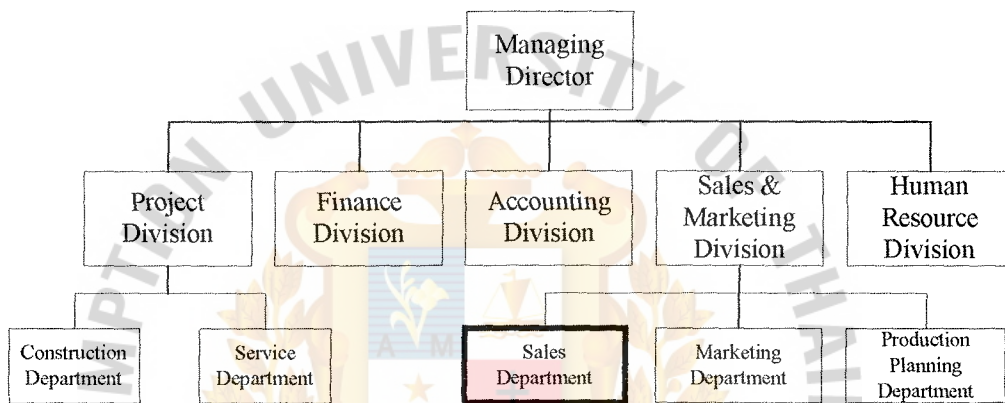


Figure 2.1. Organization Chart of Home Smarter Public Company Limited.

## 2.2 Area under Study

This project will cover business functions under the Sales Department. The study of service operations will be done at each project site including business workflows between Sales Department and other departments in the company such as Finance Department. This information will help to develop the Sales Information System.

## 2.3 Existing Business Functions

Currently, there is no fully computerized system assisting the Sales and Marketing and the Construction and Finance Departments. The customer has to go to the Head Office in order to make the contracts of buying the land and house and it will



take some time for the customer to wait for the complete contract documents. The Head Office staff uses the spreadsheet application on PC to store and produce the official documents and then send to the customer. In particular, they use Excel to do this task and then print it out, then one copy is sent to customer, one copy is kept in the Head Office and another copy is sent to the Site Office and the Construction and Finance Department. The Construction and Finance Department receives information from sales and post each concerned documents into the G/L System. After every information is posted to the G/L system, the reports about financial status such as trial balance, profit and loss, sale movements are prepared by hand. There are a lot of paper copies in many forms distributed in the company internally. The customer data is not kept and maintained in a good standard for being used, some documents are kept in different files, some are kept in disks. At present, Sales Department still uses manual operations in their current system. They keep all information in word processing files and worksheets. They use the traditional way in keeping their files by filing them on shelves and in cabinets. There is no Database Management System (DBMS) software used in this department.

From the above, the manual performance causes several problems, such as the mistake in customer details when arranging the contract because of record losses. In the end, the company can lose the customers because they may change their mind because they are not satisfied with the service.

This means that, there is a large processing data for each year. So, we need more labors and time to continue the work. To examine the career path the customer history must be done manually and waste more labors and time. So, the computerized system should be strongly considered from now.



## **2.4 Current Problems and Area for Improvements**

As mentioned before, the Home Smarter Co., Ltd. has to produce many business documents and the Sales and Marketing Division must process each document to produce the Sale Reports. The delay and missing of documents caused numerous problems to both Sales and Marketing, and Construction and Finance Departments in completing the jobs. And with this manual system, it caused the expansion and growth of the company to be very limited. The current problems of the company are:

### **The High Workload**

The Construction and Finance Officer have to manage all the documents from the Sales and Marketing Division.

### **Delay**

Sales Delays in submitting the document and sometimes the documents are missing. This causes the Construction and Finance job to be delayed.

### **Accuracy of Information**

The high workload can cause mistakes in both Sales and Marketing Division, and Construction and Finance Division. The Sales and Marketing Division may forget to submit the Sale Order or the Sales Office may forget to submit a copy of the invoice to the Finance Officer. This may cause wrong figures in several reports which management used for analyses and planning.

### **Time Consumption**

Mistakes occurred from both the Sales and Marketing, and Construction and Finance Divisions, sometimes it takes a lot of time to check out and correct. The Finance Officer might have to spend quite a long time in collecting additional information or rechecking the bulk of documents again. And the customers have to wait for response to their orders.



### **Limited Expansion**

Expansion and growth are already at their limits under the present system.

From the problem we described in the previous section, we will raise an area for improvement, which will be the objective of this proposal as follows:

#### **Reduce the Workload**

The unnecessary jobs should be cut down, at least it should be simplified. The new system should substitute the staff in doing some jobs.

#### **Improve the Information Accuracy**

There should be a new method of storing and managing information for more accuracy. The improved system should ensure that the information is always updated and allow the officers to get the right information.

#### **Reduce the Time in Collecting Information**

Once the information is guaranteed for accuracy, the officers need not spend time in double-checking the information. The information should be centralized and kept in the same storage for easier retrieval.

#### **Shorten the Delay Time**

The Sales and Marketing, and the Construction and Finance Divisions must cooperate more closely together and the new system has the document tracking capability in case Construction and Finance Division can follow the documents produced by the Sales Division. The customers need not wait for the response and the Sales Division can serve more numbers of orders.

#### **Easy to Expand**

This new system also helps to serve the management policy in order to have more branches at lower overhead cost.



## 2.5 Information Requirements

Several tools are used to define information requirements in the business, including sampling and investigating data, observing the actual operations, interviewing key personnel, and questionnaires.

It is necessary to understand what information users need to perform their jobs and achieve the goals or objectives of study. In order to get the information requirements for this project the Sales manager of Home Smarter Company and the Sales officers were interviewed which includes observing the actual operations.

The requirement of the Sales manager is to improve the operations, resolve the current problems as much as possible.





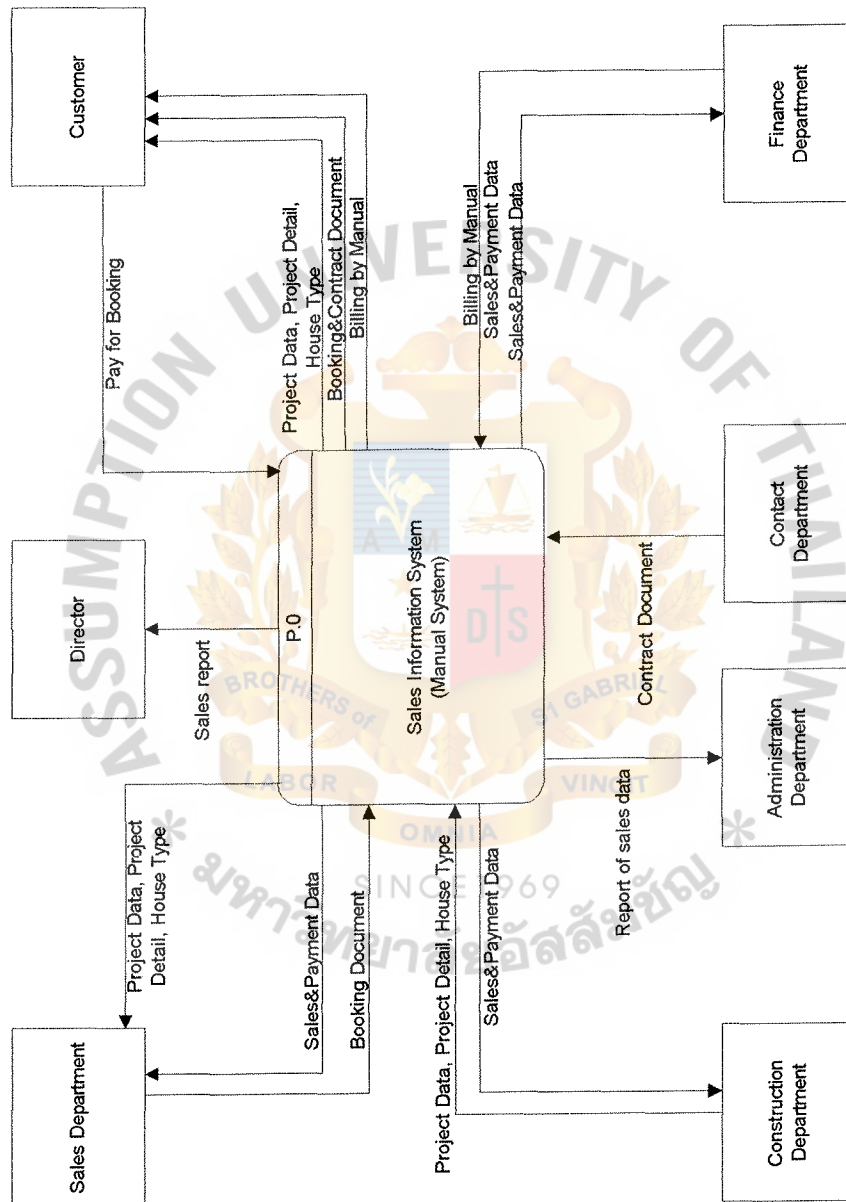


Figure 2.1. Context Diagram - Existing System.



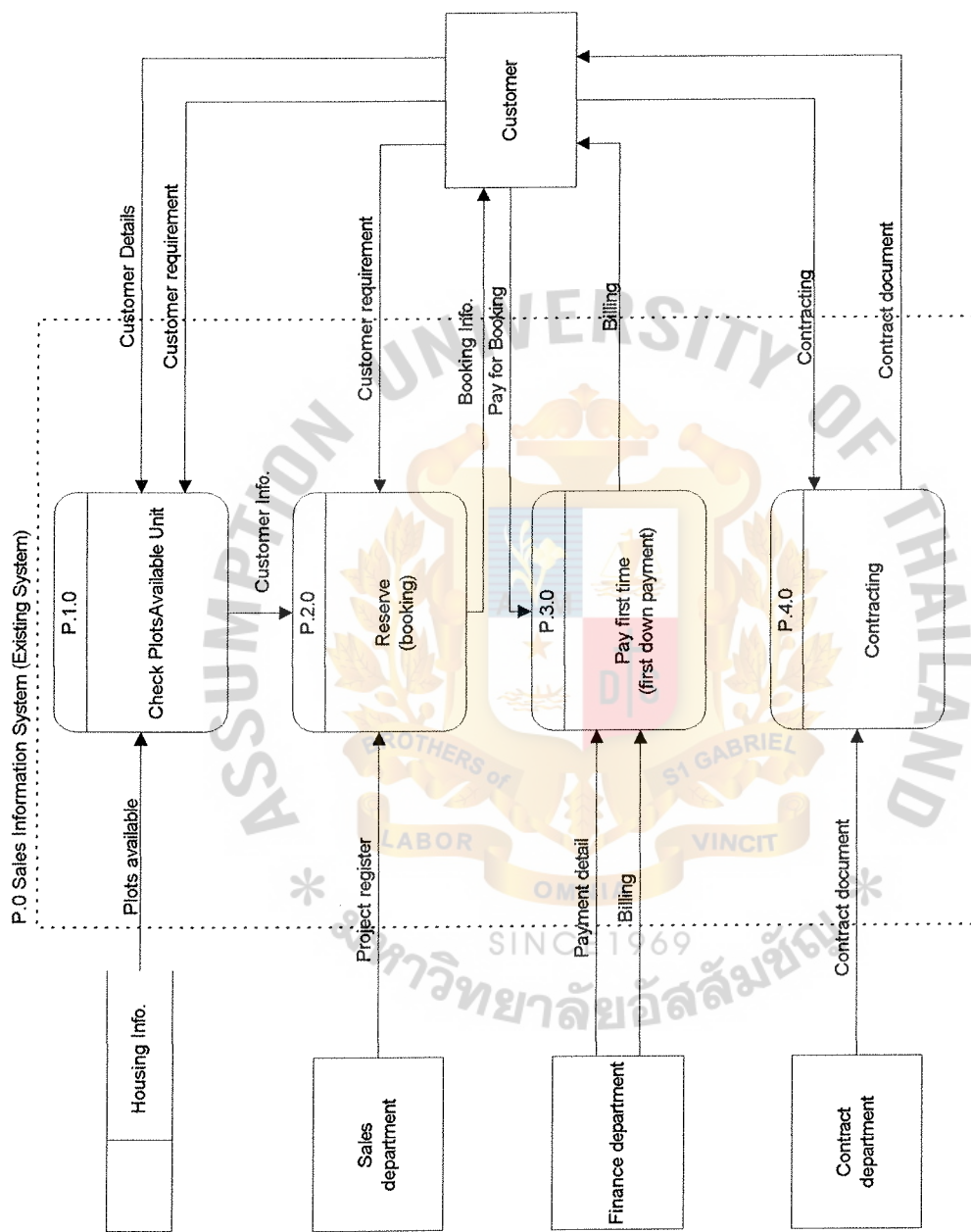


Figure 2.2. Data Flow Diagram Level 0 - Existing System.



### III. THE PROPOSED SYSTEM

#### 3.1 User Requirements

The user requirements are obtained by interviewing the system users. Then, the existing system is evaluated. For example, the existing forms and reports are reviewed and summarized, so the important data for the system are captured. Finally, the new system will serve all the activities in Sales Department to combine in one Department. All information will be kept in Database Management System which will provide convenience to the end-users. The user requirements are as follows:

- (1) Any information should be easy to search. The Sales Department provides request forms for customers. The user wants to use information in the forms, such as customer code or number, to search individual record.
- (2) The accuracy of the information is very important. Providing accurate and meaningful information so that the management is able to make a better decision and plan forecasting and controlling.
- (3) The system must have fast response time in order to process request from executive board, employees, and others.
- (4) The users want all information to be shared. The company has more than 200 employees. Working separately, like in the present day, can cause the problem of data inconsistency.
- (5) The users want to keep all histories of information, such as changing name or surname, working path, so they can retrieve information.
- (6) The executive board must be able to view information, such as customer information, and employee information, to help them in the decision making process.



- (7) The users need a secure system that unauthorized people cannot access. They are official information that must be accurate and must not be modified by unauthorized people.
- (8) The user must be able to view the search results on the monitor, and preview the reports before printing.

## **3.2 System Design**

### **3.2.1 The New Computerized System**

It consisted of subsystem as follows:

#### **Update Plots Table**

The customer order will be checked and sent to the Plots File to check whether the order plot is available or not. Then it will sent back the acknowledgement.

#### **Add New Customer**

After checking and finding that the customer is new, user will key new customer information.

#### **Reserve**

After checking the available plot, the customer can book the plot by applying the booking application then make booking contract. The original one will keep at the Sale Office at the site and the duplicate will kept by the customer.

#### **Making Contract**

After making the booking, Contract process has the payment schedule and other information about the conditions. The original one will keep at Sale Office and another one will kept by the customer.



### **Fix Down Payment**

After making contract, fix down payment will happen. Customer will pay down payment every month until finished.

### **Transfer**

After finishing the completed house and inspecting the detail of the construction, the transfer process will happen between the customer and the company.

### **Report**

After finishing every process, user can print report for Manager when he wants to get sales report such as yearly sales report, monthly sales report, weekly sales report, daily sales report or other reports.

#### **3.2.2 Overview of the Proposed System**

The context diagram of the proposed system and the data flow diagram for the proposed system are as follows:



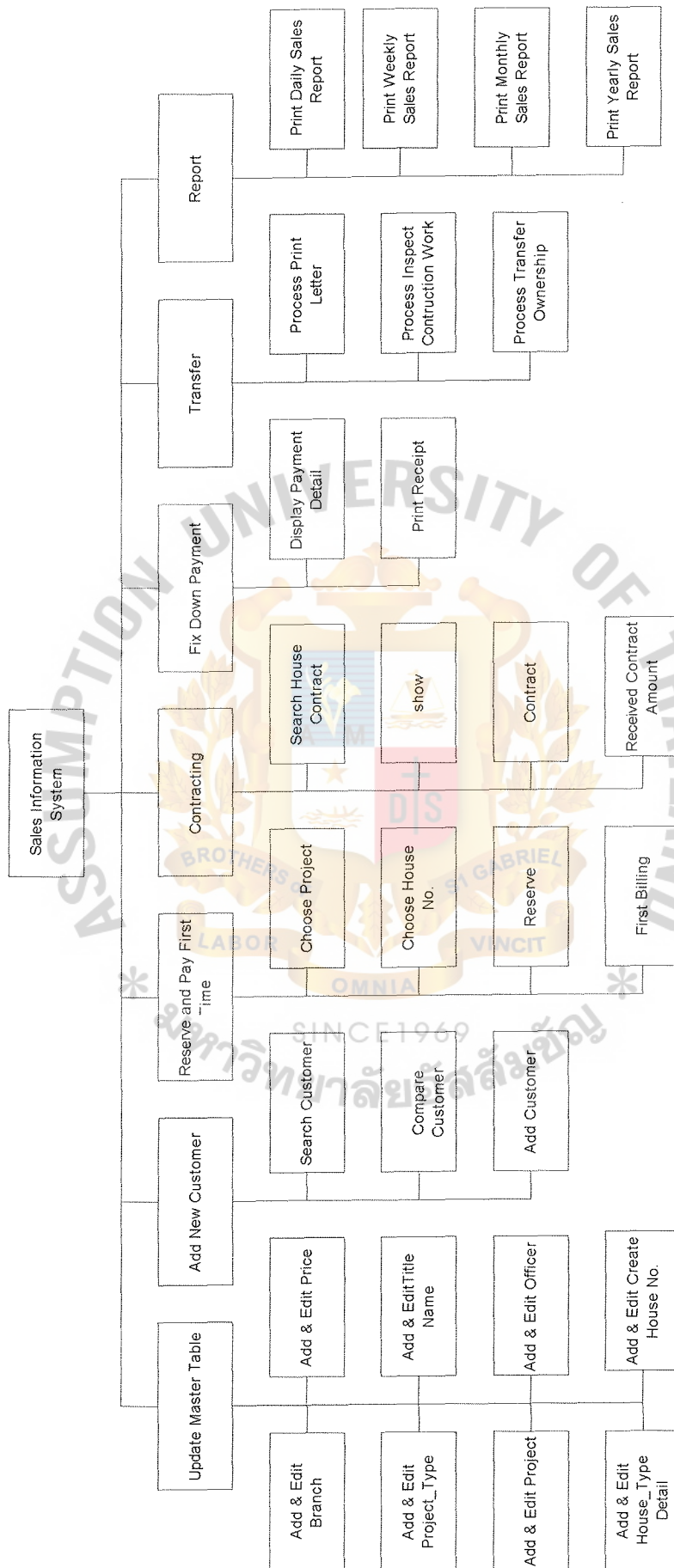


Figure 3.1. Functional Decomposition Diagram.



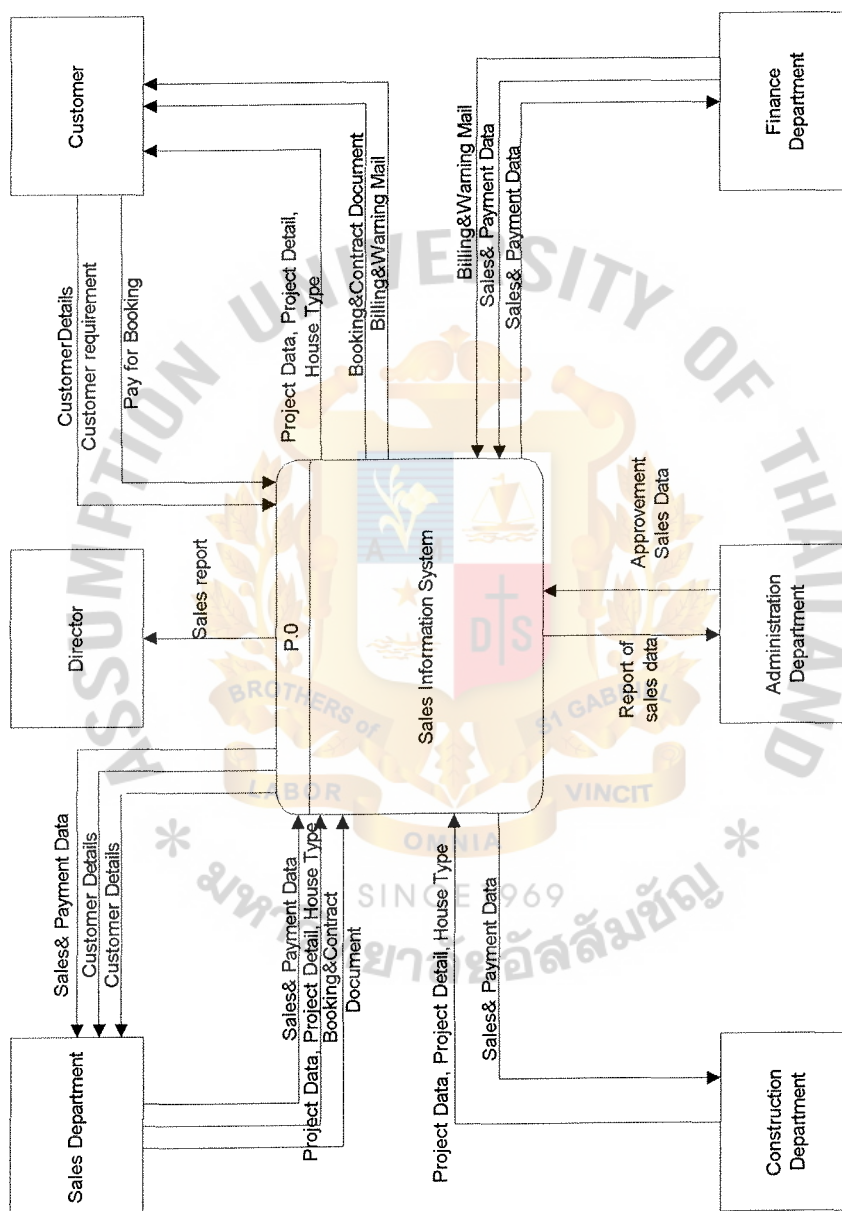


Figure 3.2. Context Diagram - Proposed System.







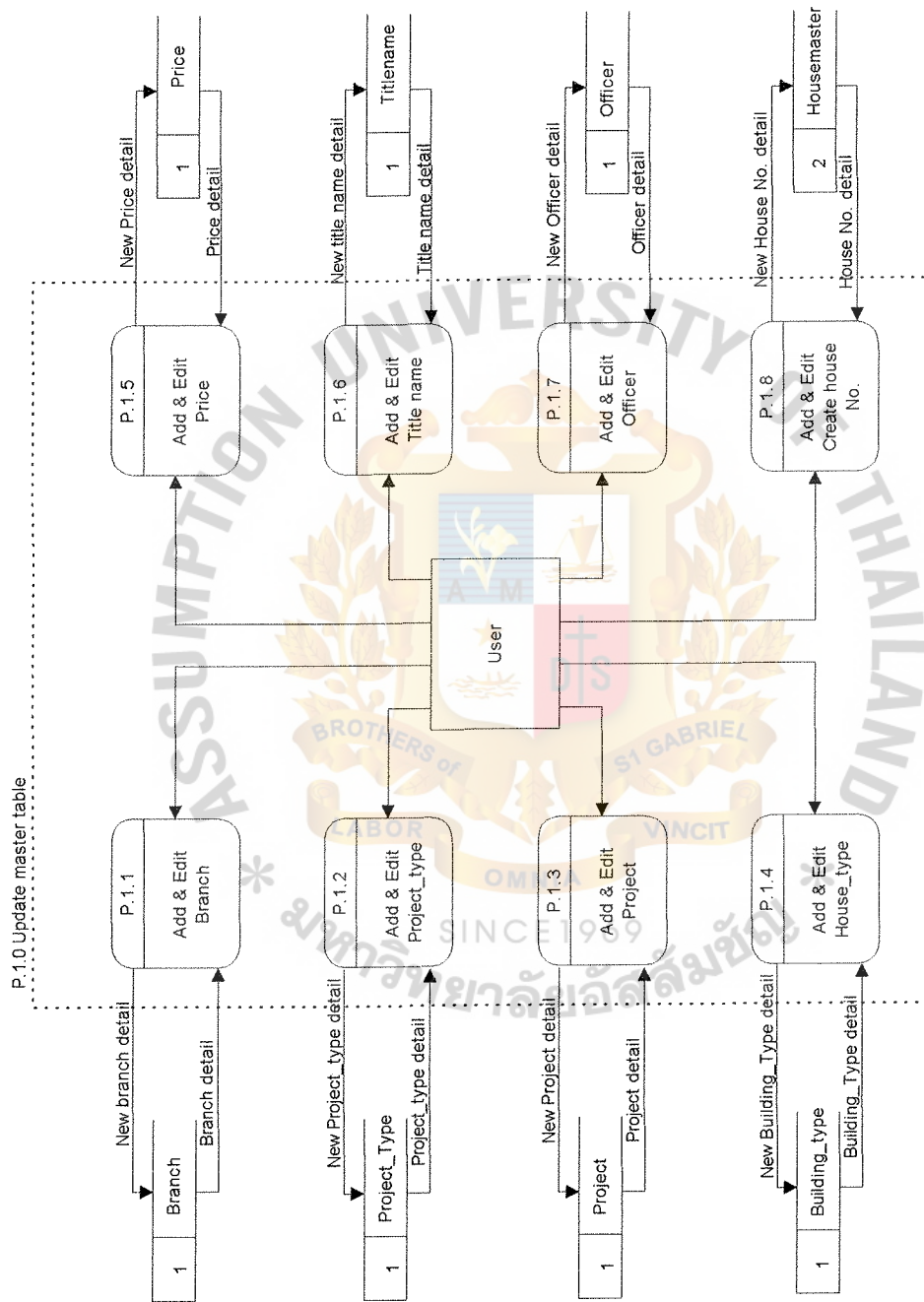


Figure 3.4. Data Flow Diagram Level 1 - Process Update master table.



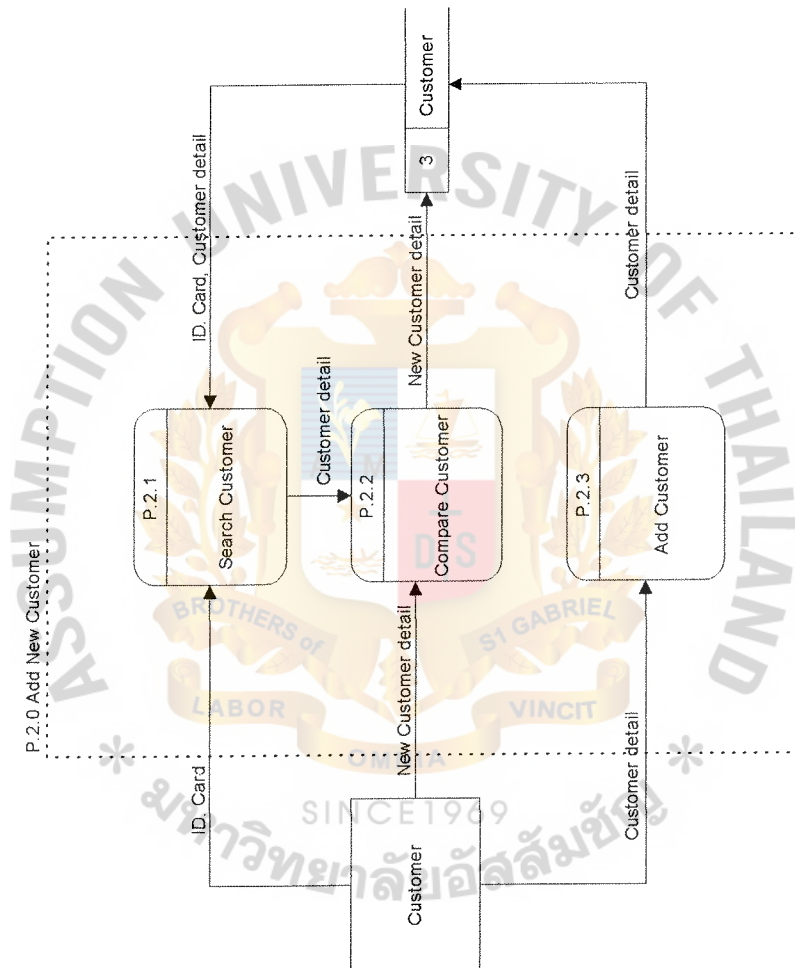


Figure 3.5. Data Flow Diagram Level 1 - Process Add New Customer.



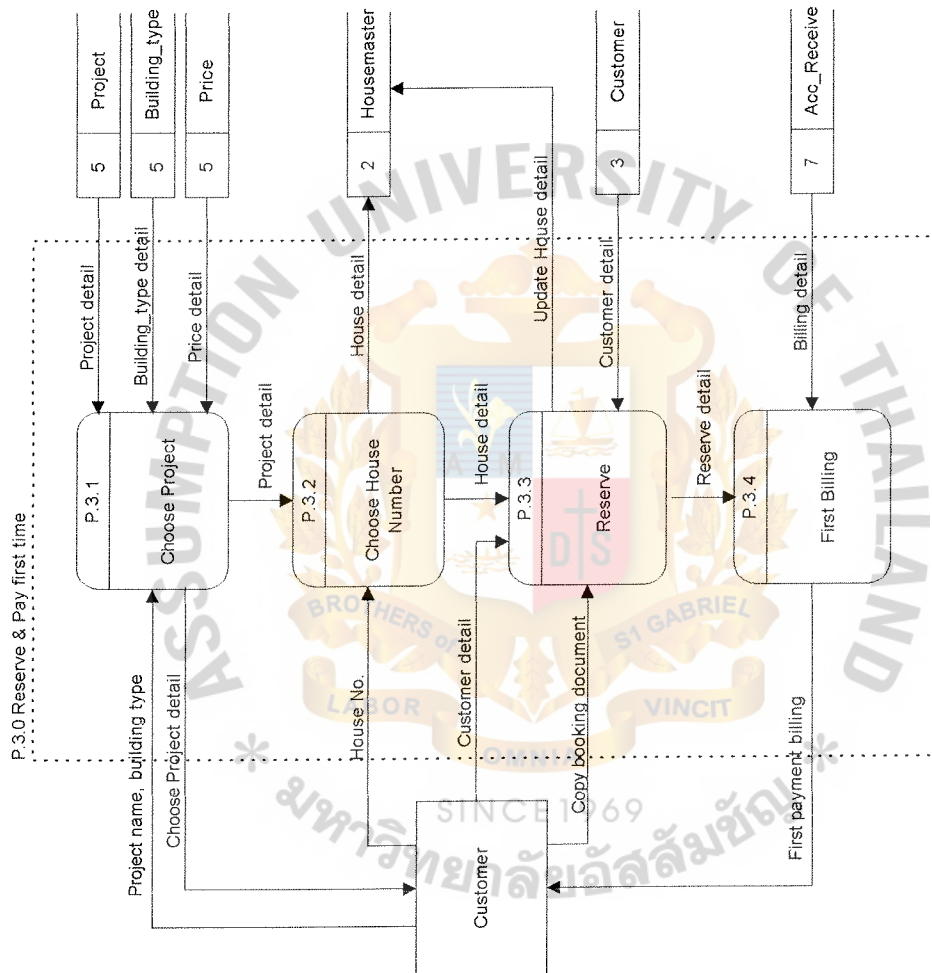


Figure 3.6. Data Flow Diagram Level 1 - Process Reserve and Pay First Time.



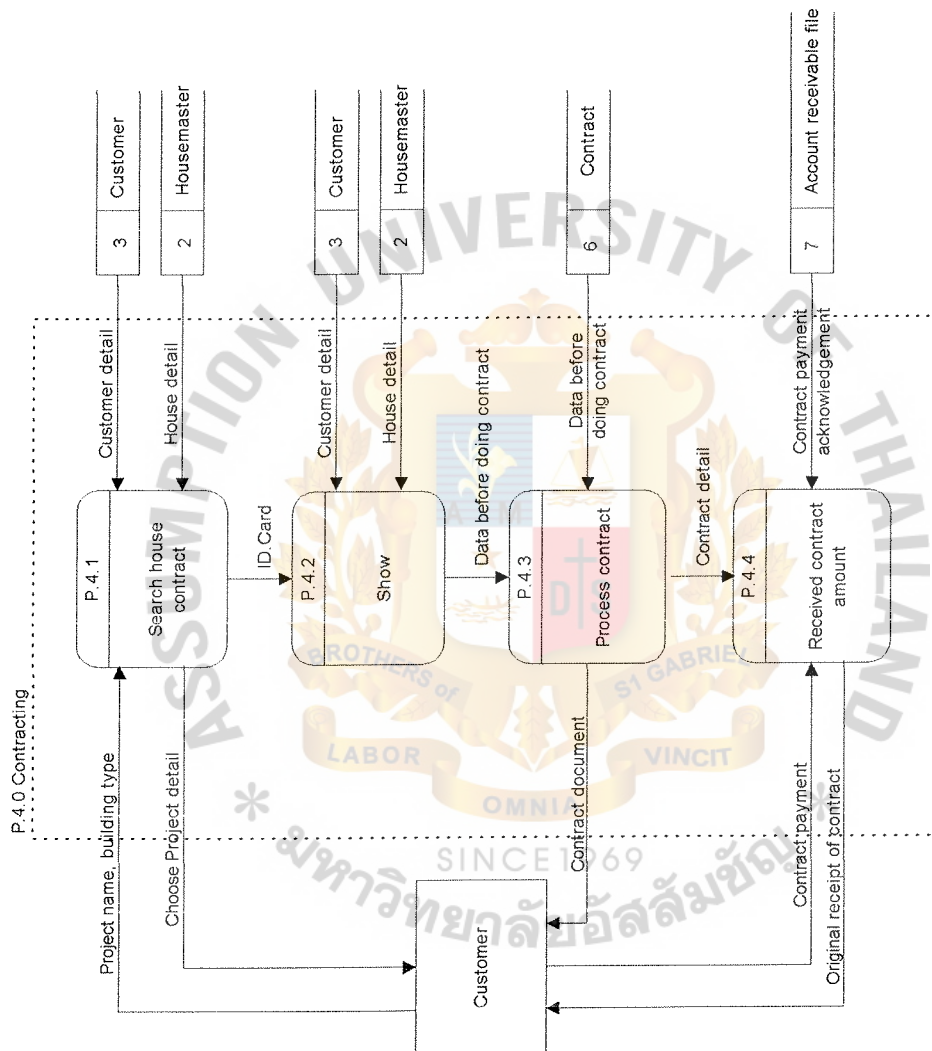


Figure 3.7. Data Flow Diagram Level 1 - Process Contracting.



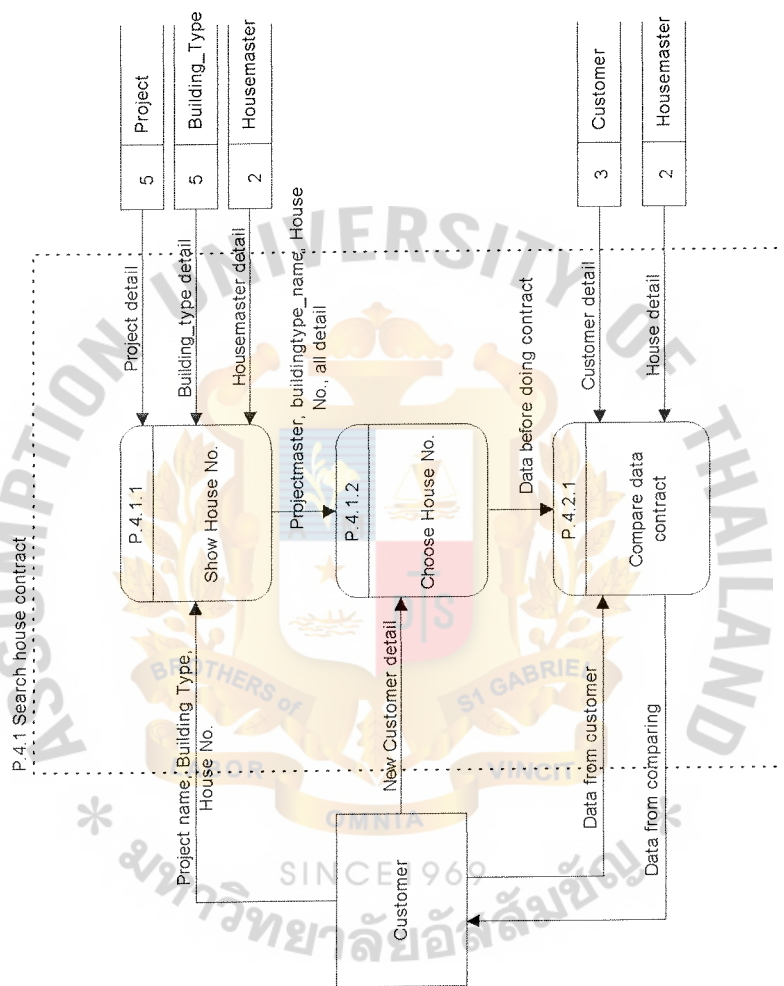


Figure 3.8. Data Flow Diagram Level 2 - Process Search House Contract.



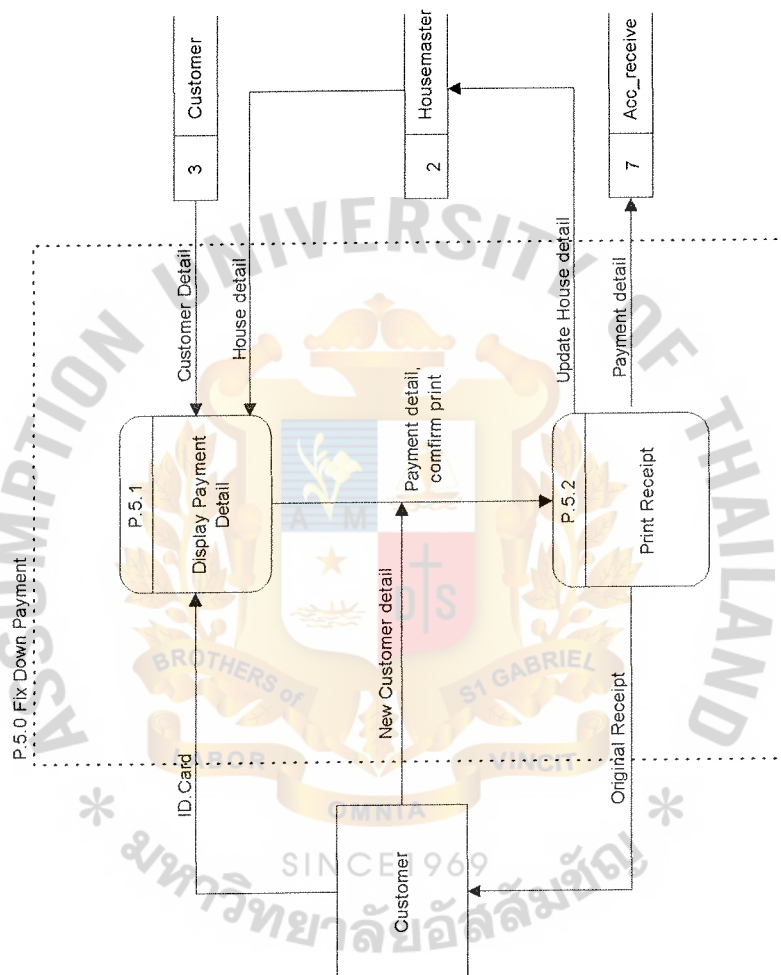


Figure 3.9. Data Flow Diagram Level 2 - Process Fix Down Payment.



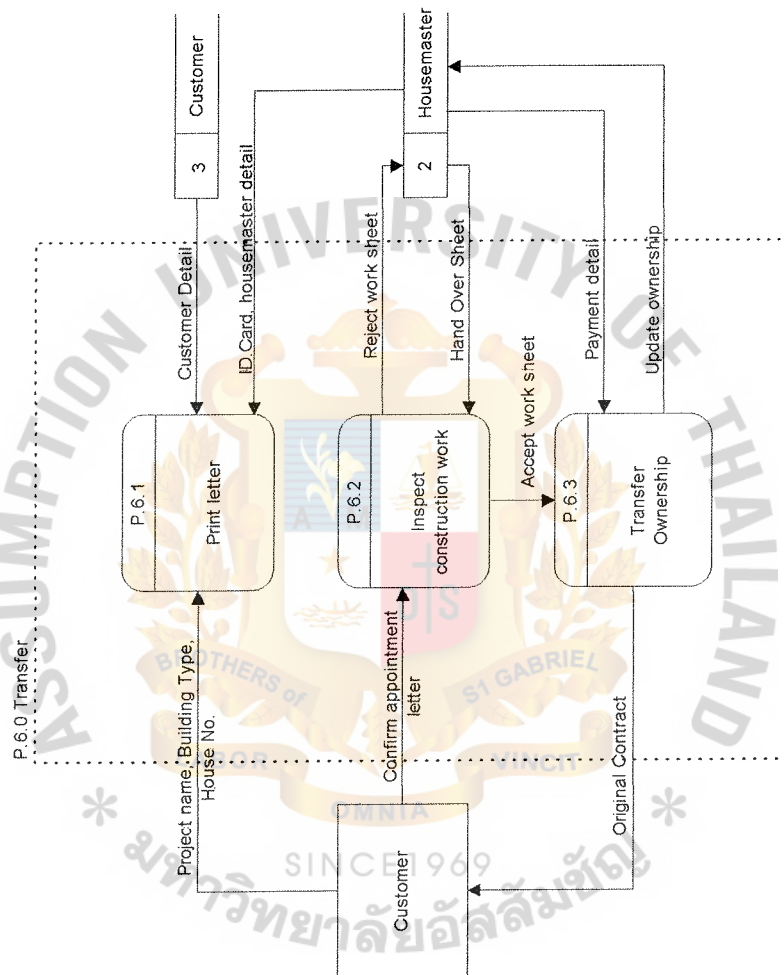


Figure 3.10. Data Flow Diagram Level 2 - Process Transfer.



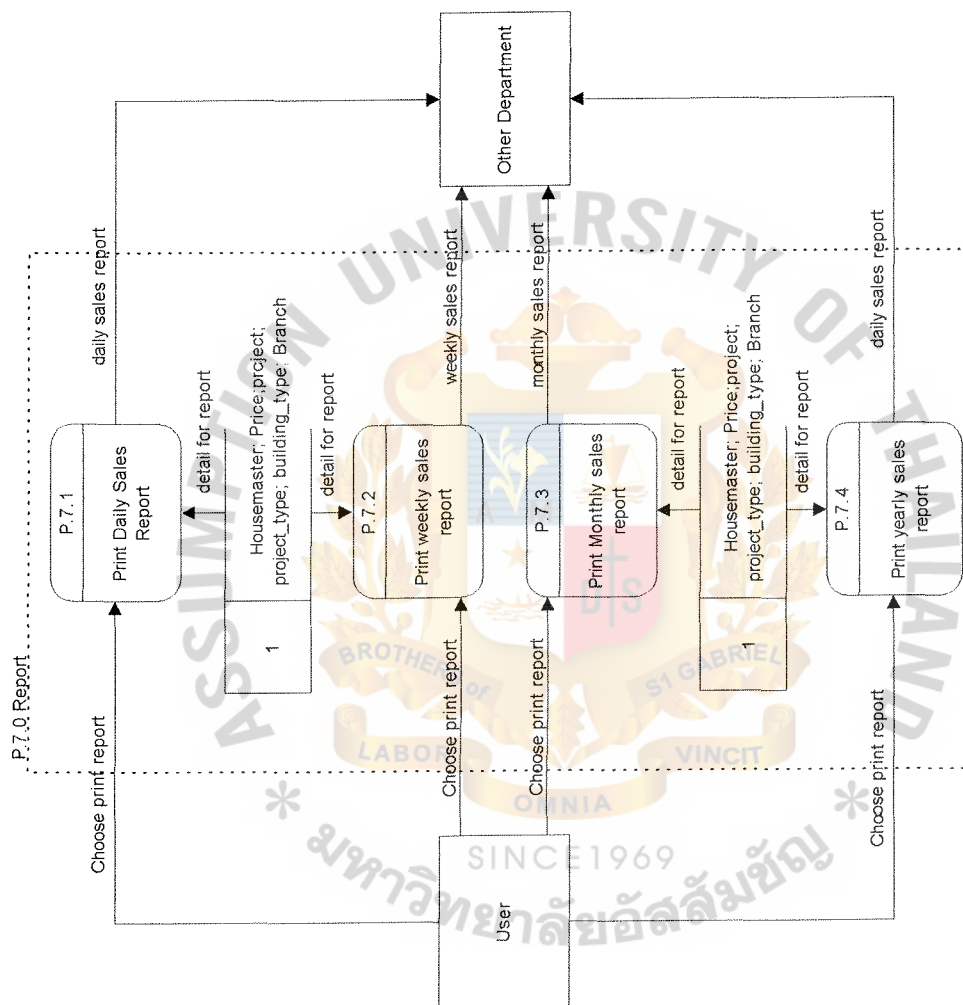


Figure 3.1.1. Data Flow Diagram Level 2 - Process Report.



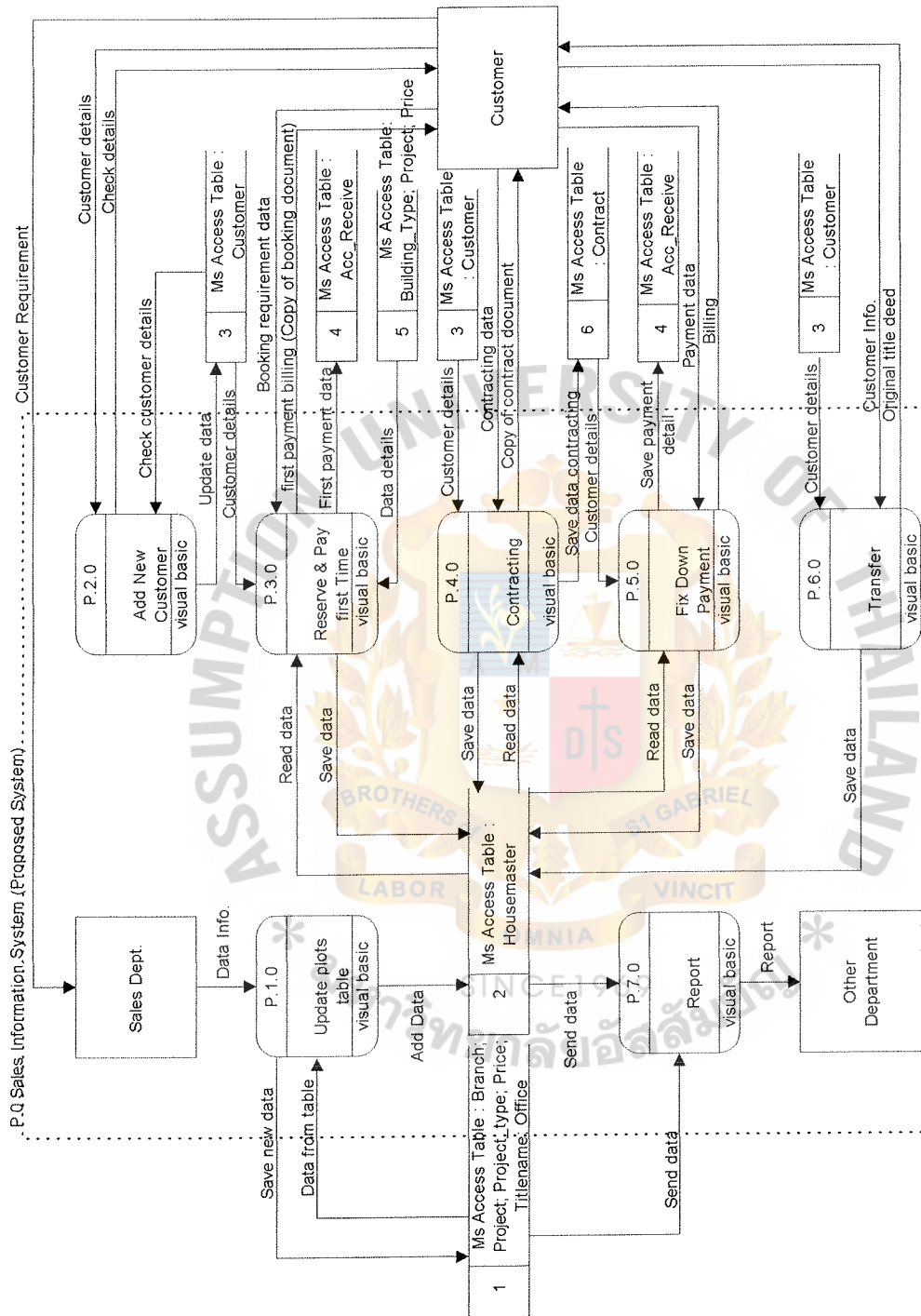


Figure 3.20. Process Architecture Diagram



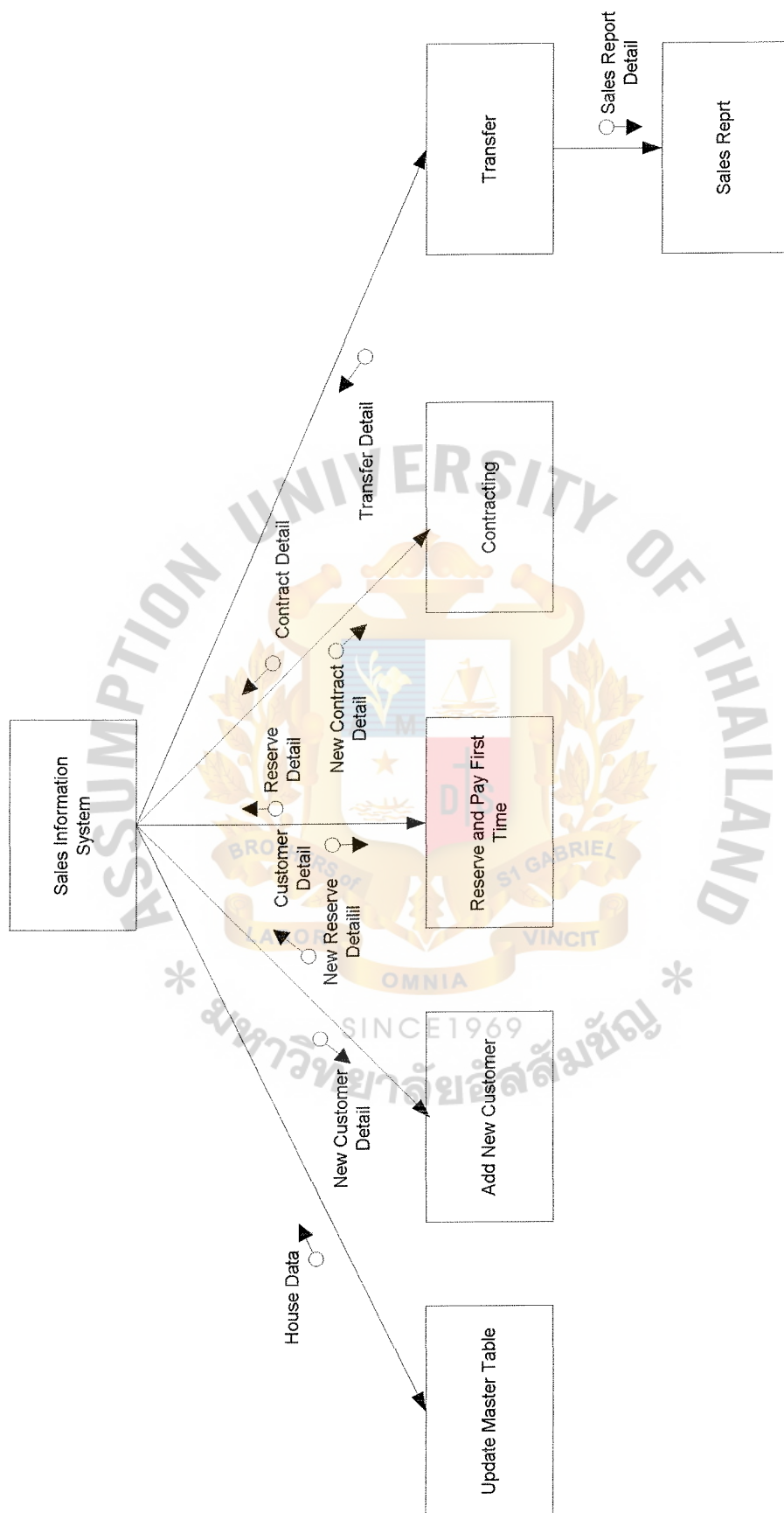


Figure 3.13. Structure Chart of Sales Information System for Housing Project.



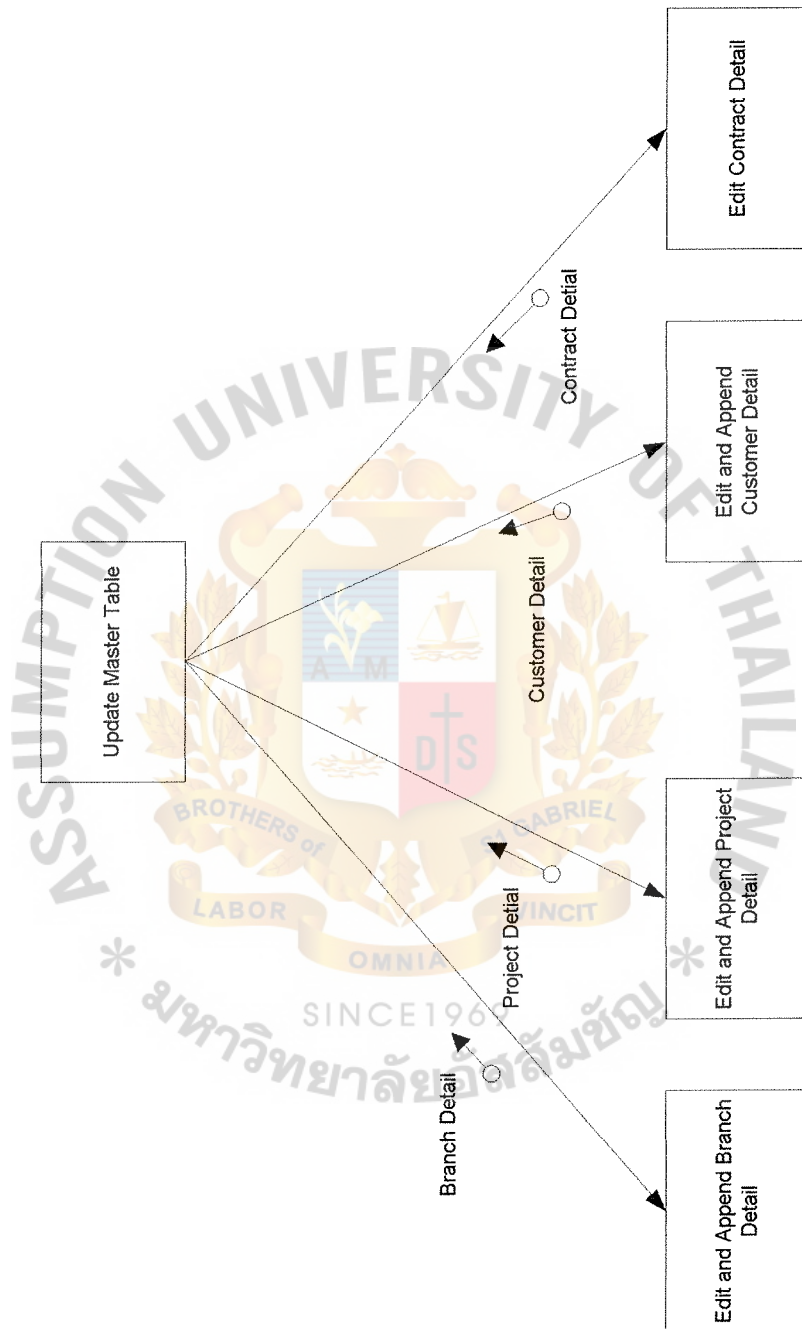


Figure 3.14. Structure Chart of Update Master Process.



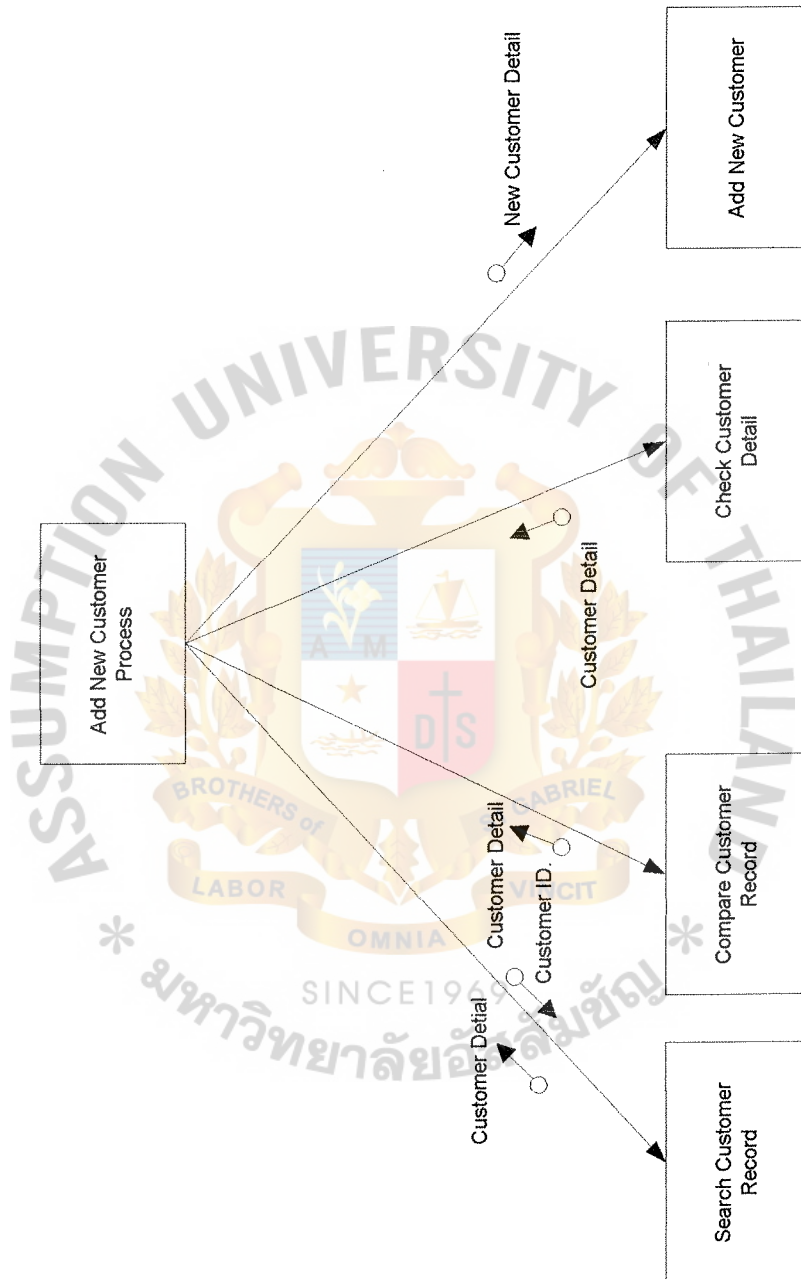


Figure 3.15. Structure Chart of Add New Customer Process.



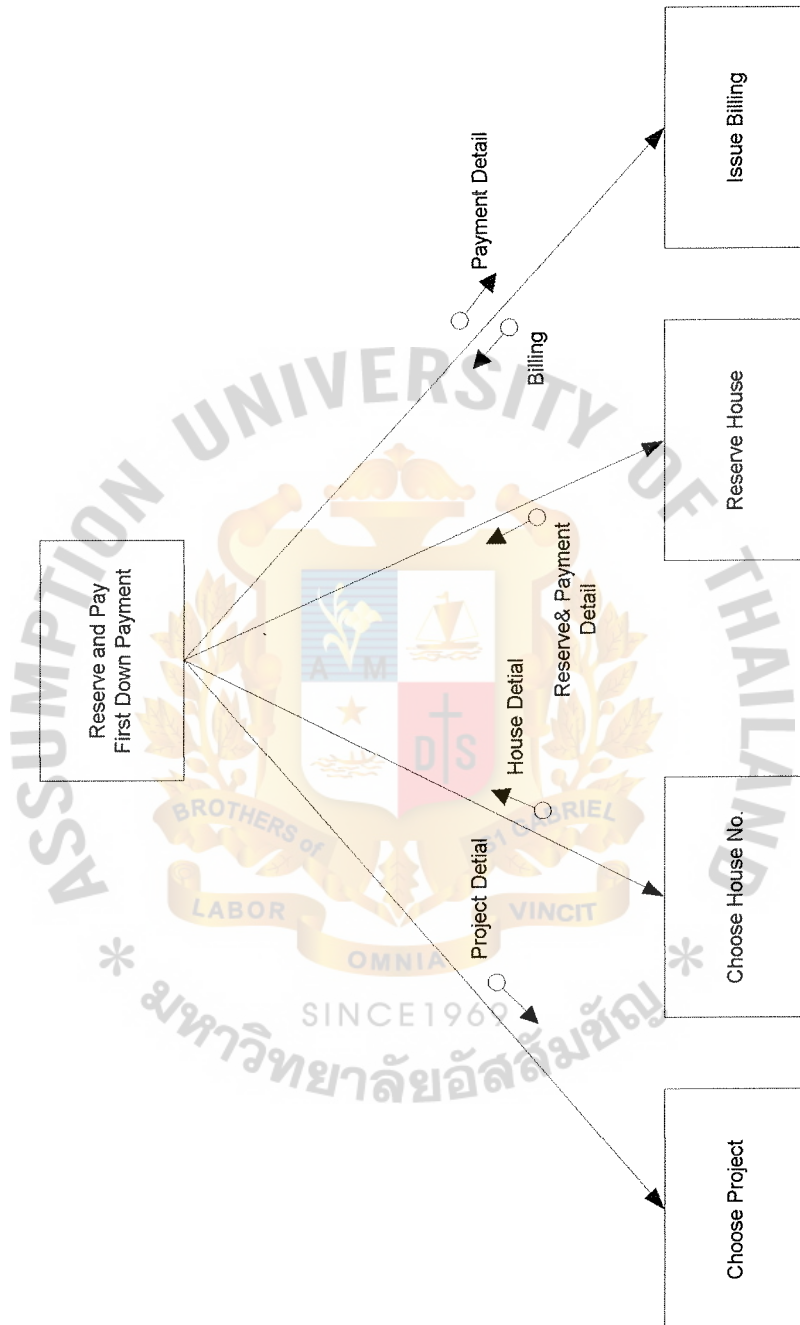


Figure 3.16. Structure Chart of Reserve and Pay First Process.



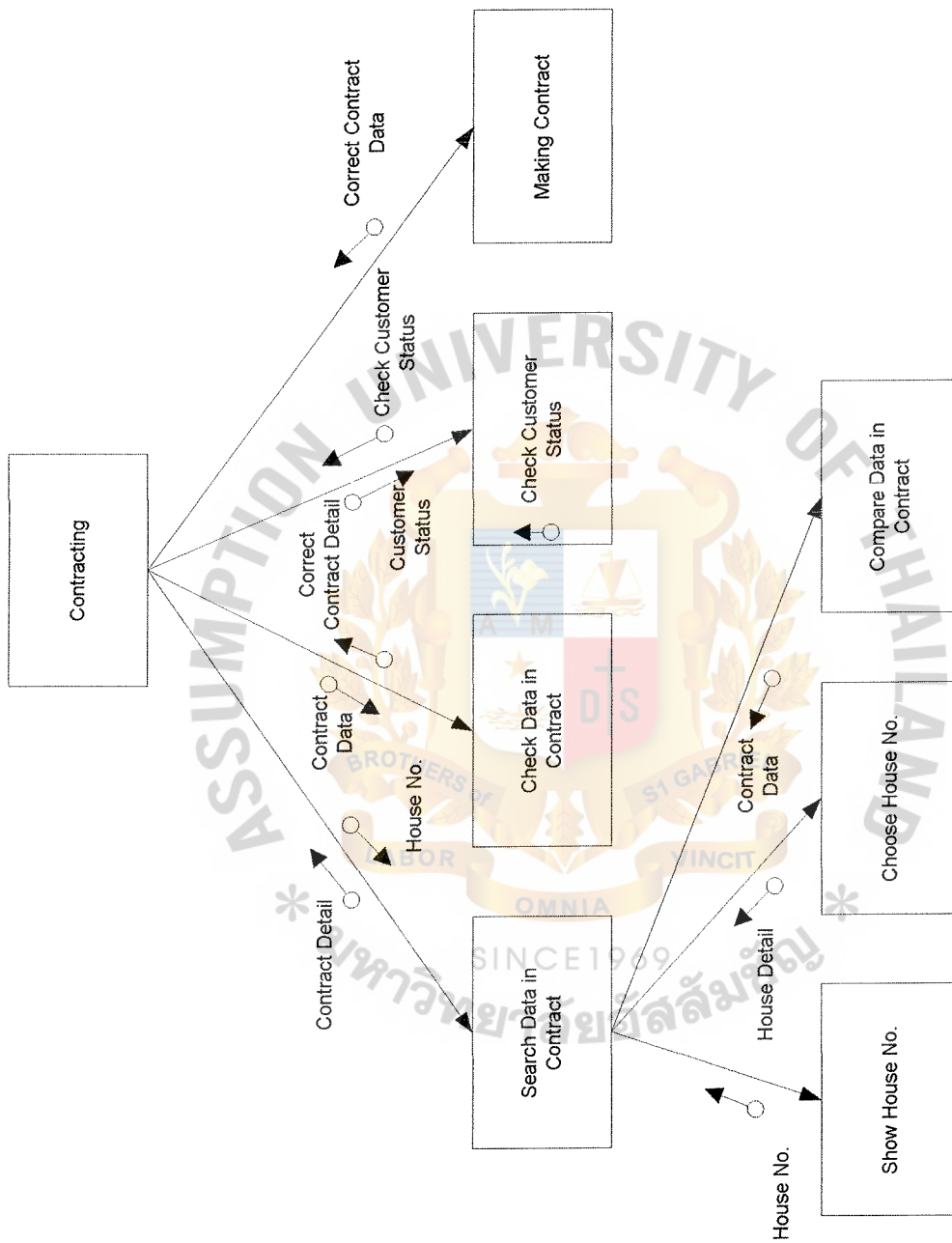


Figure 3.17. Structure Chart of Making Contract Process.



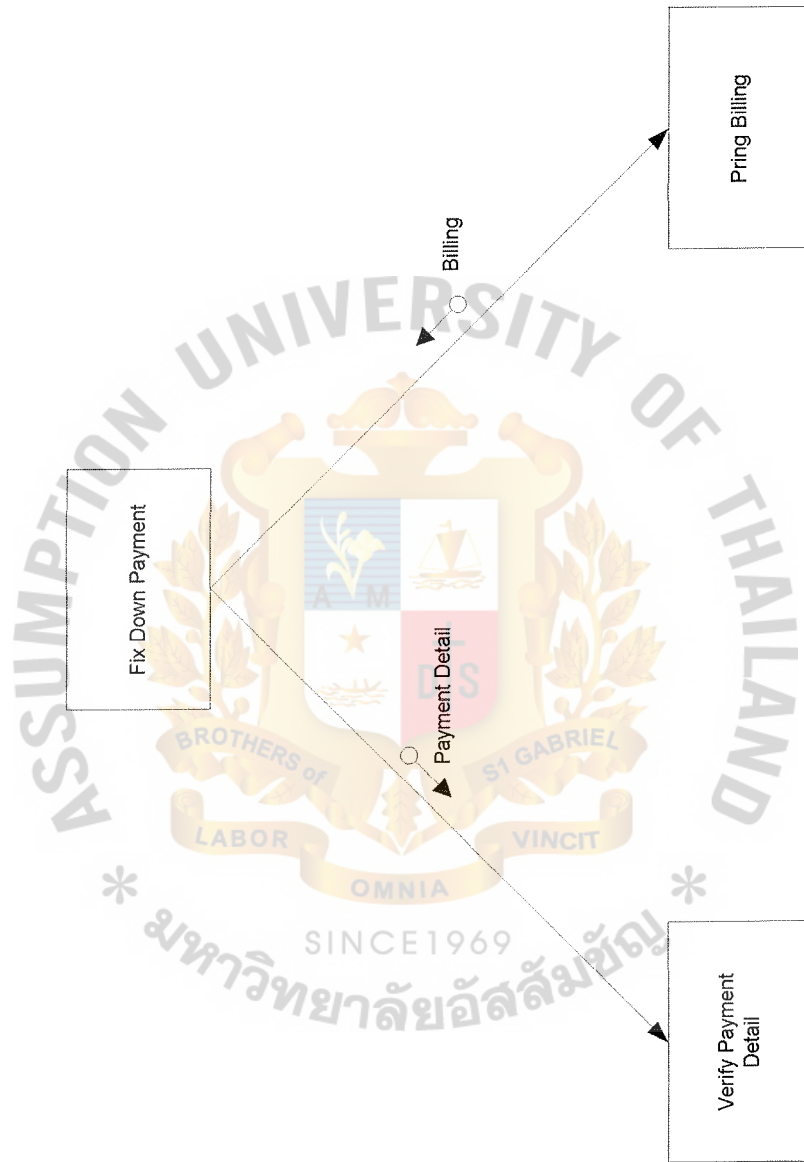


Figure 3.18. Structure Chart of Fix Down Payment Process.



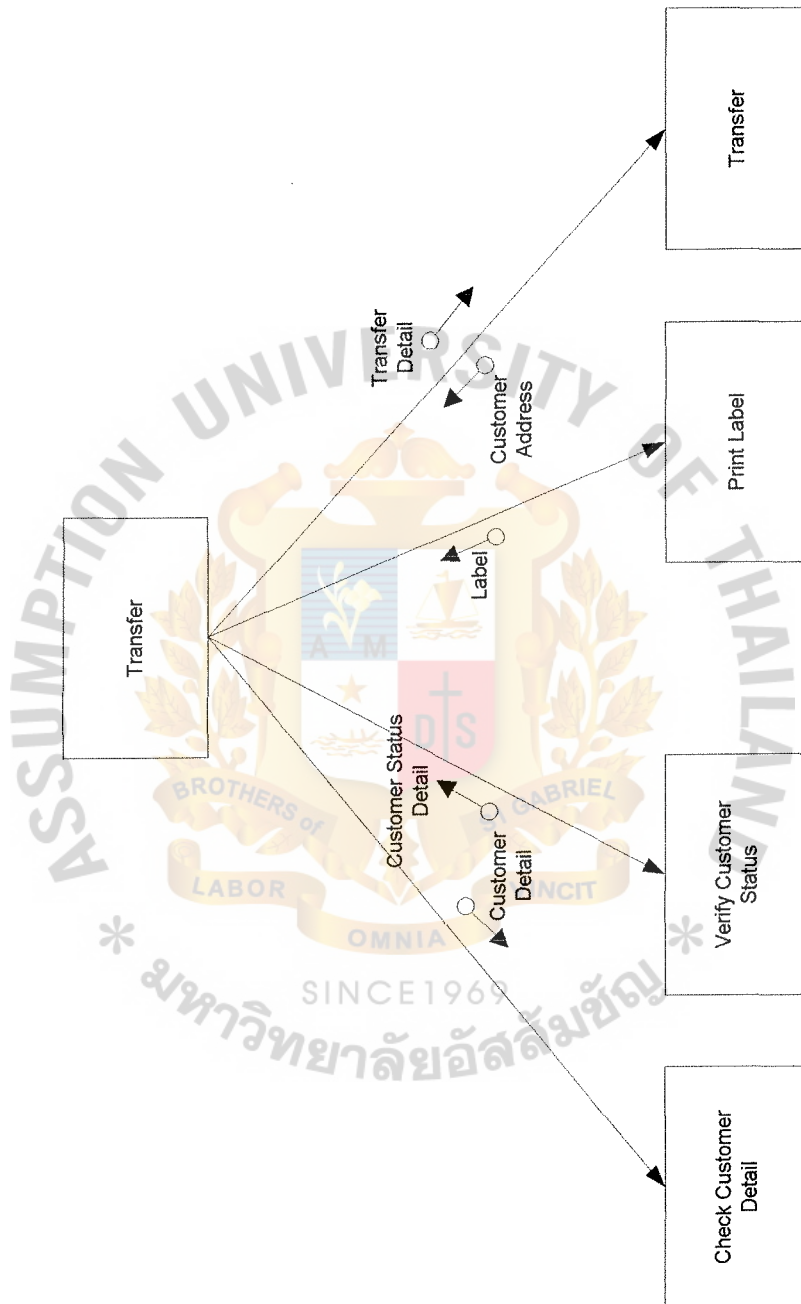


Figure 3.19. Structure Chart of Transfer Process.



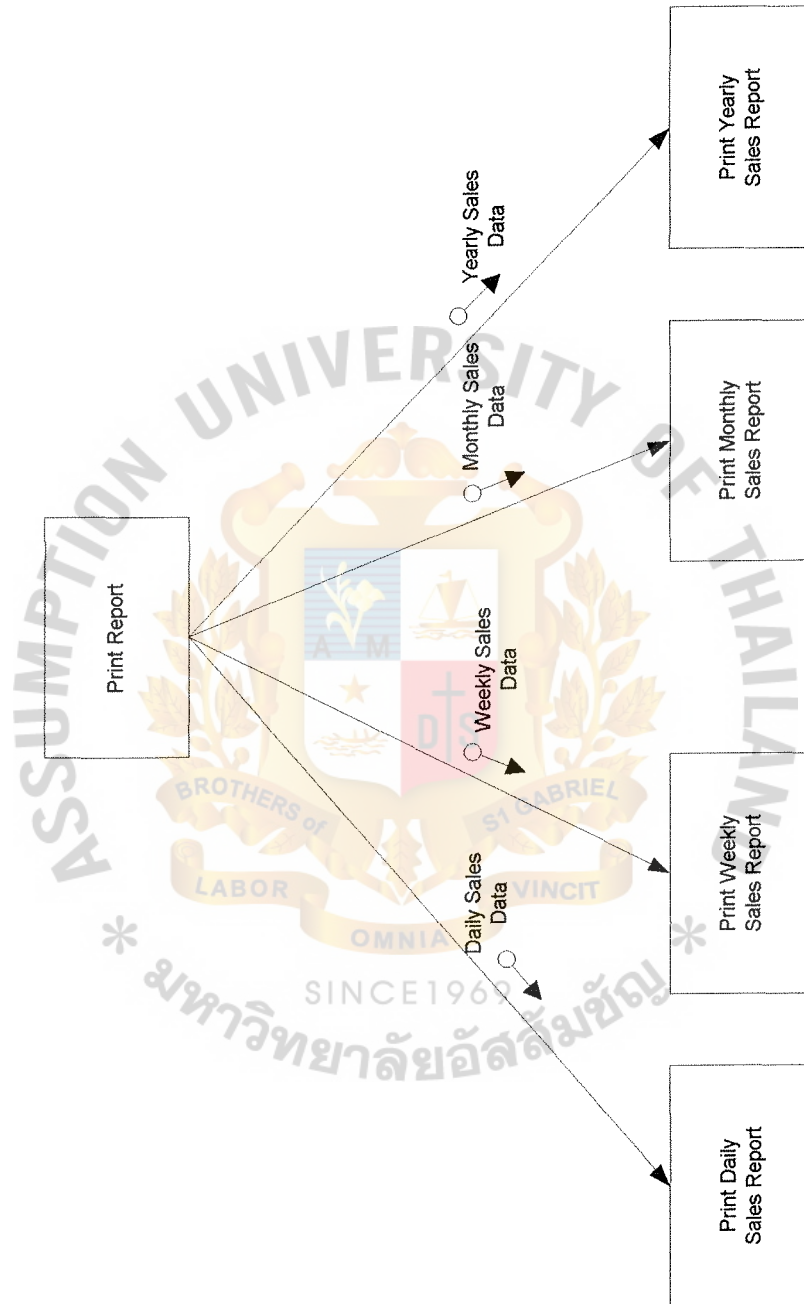


Figure 3.20. Structure Chart of Print Report Process.



### 3.3 Database Design

There are several techniques in data modeling. For this proposed system, an entity relationship diagram (ERD) is used to identify the required data. The diagram gives an overview of the database schema of the system. From the entity relationship diagram, rough database relations can be drafted. Finally, the normalization technique is applied to the rough relations, to form normalized database schemas.

To construct a data model, the first task is to discover the fundamental entities in the system. This task can be achieved by interviews with the users. Another technique is to study existing forms and reports. Then, all attributes of entities and relationships are listed. These attributes also come from the study of existing documents, such as forms and reports, and summarizing and arranging them into the related entities or relationships.

Data Dictionary- describes all in the DFD. The data dictionary can be implemented at this point. The data dictionary is important for system development because it summarizes all attributes in every table of the system. It also describes all attributes' data type and format including the range of the data. The data dictionary is shown in Appendix E.

Data Process- specifies the process in a DFD. Each process included the DFD number for the process.

Finally, the modules are packaged into load modules, which are groups of program modules that are moved as a block between memory and disk.



## **Input Design**

The input design of the proposed system comes from the user's requirement. From the user interview sections, the input design must follow the conclusion that the system must be user-friendly because the users are familiar with the old-style paperwork. Moreover, the input system must be very efficient. That is, the users should not have to deal with enormous amount of information that they have to input. This will make input processes more efficient, and the user will have to input. This will spend less time entering the information. The input should cover all required information following the database design. Some of the existing forms and reports contain excessive information, so it may not be included in the input of the system or in the database.

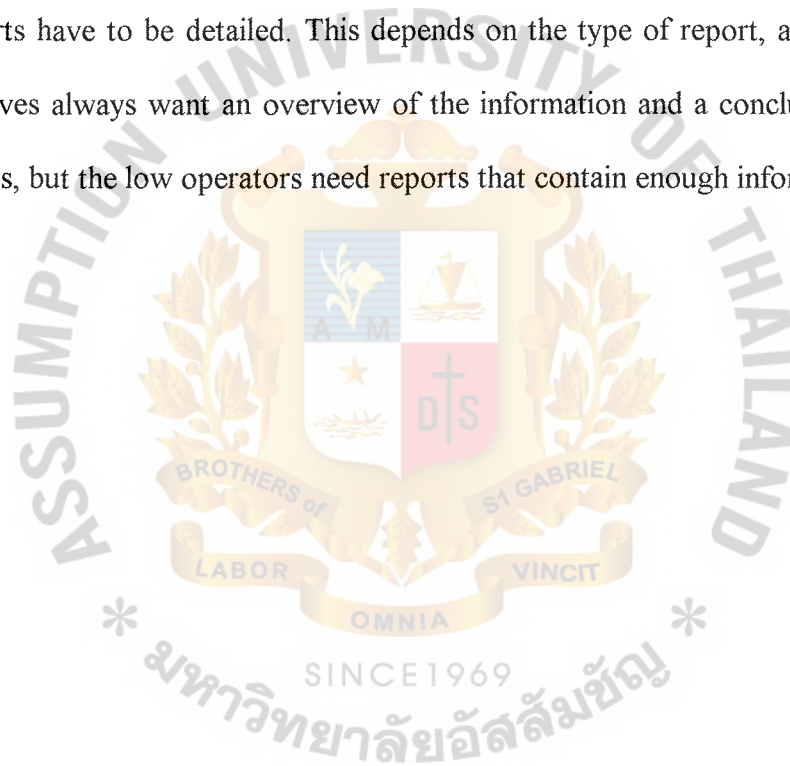
## **Output Design**

The output of the proposed system mainly deals with reports. As mentioned earlier, the report requirement came from the user requirement. First the system must be able to produce the existing reports that are presently done by dedicate officers. They have to type the reports from the request of any department. The users also have a new kind of report that they have just discovered, so the system has to be able to produce those reports.

The output design is to design the reports. The reports should not confuse readers. They should contain enough information, and be in the easy-to-read format. The format influences the reader's concentration. In the well-formatted reports, with a suitable header, easy-to-understand description, and appropriate emphasizing, such as underlines and indents, the reader will be attracted. Otherwise the reader may not want to read or even look at the reports.



Another important thing about output design is the accuracy of the information included in the reports. The information, both retrieved from the table and calculated from the existing data must be accurate. Some of the reports are not only distributed internally, but are also distributed to other organizations. So errors may damage the company's reputation. In conclusion, the output design has to concentrate mainly on information accuracy and user-friendliness. The level of the details is also important. Some reports, such as customer information, may need to be very detailed, but not all of the reports have to be detailed. This depends on the type of report, and the reader. The executives always want an overview of the information and a conclusion, without all the details, but the low operators need reports that contain enough information.





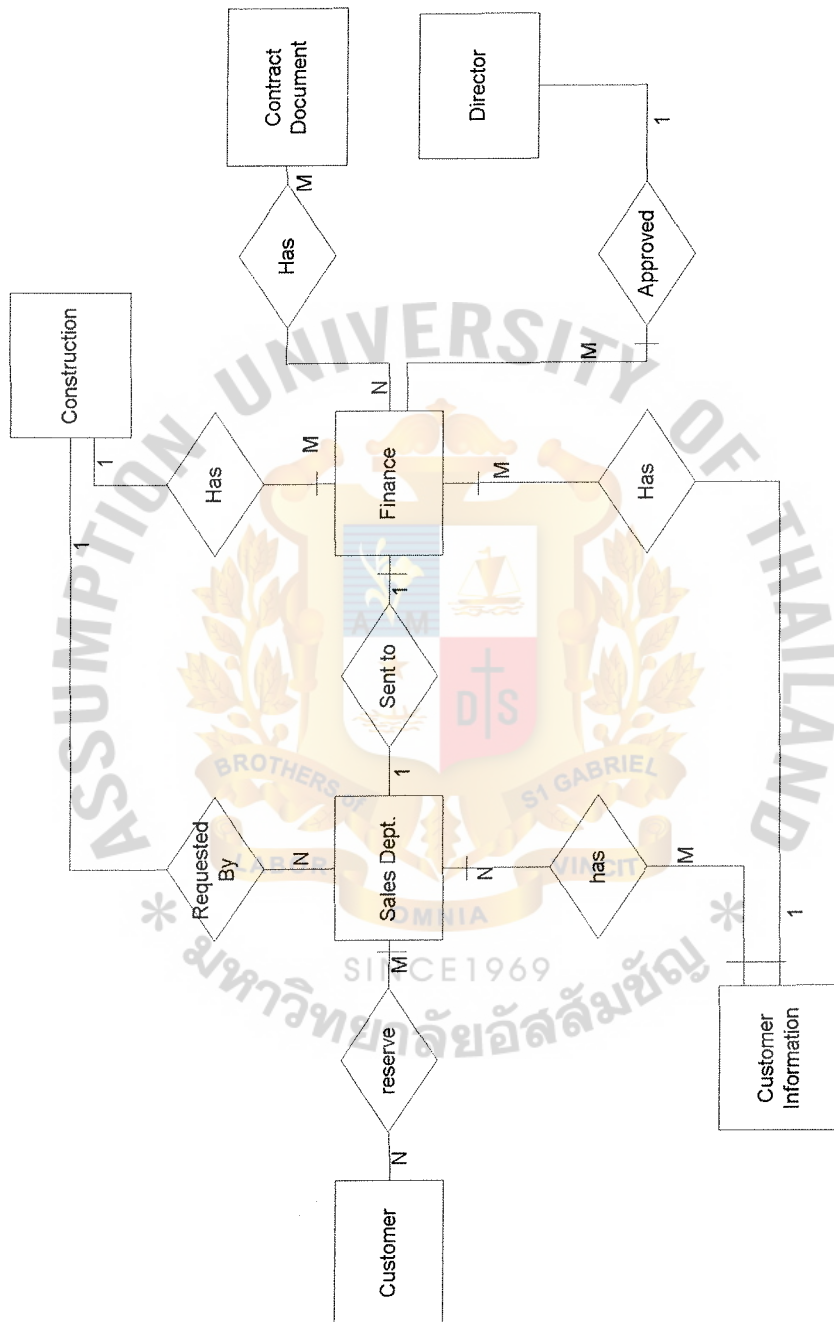


Figure 3.21. The Entity-Relationship Diagram of the Proposed System.



### 3.4 Candidate Solutions

Table 3.1. Candidate System Matrix.

Characteristics	Candidate 1	Candidate 2	Candidate 3
<u>Portion of System Computerized</u>  Brief description of that portion of the system that would be computerized in this candidate	DBMS with SQL language and use client-server via network system	Customer Services in order to fulfillment	Customer Services in order to fulfillment
<u>Benefits</u>  Brief description of the business benefits that would be realized for this candidate.	This solution can support all of the user requirements in the efficiency and timely manner.	This solution can support all of the user requirements in the efficiency and timely manner.	Provides high efficiency, easy to learn and application that perform more efficiently.
<u>Servers and Workstations</u>  A description of the servers and workstations needs to support this candidate.	Server: Pentium 4 2.4 GHz PC: Intel Celeron 2.4 GHz	Server: Pentium 4 2.4 GHz PC: Intel Celeron 2.4 GHz	Server: Pentium 4 1.8 GHz PC: Intel Celeron 1.8 GHz
<u>Software tools needed to design and build the candidate (e.g., database management system, emulators operating system, languages, etc). Not generally applicable if applications software packages are to be purchased.</u>	Window 2000 window 98, Visual Basic 6.0 Active Server Page 3.0 MS SQL server 2000	Window 2000 window 98 Developer 2000 Personal Oracle 8.0	MS Office 2000 Professional Window 2000 Advance server MS Access Windows XP Professional
<u>Applications software</u>  A description of the software to be purchased, built, accessed, or some Combination of this technique. management system, emulators	Custom Solution	Database Package	Ms Access
<u>Method of data processing</u>  Generally some combination of: on-line batch, deferred batch, remote and real time.	Database is stored and processed on server. GUI stored and processed on clients.	Oracle uses two-tier client/serve architecture with a powerful database server.	Database is stored on server. and processed on clients.
<u>Output Devices and Implication</u>  A description of output devices that would be used, special output requirements (e.g. network, preprinted form, etc.). And output considerations (e.g., timing constraints).	15" LG SW-501S Monitor HP Laser Jet 4100 DTN Dot Matrix printer	15" LG SW-501S Monitor HP Laser Jet 4100 DTN Dot Matrix printer	15" LG SW-501S Monitor HP Laser Jet 4100 DTN Dot Matrix printer
<u>Input Devices and Implication</u>  A description of input method to be used, input devices (e.g. keyboard, mouse, etc.), special input requirements (e.g., new or revised forms from which data would be input), and input considerations (e.g., timing of actual inputs)	Keyboard and Mouse	Keyboard and Mouse	Keyboard and Mouse
<u>Storage Devices and Implication</u>  Brief description of what data would be stored, what data would be accessed from existing stores, what storage media would be used, how much storage capability would be needed, and how data would be organized.	MS SQL Server DBMS with 60 GB hard disk space	Oracle DBMS with 60 GB storage capacity	60 GB hard disk space



### **Feasibility Analysis Matrix**

Feasibility is defined, as the measure of how beneficial or practical a system will be to an organization.

Feasibility analysis is the activity by which feasibility is measured and assessed. Ability criteria are used to evaluate solutions against at least four criteria.

For each candidate solution, the Feasibility analysis is carried out as the follows:

- (1) Operational feasibility: It is a measure of the solution to change the user's work environment, the solution fulfills the user's requirement and the users feeling about such a solution from Table 3.1 candidate system matrix. All candidates can support the current business process but candidate 1 and 2 get the most highest scores. Candidate 1 is easy to design, easy to understand interface. Candidates 3 fully supports the user requirements with quick implementation
- (2) Technical feasibility: It is the measure of technically practical solution and technical expertise to be designed and built by officer. Candidate 1 has the highest score of technical feasibility. Candidate 2 is very complex to understand and use for users. But candidate 3 has the lowest score of technical feasibility but Ms Access is the basic way to develop the database and is suitable for a small system with less number of users.
- (3) Schedule feasibility: It is a measure to determine whether the solution can be designed and implemented within an acceptable time period or not.

Candidate 1 spends more time than candidate 3. But it is quick to be implemented as candidate 2. Candidate 2 consumes the most time to design and implement the proposed system because Oracle is very difficult to learn. Candidate 3 takes the least time because MS Access is not



complicated and is not difficult to learn and design system. Candidate 1 spends more time than candidate 2.

- (4) Economic feasibility: It is the measure of measure-effective solution. Candidate 2 is a very complex and more powerful software solution and requires a lot of user training that causes candidate 2 to take the largest investment. Candidate 3 is the most economically feasible and has the least investment with the shortest payback period.

After understanding the business and all possible user' requirements, established in the definition phase of system analysis, we created three possible candidate solutions for further discussion. Now we have to compare the difference of each candidate solution in terms of estimated costs for client-server system (both development cost and projected annual operating costs), payback analysis for client-server system and the net present value analysis.

In the first candidate solution, according to Table D.3, the estimated total development cost is 403,500 Baht. According to Table D.3, the operation and maintenance costs are 228,000 Baht. According to Table D.3, the payback period of the first candidate solution is a year. Refer to Table D.3, the net present value of the first candidate solution is 189,873 Baht.

In the second candidate solution, according to Table D.6, the estimated total development cost is 527,000 Baht. According to Table D.6, the operation and maintenance costs are 228,000 Baht. According to Table D.6, the payback period of the first candidate solution is a year. Refer to Table D.6, the net present value of the first candidate solution is 67,665 Baht.

In the third candidate solution, according to Table D.9, the estimated total development cost is 356,300 Baht. According to Table D.9, the operation and



maintenance costs are 228,000 Baht. According to Table D.9, the payback period of the first candidate solution is a year. Refer to Table D.9, the net present value of the first candidate solution is 247,206 Baht.





Table 3.2. The Completed Feasibility Analysis Matrix.

Feasibility Criteria	Wt.	Candidate 1	Candidate 2	Candidate 3
<u>Operational Feasibility</u>				
Functionality. A description of to what degree the candidate will benefit the organization and how well the system will work. Political, a description of how well received this solution will be from user management, user, and organization perspective.		Fully support users' requirements in term of functionality and easy to design and implement.	This solution can be implemented quickly.	Fully support users' requirements in term of functionality and easy to design and implement. Plus more efficient interaction with customer records.
<b>Score</b>	15%	95	95	90
<u>Technical Feasibility</u>				
Technology. An assessment of the maturity, availability (or ability to acquire), and desirability of the computer technology needed to develop, operate system.		MS SQL Server is full database server software which engines are superior in term of speed.	Oracle is an efficient database Management system software. It is an very complex and more powerful software solution.	Ms Access is the basic way to develop database. It can be proved but it is suitable for a small system.
<b>Score</b>	15%	90	85	80
<u>Economic Feasibility</u>				
Cost to develop(Baht)		Approximately 403,500	Approximately 527,000	Approximately 356,300
Payback period(Year)		Approximately 2.5	Approximately 3.8	Approximately 2.1
Net present value(Baht)		Approximately 189,873	Approximately 67,665	Approximately 247,406
Detail calculation:				
<b>Score</b>	50%	90	80	100
<u>Schedule Feasibility</u>				
An assessment of how long the solution will take to design and implement.		Approximately 5 months	7-8 months	2-3 months
<b>Score</b>	20%	80	70	100
<b>Ranking</b>	100%	88.75	81	95.5



### 3.5 Hardware and Software Requirements

Table 3.3. Hardware and Software Specification.

Part	Description
Server:	
Processor	Pentium 4 1.8 GHz
Memory	512 MB DDR-RAM
Hard Disk	60 GB
CD-ROM	1 Unit
Operating System	Windows 2000 Advance Server
Application	MS Office 2000 Professional MS Access 2000 Norton AntiVirus 2003 Professional
Client:	
Processor	Intel Celeron 1.8 GHz
Memory	256 MB DDR-RAM
Hard Disk	40 GB
Operating System	Windows XP Professional
Application	MS Office 2000 Professional Norton AntiVirus 2003 Professional SIS system
Peripheral:	
Dot Matrix Printer	OKI860
Laser Printer	HP Laser Jet 4100 DTN
UPS	Voltage 220+/-10% Backup Time 15-30, 500 VA



Table 3.3. Hardware and Software Specification (Continued).

Part	Description
Network:	
Hub	3COM 24 Port, 10/100 BASE-TX (RJ-45)
Switch	3COM 12-port 10/100 BASE-TX
LAN Card	3COM or Intel Chip 10/100

The following picture illustrated the network architecture of the proposed system.

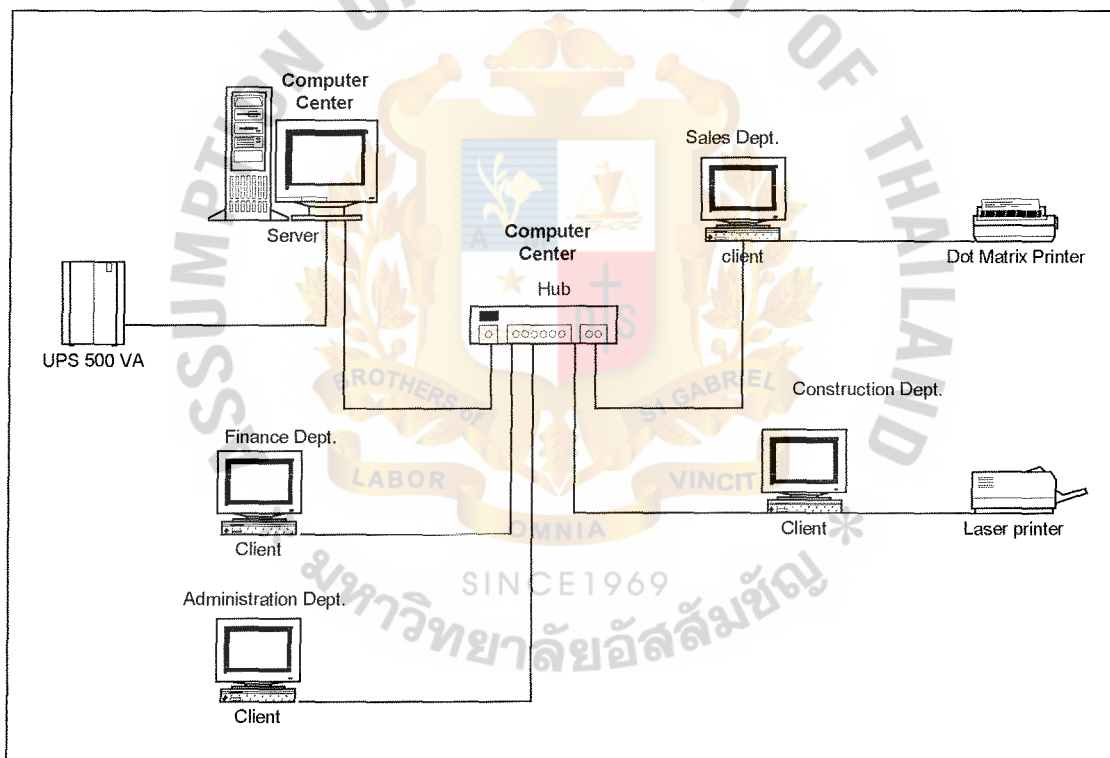


Figure 3.22. Network Infrastructure of the Proposed System.



### **3.6 Security and Control**

The secrecy, integrity, and availability of the information are very important because data are important assets. The information must be accessible, modifiable, and available only for the authorized people. The proposed information system, therefore, must have a mechanism to prevent unauthorized people from access, enter, or change the existing data. There are several mechanisms to concerning as follows:

#### **Logical Security**

Security of system application, application accesses control by authentication. Every user must authenticate themselves by entering the login dialog. This dialog will ask user to enter his user name and password. The dialog will check whether the user is an authorized person, then he can enter the system program or if not, he can't access the system.

#### **Physical Security**

The computer will be placed in a controlled access room in the Sale and Marketing department which prohibits unauthorized persons from entering the room. The room will be locked after office hours. Data will be backed up onto diskettes once a week and be kept in a cabinet of system support section, which is controlled by the Managing Director.

#### **Anti Virus to Protect Files and Program**

Normally, we should check virus very often, to protect from losing of program and file which effects to the execution of program. The problem of timeliness, throughout and inaccuracy can occur.



### **Back up of Data**

Because data is valuable, if data is lost, it means no more database to use in business. So, the operator should back it up in the zip drive or diskette for customers' data everyday and keep in the safe place.

### **3.7 System Cost Analysis**

#### **3.7.1 Cost of Manual System**

The following table illustrates cost analysis of the manual system.





Table 3.4. Cost Analysis of Manual System, Baht.

Cost Items	Year 1	Year 2	Year 3	Year 4	Year 5
Salary:					
– Sales manager 1 person @ 70,000	70,000.00	80,500.00	92,575.00	106,461.25	122,430.34
– Sales Supervisor 2 persons @ 25,000	50,000.00	57,500.00	66,125.00	76,043.75	87,450.31
– Sales Staff 3 persons @ 12,000	36,000.00	41,400.00	47,610.00	54,751.50	62,964.23
Office Supplies & Miscellaneous Cost (Per Annual):					
– Stationery	11,000.00	12,100.00	13,310.00	14,641.00	16,105.10
– Preprinted form	100,000.00	120,000.00	144,000.00	172,800.00	207,360.00
– Paper	50,000.00	60,000.00	72,000.00	86,400.00	103,680.00
– Utility	15,000.00	16,500.00	18,150.00	19,965.00	21,961.50
– Miscellaneous	5,000.00	5,500.00	6,050.00	6,655.00	7,320.50
Total cost	337,000.00	393,500.00	459,820.00	537,717.50	629,271.98
Accumulated cost	337,000.00	730,500.00	1,190,320.00	1,728,037.50	2,357,309.48



### 3.7.2 Cost of Computerized System

Table 3.5. Cost Analysis of Computerized System, Baht.

Cost Items	Year 1	Year 2	Year 3	Year 4	Year 5
Fixed Cost:					
– Hardware cost					
• Server	24,000.00	24,000.00	24,000.00	24,000.00	24,000.00
• Personnel Computer	3,980.00	3,980.00	3,980.00	3,980.00	3,980.00
• UPS	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00
• Printer	2,500.00	2,500.00	2,500.00	2,500.00	2,500.00
• Maintenance Cost	-	10,000.00	10,000.00	10,000.00	10,000.00
– Software cost					
• Operating System	8,700.00	8,700.00	8,700.00	8,700.00	8,700.00
• Development Software	6,000.00	6,000.00	6,000.00	6,000.00	6,000.00
• PC Software	4,400.00	4,400.00	4,400.00	4,400.00	4,400.00
• Anti Virus Software	2,600.00	2,600.00	2,600.00	2,600.00	2,600.00
– Network cost					
• LAN card	3,080.00	3,080.00	3,080.00	3,080.00	3,080.00
• Maintenance Cost	-	7,000.00	7,000.00	7,000.00	7,000.00
System Implementation Cost:					
– Development cost	45,000.00	-	-	-	-
– Training cost	20,000.00	-	-	-	-
– Setup cost	10,000.00	-	-	-	-
Salary:					
– Sales manager 1 person @ 70,000	70,000.00	80,500.00	92,575.00	106,461.25	122,430.34



Table 3.5. Cost Analysis of Computerized System, Baht (Continued).

Cost Items	Year 1	Year 2	Year 3	Year 4	Year 5
- Sales Supervisor 2 persons @ 25,000	50,000.00	57,500.00	66,125.00	76,043.75	87,450.31
- Sales Staff 3 persons @ 12,000	36,000.00	41,400.00	47,610.00	54,751.50	62,964.23
Office Supplies & Miscellaneous Cost (Per Annual):					
- Stationery	7,000.00	7,500.00	8,000.00	8,500.00	9,000.00
- Paper	50,000.00	55,000.00	60,500.00	66,550.00	73,205.00
- Utility	12,000.00	12,000.00	12,000.00	12,000.00	12,000.00
- Miscellaneous	3,000.00	3,000.00	3,000.00	3,000.00	3,000.00
Total cost	359,260.00	330,160.00	363,070.00	400,566.50	443,309.88
Accumulated cost	359,260.00	689,420.00	1,052,490.00	1,453,056.50	1,896,366.38



Table 3.6. Accumulated Cost of Manual and Computerized System, Baht.

Year	Accumulated Manual System Cost	Accumulated Computerized System Cost
1	337,000.00	359,260.00
2	730,500.00	689,420.00
3	1,190,320.00	1,052,490.00
4	1,728,037.50	1,453,056.50
5	2,357,309.48	1,896,366.38

### 3.8 Benefit Analysis

As can be seen in the Table 3.6., the proposed system begins to save up the operation cost by about 41,080.00 baht in the second year, 137,830.00 baht in the third year, 274,981.00 baht the fourth year and 460,943.10 baht in the fifth year. Although initial cost of the proposed system in the first year is higher, there are additional intangible benefits which arose from the proposed system as follows:

- (1) Providing timely, up-to-date, accurate information/reports to support decision-making of management.
- (2) Reduction of data and process redundancy. Employees can work easily and increase speed of doing daily operation.
- (3) Reducing human errors in performing functions.
- (4) Providing better communication between business units.

### 3.9 Payback Analysis

The followings are payback period analysis for the proposed system.



Table D.6. Comparison of the System Cost: Alternative of Candidate 2, Baht .

Cost Items	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Development cost	-527,000.00					
Operation & maintenance cost		-228,000.00	-277,400.00	-310,310.00	-347,806.50	-390,549.88
Discount factors for 12%	1.00	0.88	0.77	0.68	0.60	0.53
Time-adjusted costs (adjusted to present value)	-527,000.00	-200,640.00	-214,818.56	-211,467.58	-208,577.94	-206,105.64
Cumulative time-adjusted costs over lifetime	-527,000.00	-727,640.00	-942,458.56	-1,153,926.14	-1,362,504.08	-1,568,609.72
Benefits derived from operation of new system		455,000.00	465,000.00	475,000.00	485,000.00	495,000.00
Discount factors for 12%	1.00	0.88	0.77	0.68	0.60	0.53
Time-adjusted costs (adjusted to present value)	0	400,400.00	360,096.00	323,699.20	290,852.25	261,227.30
Cumulative time-adjusted benefits over lifetime		400,400.00	760,496.00	1,084,195.20	1,375,047.45	1,636,274.75
Cumulative lifetime time-adjusted cost + benefit	-527,000.00	-327,240.00	-181,962.56	-69,730.94	12,543.37	67,665.03



As can be seen in the Table 3.7., the lifetime costs are gradually increasing over the five-year period. However, the lifetime benefits are accruing at a much faster pace. The lifetime benefits will overtake the lifetime costs between year 2 and year 3. By plotting the cumulative lifetime time-adjusted costs and benefits, we can estimate that the payback period will occur approximately 2.1 years after the system begins operating.

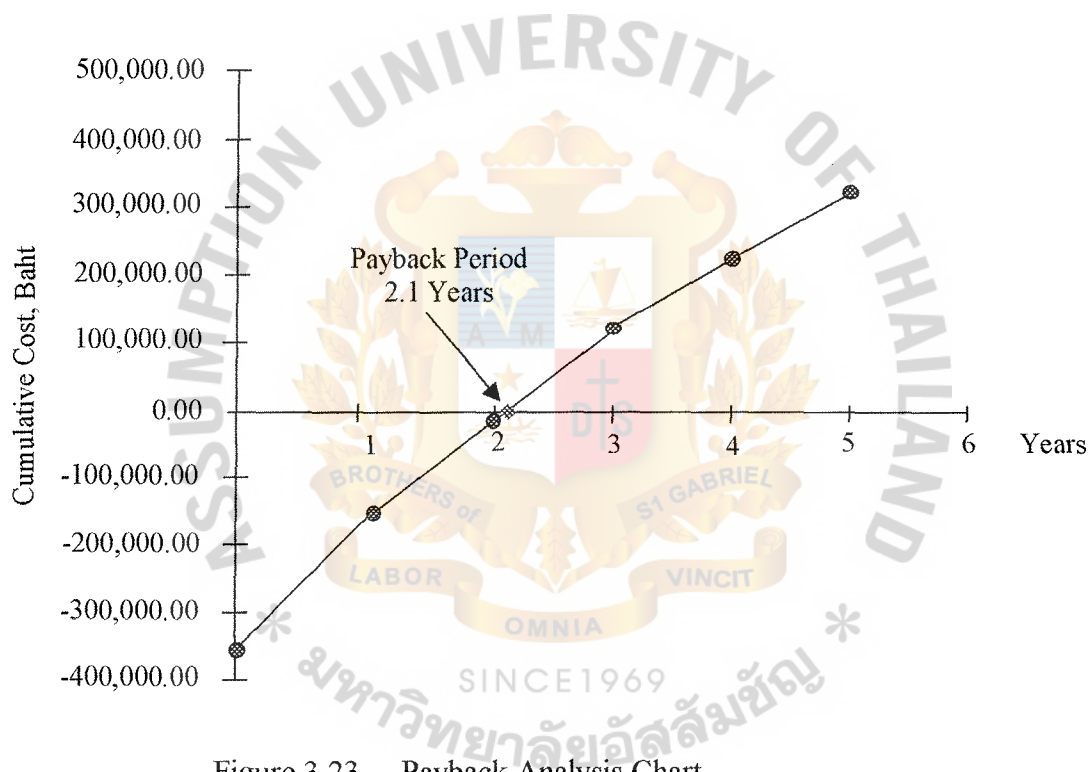


Figure 3.23. Payback Analysis Chart.



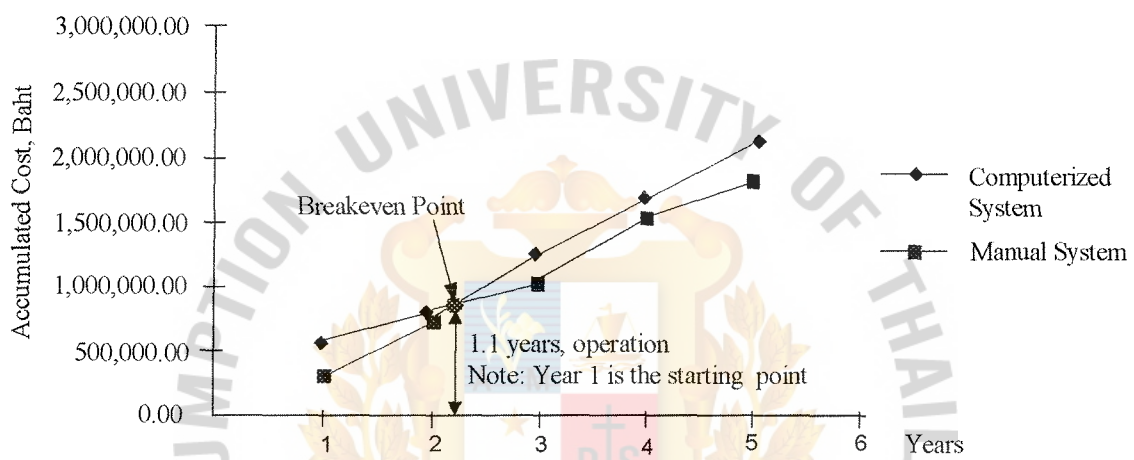


Figure 3.24. Breakeven Analysis Chart.



## **IV. PROJECT IMPLEMENTATION**

The project implementation schedule begins from gathering user requirement, system analysis and design, coding and testing up to data conversion and implementation. See detail in Figure 4.1. Project Implementation Plan.

All the system requirements, documentation of system analysis and design, and coding have already been shown in the previous section. The other areas that we would like to explain in our implementation plan are system testing, data conversion and user training.

### **4.1 System Testing**

#### **(1) Unit Testing**

Starting from the unit, which is essential to perform to ensure that the stand alone program fixes the bug without side effects.

#### **(2) Testing with Test System**

Again test the whole program after completing the unit test. This is also essential to perform to ensure that the entire application of which the modified program was a part, still works. The test data and current performance are worked here. (e.g. recovered, created, edited, etc.)

### **4.2 Data Conversion**

The data conversion approach that we proposed for this system is Parallel Systems Method. We proposed this method because this is the safest conversion approach, since it guarantees that, if the user is not familiar with the computerized system which may have many errors, the company will also not lose more time for getting information than with the manual system.



### 4.3 User Training

Introduction of the new system is conducted to each group of end users. The training program is developed to cover the following areas:

- (1) Collect all documents that are useful to develop the user manual.
- (2) Prepare user manuals that are easy to understand.
- (3) Review the training documents.
- (4) Schedule training sessions.
- (5) Conduct training sessions and distribute user documents.





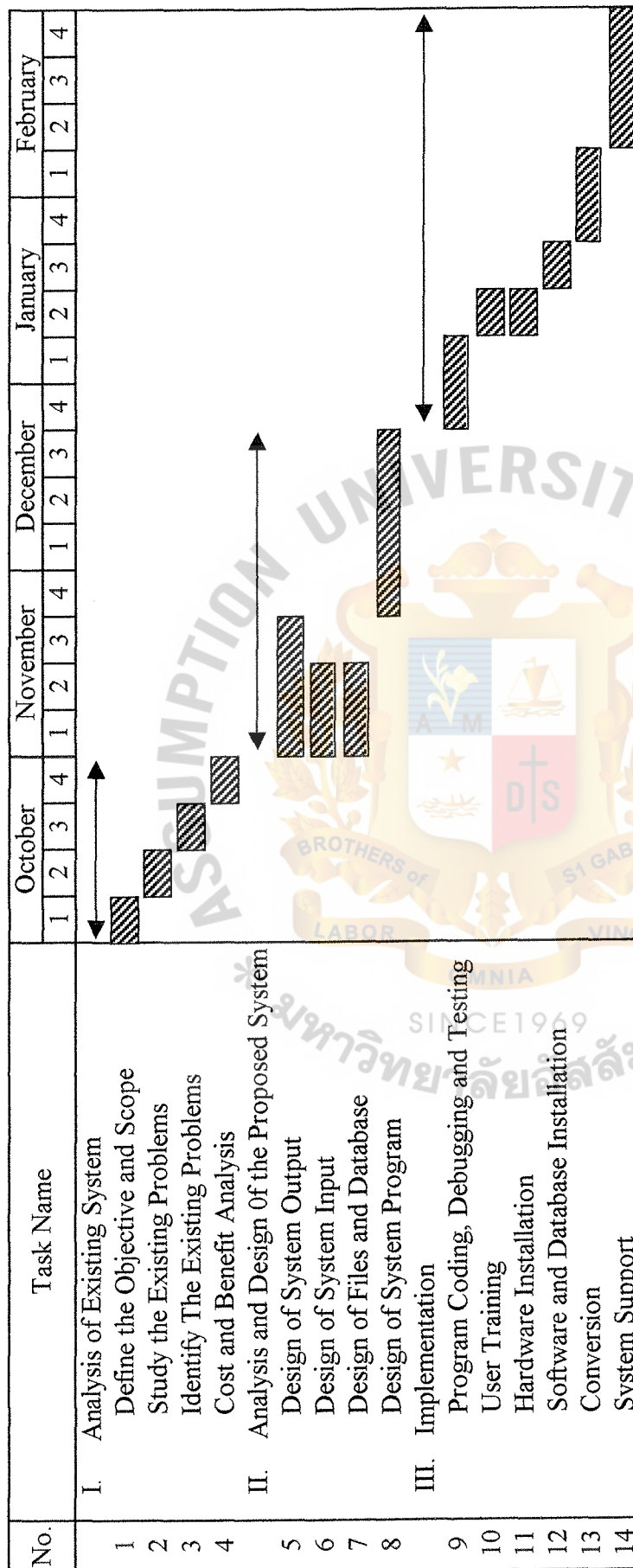


Figure 4.1. Project Plan of Sales Information System.



## **V. CONCLUSIONS AND RECOMMENDATIONS**

### **5.1. Conclusions**

The Sales Information System for Home Smarter Company is an endeavor in bringing the technology of information system and computerized system to adapt with the sales department and marketing department. The adaptation of both departments required sufficient knowledge in both departments to combine them efficiently, thus, link the requirement of both the mentioned departments efficiently.

In this project, I have the concept in working by studying and gathering the information related to the sales system and marketing strategies in choosing the sale information system by means of information technology approach. The purpose of the computerized system is to produce and synthesize the data for supporting the booking process of user. The user can use the system work conveniently and easily, although the user is not an expert in computerized system or has no knowledge in computer field.

However, the information system and data of sale information system is mostly clustered in the sale office at the site and the head office involved, and do not store those information systems systematically. I have to study various sources for the adaptation to use, by emphasizing the information systems that have already been done, such as the price estimate data area and expense in system maintenance and procedures that are important factors for choosing the computerized system, including the data related to the computerized system in other aspects etc, for the user to obtain most information that is necessary for the decision in choosing the sale information system that will eventually affect the efficiency of the sale.



Table 5.1. The Degree of Achievement of the Proposed System.

Process	Existing System	Proposed System
Update Information Process	1 hrs.	15 mins.
Reserve and Payment Process	30 mins.	5 mins.
Contracting Process	25 mins.	5 mins.
Transfer Process	25 mins.	10 mins.
Printing Process	1 hr.	10 mins.

- (1) **Update Information Process:** In the existing system sales officer must spend 1 hour, because sales officer must find data in any file before they can update it. In the proposed system, sales officer need spend only 15 minutes because sales officer can update information by the computerized system.
- (2) **Reserve and Payment:** In the existing system customers must write information by themselves in reserve form and go to finance department, so they have to spend 30 minutes on this process. In the proposed system, the customer spends 5 minutes on this process.
- (3) **Making Contract:** In the existing system customer must write information by themselves in contract form. Sales officer must spend 25 minutes to prepare and check contract document. In the proposed system, sales officer can key data about customer and then print contract document by the computerized system, so sales officer spends 5 minutes in this process.
- (4) **Transfer:** After finishing from update information, reserve and payment, and making contract, existing system spends 25 minutes on transfer process because officers must prepare documents and check customers last down payment status. But in the proposed system officer need spend 10 minutes on transfer process.



- (5) **Report:** In the existing system officer must spend 1 hour because they must key information every time but in this proposed system, sales officer can spend 10 minutes because all information is kept in the computerized system. So, in the proposed system, the sales officer spends only 1 hour and 30 minutes on Sales Information System. But in the existing system they have to spend 7 hours and 20 minutes on performance and same task.

As can be seen from Table 5.1, time processing of the proposed system is significantly reduced compared to the existing system. Since the existing system is performed manually it consumes more time than the computerized system.

## 5.2 Recommendations

In order to make the proposed system more beneficial in the future, the following are recommended:

- (1) The system should be expanded to integrate with other systems in the company such as Accounting system, Human Resource system and Marketing system. This will eliminate the manual operations which information from Sale and Reservation system will be re-keyed into other systems.
- (2) Business should be accredited benefit of the Internet by allowing customer to visit the company's web site. Although this requires the amendment to business procedures, it will increase business opportunity to satisfy its customers especially the foreigners.





## APPENDIX A

### USER INTERFACE DESIGN



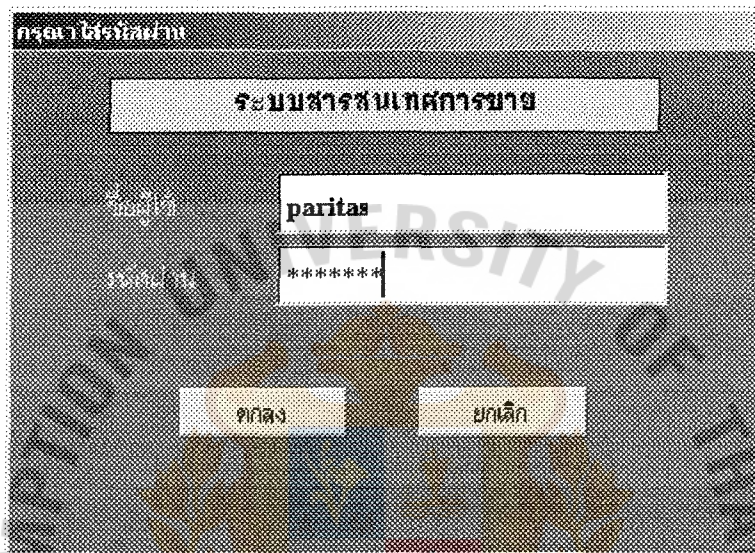


Figure A.1. Login Screen.

Each user will be assigned a unique user id and password for working with the system. This promotes system security in which that each of the transaction can be identified who did perform it. In addition, user id and password is a basic security to protect system from unauthorized users or intruders.



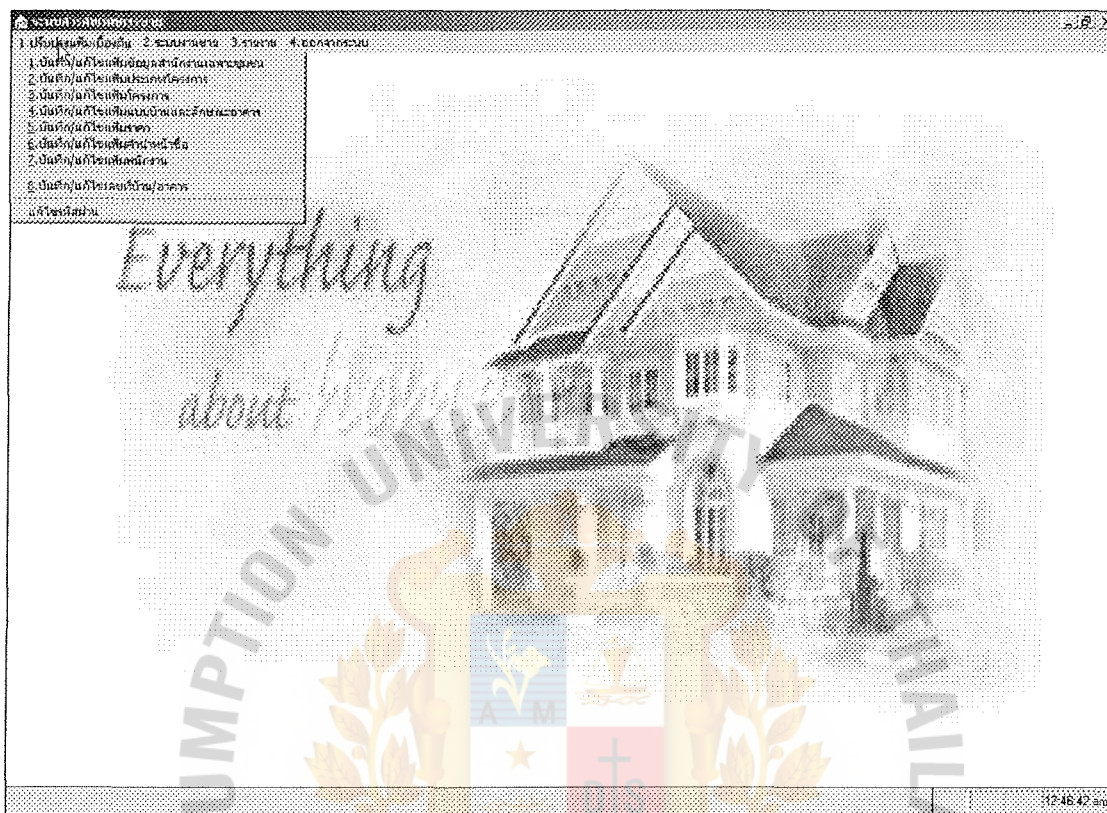


Figure A.2. Main Menu of Basic File.

After successful login, the main menu screen will be appeared for user to select the system function. The main menu of basic file is for maintaining the organization information, such as save and edit branch types, branch file, house types, pre-name and employee.





Figure A.3. Main Menu of Sales System.

After successful login, the main menu screen will be appeared for user to select the system function. The main menu of sales system is for maintaining the organization information, such as customer details, booking details, contract details, payment details, warning mail, and transfer details.



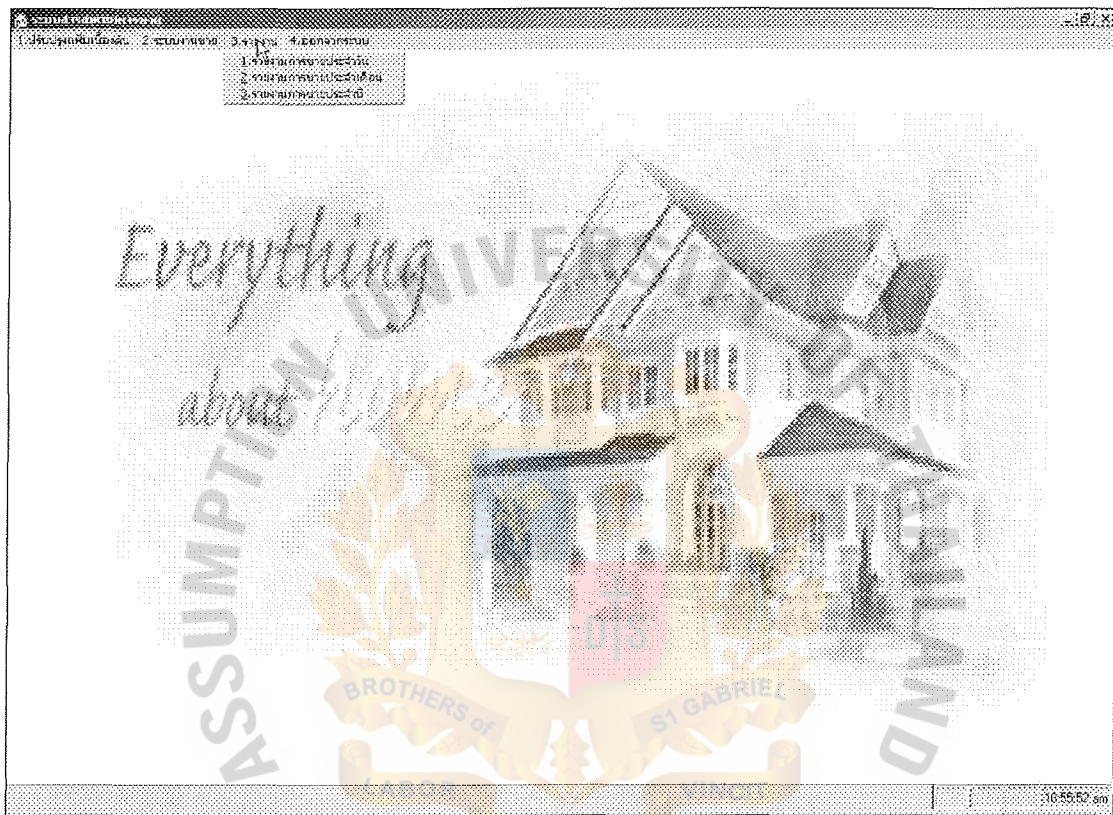


Figure A.4. Main Menu of Report.

The system provides many reports for management and users. They will be used to support routine operation and for analytical.



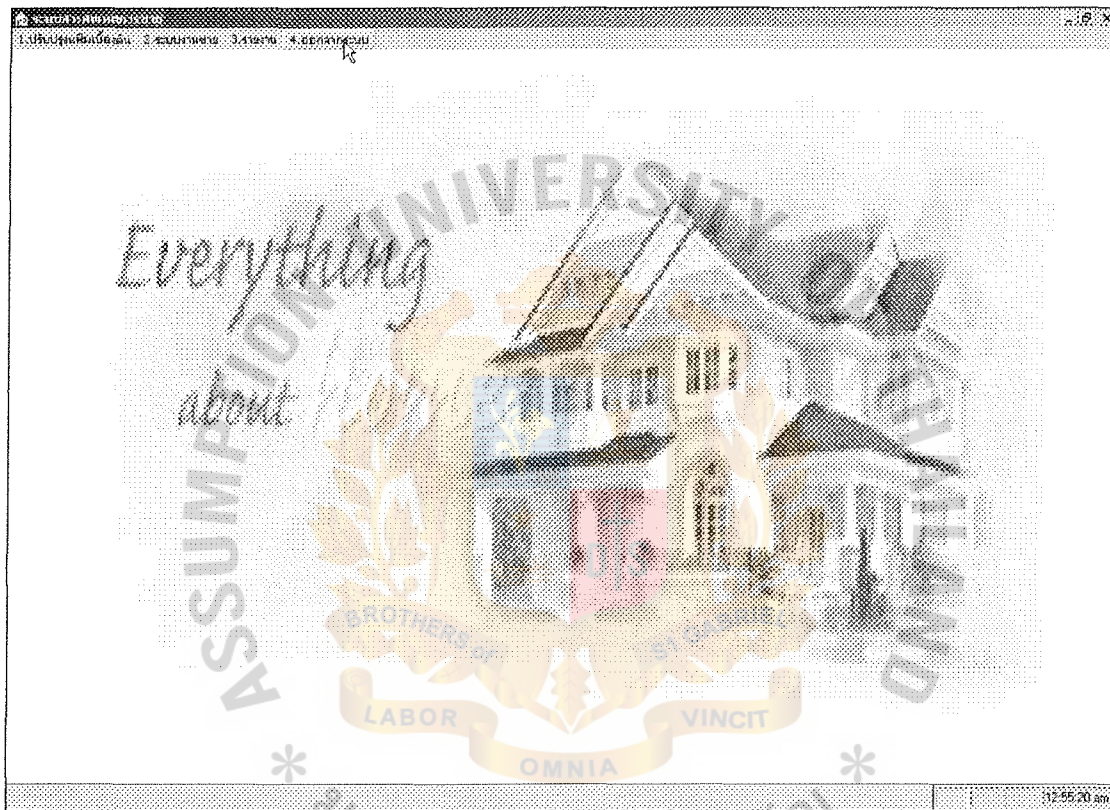


Figure A.5. Exit From The System.

Press the Exit button can do exiting the system.



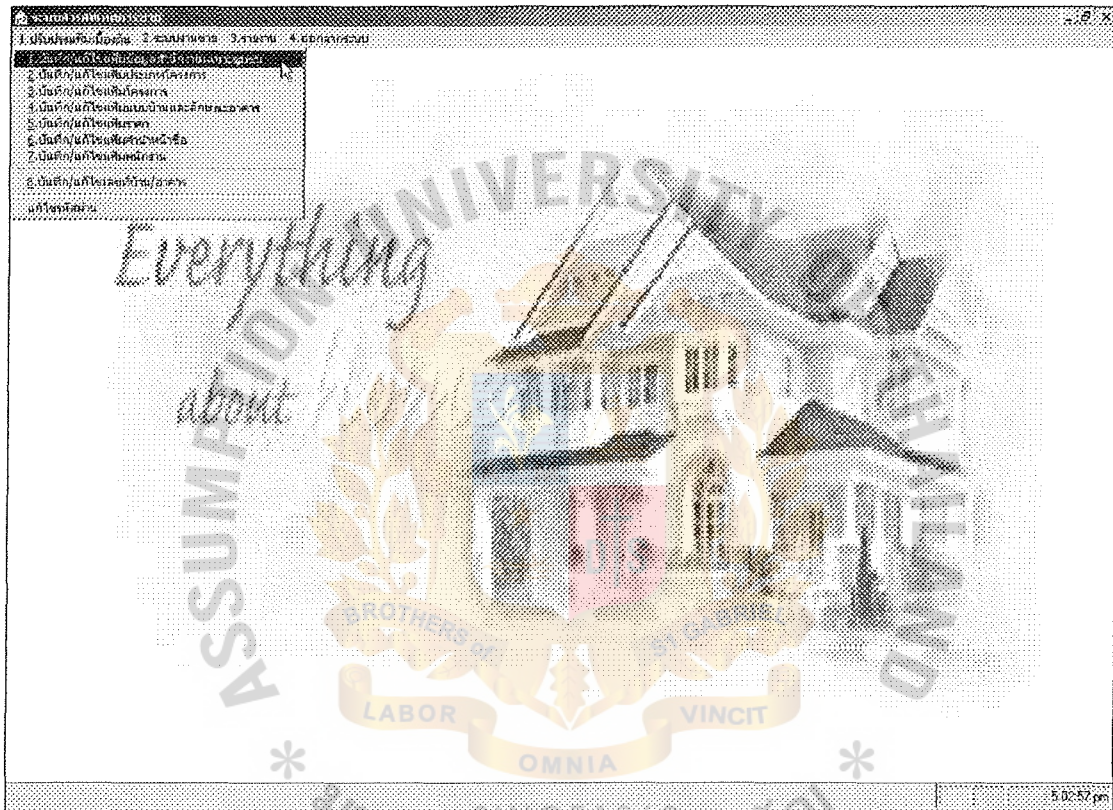


Figure A.6. Main Menu of Save and Edit Branch File.

The main menu of save and edit branch file is used for maintaining the branch file, users can save and edit branch on this screen.





Figure A.7. Screen Layout of Branch Code.

The system will automatically generate the branch code for each branch, user can add, edit, delete or save the branch on this screen.



สำนักงานสาขา

รหัสสำนักงานสาขา	ชื่อสำนักงานสาขา	ชื่อย่อสำนักงานสาขา
0001	สำนักงานสาขาพญาไท	สว.พญาไท
0002	สำนักงานสาขาธนบุรี	สว.ธนบุรี
0003	สำนักงานสาขางานสด	สว.บางสด
0004	สำนักงานสาขาศึกษา	สว.ศึกษา
0006	สำนักงานเขตประเวศ	สว.ประเวศ

ตกลง ยกเลิก

Figure A.8. Screen Layout of Branch Code (Continued).



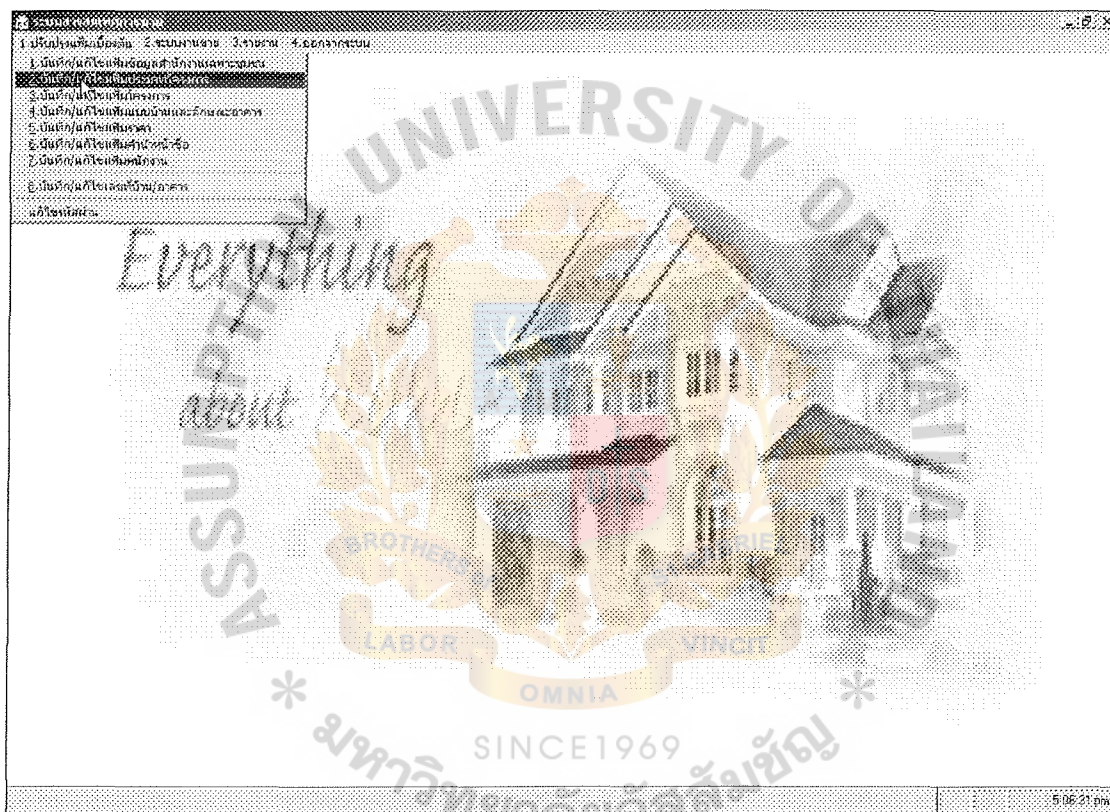


Figure A.9. Main Menu of Save and Edit Project Code.



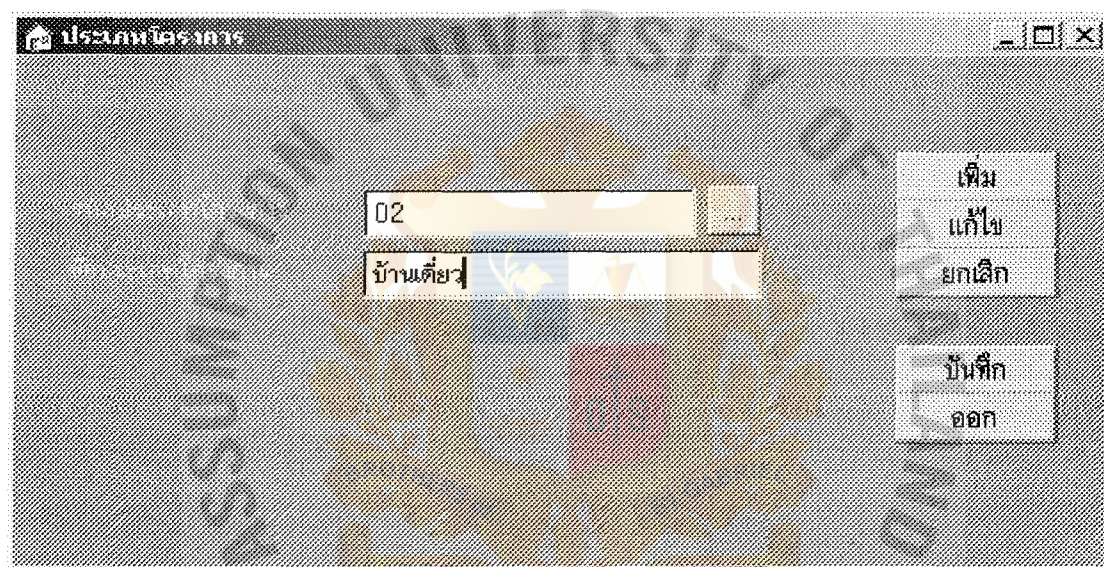


Figure A.10. Screen Layout of Project Code.



โปรแกรมโครงการ

ชื่อโครงการ

รหัสประเภทโครงการ	ชื่อประเภทโครงการ
01	เช่า
02	เช่าซื้อ

ตกลง ยกเลิก

Figure A.11. Screen Layout of Project Code (Continued).



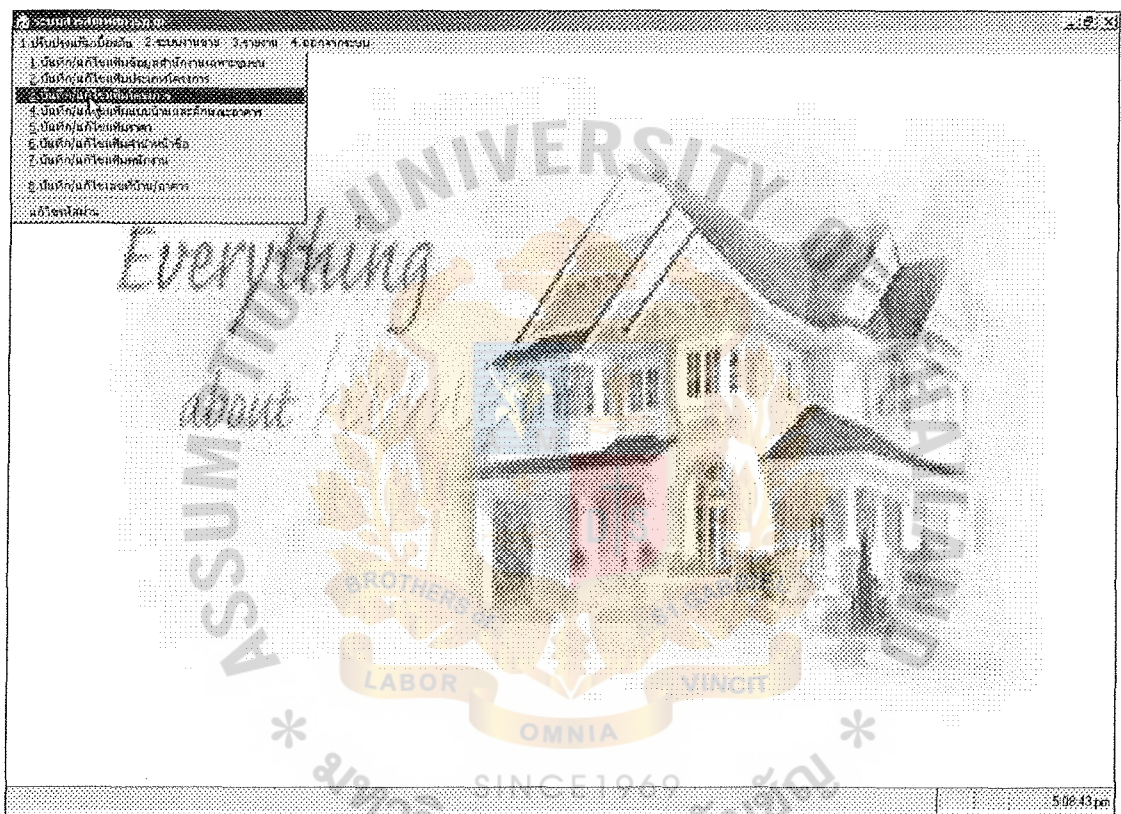


Figure A.12. Main Menu of Save and Edit Project File.



Figure A.13. Screen Layout of Edit Project Description.

The screen layout of edit project description is for maintaining the project description such as adding the project details. Users can also edit, delete, save the project details on this screen.



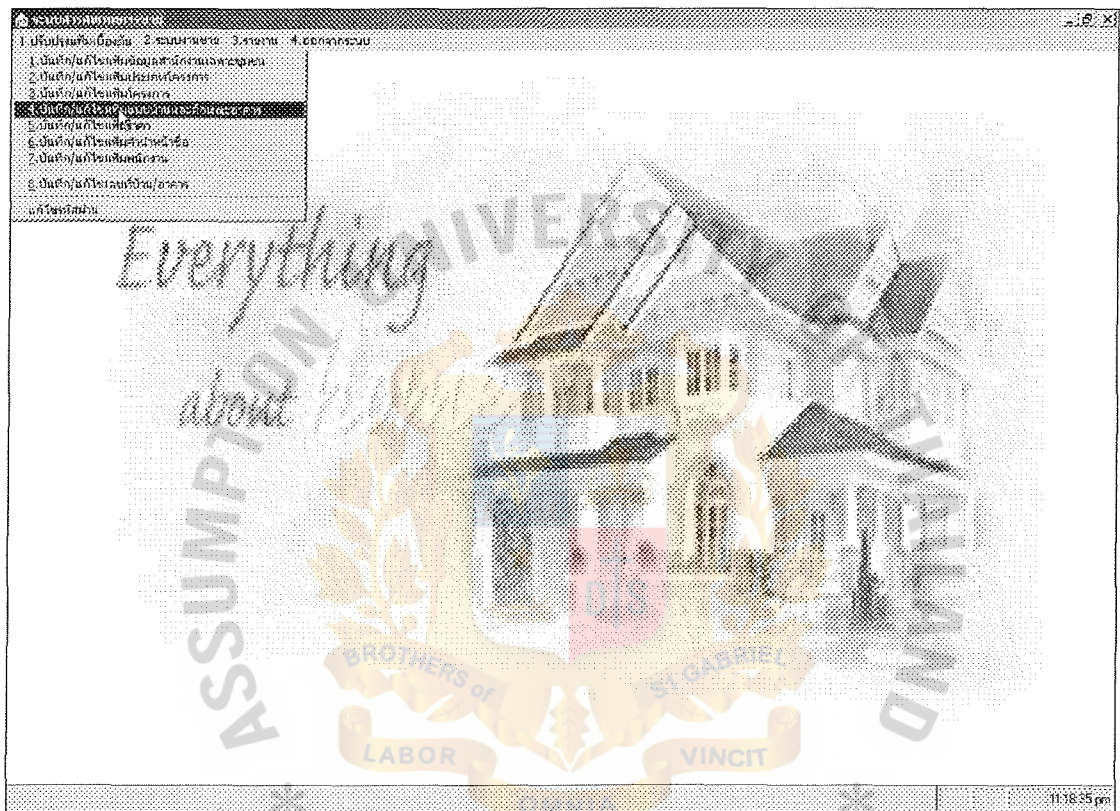


Figure A.14. Main Menu of Save and Edit House Type Code.



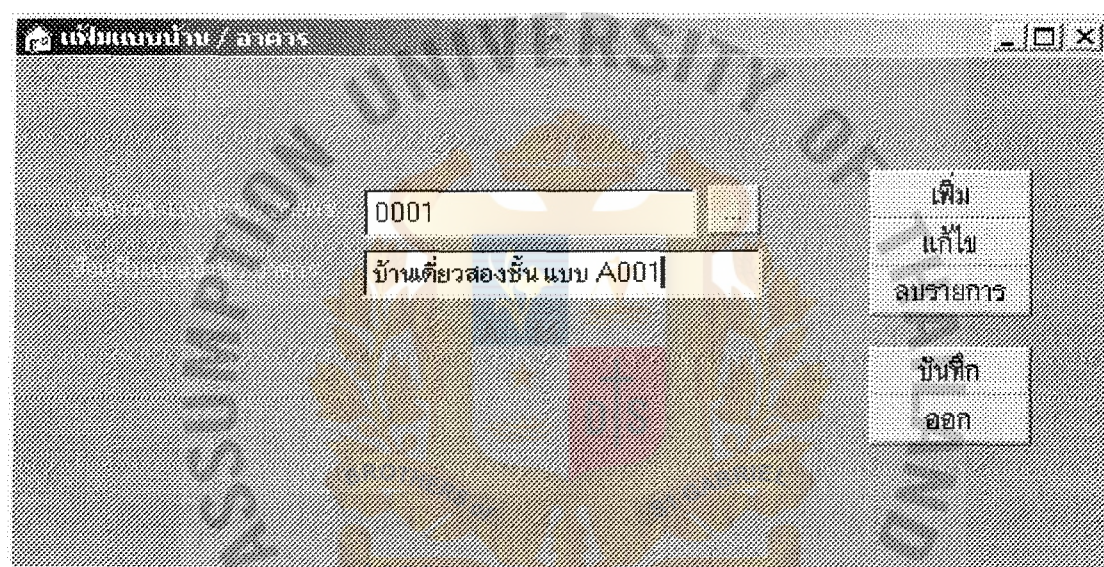


Figure A.15. Screen Layout of House Type Code.



โปรแกรมประมวลผล

รหัสแบบบ้าน / อาคาร

รหัสแบบบ้าน / อาคาร	ชื่อแบบบ้าน / อาคาร
01	ทาวเฮ้าส์รีนเคียว แบบ A
02	ทาวเฮ้าส์รีนเคียว แบบ B
03	ทาวเฮ้าส์รีนเคียว แบบ C
04	ทาวเฮ้าส์สองชั้น แบบ A
05	ทาวเฮ้าส์สองชั้น แบบ B
06	ทาวเฮ้าส์สองชั้น แบบ C
07	บ้านเดี่ยวแบบ A
08	บ้านเดี่ยวแบบ B
09	บ้านเดี่ยวแบบ C

ตกลง ยกเลิก

Figure A.16. Screen Layout of House Type Code (Continued).





Figure A.17. Main Menu of Save and Edit Price File.



โปรแกรมแก้ไขราคาแบบใหม่

นางมต สวนธนบุรีรัมย์

บ้านเดี่ยวสองชั้น

30 65

3000000

จำนวน (บาท/เดือน)	ระยะเวลาผ่อนชำระ (บาท/เดือน)
18750	12300
18750	8750
18750	5900
18750	4680
18750	

C:\Homelimage\A01

Bangmod\_A01001.bmp  
Bangmod\_A01002.bmp  
Bangmod\_A01003.bmp  
Bangmod\_A01004.bmp  
Bangmod\_A01001.bmp

รายละเอียดอื่น ๆ

บ้านเดี่ยว สองชั้น 3 ห้องนอน 2 ห้องน้ำ 1 ห้องรับแขก ที่จอดรถ 1 คัน พร้อมพื้นที่ใช้สอย

เพิ่ม  
แก้ไข  
ลบรายการ  
บันทึก  
ออก

Figure A.18. Screen Layout of Edit Price and House Type Description.







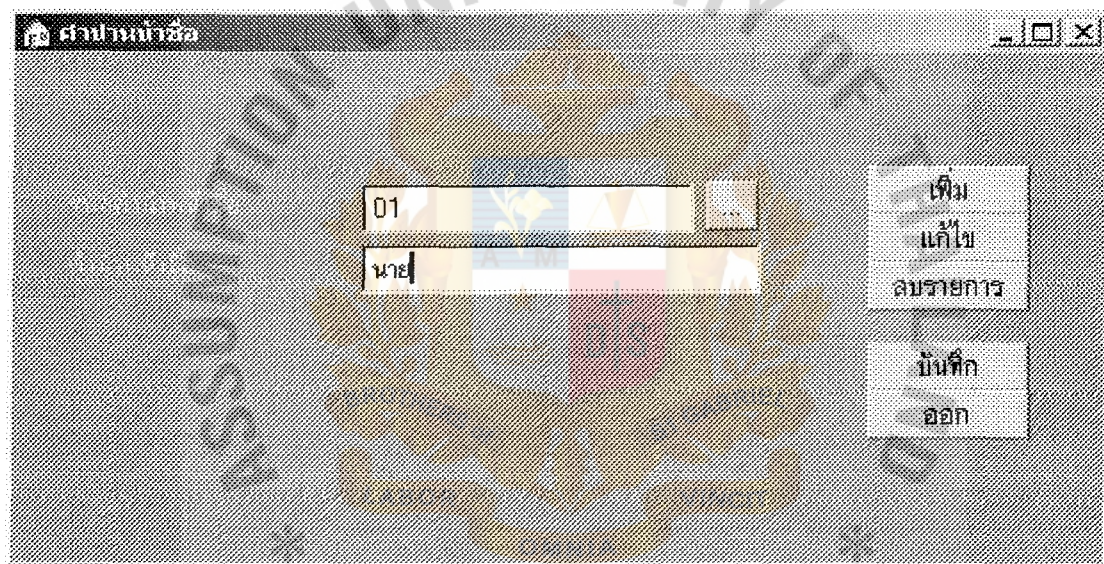


Figure A.20. Screen Layout of Title Name Code.



หน้าจอแสดงผล

รหัสพนักงาน	ชื่อพนักงาน
01	นาย
02	นาง
03	นางสาว

ตกลง ยกเลิก

Figure A.21. Screen Layout of Title Name Code.



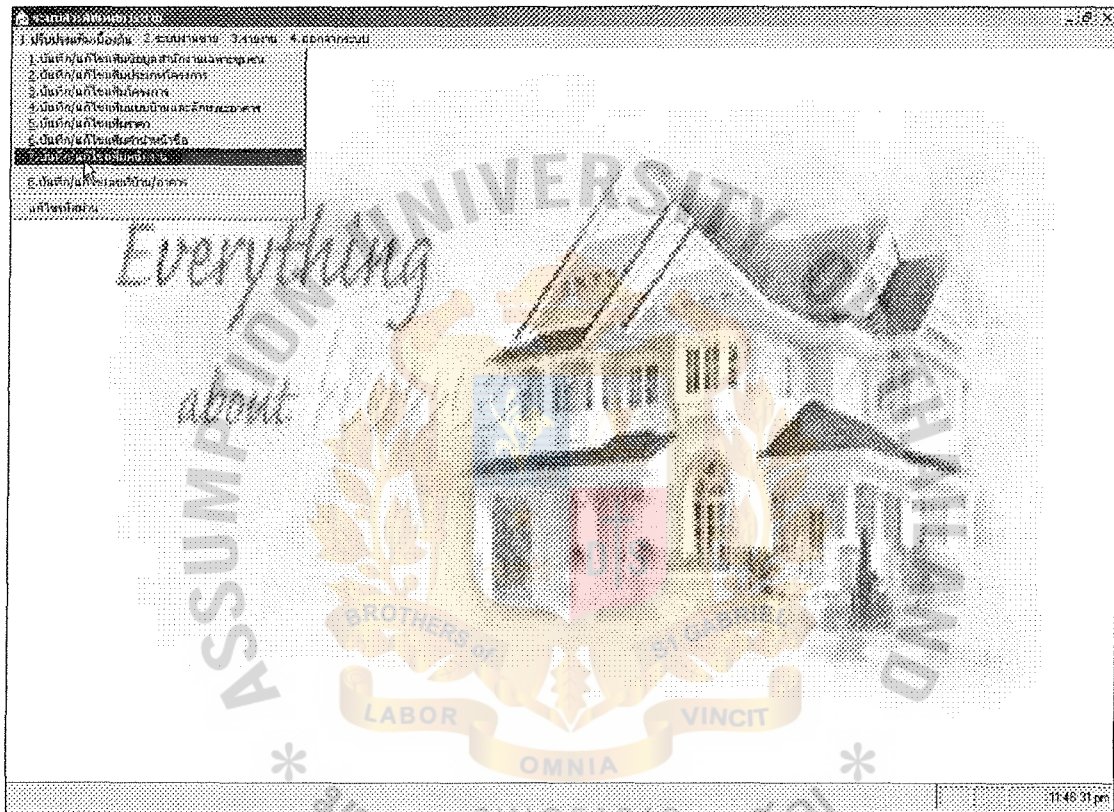


Figure A.22. Main Menu of Save and Edit Officer File.



รหัสพนักงาน	10144221	เพิ่ม
ตำแหน่ง	นางสาว	แก้ไข
ชื่อ	ปรีทัศน์	ลบรายการ
นามสกุล	สุนทรวิจิตร	บันทึก
		ออก

Figure A.23. Screen Layout of Officer Code.



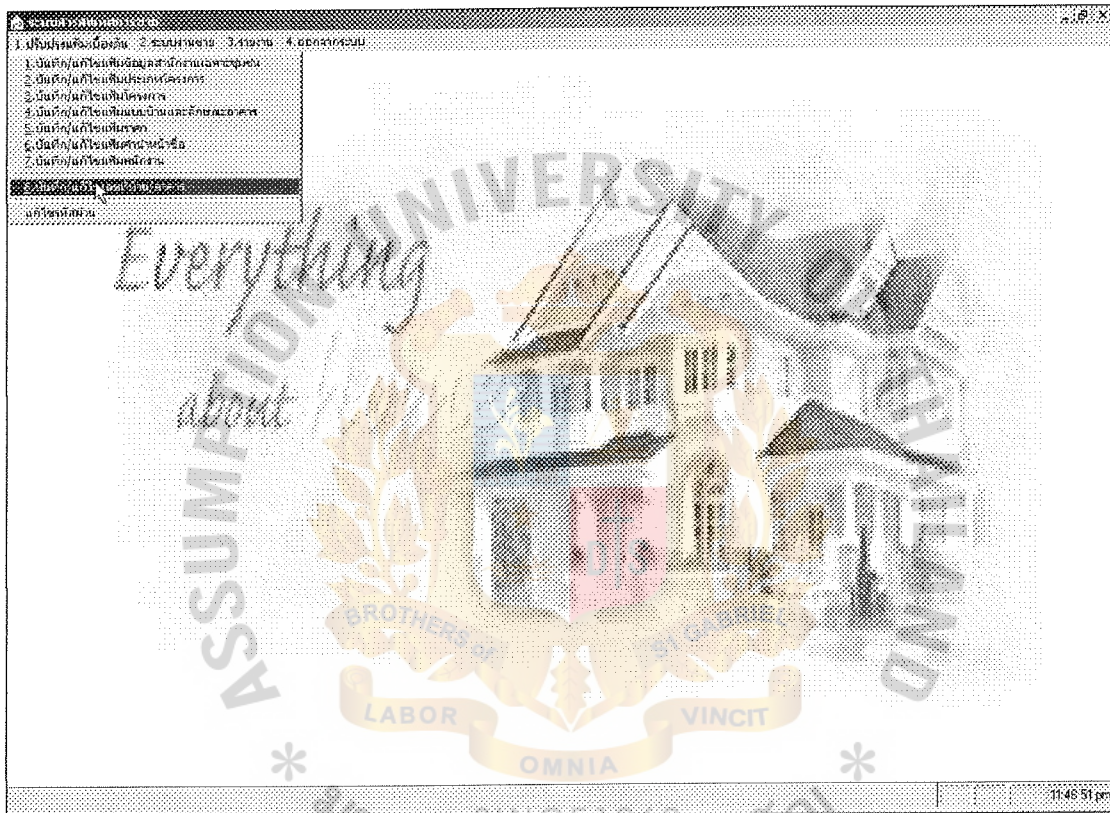
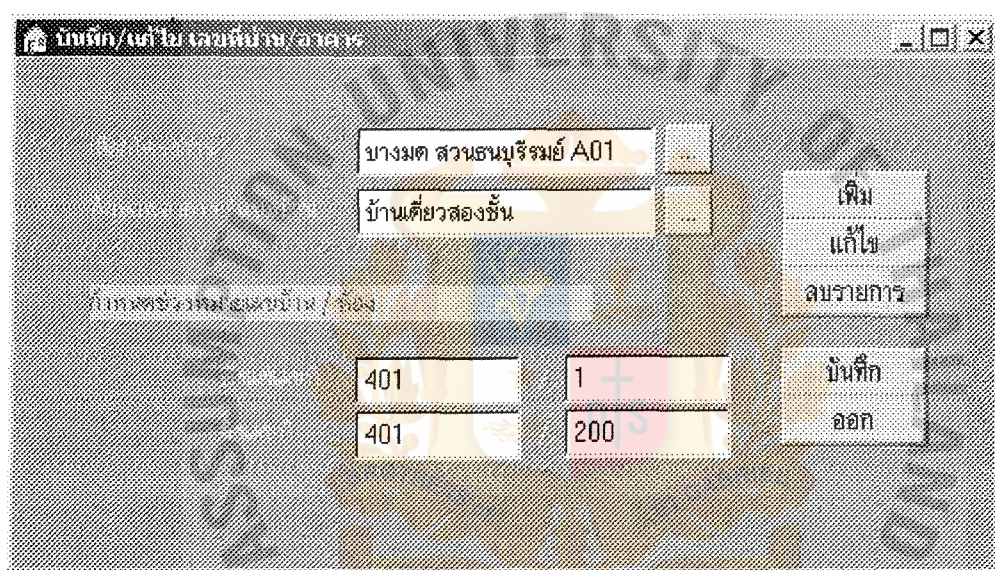


Figure A.24. Main Menu of Save and Edit House Number.







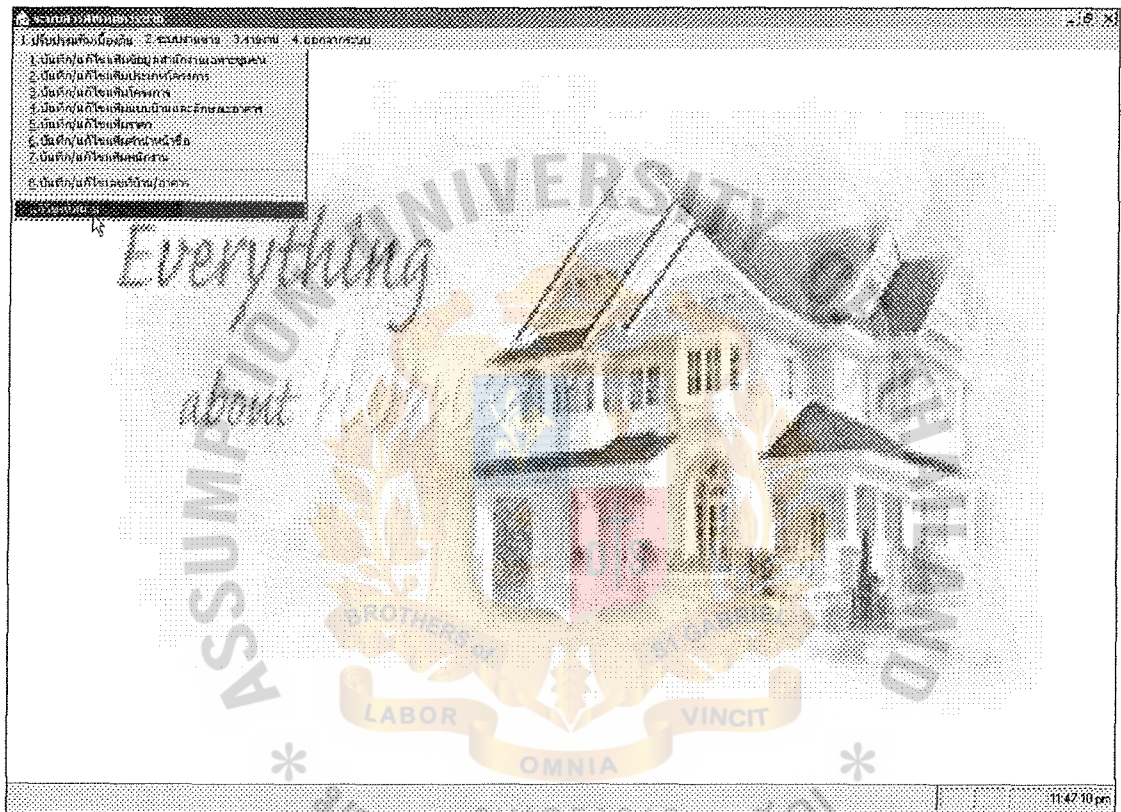


Figure A.26. Main Menu of Change Password for Login .



หน้าเว็บ: 108432

รหัสผ่านใหม่

รหัสผ่านเดิม

ยืนยันรหัสผ่าน

ปุ่มที่ 1

ปุ่มที่ 2

Figure A.27. Screen Layout of Change Password for Login.





Figure A.28. Main Menu of Customer Description.



รายละเอียดลูกค้า

นาย สมชาย สุขภาพ

06 สิงหาคม 2516 30

ไทย ไทย

เลือก ☐ ชาย ☐ หญิง

พนักงานบริษัทเอกชน

20,000

3-1021-00219-78-6

17 กันยายน 2543

17 กันยายน 2549

สำนักงานเขตบางขุนเทียน

ที่อยู่ปัจจุบัน / ที่ติดต่อ

213 ซ. จันทน์พริ้ง ถ. พระราม 2  
แขวงท่าข้าม เขตบางขุนเทียน  
กรุงเทพฯ 10150

ที่อยู่เดิม (ถ้ามี)

213 ซ. จันทน์พริ้ง ถ. พระราม 2  
แขวงท่าข้าม เขตบางขุนเทียน  
กรุงเทพฯ 10150

การทำงานปัจจุบัน

บริษัท ไทยปริทัศน์ จำกัด  
232-4 ซ. ลีลม 2 ถ. ลีลม  
สีลม บางรัก กรุงเทพฯ 10230

การทำงานพิเศษ

I

เพิ่ม แก้ไข ลบรายการ บันทึก ออก

Figure A.29. Screen Layout of Customer Description.

The screen layout of edit customer description is for maintaining the project description such as adding the customer details. Users can also edit, delete, save the customer details on this screen.



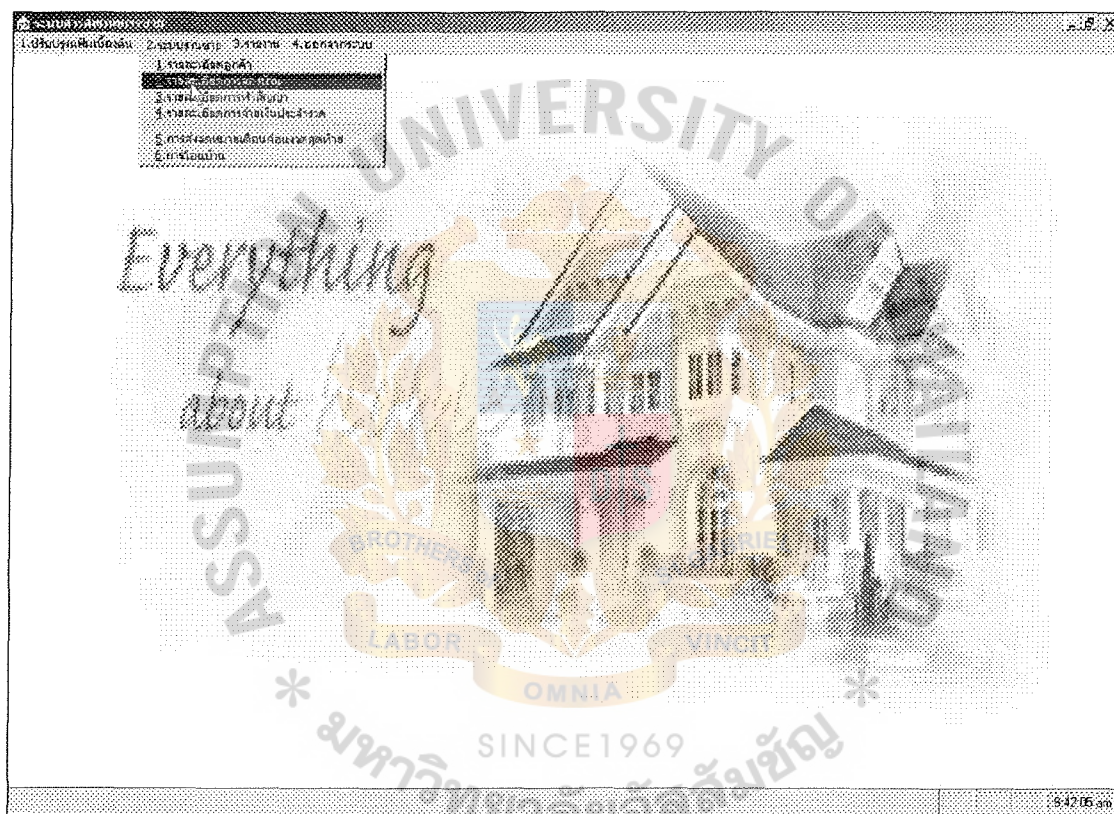


Figure A.30. Main Menu of Reserve House.



แบบฟอร์มจองบ้าน

ข้อมูลผู้เช่า

นาย สมชาย สุภาพ

06/10/2516 30

ไทย ไทย

พนักงานบริษัทเอกชน

20,000

3-1021-00219-78-6

17 กันยายน 2543

17 กันยายน 2549

ที่อยู่ปัจจุบัน / ที่ติดต่อ

213 ซ.จันทน์รังสิต อ.พระราม 2  
แขวงท่าข้าม เขตบางขุนเทียน  
กรุงเทพฯ 10150

พนักงานบริษัทเอกชน

บริษัท ไทยปริทัศน์ จำกัด  
232-4 ซ.สีลม 2 ถนนสีลม  
สีลม บางรัก กรุงเทพฯ 10230

ข้อมูลบ้านที่จอง

401/15

บางมด สวนอนุวัตรมย์

บ้านเดี่ยวสองชั้น

ประเภทที่ดิน ที่ตั้ง

นางสาวปริศนา สุนทรมาลี

พิมพ์ใบจอง

Figure A.31. Screen Layout of Reserve House form.

The screen layout of reserve house form is for display the reserve house form such as customer detail, house details.



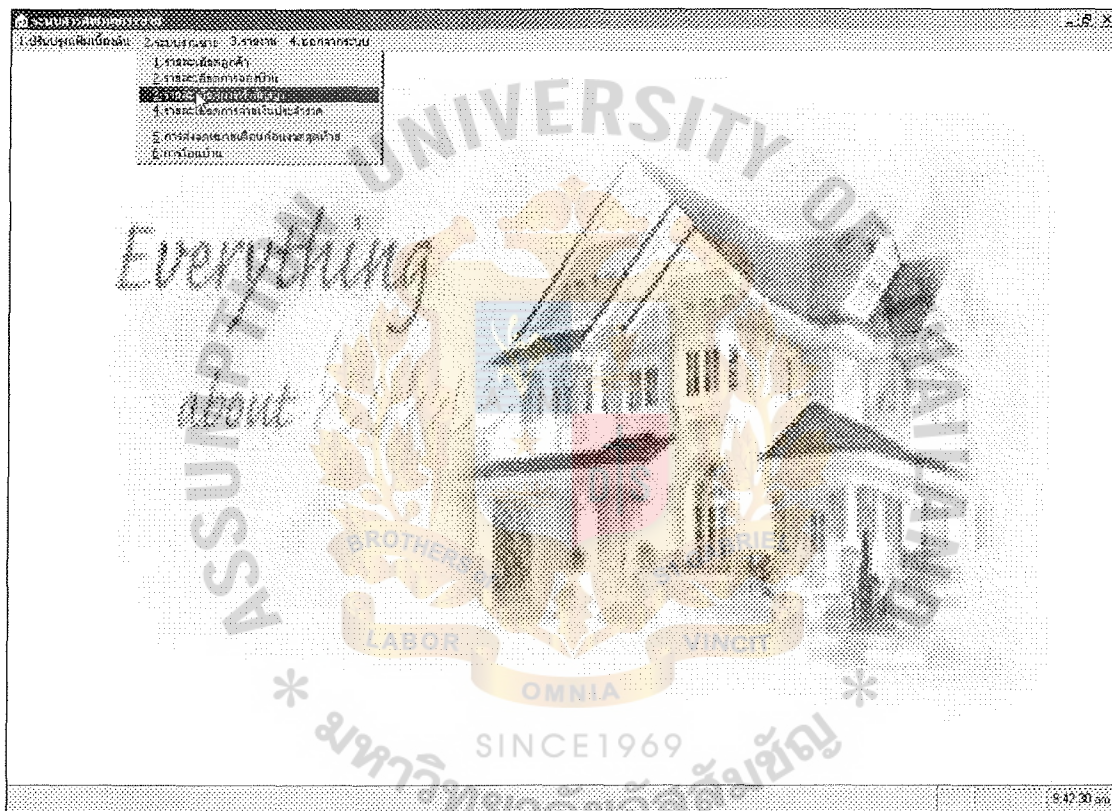


Figure A.32. Main Menu of Contracting.



Page1 Page2 เลขที่สัญญา PM0001 000004 0001

สัญญาฉบับนี้ทำขึ้น ณ บริษัทตัวอย่างจำกัด

เมื่อวันที่ 19 ตุลาคม 2543 ระหว่าง บริษัทตัวอย่างจำกัด

โดย นางสาวปริทัศน์ สุนทรภังละ ผู้รับมอบอำนาจ ซึ่งต่อไปนี้จะเรียกว่า "ผู้ให้เช่าซื้อ" ฝ่ายหนึ่ง กับ นายสมชาย สุขภาพ อายุ 30 ปี และ ... อายุ ... ปี ซึ่งต่อไปนี้จะเรียกว่า "ผู้เช่าซื้อ" อีกฝ่ายหนึ่ง ทั้งสองฝ่ายได้ตกลงทำสัญญากันดังต่อไปนี้

ข้อ 1 ผู้เช่าซื้อตกลงเช่าซื้อและผู้ให้เช่าซื้อตกลงให้เช่าซื้อบ้านจำนวน 1 หลัง คือ บ้านเลขที่ 401/15 เนื้อที่รวมประมาณ 65 ตารางวา ลักษณะอาคารแบบ บ้านเดี่ยวสองชั้น ในโครงการ บ้านต.สวนประจักษ์ ของผู้ให้เช่าซื้อ ตั้งอยู่ที่ ถนนประชาอุทิศ ปทุมธานี

ในราคา 3,000,000 บาท (สามล้านบาทถ้วน)

แบ่งชำระเป็นงวด จำนวน 60 งวด งวดละ 1 เดือน ในอัตราดอกเบี้ยดังนี้

1.1 งวดที่ 1-12 เป็นเงิน	19,000	บาท	(หนึ่งหมื่นเก้าพันบาทถ้วน)
1.1 งวดที่ 1-12 เป็นเงิน	19,000	บาท	(หนึ่งหมื่นเก้าพันบาทถ้วน)
1.1 งวดที่ 1-12 เป็นเงิน	19,000	บาท	(หนึ่งหมื่นเก้าพันบาทถ้วน)
1.1 งวดที่ 1-12 เป็นเงิน	19,000	บาท	(หนึ่งหมื่นเก้าพันบาทถ้วน)
1.1 งวดที่ 1-12 เป็นเงิน	19,000	บาท	(หนึ่งหมื่นเก้าพันบาทถ้วน)

ถนนประชาอุทิศ ปทุมธานี

นางสาวปริทัศน์ สุนทรภังละ

บันทึกการทำสัญญา

Figure A.33. Screen Layout of Contracting.

The screen layout of contracting is for display the contract details such as the customer details, fix time payment, house details.







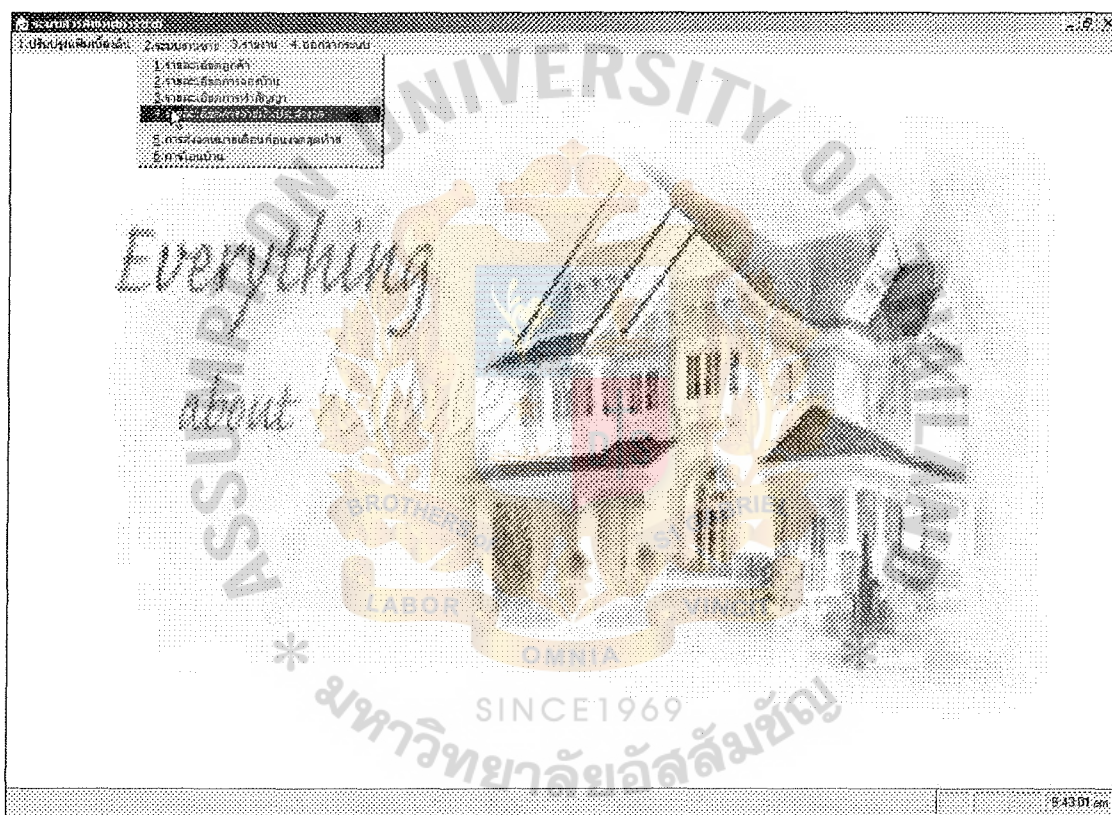


Figure A.35. Main Menu of Payment.



ใบเสร็จรับเงิน (RECEIPT) R001/0743

02 สิงหาคม 2543

นางมต ส่วนธนบุรีรัมย์  
บ้านศิโยสองชั้น  
401/15

นายสมชาย สุภาพ

02 สิงหาคม 2543

นางสาวปรีกาศน์ สุนทรมังละ

งวดที่	ประจำเดือน	จำนวนเงิน
1	07/43	18760.00

หนึ่งหมื่นแปดพันเจ็ดร้อยห้าสิบบาทถ้วน

พิมพ์ทางเครื่องพิมพ์

Figure A.36. Screen Layout of Billing.





Figure A.37. Main Menu of Send Mail.



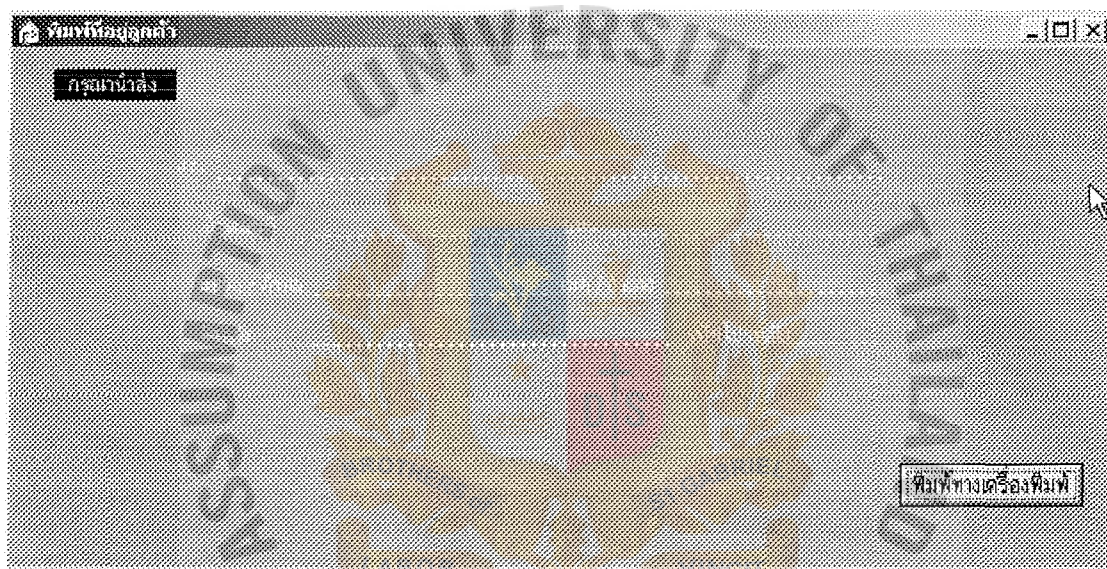


Figure A.38. Screen Layout of Form of Mail.



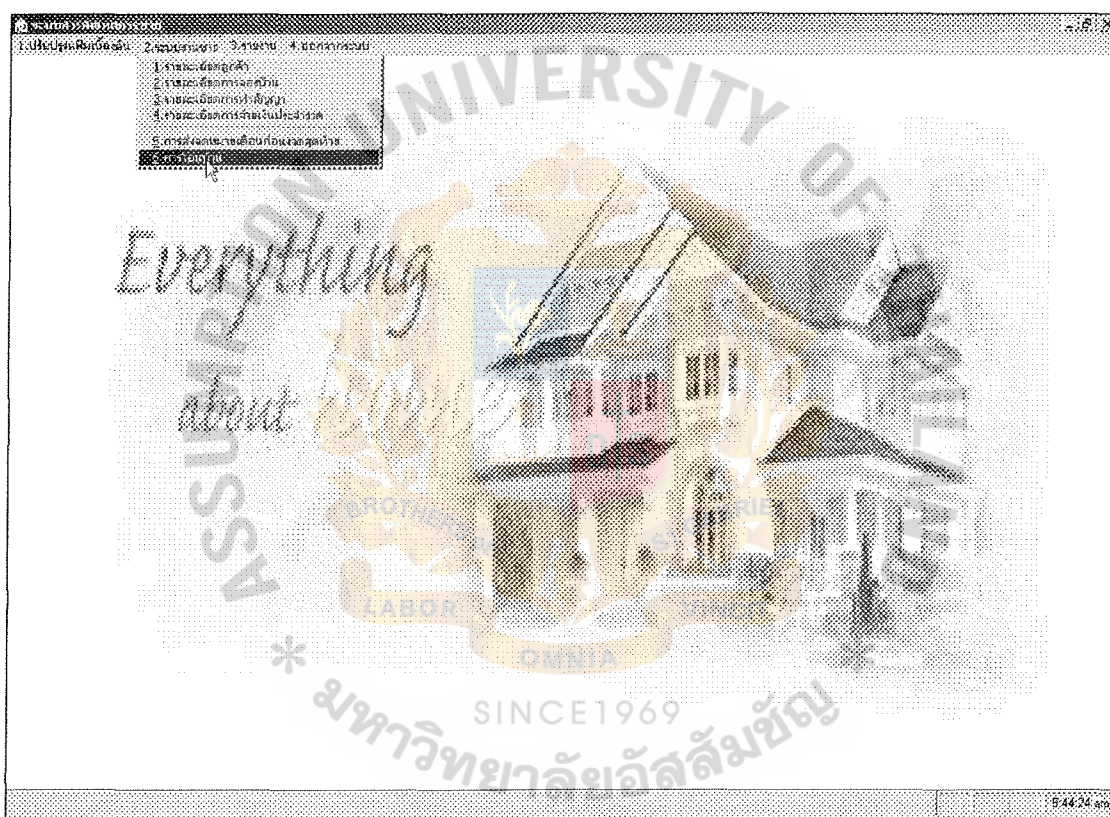


Figure A.39. Main Menu of Transfer.



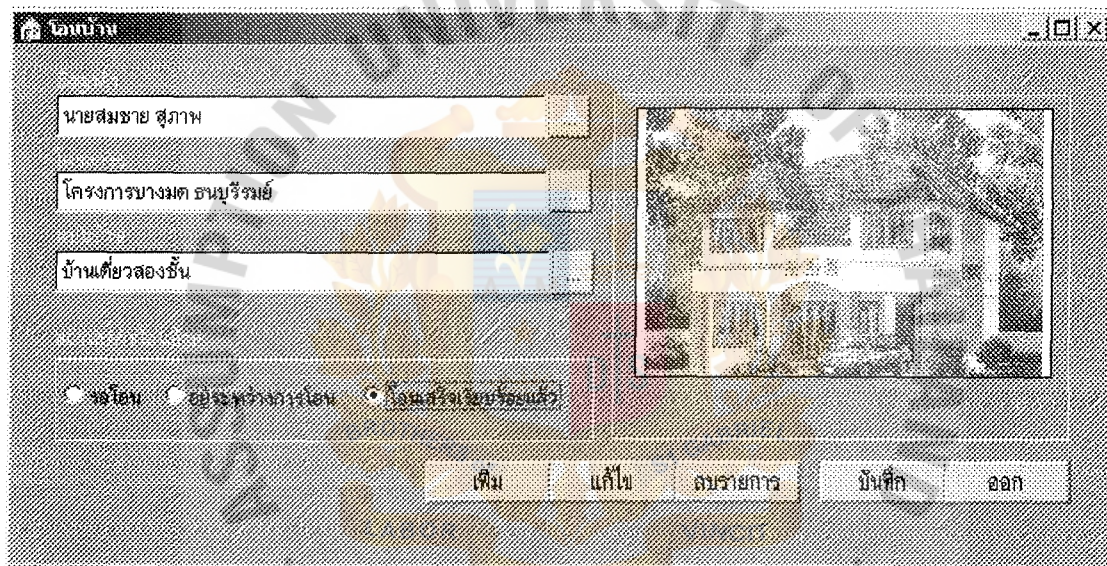


Figure A.40. Screen Layout of Transfer.





Figure A.41. Main Menu of Daily Sales Report.



รายงานการขายประจำวัน

เลือกเงื่อนไขเพื่อออกรายงาน

วันที่: 31 พฤษภาคม 2543

ชื่อหน่วยงาน: โครงการบางมด อนุภูมิ

โครงการ: โครงการแจ้งวัฒนะ

เอกสารก่อนพิมพ์ เครื่องพิมพ์ ออก

Figure A.42. Screen Layout of Daily Sales Report.





## APPENDIX B

### REPORT DESIGN



## HOUSING ORGANIZATION

### Daily Sales Report

Date: 06/12/46

No.	Date	Project Name	Sales Amount	Note
1	12/6/2546	บ้านดงอภัย	25,000,000	
2	12/6/2546	บ้านชลดา	7,500,000	
3	12/6/2546	บ้านนันทวัน	6,900,000	
4	12/6/2546	บ้านสิริสวัสดิ์	5,800,000	

Figure B.1. Daily Sales Report Arrange by Date.



## HOUSING ORGANIZATION

Daily Sales Report (Arrange by Project Name).

Project Name: บ้านดงวัลย์

No.	Date	Sales Amount	Note
1	12/6/2546	10,000,000	
2	12/6/2546	15,000,000	

Figure B.2. Daily Sales Report Arrange by Project Name.



## HOUSING ORGANIZATION

### Weekly Sales Report

Date: 05/04/46 to 05/10/46

No.	Date	Project Name	Sales Amount	Note
1	4/5/2546	บ้านดงคำ	25,000,000	
2	5/5/2546	บ้านชลดา	7,500,000	
3	7/5/2546	บ้านนันทวัน	6,900,000	
4	10/5/2546	บ้านสีวลี	5,800,000	

Figure B.3. Weekly Sales Report Arrange by Date.



## HOUSING ORGANIZATION

Weekly Sales Report (Arrange by Project Name).

Project Name: บ้านชลตา

No.	Date	Sales Amount	Note
1	5/6/2546	4,000,000	
2	7/6/2546	3,500,000	

Figure B.4. Weekly Sales Report Arrange by Project Name.



## HOUSING ORGANIZATION

Monthly Sales Report					Month : มิถุนายน 2546
No.	Date	Project Name	Sales Amount	Note	
1	4/6/2546	บ้านดงอู่	25,000,000		
2	5/6/2546	บ้านขกดา	7,500,000		
3	7/6/2546	บ้านนันทวัน	6,900,000		
4	10/6/2546	บ้านสิวลี	5,800,000		

Figure B.5. Monthly Sales Report Arrange by Month.



## HOUSING ORGANIZATION

Monthly Sales Report (Arrange by Project Name).

Project Name: บ้านนันทวัน

No.	Date	Sales Amount	Note
1	5/6/2546	4,000,000	
2	7/6/2546	3,500,000	
3	5/6/2546	4,000,000	
4	7/6/2546	3,500,000	
5	5/6/2546	4,000,000	
6	7/6/2546	3,500,000	

Figure B.6. Monthly Sales Report Arrange by Project Name.



## HOUSING ORGANIZATION

Yearly Sales Report Year : 2546

No.	Date	Project Name	Sales Amount	Note
1	4/1/2546	บ้านด้าววัลย์	25,000,000	
2	25/1/2546	บ้านชลดา	7,500,000	
3	7/2/2546	บ้านนันทวัน	11,900,000	
4	10/3/2546	บ้านสีวิดี	5,800,000	
5	4/4/2546	บ้านด้าววัลย์	5,000,000	
6	15/5/2546	บ้านชลดา	7,500,000	
7	17/8/2546	บ้านนันทวัน	8,900,000	
8	10/12/2546	บ้านสีวิดี	7,800,000	

Figure B.7. Yearly Sales Report Arrange by Year.



## HOUSING ORGANIZATION

Yearly Sales Report (Arrange by Project Name).

Project Name: บ้านดีวิถี

No.	Date	Sales Amount	Note
1	5/1/2546	4,000,000	
2	7/2/2546	3,500,000	
3	5/3/2546	4,000,000	
4	7/8/2546	3,500,000	
5	5/10/2546	4,000,000	
6	7/11/2546	3,500,000	

Figure B.8. Yearly Sales Report Arrange by Project Name.



## HOUSING ORGANIZATION

### Sales Remain Report (Any project)

Date : 06/5/46

No.	Project Name	Total Unit Sales Open	Sales Amount	Sales Remain
1	บ้านดงวัลย์	2	8,000,000	
2	บ้านชลดา	1	4,000,000	

Figure B.9. Sales Remain Report.



## HOUSING ORGANIZATION

### Sales Remain Report (Arrange by Project)

Date : 16/6/46

No.	House Type	Total Unit Sales Open	Sales Amount	Sales Remain
1	บ้านเดี่ยว	2	8,000,000	
2	บ้านเดี่ยว	1	4,000,000	

Figure B.10. Sales Remain Report Arrange by Project.



## HOUSING ORGANIZATION

Sales Value Report (Arrange by Project Name and Type of House).

Project Name: บ้านหัดดา

No.	Type of House	Sales Amount	House Price	Sales Value
1	บ้านเดี่ยว	2	3,500,000	7,000,000
2	บ้านเดี่ยว	1	4,000,000	4,000,000
	Total	3	7,500,000	11,000,000

Figure B.11. Sales Value Report Arrange by Project Name and Type of House.



## HOUSING ORGANIZATION

Customer Information Report (Arrange by Project).

Date: 06/05/46

No.	Customer Name	Address	Tel.	House No.	House Type
1	สมชาย รักชาติ	3/6 สุขุมวิท 62 พระโขนง กทม.	02-3324129	205	บ้านเดี่ยว
2	ณัฐ ทองแท้	2/4 บางบัวทอง นนทบุรี	02-2242248	207	บ้านเดี่ยว

Figure B.12. Customer Information Report Arrange by Project.







Table C.1. Customer Table Schema.

No.	Field Name	Field Type	Length	Key Type
1	CUS_ID_CARD	Char	13	Primarykey
2	CUS_TITLE_CD	Char	2	Attribute
3	CUS_NAME	Varchar2	30	Attribute
4	CUS_SURNAME	Varchar2	30	Attribute
5	CUS_BIRTH	Date		Attribute
6	CUS_NATIONALITY	Varchar2	20	Attribute
7	CUS_TRADE	Varchar2	30	Attribute
8	CUS_ISSUE_DATE	Date		Attribute
9	CUS_EXPIRE_DATE	Date		Attribute
10	CUS_ISSUE_BY	Varchar2	30	Attribute
11	CUS_ADDRESS	Varchar2	150	Attribute
12	CUS_ROAD	Varchar2	50	Attribute
13	CUS_SUB_DISTRICT	Varchar2	20	Attribute
14	CUS_DISTRICT		20	Attribute
15	CUS_PROVINCE	Varchar2	20	Attribute
16	CUS_POSTCODE	Character	5	Attribute
17	CUS_TEL	Varchar2	20	Attribute
18	CUS_INCOME	Number	6	Attribute
19	CUS_WK	Varchar2	40	Attribute
20	CUS_WK_ADDRESS	Varchar2	150	Attribute
21	CUS_WK_DISTRICT	Varchar2	50	Attribute
22	CUS_WK_PROVINCE	Varchar2	20	Attribute
23	CUS_WK_ROAD	Varchar2	20	Attribute
24	CUS_CONT_ADDRESS	Varchar2	150	Attribute
25	CUS_CONT_ROAD	Varchar2	50	Attribute
26	CUS_CONT_SUB_DISTRICT	Varchar2	20	Attribute
27	CUS_CONT_DISTRICT	Varchar2	20	Attribute
28	CUS_CONT_PROVINCE	Varchar2	20	Attribute



Table C.1. Customer Table Schema (continued).

No.	Field Name	Field Type	Length	Key Type
29	CUS_CONT_POSTCODE	Char	5	Attribute
30	CUS_CONT_TEL	Varchar2	20	Attribute
31	CUS_S_STATUS	Char	1	Attribute
32	CUS_SPOUSE_TITLE_CD	Char	2	Attribute
33	CUS_SPOUSE_NAME	Varchar2	30	Attribute
34	CUS_SPOUSE_SURNAME	Varchar2	30	Attribute
35	CUS_SPOUSE_BIRTH	Date		Attribute
36	CUS_SPOUSE_NATIONALITY	Varchar2	20	Attribute
37	CUS_SPOUSE_TRADE	Varchar2	30	Attribute
38	CUS_SPOUSE_WK	Number	6	Attribute
39	CUS_SPOUSE_WK	Varchar2	40	Attribute
40	CUS_SPOUSE_WK_ADDRESS	Varchar2	150	Attribute
41	CUS_SPOUSE_WK_ROAD	Varchar2	50	Attribute
42	CUS_SPOUSE_WK_DISTRICT	Varchar2	20	Attribute
43	CUS_SPOUSE_WK_PROVINCE	Varchar2	20	Attribute



Table C.2. Housemaster Table Schema.

No.	Field Name	Field Type	Length	Key Type
1	HM_HOUSE_NO	Char	9	Primarykey
2	HM_PROJ_CD	Char	6	Primarykey
3	HM_HTYPE_TYPE	Char	4	Attribute
4	HM_ID_CARD	Char	13	Attribute
5	HM_SIZE	Number	(6,2)	Attribute
6	HM_STATUS	Char	1	Attribute
7	HM_RESERVE_DATE	Date		Attribute
8	HM_PAYRATE	Integer		Attribute
9	HM_PAYTIME	Integer		Attribute
10	HM_ALL_PLAYTIME	Integer		Attribute
11	HM_AMT	Number	(10,2)	Attribute
12	HM_TOT_AMT	Number		Attribute
13	HM_PAY_DATE	Date		Attribute
14	HM_OWNERSHIP	Date		Attribute
15	HM_OFFICE_CD	Char	7	Attribute



Table C.3. Project Table Schema.

No.	Field Name	Field Type	Length	Key Type
1	PRJ_PROJECT_CODE	Char	6	Primarykey
2	PRJ_BRANCE_CD	Char	4	
3	PRJ_PROJTYPE_CD	Char	2	Attribute
4	PRJ_NAME	Varchar2	80	Attribute
5	PRJ_COMMENT	Varchar2	255	Attribute
6	PRJ_ADDRESS	Varchar2	255	Attribute
7	PRJ_DISTRICT	Varchar2	200	Attribute
8	PRJ_SUB_DISTRICT	Varchar2	30	Attribute
9	PRJ_PROVINCE	Varchar2	30	Attribute
10	PRJ_LOCATE_PIC	Long Raw		Attribute
11	PRJ_OFFICE_CD	Char	7	Attribute





Table C.4. Contract Table Schema.

No.	Field Name	Field Type	Length	Key Type
1	CT_HOUSE_NUMBER	Char	6	Primarykey
2	CT_PROJ_CD	Char	4	
3	CT_CONTRACT_DATE	Char	2	Attribute
4	CT_PRINTER_NAME	Varchar2	80	Attribute
5	CT_PRINTER_SURNAME	Varchar2	255	Attribute
6	CT_PRINTER_AGE	Varchar2	255	Attribute
7	CT_PRINTER_ADDRESS	Varchar2	200	Attribute
8	CT_PRINTER_ROAD	Varchar2	30	Attribute
9	CT_PRINTER_DISTRICT	Varchar2	30	Attribute
10	CT_PRINTER_SUB_DISTRICT	Long Raw		Attribute
11	CT_PRINTER_PROVINCE	Char	7	Attribute
12	CT_CUST1_NAME	Varchar2	60	Attribute
13	CT_CUST1_SURNAME	Varchar2	30	Attribute
14	CT_CUST2_NAME	Varchar2	60	Attribute
15	CT_CUST2_SURNAME	Varchar2	30	Attribute



Table C.5. Price Table Schema.

No.	Field Name	Field Type	Length	Key Type
1	PRC_PROJ_CD	Char	6	Primarykey
2	PRC_BDTYPE_CD	Char	4	Primarykey
3	PRC_UNIT	Number	4	Attribute
4	PRC_SIZE	Number	(6,2)	Attribute
5	PRC_PRICE	Number	(10,2)	Attribute
6	PRC_BD_PICTURE	Long Raw		Attribute
7	PRC_DOWN01_12	Number	(7,2)	Attribute
8	PRC_DOWN13_24	Number	(7,2)	Attribute
9	PRC_DOWN025_36	Number	(7,2)	Attribute
10	PRC_NHA_RATE05	Number	(7,2)	Attribute
11	PRC_NHA_RATE10	Number	(7,2)	Attribute
12	PRC_NHA_RATE15	Number	(7,2)	Attribute
13	PRC_NHA_RATE20	Number	(7,2)	Attribute
14	PRC_COMMENT	Character	225	Attribute



Table C.6. Officer Table Schema.

No.	Field Name	Field Type	Length	Key Type
1	OF_OFFICER_CODE	Char	7	Primarykey
2	OF_TITLE_CD	Char	2	Attribute
3	OF_NAME	Varchar2	30	Attribute
4	OF_SURNAME	Varchar2	30	Attribute
5	OF_PASSWORD	Varchar2	10	Attribute

Table C.7. Account Receive Table Schema.

No.	Field Name	Field Type	Length	Key Type
1	AC_RECEIPT_NO	Char	10	Primarykey
2	AC_HOUSE_NO	Char	9	Attribute
3	AC_PRJ_CD	Char	6	Attribute
4	AC_AMT	Number	(7,2)	Attribute
5	AC_TIME	Integer	10	Attribute
6	AC_PAY_DATE	Date		Attribute



Table C.8. Building Type Table Schema.

No.	Field Name	Field Type	Length	Key Type
1	HOUSE_HTYPE_CODE	Char	4	Primarykey
2	HOUSE_NAME	Varchar	80	Attribute

Table C.9. Project Type Table Schema.

No.	Field Name	Field Type	Length	Key Type
1	PRJT_PROJTYPE_CODE	Char	2	Primarykey
2	PRJT_NAME	Varchar2	80	Attribute

Table C.10. Title NameTable Schema.

No.	Field Name	Field Type	Length	Key Type
1	TLE_TITLE_CODE	Char	2	Primarykey
2	TLE_NAME	Varchar2	30	Attribute

Table C.11. Branch Table Schema.

No.	Field Name	Field Type	Length	Key Type
1	BRN_BRANCH_CODE	Char	4	Primarykey
2	BRN_NAME	Varchar2	80	Attribute
3	BRN_SHORTNAME	Varchar2	50	Attribute





## APPENDIX D

### ALTERNATIVE CANDIDATE SOLUTIONS



## Cost of Computerized System

Table D.1. Cost Analysis of Computerized System: Alternative of Candidate 1, Baht.

Cost Items	Year 1	Year 2	Year 3	Year 4	Year 5
Fixed Cost:					
– Hardware cost					
• Server	26,000.00	26,000.00	26,000.00	26,000.00	26,000.00
• Personnel Computer	4,000.00	4,000.00	4,000.00	4,000.00	4,000.00
• UPS	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00
• Printer	2,500.00	2,500.00	2,500.00	2,500.00	2,500.00
• Maintenance Cost	-	12,000.00	12,000.00	12,000.00	12,000.00
– Software cost					
• Operating System	12,000.00	12,000.00	12,000.00	12,000.00	12,000.00
• Development Software	7,000.00	7,000.00	7,000.00	7,000.00	7,000.00
• PC Software	6,000.00	6,000.00	6,000.00	6,000.00	6,000.00
• Anti Virus Software	2,600.00	2,600.00	2,600.00	2,600.00	2,600.00
– Network cost					
• LAN Card	3,400.00	3,400.00	3,400.00	3,400.00	3,400.00
• Maintenance Cost	-	9,000.00	9,000.00	9,000.00	9,000.00
System Implementation Cost:					
– Development cost	45,000.00	-	-	-	-
– Training cost	20,000.00	-	-	-	-
– Setup cost	15,000.00	-	-	-	-
Salary:					
– Sales manager 1 person @ 70,000	70,000.00	80,500.00	92,575.00	106,461.25	122,430.34



Table D.1. Cost Analysis of Computerized System: Alternative of Candidate 1, Baht (Continued).

Cost Items	Year 1	Year 2	Year 3	Year 4	Year 5
- Sales Supervisor 2 persons @ 25,000	50,000.00	57,500.00	66,125.00	76,043.75	87,450.31
- Sales Staff 3 persons @ 12,000	36,000.00	41,400.00	47,610.00	54,751.50	62,964.23
Office Supplies & Miscellaneous Cost (Per Annual):					
- Stationery	7,000.00	7,500.00	8,000.00	8,500.00	9,000.00
- Paper	50,000.00	55,000.00	60,500.00	66,550.00	73,205.00
- Utility	12,000.00	12,000.00	12,000.00	12,000.00	12,000.00
- Miscellaneous	3,000.00	3,000.00	3,000.00	3,000.00	3,000.00
Total cost	372,700.00	342,600.00	375,510.00	413,006.50	455,749.88
Accumulated cost	372,700.00	715,300.00	1,090,810.00	1,503,816.50	1,959,566.38



Table D.2. Accumulated Cost of Manual and Computerized System: Alternative of Candidate1, Baht.

Year	Accumulated Manual System Cost	Accumulated Computerized System Cost
1	337,000.00	372,700.00
2	730,500.00	715,300.00
3	1,190,320.00	1,090,810.00
4	1,728,037.50	1,503,816.50
5	2,357,309.48	1,959,566.38

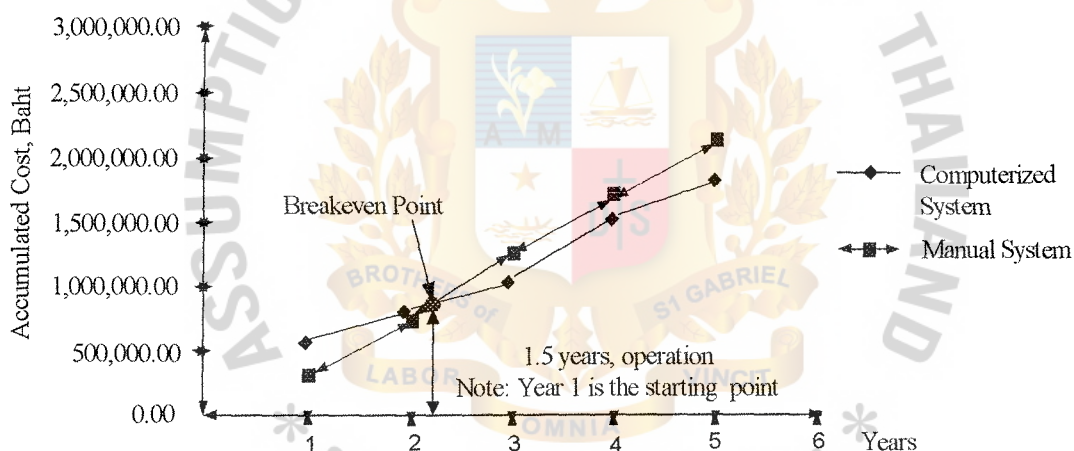


Figure D.1. Breakeven Analysis Chart: Candidate 1.

### Payback Analysis

The followings are payback period analysis for the proposed system.



Table D.3. Comparison of the System Cost: Alternative of Candidate 1, Baht .

Cost Items	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Development cost	-403,500.00					
Operation & maintenance cost		-228,000.00	-277,900.00	-310,810.00	-348,306.50	-391,049.88
Discount factors for 12%	1.00	0.88	0.77	0.68	0.60	0.53
Time-adjusted costs (adjusted to present value)	-403,500.00	-200,640.00	-215,205.76	-211,808.31	-208,877.79	-206,369.50
Cumulative time-adjusted costs over lifetime	-403,500.00	-604,140.00	-819,345.76	-1,031,154.07	-1,240,031.86	-1,446,401.37
Benefits derived from operation of new system		455,000.00	465,000.00	475,000.00	485,000.00	495,000.00
Discount factors for 12%	1.00	0.88	0.77	0.68	0.60	0.53
Time-adjusted costs (adjusted to present value)	0	400,400.00	360,096.00	323,699.20	290,852.25	261,227.30
Cumulative time-adjusted benefits over lifetime		400,400.00	760,496.00	1,084,195.20	1,375,047.45	1,636,274.75
Cumulative lifetime time-adjusted cost + benefit	-403,500.00	-203,740.00	-58849.76	53,041.13	135,015.59	189,873.38



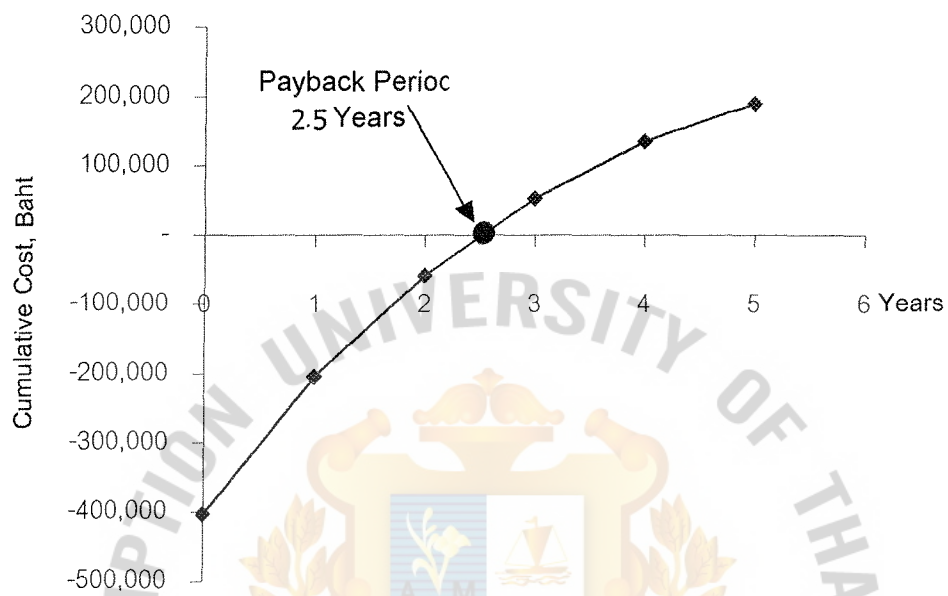


Figure D.2. Payback Analysis Chart: Candidate 1.



Table D.4. Cost Analysis of Computerized System: Alternative of Candidate 2, Baht.

Cost Items	Year 1	Year 2	Year 3	Year 4	Year 5
Fixed Cost:					
– Hardware cost					
• Server	26,000.00	26,000.00	26,000.00	26,000.00	26,000.00
• Personnel Computer	4,000.00	4,000.00	4,000.00	4,000.00	4,000.00
• UPS	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00
• Printer	2,500.00	2,500.00	2,500.00	2,500.00	2,500.00
• Maintenance Cost	-	12,000.00	12,000.00	12,000.00	12,000.00
– Software cost					
• Operating System	24,000.00	24,000.00	24,000.00	24,000.00	24,000.00
• Development Software	12,000.00	12,000.00	12,000.00	12,000.00	12,000.00
• PC Software	5,500.00	5,500.00	5,500.00	5,500.00	5,500.00
• Anti Virus Software	2,600.00	2,600.00	2,600.00	2,600.00	2,600.00
– Network cost					
• LAN Card	3,400.00	3,400.00	3,400.00	3,400.00	3,400.00
• Maintenance Cost	-	8,500.00	8,500.00	8,500.00	8,500.00
System Implementation Cost:					
– Development cost	70,000.00	-	-	-	-
– Training cost	30,000.00	-	-	-	-
– Setup cost	21,000.00	-	-	-	-
Salary:					
– Sales manager 1 person @ 70,000	70,000.00	80,500.00	92,575.00	106,461.25	122,430.34



Table D.4. Cost Analysis of Computerized System: Alternative of Candidate 2, Baht (Continued).

Cost Items	Year 1	Year 2	Year 3	Year 4	Year 5
– Sales Supervisor 2 persons @ 25,000	50,000.00	57,500.00	66,125.00	76,043.75	87,450.31
– Sales Staff 3 persons @ 12,000	36,000.00	41,400.00	47,610.00	54,751.50	62,964.23
Office Supplies & Miscellaneous Cost (Per Annual):					
– Stationery	7,000.00	7,500.00	8,000.00	8,500.00	9,000.00
– Paper	50,000.00	55,000.00	60,500.00	66,550.00	73,205.00
– Utility	12,000.00	12,000.00	12,000.00	12,000.00	12,000.00
– Miscellaneous	3,000.00	3,000.00	3,000.00	3,000.00	3,000.00
Total cost	430,200.00	358,600.00	391,510.00	429,006.50	471,749.88
Accumulated cost	430,200.00	788,800.00	1,180,310.00	1,609,316.50	2,081,066.38



Table D.5. Accumulated Cost of Manual and Computerized System: Alternative of Candidate 2, Baht.

Year	Accumulated Manual System Cost	Accumulated Computerized System Cost
1	337,000.00	430,200.00
2	730,500.00	788,800.00
3	1,190,320.00	1,180,310.00
4	1,728,037.50	1,609,316.50
5	2,357,309.48	2,081,066.38

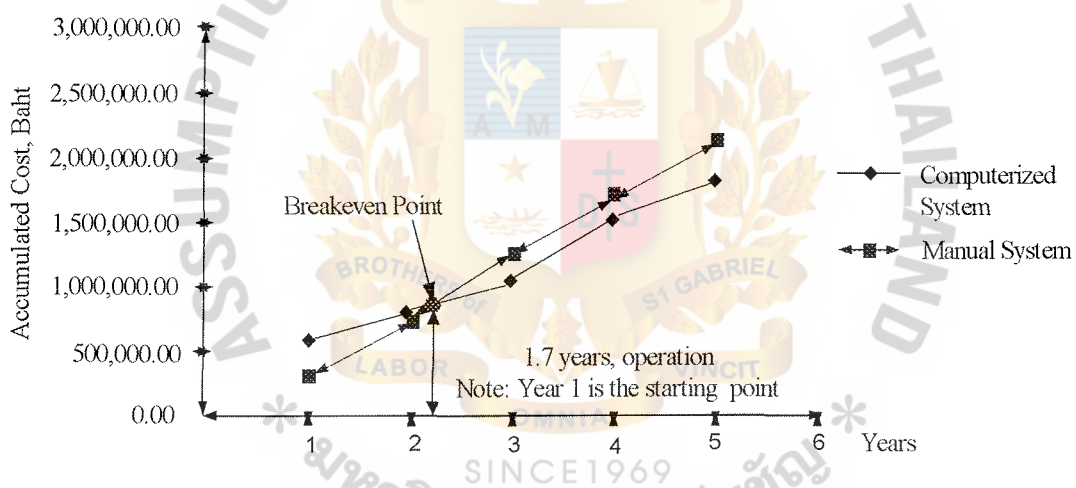


Figure D.3. Breakeven Analysis Chart: Candidate 2.

### Payback Analysis

The followings are payback period analysis for the proposed system.



Table D.6. Comparison of the System Cost: Alternative of Candidate 2, Baht .

Cost Items	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Development cost	-527,000.00					
Operation & maintenance cost		-228,000.00	-277,400.00	-310,310.00	-347,806.50	-390,549.88
Discount factors for 12%	1.00	0.88	0.77	0.68	0.60	0.53
Time-adjusted costs (adjusted to present value)	-527,000.00	-200,640.00	-214,818.56	-211,467.58	-208,577.94	-206,105.64
Cumulative time-adjusted costs over lifetime	-527,000.00	-727,640.00	-942,458.56	-1,153,926.14	-1,362,504.08	-1,568,609.72
Benefits derived from operation of new system		455,000.00	465,000.00	475,000.00	485,000.00	495,000.00
Discount factors for 12%	1.00	0.88	0.77	0.68	0.60	0.53
Time-adjusted costs (adjusted to present value)	0	400,400.00	360,096.00	323,699.20	290,852.25	261,227.30
Cumulative time-adjusted benefits over lifetime		400,400.00	760,496.00	1,084,195.20	1,375,047.45	1,636,274.75
Cumulative lifetime time-adjusted cost + benefit	-527,000.00	-327,240.00	-181,962.56	-69,730.94	12,543.37	67,665.03



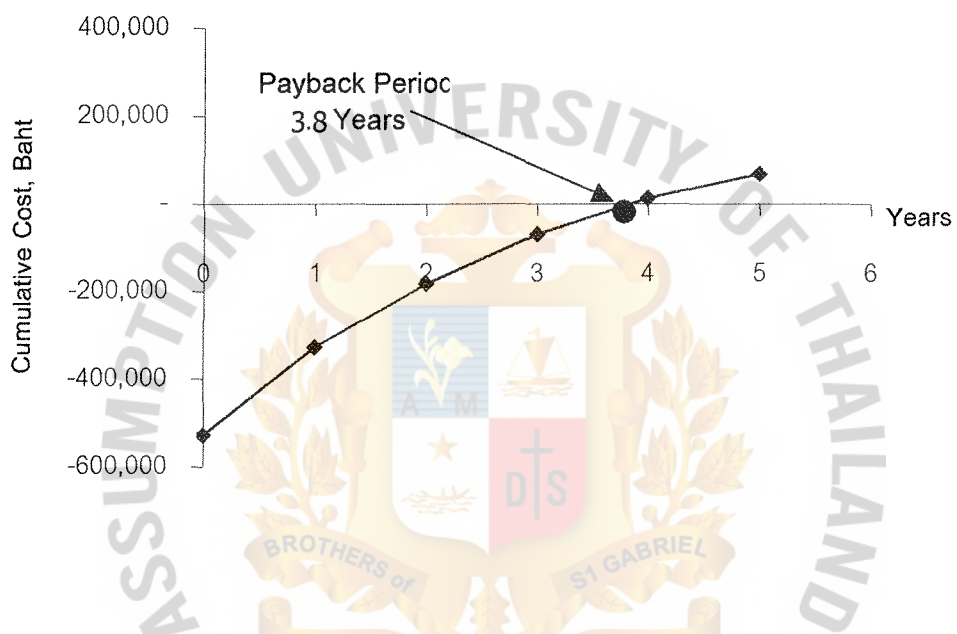


Figure D.4. Payback Analysis Chart: Candidate 2.



Table D.6. Cost Analysis of Computerized System: Alternative of Candidate 3, Baht.

Cost Items	Year 1	Year 2	Year 3	Year 4	Year 5
Fixed Cost:					
– Hardware cost					
• Server	24,000.00	24,000.00	24,000.00	24,000.00	24,000.00
• Personnel Computer	3,980.00	3,980.00	3,980.00	3,980.00	3,980.00
• UPS	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00
• Printer	2,500.00	2,500.00	2,500.00	2,500.00	2,500.00
• Maintenance Cost	-	10,000.00	10,000.00	10,000.00	10,000.00
– Software cost					
• Operating System	8,700.00	8,700.00	8,700.00	8,700.00	8,700.00
• Development Software	6,000.00	6,000.00	6,000.00	6,000.00	6,000.00
• PC Software	4,400.00	4,400.00	4,400.00	4,400.00	4,400.00
• Anti Virus Software	2,600.00	2,600.00	2,600.00	2,600.00	2,600.00
– Network cost					
• LAN Card	3,080.00	3,080.00	3,080.00	3,080.00	3,080.00
• Maintenance Cost	-	7,000.00	7,000.00	7,000.00	7,000.00
System Implementation Cost:					
– Development cost	45,000.00	-	-	-	-
– Training cost	20,000.00	-	-	-	-
– Setup cost	10,000.00	-	-	-	-
Salary:					
– Sales manager 1 person @ 70,000	70,000.00	80,500.00	92,575.00	106,461.25	122,430.34



Table D.6. Cost Analysis of Computerized System: Alternative of Candidate 3, Baht (Continued).

Cost Items	Year 1	Year 2	Year 3	Year 4	Year 5
- Sales Supervisor 2 persons @ 25,000	50,000.00	57,500.00	66,125.00	76,043.75	87,450.31
- Sales Staff 3 persons @ 12,000	36,000.00	41,400.00	47,610.00	54,751.50	62,964.23
Office Supplies & Miscellaneous Cost (Per Annual):					
- Stationery	7,000.00	7,500.00	8,000.00	8,500.00	9,000.00
- Paper	50,000.00	55,000.00	60,500.00	66,550.00	73,205.00
- Utility	12,000.00	12,000.00	12,000.00	12,000.00	12,000.00
- Miscellaneous	3,000.00	3,000.00	3,000.00	3,000.00	3,000.00
Total cost	359,260.00	330,160.00	363,070.00	400,566.50	443,309.88
Accumulated cost	359,260.00	689,420.00	1,052,490.00	1,453,056.50	1,896,366.38



Table D.7. Accumulated Cost of Manual and Computerized System: Alternative of Candidate 3, Baht.

Year	Accumulated Manual System Cost	Accumulated Computerized System Cost
1	337,000.00	359,260.00
2	730,500.00	689,420.00
3	1,190,320.00	1,052,490.00
4	1,728,037.50	1,453,056.50
5	2,357,309.48	1,896,366.38

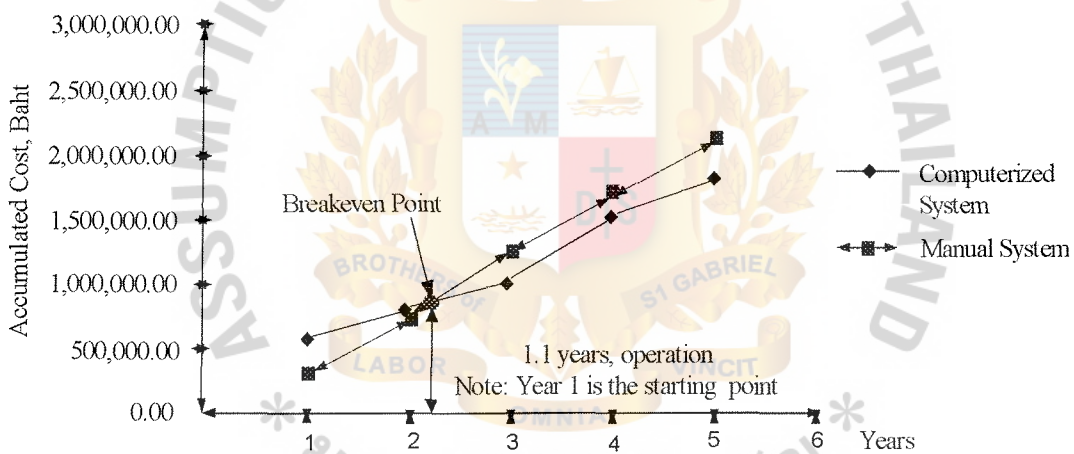


Figure D.5. Breakeven Analysis Chart: Candidate 3.

### Payback Analysis

The followings are payback period analysis for the proposed system.



Table D.9. Comparison of the System Cost: Alternative of Candidate 3, Baht .

Cost Items	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Development cost	-356,300.00					
Operation & maintenance cost		-228,000.00	-273,900.00	-306,810.00	-344,306.50	-387,049.88
Discount factors for 12%	1.00	0.88	0.77	0.68	0.60	0.53
Time-adjusted costs (adjusted to present value)	-356,300.00	-200,640.00	-212,108.16	-209,082.42	-206,479.01	-204,258.58
Cumulative time-adjusted costs over lifetime	-356,300.00	-556,940.00	-769,048.16	-978,130.58	-1,184,609.59	-1,388,868.17
Benefits derived from operation of new system		455,000.00	465,000.00	475,000.00	485,000.00	495,000.00
Discount factors for 12%	1.00	0.88	0.77	0.68	0.60	0.53
Time-adjusted costs (adjusted to present value)	0	400,400.00	360,096.00	323,699.20	290,852.25	261,227.30
Cumulative time-adjusted benefits over lifetime		400,400.00	760,496.00	1,084,195.20	1,375,047.45	1,636,274.75
Cumulative lifetime time-adjusted cost + benefit	-356,300.00	-156,540.00	-8552.16	106,064.62	190,437.85	247,406.58



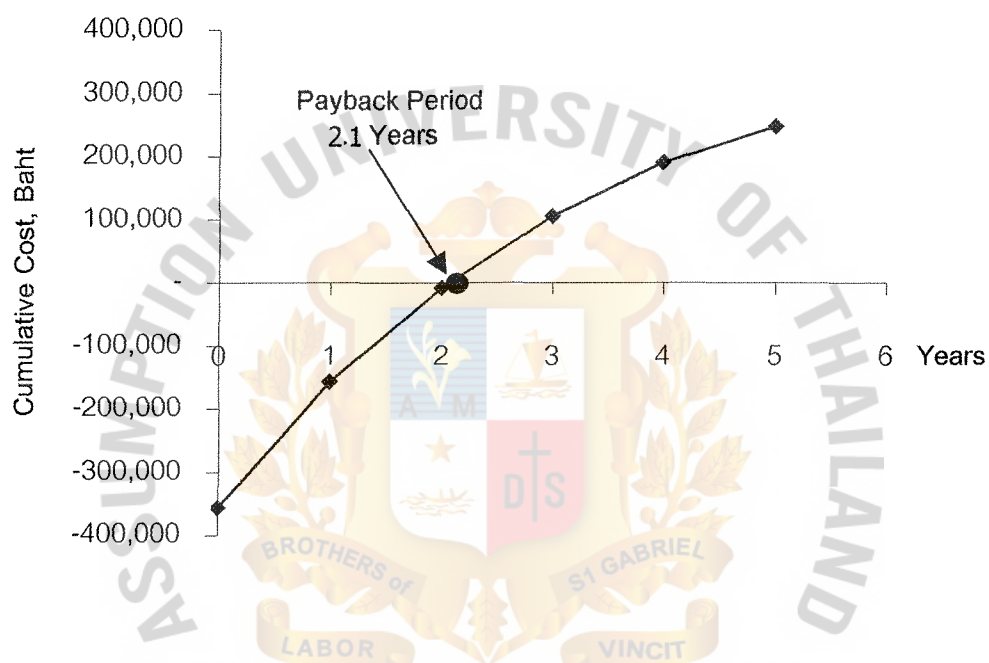


Figure D.6. Payback Analysis Chart: Candidate 3.





**APPENDIX E**  
**DATA DICTIONARY**



Table E.1. Data Dictionary.

Field Name	Meaning
AC TOTAL	Total of payment accountant receive from customer
AC HOUSE NO	Number of housing in biling
AC PAY DATE	Date of project on biling
AC PRJ CD	Code of project on biling
AC RECEIPT NO	Number of biling
HOUSE TYPE CODE	Type of house code
HOUSE NAME	Name of house
PRJ CODE	Code of project
PRJ NAME	Name of project
CUS ADDRESS	Address of customer
CUS BIRTH	Date of birth of customer
CUS_CONT_ADDRESS	The address of customer who can not be contacted now.
CUS_CONT_DISTRICT	The district address of customer who can not be contacted now.
CUS CONT POSTCODE	The postcode from address of customer who can be contacted.
CUS CONT TEL	The telephone of customer who can be contacted now.
CUS DISTRICT	The district address of customer who can be contacted now.
CUS EXP DATE	Expire date of customer identification card
CUS ID CARD	Identification card of customer
CUS CONT ROAD	The road in address of customer who can be contacted now.
CUS CONT SUB DISTRICT	The sub district in address of customer who can be contacted now.
CUS INCOME	The income of customer
CUS ISSUE BY	The place that issue Id. card of customer
CUS ISSUE DATE	The date of customer spouse
CUS S STATUS	The status of customer spouse
CUS SPOUSE INCOME	The income of customer spouse
CUS SPOUSE NAME	The name of customer spouse
CUS SPOUSE SURNAME	The surname of customer spouse
CUS SPOUSE TITLE_CD	The title name code of customer spouse
CUS SPOUSE WK	The office name of customer spouse
CUS SPOUSE WK ADDRESS	The office address of customer spouse
CUS SPOUSE WK DISTRICT	The office district address of customer spouse
CUS SPOUSE WK PROVINCE	The office province address of customer spouse
CUS SPOUSE WK ROAD	The office road address of customer spouse
CUS NAME	The name of customer
CUS SURNAME	The surname of customer



Table E.1. Data Dictionary (continued).

Field Name	Meaning
CUS_POSTCODE	The post code in address of customer
CUS_PROVINCE	The province in address of customer
CUS_ROAD	The road in address of customer
CUS_SUB_DISTRICT	The sub district in address of customer
CUS_TEL	The telephone of customer
CUS_TITLE_CD	The code of title name of customer
CUS_TRADE	The occupation of customer
CUS_WK	The office name of customer
CUS_WK_ADDRESS	The address of customer office
CUS_WK_DISTRICT	The district in address of customer office
CUS_WK_PROVINCE	The province in address of customer office
CUS_WK_ROAD	The road in address of customer office
CT_CONTACT_DATE	The date of doing contract
CT_CUS1_NAME	The name of first customer in contract
CT_CUS1_SURNAME	The surname of first customer in contract
CT_CUS2_NAME	The name of second customer in contract
CT_CUS2_SURNAME	The surname of second customer in contract
CT_HOUSE_NO	The house number in contract
CT_PARTNER_NAME	The name of customer partner
CT_PARTNER_SURNAME	The surname of customer partner
CT_PARTNER_ADDRESS	The address of customer partner in contract
CT_PARTNER_AGE	The age of customer in contract
CT_PARTNER_DISTRICT	The district address customer address in contract
CT_PARTNER_PROVINCE	The province address customer address in contract
CT_PARTNER_SUB_DISTRICT	The sub district address customer address in contract
CT_PARTNER_ROAD	The road in address of customer in contract
CT_PROJ_CODE	The project code in contract
HM_AMT	The amount in housemaster table
HM_HTYPE_CE	The house type in housemaster table code
HM_CONTACT	The contact in housemaster table
HM_CONTACT_DATE	The date of doing contact in housemaster table
HM_HOUSE_NO	The house number in housemaster table
HM_PAY_DATE	The date of payment in housemaster table
HM_PAYTIME	The payment time in housemaster table
HM_PROJ_CD	The code of project in housemaster table
HM_RECIPIENT	The recipient in housemaster table
HM_RESERVE	The date of reservation in housemaster date



Table E.1. Data Dictionary (continued).

Field Name	Meaning
HM SIZE	The size of house in housemaster table
HM STATUS	The status of house
HM_ZONE_CD	The code of house in housemaster table
PRC HOUSE_PICTURE	The picture of house
PRC_HTYPE_CD	The house type in price table
PRC_COMMENT	The comment about price
PRC_DOW1_12	The price of down payment in first year.
PRC_DOW_24	The price of down payment in second year.
PRC_DOW_36	The price of down payment in third year.
PRC_RATE05	The rate 5 years for payment after down payment
PRC_RATE15	The rate 15 years for payment after down payment
PRC_RATE20	The rate 20 years for payment after down payment
PRC_PRICE	The price of house in price table
PRC_PRICEPROJ_CD	The code of house in price table
PRC_SIZE	The size of house in price table
PRC_UNIT	The unit of house in price table
PRJ_ADDRESS	The address of project
PRJ_BRANCE_CD	The code of branch
PRJ_COMMENT	The comment about project
PRJ_DISTRICT	The district in address of project
PRJ_LOCATE_PIC	The picture of project locate
PRJ_NAME	The project name
PRJ_PROJECT_CODE	The code of project in project table
PRJ_PROJTYPE_CD	The code of project type in project table
PRJ_PROVINCE	The province site of project in project table
PRJ_ROAD	The road site of project in project table
PRJ_SUB_DISTRICT	The sub district site of project in project table
PRJT_NAME	The project type name in project type table
PRJT_PROJTYPE_CD	The project type code in project type table
TLE_NAME	The title name such as Ms., Miss, Ms.
TLE_TITLE_CD	The code of title name
TLE_TITLE_CD	The code of title name



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