



Information System for Bangkok Sales Department of
Royal Project Foundation

by

Mr. Tawan Wasuwanich

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

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Project Title Information System for Bangkok Sales Department of
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Academic Year March 17, 2002

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

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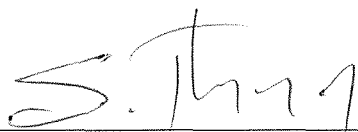
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ABSTRACT

Royal Project Foundation (Doi Kham Royal Project) is His Majesty the King's patronized project. It was established to service and support several hill tribes in the North in cultivation, transformation, packaging, marketing, and sale their products to several provinces in the north and middle region of Thailand.

The current existing system of the Bangkok Branch of the Royal Project Foundation is based on the manual and some computerized systems. Most data are stored on paper, while some parts are kept in the Microsoft Word 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 the manual system, which are error-prone and having a high maintenance cost.

The new system is designed by using LAN system that will be shared data to support all concern operations. The software used in this project is HTML, JavaScript, ASP and Microsoft Access. Applying this new system, it can help the organization solve the problems from the existing systems; the costs of operation and time consumption, and it also can generate necessary report required for management.

ACKNOWLEDGEMENTS

Several people have made contributions to this project, especially his parent. The writer would like to acknowledge their efforts and thank them for their help. Furthermore this system development project requires the cooperation of several persons.

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The writer would like to express his gratitude to all of those who have sacrificed their valuable time in order to provide the information needed for the system. The writer hopes to have a chance to repay them as they have so much for him.

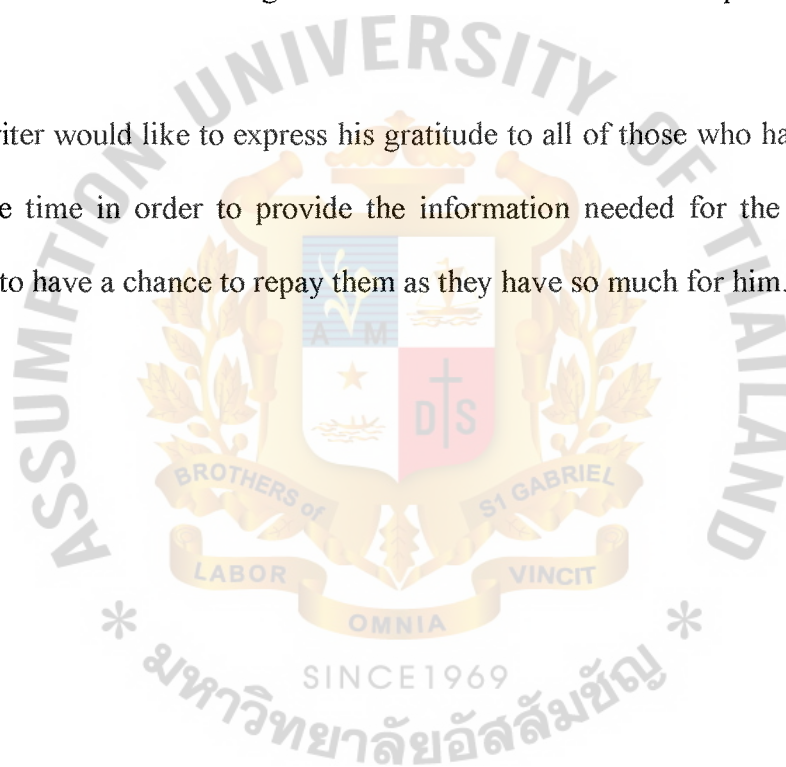


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I. INTRODUCTION

1.1 Background of the Project

Presently, Information System is a key to success of all business in this globalization environment. Because it takes less time in operating routine jobs and is low cost, computer information system is attractive to several firms. Decreasing costs of hardware and software program cause development of information system in our organization economically.

In this project, Local Area Network (LAN) and Web Service Application are employed to use for information network and software developer, respectively. For a middle size organization, LAN provides sufficient network power to support the business transaction. Data can be shared in the network. Every staff can communicate to each other through LAN channel.

For software application, this project employs Web Service Application composed of HTML, JavaScript and ASP that is powerful for developing software program and database system. It provides beautiful featured with user friendly that is very easy to user for non-computer literatures. Technically, the application provides extremely sharability of software and database as well.

1.2 Objectives of the Project

The objectives of this project are as follows:

- (1) To analyze the existing system and to design the new system to improve operation efficiency
- (2) To determine the information and system requirement by interviewing the concerned staff, expectation from management level and investigation of the hard data.

- (3) Design the new system on computer-based information system.
- (4) To develop the computerized system that can reduce manual process, time consumption and also provide reports that cover major aspects and satisfy to management level and user requirement.
- (5) To develop software package for order processing system
- (6) To estimate and compare cost and benefit between the existing and the new systems.

1.3 Scope of the Project

The project concerns developing purchase order system of Sales Department at Bangkok Market Section of the Royal Project Foundation. The areas of the system designed are as follows:

- (1) Customer Order
- (2) Open Order
- (3) Delivery Order
- (4) Generate Report

1.3.1 Customer Order

- (a) Verify customer: new customer and old customer
- (b) Create new customer
- (c) Verify on or credit customer and create new credit for new customer
- (d) Check stock according to customer purchase order.

1.3.2 Open Order

- (a) Create new order and input data and record in order history file
- (b) Reserve product items in stock by customer order.

1.3.3 Delivery Order

- (a) Perform delivery product by customer order including balance stock.

- (b) Request for printing invoice to delivery order

1.3.4 Generate Report

- (a) Verify report request from management
- (b) Summary customer order to produce report
- (c) Compute the total amount purchase order to supplier
- (d) Produce total summary report from all reports.

1.4 Deliverables

The new system we design will be employed to use in the real world. The deliverables are software, hardware, new business system, new computer information system, staff trained and documents.

1.4.1 Software

The software used in the new system, for operating the system, we income the Window NT 4.0 and Window 98 to be used in the new computer system. For order processing, we design Web Service Software by Macromedia Dreamweaver 4 with HTML, JavaScript and ASP. The order processing software will compose of interactive beautiful features of input screen output screen, systematized database that can share the information, and can generate necessary report and so on.

1.4.2 Hardware

The hardware employed in the new system will be efficient and provide hi-speed operation. However, hardware investment is high costs. Hardware selected may be not the highest technology on earth, but they are worth to use in the new system.

1.4.3 New Business System

The new business system is designed to be more efficient and to incorporate with the computer system. The new business system will improve the speed of business operation and internal security as well

1.4.4 New Computer System

The new computer information system combines the new business system, new software and hardware used, computer database and network. The computer system provides a lot of benefits to the organization, as we will discuss in Chapter IV, the proposed system.

1.4.5 Staff Trained

The employees related to the system will be trained to use the new system as well. MIS staff maybe trainer. Project team must produce system manual books and provide sufficient training, thus the users can use the system efficiently and can solve some problem according to the system by themselves.

1.4.6 Documents

Document deliverables are dealing with requirement specification, system analysis, conceptual design, implementation and manual book for the system.

1.5 Project Plan

Project plan can be clearly illustrated by project timeline (Figure 1.1). The project composed of 4 phases as follows:

Phase I: Requirement Specification

Phase II: System Analysis

Phase III: Conceptual Design

Phase IV: Implementation & Installation

The details of each phase and time used to run the project could be estimated and showed in that figure.

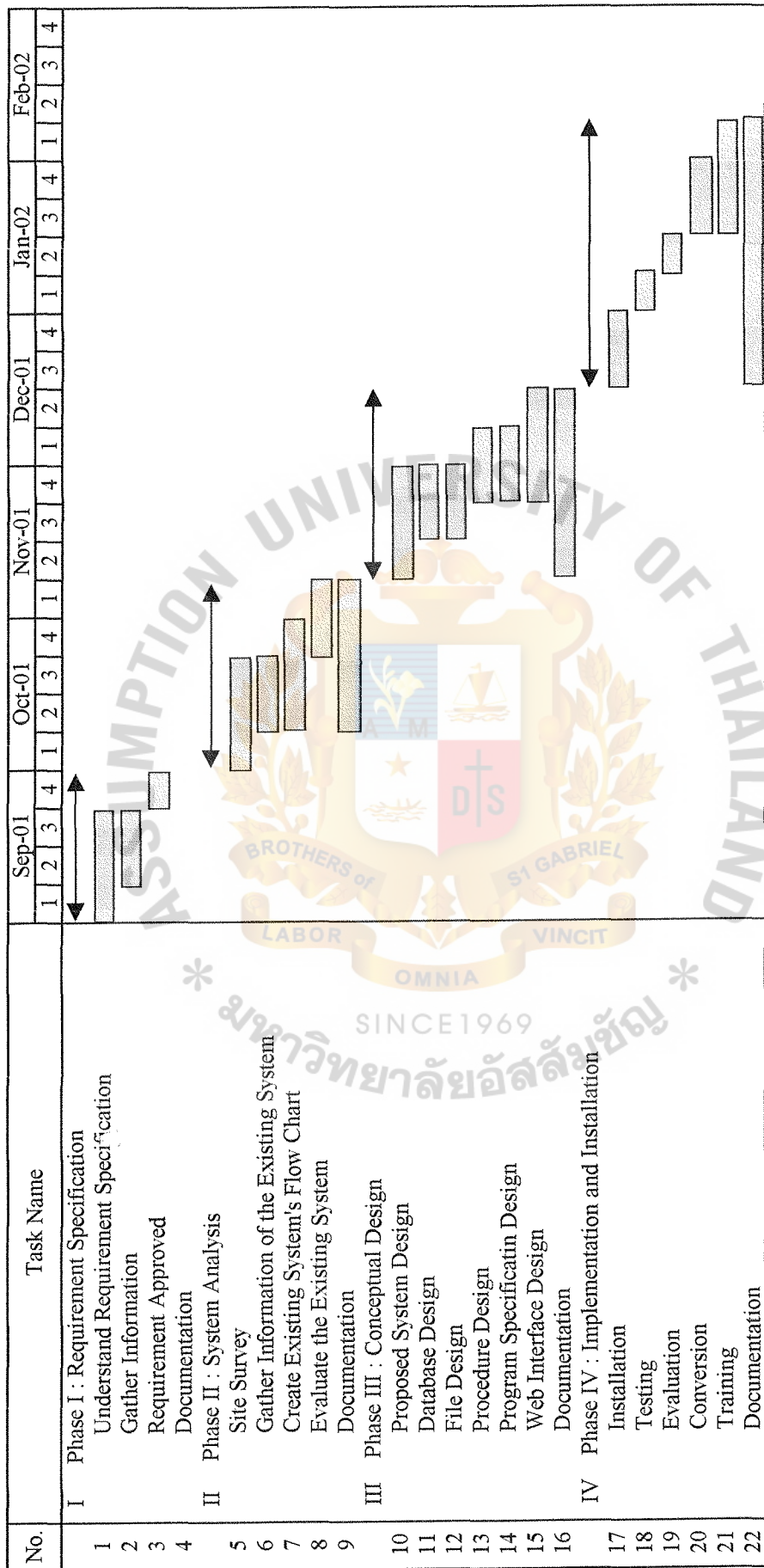


Figure 1.1. Project Plan.

II. THE EXISTING SYSTEM

2.1 Background of the Organization

Royal Project Foundation or Doi Kham, is one of the most popular his majesty the king's patronized projects. This organization becomes a foundation today but remains the original purpose that is to help the hill people lifting up their living by cultivating several economic agricultural products. By this, RPF sends many specialists to educate north people of planting and acts as a middleman who buys the products, transports and sells them to wholesalers, retailers or even ultimate customers through RPF retail stores.

Presently, RPF are separated into two sections, Bangkok and Chiangmai Market Sections. Bangkok Section is responsible to buy products from Chiangmai Section and to sell to customers in Bangkok and the middle region of Thailand. Actually the main purpose of establishing the Bangkok Section is to ventilate excessive products from Chiangmai that are not reserved or brought from any customers before contaminating. Thus, Bangkok Section often faces unexpected products sent from Chiangmai section. Many times, the products are not needed. The Sales Department in Bangkok Section confronts the difficult tasks that they must try to sell these products as soon as possible to the customers they knew or have never known before. Therefore, the Sales Department should have an efficient information system and customer database to support their everyday duties. Most of the existing operations of the Sales Department are manual operations, which are inefficient and create many problems such as human errors. Thus, the system needs to be improved.

The Sales Department at Bangkok Section is operating together with other departments, as illustrated in Figure 2.1, which are Accounting, Administration,

Purchasing, and Warehouse. Dried Flower is a separate division which buys dried flowers from several input stations of RPF, transforms into beautiful color and design, and sells them to customers. It has its own separated departments, such as accounting or sales, which perform business support functions. RPF retail stores are responsible for selling RPF products to ultimate customers like ordinary mini-mart. Each retail store operates by itself but has to report and send profit to the main office, Chiangmai Market Section. There are RPF retail stores in the north and middle provinces in Thailand. Retail stores in Bangkok and other provinces in the middle region buy RPF products from the Sales Department at Bangkok Market Section for selling in shops. Therefore, Retail stores perform like Sales Department's customers.

2.2 Existing Business Function

The Sales Department at Bangkok Market Section widely expands its markets to serve customers in several areas. Many kinds of new product lines or items are developed and successfully to satisfy customers' needs. Presently, the department has a Sales Manager to control and make final decision for the department. There is an assistant and staffs responsible for its business functions that are as follows:

- (1) Customer order
- (2) Check and Update stock
- (3) Delivery order

Details of each business function are below:

2.2.1 Customer Order

The Sales Department is responsible for selling its products to its customers. Customer purchase order can be entered by several ways: phone, facsimile, and direct order. In some cases, when customers do not have their purchase orders or they may order product by phone, the Sales Department has to create a customer purchase order

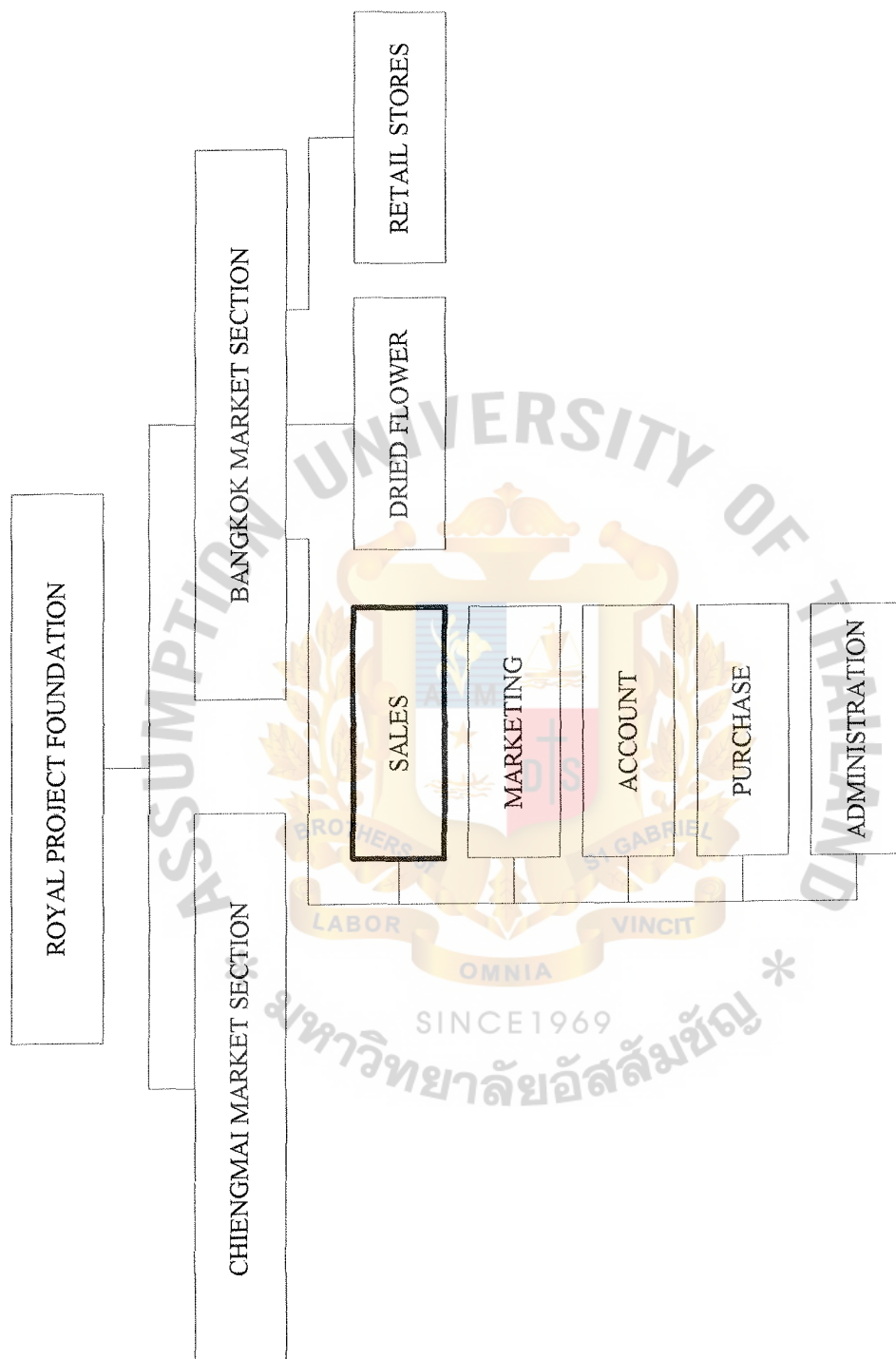


Figure 2.1. The Organization Chart of Royal Project Foundation.

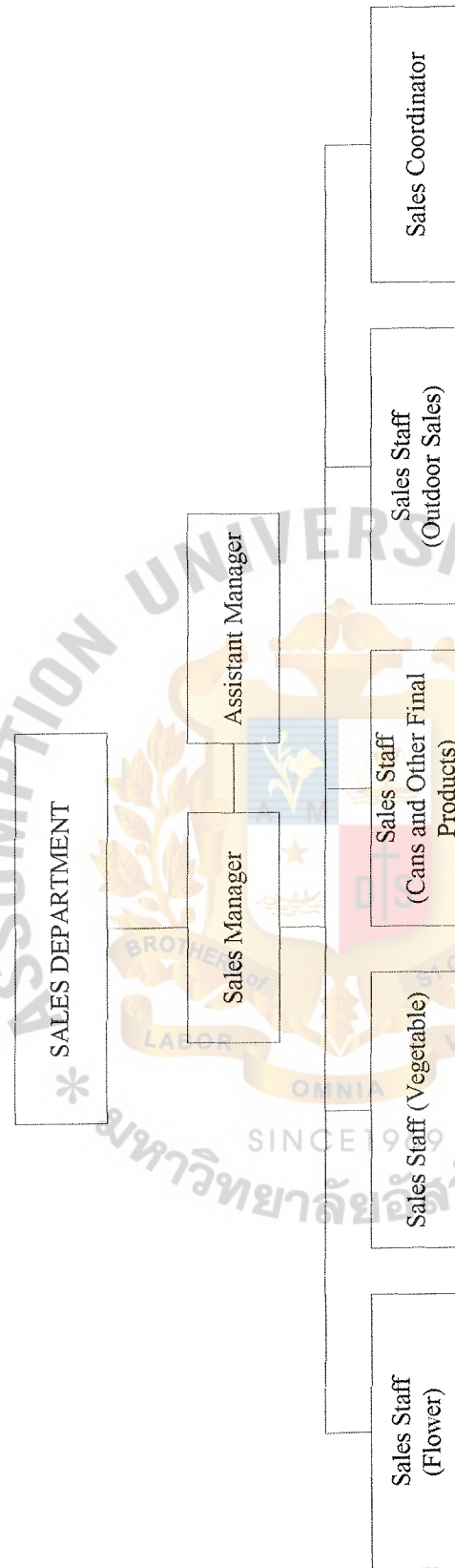


Figure 2.2. The Organization Chart of Bangkok Sales Department.

following the order. From the customer order, the Sales Department makes copies of it. Then staff deliveries order copies to other relative unit.

2.2.2 Check and Update Stock

Duties of the department deal with checking inventories before customer order generation and updating the stock after some of the inventories are ordered. In the existing system, stock check and update are done by documentation that is very slow and the information is very far from real time data.

2.2.4 Delivery Order

The Sales Department receives the information about stock status from the Warehouse many times a day. When they receive a customer order, they will check available inventories in the stock. If they find that products following the order are available, they will accept the order, and vice versa. After submitting order, they have to cut the product quantities off from the stock. Next, they request the Accounting to issue commercial invoice following the customer order and then send a copy to the Warehouse to prepare items to be transported to the customer. Ordered items will be transported to customer with the customer order and commercial invoice according to the order. The copy of invoice and customer order will be collected into files.

2.3 Current Problems and Areas for Improvements

2.3.1 Current Problems

The existing system is a manual system. Computers are used for data keeping, and generating some documents and reports. Therefore, there are many problems in the order processing and they can be inferred as follows.

- (1) Data are stored in the way that is not systematic and can not be shared by several relative units.
- (2) Same data are re-entered in many processes.

- (3) Same data are stored in the same source. It creates many problems when they have to update those data. It causes inconsistency problem and loss of disk space. Duplicated documents are a lot as well.
- (4) Most processes in the existing system are manual operations that create many human errors and are too slow. For example, sales staffs have to find customer order in the document files with very slowly compared to finding from a computer file.
- (5) Order processing system and inventory control systems are also manual system, thus information about product level in stock or product available for ordering is incorrect or not currently updated. It causes many problems in stock control, stock update, and order processing.
- (6) Loss of data is easily occurred due to insufficient security control to protect important data.
- (7) The existing computer system can not generate necessary reports for decision making, management, or other several purposes
- (8) Computer hardware is not sufficient to support current workload.
- (9) Staffs in Sales Department are not sufficient for the workload that occurs.
- (10) Staffs lack of computer knowledge.

2.3.2 Areas for Improvements

For the areas for improvements of this project, we consider the existing problems and think what we should do to solve them. From the problems defined and clearly understand in the last section, the areas we want to improve are based on them. The new system will employ the computer information system to solve the problems we confront and will be more efficient and powerful in order to support more workload if

the organization expands in the future. The followings are the criteria that need to developed:

- (1) Data will be stored in the suitable database that will be arranged systematically. Data can be shared by several computer hardwares or even several departments. They must be easy to retrieve. Powerful database system will reduce data redundancy and data inconsistency problems.
- (2) New computerized system must improve security control to prevent the loss of data from system failure or system invaders.
- (3) New computerized system should have report generator that can generate necessary report required from information stored in sharing database.
- (4) Efficient computer system should replace manual operations that are tedious, routine, slow, and human errors mostly occur.
- (5) Increase the number of computer hardware used in the department or even the organization to improve the performance of the business operation. However, it must be worth when we consider the cost and benefit.
- (6) Computer information system will not only improve work performance but also reduce staff workload.
- (7) By using computerized system, we can reduce paper work. It will save company cost and reserve natural forest resource.
- (8) Better service improved by computer system will increase customer.
- (9) Employing computer system required training computer skill to staff relating to the system.

From all mentioned above, the areas of improvements concern the problems of the existing system that causes the staff to spend a lot of time completing the work. Manual operations create many human errors, are inefficient, and create cost compared

with employing the computer system. Furthermore, the existing systems do not satisfy the business requirements today. Staffs who will use the system are considered as well. They should be trained to use the system effectively.



III. THE PROPOSED SYSTEM

3.1 User Requirements (System Specification)

3.3.1 Staff Requirements

- (1) The proposed system must be easy to use, faster to retrieve information and provide necessary facilities to support job processing.
- (2) It should be able to retrieve customer order and purchase order record in many ways.
- (3) Stock details should collect important details describing products.
- (4) Customer, product, customer order, purchase order information should be provided and generated other relative information required.
- (5) All information concerned in the process should be kept with the organization securely.
- (6) Input and Output screens are designed to provide user friendly. They should be easy to understand and operate.
- (7) The new system should be able to check back to any historical files of any processes.
- (8) The new system should provide automatic calculation needed for any processes.
- (9) Window text or description used in the system, such as in input and output screen windows, should use simple, easy to understand language so that staff using the system can operate correctly and comfortably.
- (10) Printing purchase order and invoice can be generated by using information in database.

- (11) Order processing system should be an automated system that can check stock status before submitting order.
- (12) The new system must provide searching of any information possible and easy.

3.1.2 Management Requirements

- (1) Statistic report about customer order and purchase order can be produced weekly, monthly and quarterly to meet management requirement.
- (2) Report about sales volume, purchase volume, product available in stock, inventory movement, and customer order classify into customer group can be generated weekly, monthly and quarterly to use for investigating the business trend.
- (3) Summary report that collects the important information for executives can be generated.

3.1.3 General User Requirements

- (1) Inquiry of order processing should be faster.
- (2) The new system should provide many ways to access the information.
- (3) User friendly is a must.
- (4) Simple report can be generated.

3.2 System Design

The system design can be categorized into the following parts.

- (1) Dataflow and process design
- (2) Web interface design
- (3) File design
- (4) Database interaction design
- (5) Procedure design

(6) Program specification design

3.2.1 Data Flow and Process Design

From the existing system, data flow and process have to be adjusted to be more complete. In dataflow and process design, we can separate the entire system into 4 major processes briefly described below: See Appendices A and B.

Process 1: Customer Order

- (a) Verify customer: new customer and old customer
- (b) Create new customer
- (c) Verify on or credit customer and create new credit for new customer
- (d) Check stock according to customer order.

Process 2: Open Order

- (a) Create new order and input data and record in order history file
- (b) Reserve product items in stock by customer order.

Process 3: Delivery Order

- (a) Perform delivery product by customer order including balance stock.
- (b) Request for printing invoice to delivery order

Process 4: Generate Report

- (a) Verify report request from management
- (b) Verify stock slow moving to produce report
- (c) Summary customer order to produce report
- (d) Compute the total amount purchase order to supplier
- (e) Produce total summary report from all reports

3.2.2 Web Interface Design

The major concept for the input and output screen design is based on whether the screen can be used to input and output data to the system. They have simple look and

are easy to understand and operate. Input and output screens are designed by means of information system design method. The windows displayed can show the reference data concerning the process. Input screen design concerns about what and how the staff inputs data and data input can be converted to be stored in the database. Output screen design concerns about specific layout or format of information to be used to generate reports.

3.2.3 File Design

The design of file concerns the nature and content of files. The files incorporate with the details covering the information, such as customer order file table displays the information about customer identification number, customer name, items ordered, and so on.

The order processing system for the Sales Department of the Bangkok section of the Royal Project Foundation is a new application that requires the design of all files used. Some of the master files may already exist but need to add some field to be more useful. A new application still needs the existing master files for reference in design. See Appendix E: Figure E.2.

3.2.4 Database Interaction Design

The database design is the extremely important phase concerned for even large or small system. Databases arrange information and file systematically. The interaction of database themselves is necessary for updating or modifying data. Moreover, more databases can refer to each other. Systematized database can reduce Data Redundancy and Inconsistency problem. Furthermore, the MIS staff should be able to interact to the database to modify or to solve problem occurred from database operation. The database must meet the system requirements as well. (See Appendix D: Figure D.1.)

3.2.5 Procedure Design

The design of the procedures specifies the tasks that will be operated when using the new system and the person who is responsible for completing those tasks. The important procedures include the followings:

- (1) Data entry procedure
- (2) Run time procedure
- (3) Error handling procedure
- (4) Security and backup procedure

3.2.6 Program Specification Design

The program specifications describe the design of process of input data into the process and output data after process. This specification will be used to produce the software applications. For designing the computer software, it is important to ensure that:

- (1) The actual program must perform all tasks and in the manner intended for the application
- (2) The structure of software is divided into modules for easy testing and validation, to make sure that the software implementation follows the procedures designed.
- (3) Future modification can be made with minimum disruption to the design of the system. (See Appendices A, B and D)

3.3 Hardware and Software Requirements

3.3.1 Hardware Requirements

- (a) File Server: Laser Pentium IV Application Server (1 Qty)

Specifications and Accessories:

- (1) Intel Pentium IV, 1.4 GHZ

- (2) HDD 20 GB
- (3) RAM 128 MB
- (4) CD-ROM 52X
- (5) FAX/MODEM 56K
- (6) AGP 32 MB
- (7) 17" Console Monitor Screen
- (8) Sound Blaster VIBRA
- (9) DAT tape, 1 Floppy Disk Drive
- (10) Keyboard 104 Keys, 2 I/O Ports, 1 Parallel Port, 1 Mouse
- (11) 10/1000 MBPS LAN Card
- (12) Ultra-Wide SCSI Controller
- (b) PC Workstation: Laser Pentium III PC Workstation (4 Qty)
Specifications and Accessories:
 - (1) Intel Pentium III, 1 GHZ
 - (2) HDD 20 GB
 - (3) RAM 128 MB
 - (4) CD-ROM 52X
 - (5) FAX/MODEM 56K
 - (6) 17" Console Monitor Screen
 - (7) DAT Tape, 1 Floppy Disk Drive
 - (8) ATX Case
 - (9) Keyboard 104 Keys, 2 I/O Ports, 1 Parallel Port, 1 Mouse
- (c) Network Peripheral
 - (1) 3Com Ether-Link XL PCI 10Base LAN Card
 - (2) 3Com Office Connect Hub/8 TPC

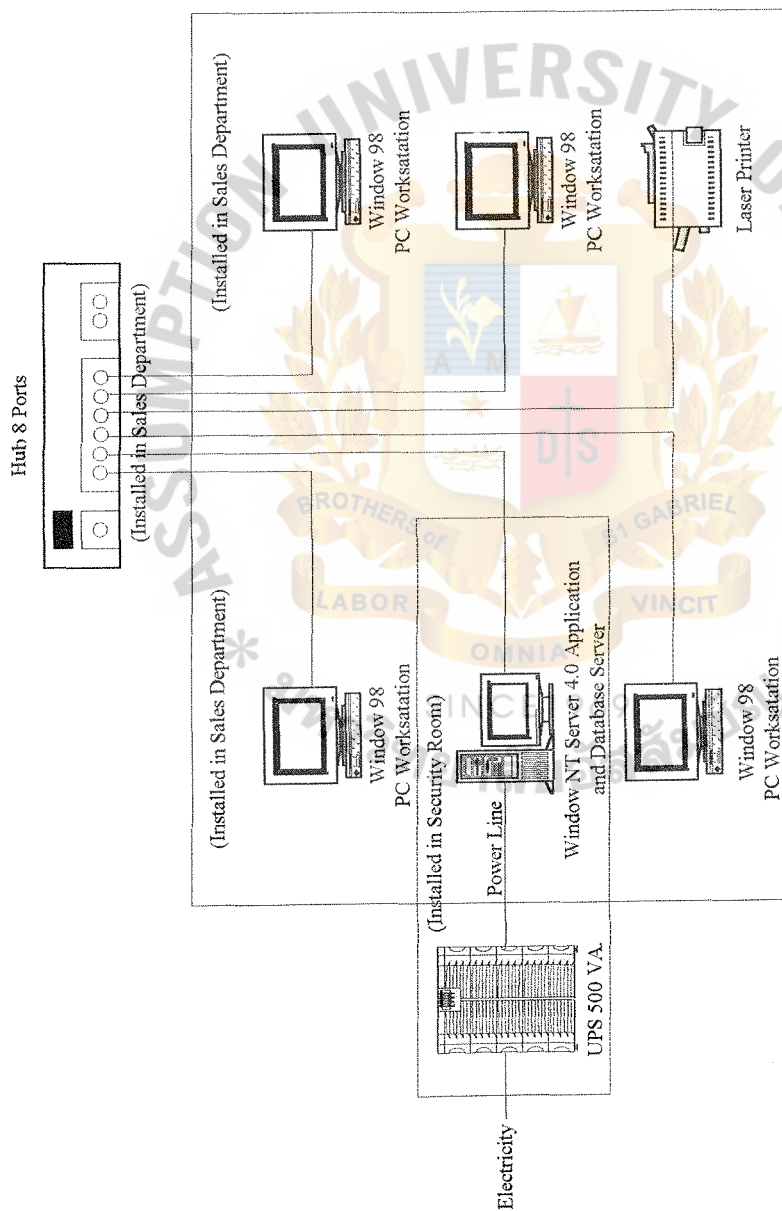


Figure 3.1. Network for Order Processing for Sales Department.

(3) Cabling System

(d) Printer

(1) HP LaserJet 5MP 600 dpi, 6 ppm, 2 MB (1 Qty)

(c) UPS

(1) PCM Smart King 500VA (Support 1 Computer) (1 Qty)

3.3.2 Software Requirements

(a) Windows NT Server 4.0 Thai CD-ROM 5 Client

(b) Windows 98 Thai Edition

(c) JavaScript

(d) ASP

(e) Macromedia Dreamweaver 4.0

3.4 Security and Control

Bangkok Section of Royal Project Foundation is a company selling agricultural products, flowers, dried flower, and canned goods to their customer. Before system development, security has never been a major concern and seemed not to be vital for the small organization. However, employing computer information system causes security and control to be more concerned. Considering information relating customer, supplier, cost and price of the products, revenue and others are very important to protect and examine risks and threats involved. For security management, the organization should have restrictive security measures, plan, and policy for the new system.

The risk and threat to the computer system are unexpected. System failure may interrupt the operations and cause loss of opportunity in business. Some risks and threats might be a loss of data, incorrect input of data, unauthorized access,

unauthorized modification, damage of data, fraud, and system failure by disaster or disruption of the system.

The goal of security management is to prepare and implement the system to ensure that the system is under control. The system should maintain integrity, confidentiality and availability of data. However, it must be noted that implementation of security measures and control does cause time consuming and additional cost. The system analyst has to discuss the project team for the suitable level of security needed and must approach this concern in realistic and pragmatic way considering the probability of specific threats.

3.4.1 Security Policy and Measure

The security policies and measures are set from agreement of MIS team and system users. The policies specified are as follows.

- (a) Protect organization's information by security control measures of both two major ways: Discretionary and Mandatory.
- (b) Preserve data integrity.
- (c) Prevent loss of data due to natural disaster.
- (d) Control procedures states the steps of implementation for the security measures.
- (e) Educate people concerning the system and system security.
- (f) Set security management team or person, who responsible for security management.
- (g) Ensure that the security measures and policies are effective, for short and long term. Ensure that they cover the overall system.

3.4.3 Security Control Design

Data not only have intrinsic values, but also costs. That is why we take time and money to ensure that the proper security control methods have been considered in the design of the system.

(1) Control Used

There are many security control methods. The controls used in the system are as follows

(a) Control review steps

The following steps are used to determine the control measures that must be designed and develop in the new system in order to confront risk and threat that may occur.

- (1) Examine the risks and threats, their possibility and loss.
- (2) Ascertain which controls will be implemented.
- (3) Further evaluate the necessary controls during the development of the system to prepare the security measures or system design supporting system security.
- (4) Generate a report of the security control against those risks and threats to the top manager to review and decide the priority and importance of each control. Then, make the agreement of security controls of the system to be implemented later.
- (5) During system testing, verify that the controls have been implemented correctly.

(Risk Management, See Appendix G)

(b) Physical Controls

The easiest, most effective, and least expensive controls are physical controls. These include proper locks of floppy disk drive to protect unwanted software to be loaded in the system. The location planning can reduce the risks of natural disaster. The backup of the data is also important when unexpected situation occurs.

(c) Control Procedures

Control procedures specify the stepwise process to ensure that the system is controlled properly. A series of controls to be listed is implemented to preserve integrity, confidentiality and availability of the data and resources. These procedures will also state the timetable for periodic review of all security measures and controls that there are few controls being permanently effective for each case.

(2) Security Design Methods

There are security design methods for some controls that are important and necessary for the new system.

(a) User authentication

Only authorized persons can access to the system by using password enter on the authentication window. The password should be changed periodically by the user as a rule.

(b) Data entry

(1) Entry, delete and modify data are allowed by authorized person only.

(2) Data entry must follow the procedure and format

- (3) Data entry must be double-checked and verified. All forms and authorization signatures should be reviewed by supervisor level.
- (4) Review the operation procedures to ensure that the data entry are following the procedures set.
- (5) Software program should be able to search for duplication of data entry. A message will be shown when the duplication is found.
- (6) When the system detects an error, it should proceed to edit the entire record until completion.
- (7) Output reports must be reviewed on a random basis, to ensure that the data entry was complete, correct and in the proper format.
- (8) Reports should include described heading and date generated and printed for easy reference.
- (9) Mark the reference document for data entry reference, to ensure that the same document is not processed twice.

(c) File protection

- (1) Access control features should be designed in software program or can be a part of operation system used
- (2) Encryption techniques can be used if necessary.
- (3) Copy protection can be employed to prevent copying of the files.
- (4) File should be kept on a secondary storage for backup data.
- (5) Backup copies must be labeled properly

- (6) Backup copies should be created each time the database is updated or modified.

3.4.4 Effectiveness of Controls

Most important concept emphasized to manager and staffs is that if the controls are not properly used all the time, effort and costs of designing and implementing the controls will be lost. People who are responsible for implementing these controls must be convinced of the needs and the benefits of security. MIS design team should give an effective training to the staff, The user manual books and security procedure manuals are produced as guide of how to use the program in the way of improving security.

3.5 Breakeven Point Analysis

3.5.1 Estimated Costs of the Existing System and the Project

Tables 3.1 and 3.2 show the estimated costs of the existing system and the proposed system respectively. The new system creates Development Costs including Personnel, Hardware and Software Costs. Personnel Costs are all labor costs expense for development the system including system analysis and design, programming, installation and testing. Operating Costs occurs during the year that the system is implemented. You can recognize that the new system requires only four staffs for order processing. Office Supplies means non-reusable goods used in the office such as paper, clip, and so on. For our new system, office supplies such as computer printed form for dot matrix printer that its cost is much higher than normal A.4 paper is rejected. Thus, it lowers the operating costs. Other supplies, such as other papers, paper files and stationary, are reduced as well. Office Equipment is durable good needed for office operation such as tables, chairs, photocopy machine, facsimile, and telephone. They are also reduced for the new system.

Table 3.1. Estimated Costs of the Existing System, Baht.

Cost Items	Description	Amount	Unit Price (/Hr.)	Price
1. Operating Cost	1.1. Personnel Cost: Staff (12 mths./ea)	10	15,000	150,000
	Subtotal 1:			150,000
	1.2. Maintenance: Hardware Maintenance Software Maintenance			50,000 20,000
	Subtotal 2:			70,000
	1.3. Other Expenses: Office Supplies Office Equipments Utility Expense Miscellaneous			60,000 70,000 30,000 60,000
	Subtotal 3:			220,000
	Total Operating Cost			440,000
	Total Annual Cost			440,000

Table 3.2. Estimated Project Costs, Baht.

Cost Items	Description	Amount	Unit Price (/Hr.)	Price
1. Development Cost:	1.1. Personnel Cost:			
	System Analyst (160 hrs./ea)	1	250	40,000
	System Designer (160 hrs./ea)	1	250	40,000
	Programmer (120 hrs./ea)	1	250	30,600
	Database Specialist (120 hrs./ea)	1	150	18,000
	Telecommunication Specialist (80 hrs./ea)	1	150	12,000
	Subtotal 1:			140,600
	1.2. New Hardware:			
	Window NT Server 4.0 Thai	1	35,000	35,000
	Clients	4	30,000	120,000
	HP Laser Printer	1	35,000	35,000
	LAN Card	4	5,500	22,000
	Hub 8 TPC	1	8,600	8,600
	UPS (500 VA)	1	8,950	8,950
	Cabling System	1	20,000	20,000
	Subtotal 2:			249,550
	1.3. New Software:			
	Server Software	1	40,000	40,000
	Client Software	4	20,000	80,000
	Subtotal 3:			120,000
	Total Development Cost			510,150
2. Operating Cost	2.1. Personnel Cost:			
	Technician (100 hrs./ea)	1	250	25,000
	Staff (12 mths./ea)	4	15,000	60,000
	Subtotal 1:			85,000
	2.2. Maintenance:			
	Hardware Maintenance			35,000
	Software Maintenance			25,000

Table 3.2. Estimated Project Costs, Baht (Continued).

Cost Items	Description	Amount	Unit Price (/Hr.)	Price
	Subtotal 2:			60,000
	2.3. Other Expenses:			
	Office Supplies			15,000
	Office Equipments			30,000
	Utility Expense			20,000
	Miscellaneous			20,000
	Subtotal 3:			85,000
	Total Operating Cost			230,000
	Total Project Annual Cost			740,150



Table 3.3. Cost Comparison between Existing System and Proposed System, Baht.

Cost Items	Years					
	1	2	3	4	5	6
Existing System						
1. Operating Cost						
1.1. Personnel Cost (increase 5% per year)	150,000	157,500	165,375	173,644	182,326	191,442
1.2. Maintenance Cost (increase 10% per year)	70,000	77,000	84,700	93,170	102,487	112,736
1.3. Utility Expense (increase 5% per year)	30,000	31,500	33,075	34,729	36,465	38,288
1.4. Other Expenses (increase 5% per year)	190,000	199,500	209,475	219,949	230,946	242,493
Total Cost	440,000	465,500	492,625	521,491	552,224	584,960
Cumulative Cost	440,000	905,500	1,398,125	1,919,616	2,471,841	3,056,800
Proposed System						
1. Development Cost						
1.1. Personnel Cost (Bht 140,600/5)	28,120	28,120	28,120	28,120	28,120	28,120
1.2. New Hardware (Bht 449,550/5)	49,910	49,910	49,910	49,910	49,910	49,910
1.3. New Software (Bht 120,000/5)	24,000	24,000	24,000	24,000	24,000	24,000
Total Development Cost	102,030	102,030	102,030	102,030	102,030	102,030
2. Operating Cost						
2.1. Personnel Cost (increase 5% per year)	85,000	89,250	93,713	98,398	103,318	108,484
2.2. Maintenance Cost (increase 10% per year)	60,000	66,000	72,600	79,860	87,846	96,631
2.3. Utility Expense (increase 5% per year)	20,000	21,000	22,050	23,153	24,310	25,526
2.4. Other Expenses (increase 5% per year)	65,000	68,250	71,663	75,246	79,008	82,958
Total Operating Cost	230,000	244,500	260,025	276,656	294,482	313,598
Total Cost	332,030	346,530	362,055	378,686	396,512	415,628
Cumulative Cost	910,650	1,257,180	1,619,235	1,997,921	2,394,433	2,810,062

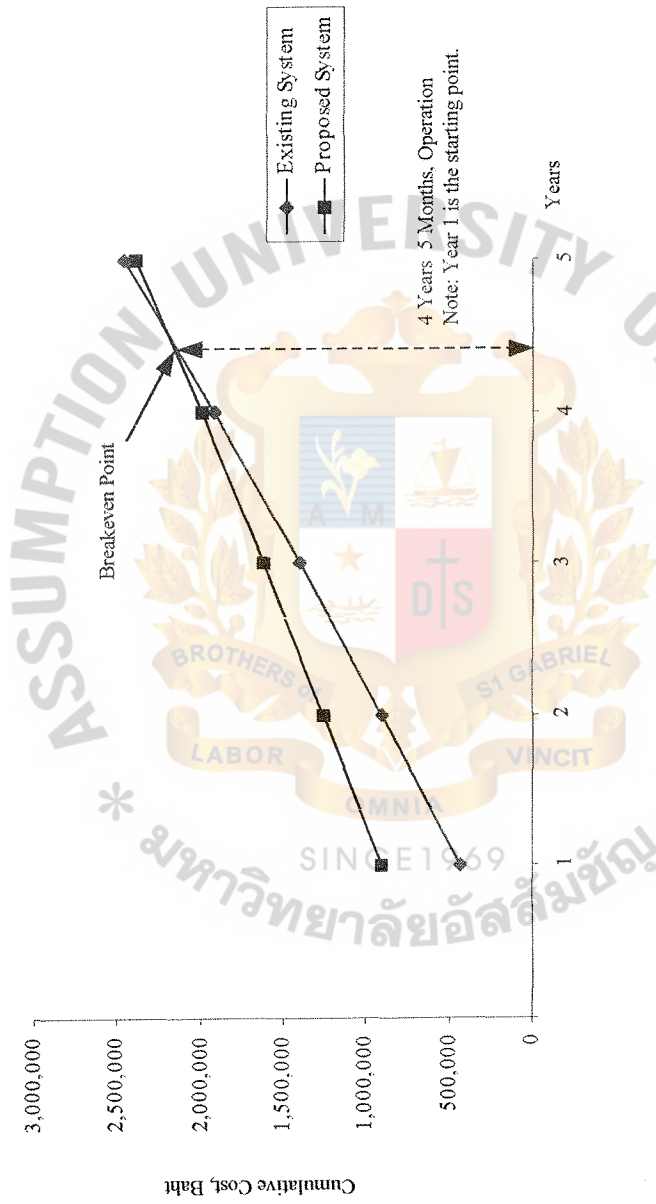


Figure 3.2. Cost Comparison between Existing System and Proposed System.

3.5.2 Breakeven Point

Table 3.3 shows cost compared between the existing system and the new system and Figure 3.2 shows us the breakeven point of the project, which is in the fifth month of the forth year.

3.6 Payback Period Analysis

Payback period analysis refers to costs and benefits analysis of the system. In the previous part, we have calculated the estimated costs of the new system. In this part, we have to estimate the project annual benefit to be calculated the payback period of the new system.

3.6.1 Estimated Costs of the Proposed System

See Table 3.2.

3.6.2 Estimated Benefits of the Proposed System

The estimated benefits of the proposed system is illustrated in Table 3.4 and the calculations of each item are as follows:

- (1) Reduction of time for data processing
 - (a) By using manual system, 1 job consumes = 90 minutes.
 - (b) By using computerized system, 1 job consumes = 40 minutes.
 - (c) Thus, we can reduce time consumption = 50 minutes for each job.
 - (d) In one day, we have 15 jobs averaged, thus, we reduce time = 15×50
= 750 minutes or 12.50 hours.
 - (e) The per month salary = 15,000 Baht, one month has 22 workdays and a workday has 7 working hours. Thus, per month labor cost = $15,000 / (7 \times 22) = 97.40$ Baht.

- (f) In one day, we can reduce time consumption = 12.50 hours. Thus, in one month, we can reduce time consumption = $22 \times 12.50 = 275$ hours.
- (g) Per month cost reduced for the decrease of time consumption = $275 \times 97.40 = 26,785$ Baht.
- (2) Reduction of time for operation preparation
- (a) By using manual system, the preparation time for a job = 60 minutes.
- (b) By using computerized system, the preparation time for a job = 20 minutes.
- (c) Thus, we can reduce time = 40 minutes.
- (d) In one day, staffs do 15 jobs. Thus, the proposed system can reduce time = $15 \times 40 = 600$ minutes or 10 hours.
- (e) Cost reduced for a month = $10 \times 22 \times 97.40 = 21,428$ Baht.
- (3) Faster information inquiry
- (a) In one day, information inquiry consumes = 14 minutes for the manual system whereas 2 minutes for the proposed system
- (b) Approximate inquiry jobs per day = 100 jobs.
- (c) The computerized system can reduce time = $100 \times 12 = 120$ minutes or 2 hours.
- (d) Cost reduced for a month = $2 \times 22 \times 97.40 =$ Baht 4,285.6 or approximate = 4,286 Baht.
- (4) Faster submission of reports
- Approximate = 2,000 Baht per month
- (5) Reduction of data correction
- Approximate = 2,000 Baht per month

3.6.3 Payback Period Analysis

The Annual benefits of the new system should increase as well, because users will learn to use the system and more understand, then they can operate the system more accurate, faster, and generate more tasks for the same period of time. Therefore we increase the Annual benefits by 10% each year to make the calculation more accurate.

The discount rate used is 12% averaged from loan interest rate and rate of revenue from other investment spending the same amount of costs.

From Table 3.5, we compare cumulative costs and benefits of the proposed system. The result is that payback period of the system is the second month of the initial year.

Table 3.4. Estimated Benefits of the Proposed System, Baht.

Benefit Items	Amount
1. Reduction of time for data processing	26,785.00
2. Reduction of time for operation preparation	21,428.00
3. Faster information inquiry	4,286.00
4. Faster submission of reports	2,000.00
5. Reduction of data correction	2,000.00
Total Project Benefit (per month)	56,499.00
Total Project Annual Benefit	677,988.00

Table 3.5. Payback Period Analysis, Baht.

Cost Items	Years					
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Development cost:	-102,030.00	0.00	0.00	0.00	0.00	0.00
Operation and Maintenance cost (increase 10% per year):	0.00	-230,000.00	-253,000.00	-278,300.00	-306,130.00	-336,743.00
Discount factors for 12%:	1.00	0.89	0.80	0.71	0.64	0.67
Time adjusted costs (adjusted to present period value):	-102,030.00	-258,426.97	-316,250.00	-391,971.83	-478,328.13	-502,601.49
Cumulative time adjusted costs over lifetime:	-102,030.00	-360,456.97	-676,706.97	-1,068,678.80	-1,547,006.92	-2,049,608.41
Benefit derive from operation of new system (increase 10% per year):	0.00	677,988.00	745,786.80	820,365.48	902,402.03	992,642.23
Discount factors for 12%:	1.00	0.89	0.80	0.71	0.64	0.67
Time adjusted costs (adjusted to present period value):	0.00	761,784.27	932,233.50	1,155,444.34	1,410,003.17	1,481,555.57
Cumulative time adjusted costs over lifetime:	0.00	761,784.27	1,694,017.77	2,849,462.11	4,259,465.28	5,741,020.84
Cumulative lifetime time-adjusted costs + benefits:	-102,030.00	401,327.30	1,017,310.80	1,780,783.31	2,712,458.35	3,691,412.43

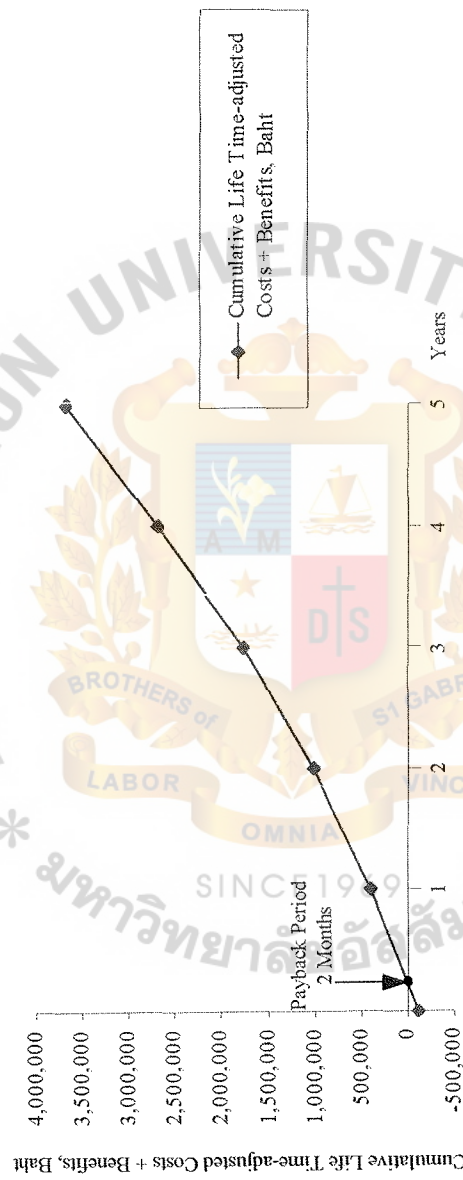


Figure 3.3. Payback Analysis Chart.

IV. PROJECT IMPLEMENTATION

4.1 Overview of the Project

The implementation plan for Order Processing for the Sales Department start after the top management agrees with the outline of proposal for the new system and analyzed the cost compared with benefits. The implementation of the new system is classified into 4 phases as follows.

Phase I: Requirement Specification

Phase II: System Analysis

Phase III: Conceptual Design

Phase IV: Implementation & Installation

(See Figure 4.1: Project Implementation Schedule)

The Implementation and Installation phase is the most difficult part that concerns the problems occurring in design and software development. The adjustment will be done during the development to fit the system to the real situation. After installing the system, Testing is a must to ensure the system is working. Problems and errors occurring will be solved. When the system is ready to use, we have to train the staff of the new system so that they can operate it properly.

4.1.1 Software Programming and System Implementation Recommendation

- (1) Design software as user friendly as possible
- (2) Software should be modular and partitioned in to elements for specific functionality and sub-functions.
- (3) Software must distinctly separate the representation of the data and the procedure.
- (4) Software should be modular to have independent functional characteristics.

- (5) The design software must satisfy the user requirements and can be discussed between system analysts and users.
- (6) Testing the system and programs is very important to make sure that the software programs match the user requirements.
- (7) Conversion should be parallel to ensure that the staff can adapt to the new system.
- (8) Training is needed for users to use the new system.

4.1.2 The Implementation Steps

To complete the implementation process, the following steps must be performed in correct order.

- (1) Study of all the documents from the System Analysis, System Design and Requirements Specification Phase are needed before the Implementation.
- (2) Follow the implementation process including programming, installation and documentation.
- (3) The order processing will include the coding of customer database, supplier database. Then information will be keyed to computer file, such as order information, purchase order information, stock information and sale reserve stock for customer order.
- (4) In this project, we install the system by means of parallel installation. The parallel installation means that we run the new system during using the existing system. This makes sure that the business operations will not be interrupted.
- (5) For running the parallel system, more training to the user is needed at this stage.
- (6) All processes of the system have to be run to check for any errors

- (7) Out put and output reports are another way we can check for the system incorrectness, therefore the output should be retrieved to check of errors.
- (8) The report of testing will be produced and sent to the relative partners in the analysis, design and implementation phase to evaluate the system and solve the problem occurred.
- (9) The final step is the maintenance to ensure that the system is operating properly.
- (10) Periodic system review is necessary to determine if there are any further problems.

4.2 Testing

4.2.1 Coding

In this project, Microsoft Access is used to build up the system because it completely provides the functions necessary to develop the system. It is used to design input and output screen, menu design and database design in a simple way.

Microsoft Access manipulates an unlimited number of database. The program structure is not complicated to develop and the line of code used in the program is less than the other programming language. The screen design is user friendly and easy for user to get familiar with the system in a short time. Modification can be done according to the future user requirement that will probably change.

According to the system coding, the interactive programs will help the new user to perform fast and easy searching for the information by using keywords. The information-hiding program is very convenient for users to use the program without knowledge of the syntax of the program.

4.2.2 Testing

Testing is the process of executing all or some parts of the system in order to discover any errors. Testing of specific programs, subsystem and the entire system is essential for quality assurance of the software. It is done to display any existing problems in the programs and their interface before the system is actually used. Typically, testing is carried out by means of a bottom-up fashion, which is described as follows:

(a) Program Testing

The programmer follows each step in the program specification to check whether the routine works can be carried out as is written. The valid and invalid tested data are created and then input into the system. Then the program is run in order to test all possible situations that might occur in the future.

(b) Linkage Testing

This step is done to see if the programs, which are interdependent, can actually work together as planned.

(c) System Testing

When link tests are concluded satisfactorily, the system as complete entity must be tested. The objective of the entire system testing is to ensure that the users are able to input the data properly and the overall system flow can work properly. In other word, the test is carried out to ensure that the entire system functions are effectively processed as a whole.

4.4.2 Training Approaches

(a) System operator training

The training involves computer staff who is responsible for keeping the equipment running, providing the necessary support service, and introducing the application to the end users. Training must cover the handling of all possible operations and the performance of routine operations.

Training also involves the procedure concerning with how to load, copy and back data file. Operators have to know which procedures are appropriate when the situations occur and how to accomplish them. The system operators need to know what the most likely malfunctions are, how to detect them and what step to follow when they arise.

(b) End-user training

When the application and the equipment are new to the users, user training will address the fundamental education first. For example, the end-user needs to know how to turn on and off the computer, how to insert diskette and how to load a program into the system. They also want to be sure that any actions they do with the system will not damage the system and their data.

In addition, after basic education, then the users have to train to use the system. For example, they have to learn about the linkage of the system, how to enter and handling the data in correct way, how to update, delete and modify the record, and so on. This training is the basis knowledge of the system that the end-user should recognize and correctly perform.

After training, the project developer is necessary to collect feedback from the trainees. The objective of find the trainees' feedback is to ensure that the users understand and can use the system properly. Furthermore, the feedback will state whether the system matches the user requirement, is user friendly, and the project developer can know the additional system requirement and problems.



V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The purpose of the project is to analyze, design and implement the “ Order Processing for the Sales Department” of Bangkok Section of Royal Project Foundation, in term of providing customer database, supplier database, customer order, supplier purchase order, stock control, print purchase order and invoice and generate reports. The development of the computer information system is not easy and it takes a high cost for building the system. A long time has been spent to accomplish the system according to the objectives. Decision of exploiting the computer system must be careful, concerning relative factors of building the system and the effects of the system after implementation.

The system development can not be successful if the executives, staffs, and other relative partners do not incorporate with one another. Executives must allow implementing the project. Thus, they do have positive attitude about the project and know how much benefit they will gain from the computer system. Staffs and users must have essential computer literature and proper training. Therefore, they can use the system properly and will not create problems. Human resource is an important factor to run the system, thus we have to be concerned about it.

In the existing system, the manual operation creates inefficiency, costs and a lot of human errors. There are many redundancy processes and it consumes a lot of time, which affects the other routine jobs. The workloads compared to the number of staffs are inadequate.

For the proposed system, it can provide more efficient business process supported by computer information system. In this case, it reduces times wasted in

tedious manual system. At the same time, staff can develop their work for better performance. The proposed system design includes the analysis of the system, design of the new business and computer system, database design, data dictionary, file design, procedure design, input and output screen design, report design and hardware and software specification. From cost-benefit analysis, we recognized that the investment in the new system is worth. The security controls are also built to protect the system damage. LAN and database system provides sharable information that is a must. Moreover, modular design makes the system easy to be expanded in the future.

Presently, the computer system is used as the strategic way of doing business in the globalizing environment. The success of business will come together with the success of the information system.

Table 5.1 shows the time performance on each process of the proposed system compared with the existing system.

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

Process	Existing System	Proposed System
Create Customer Order	45 mins	15 mins
Generate Invoice	30 mins	5 mins
Generate Report	180 mins	15 mins
Check/Balance Stock	90 mins	10 mins
Printing Process	5 mins	3 mins
Total Time Consumption	350 mins	48 mins

Descriptions of each process are below.

- (1) Create customer order process of the proposed system can reduce time from 45 to 15 minute. This is because the computerized system can immediately retrieve customer details from the database. Just fill his order

detail into the input screen and click a button to process customer order.

Then staffs can also print customer order from the information.

- (2) Generate invoice process uses customer database and order details that has been already in the system to be created a commercial invoice just within 5 minutes.
- (3) Generate report is very easy for the computerized system and it consumes much less time than the manual system.
- (4) Check and update stock is automatically done by the system. Thus, it consumes about less than 10 minutes to process those.

5.2 Recommendations

There are some recommendation to improve the efficiency of work and accuracy of the information.

- (1) The company should plan to develop another module involved the system, to expand the system to widely use in the organization and make the new system more effective.
- (2) The system developer team should develop Standard Operation Procedure to provide to the end-users to use as a basis. For SOP, they can work follow it in the right way. It can reduce supporting time of the system developer team to solve their problems and they can confront the problems themselves as well.
- (3) The company should recognize about Electronic Data Interchange (EDI). It is becoming more widespread in business today and provide a lot of benefit to the organization.



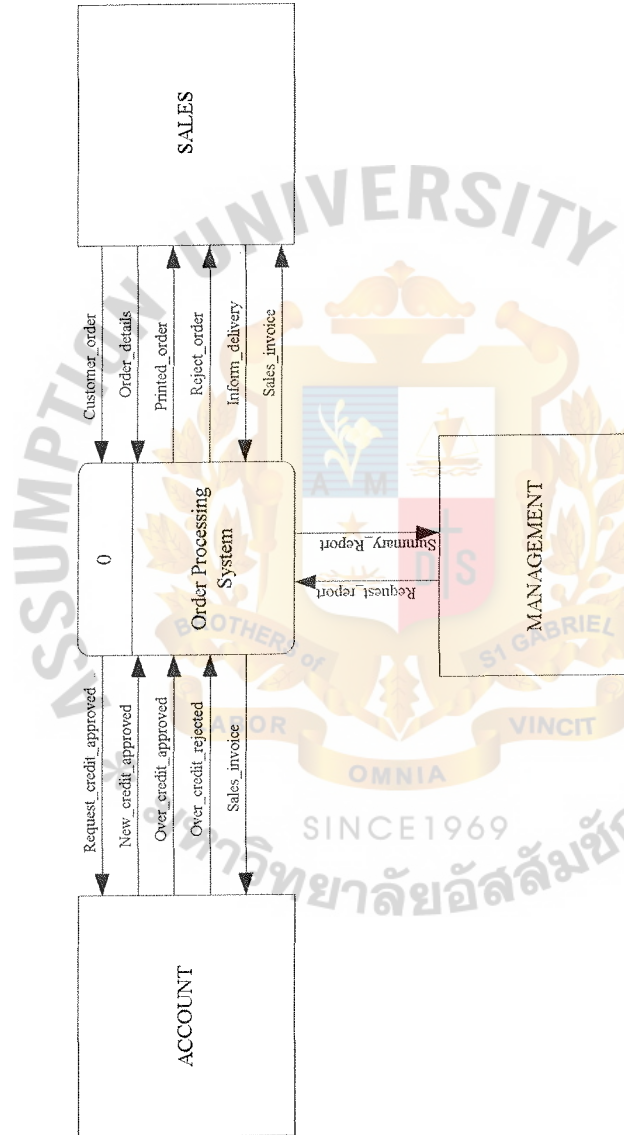


Figure A.1. Context Diagram - Order Processing System.

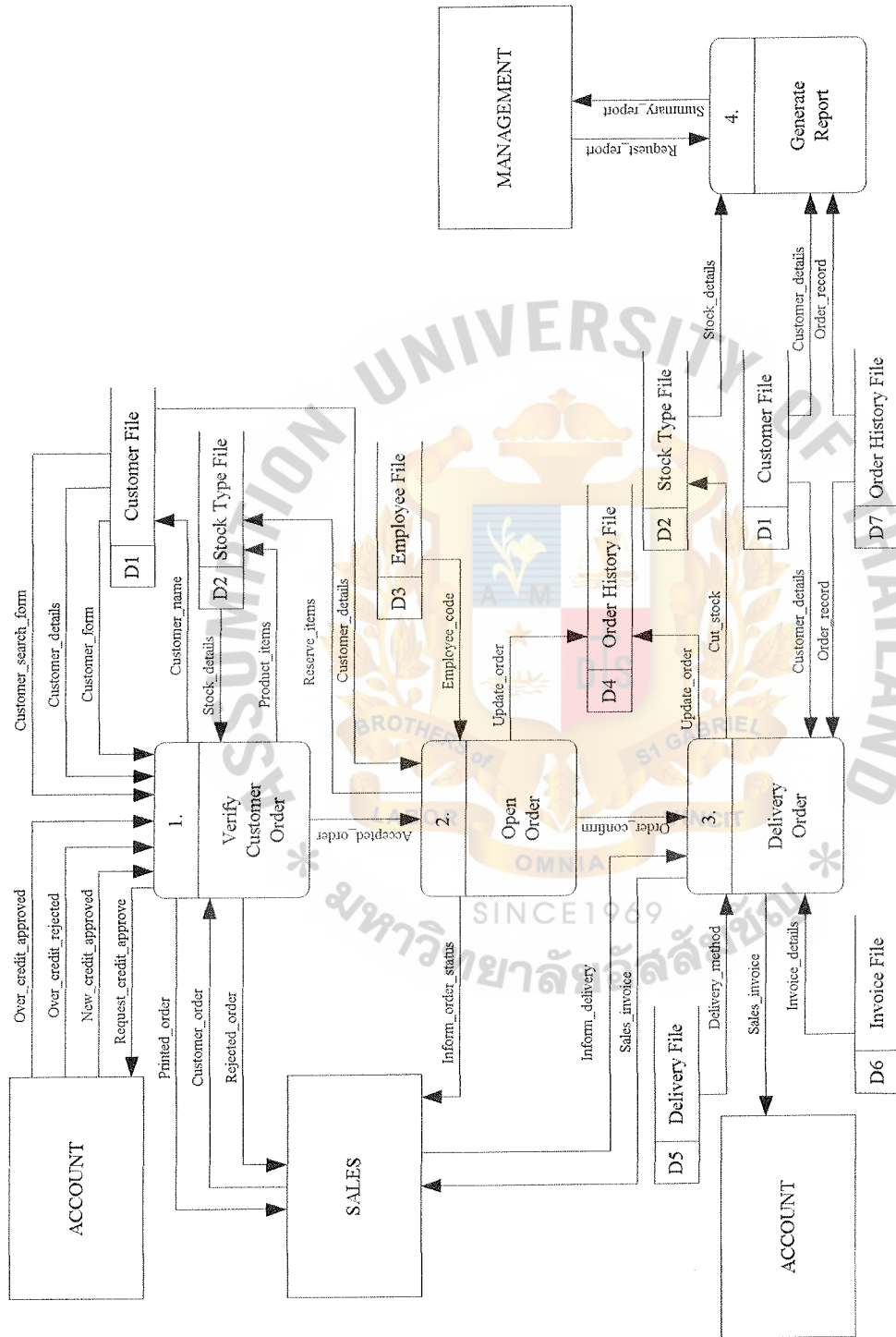


Figure A.2. DFD (Level 0) - Order Processing System.

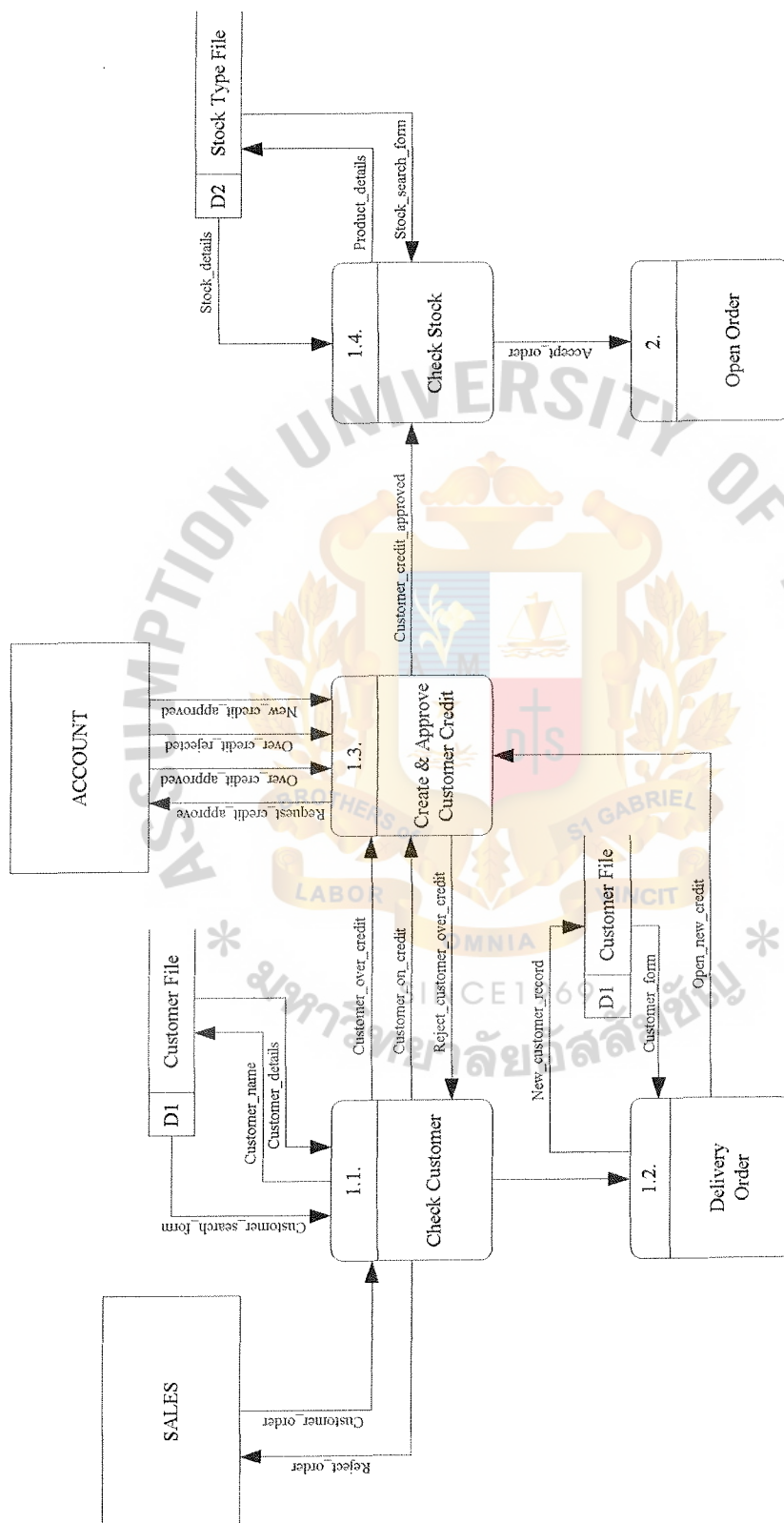


Figure A.3. DFD (Level 1) Process 1. - Verify Customer Order.

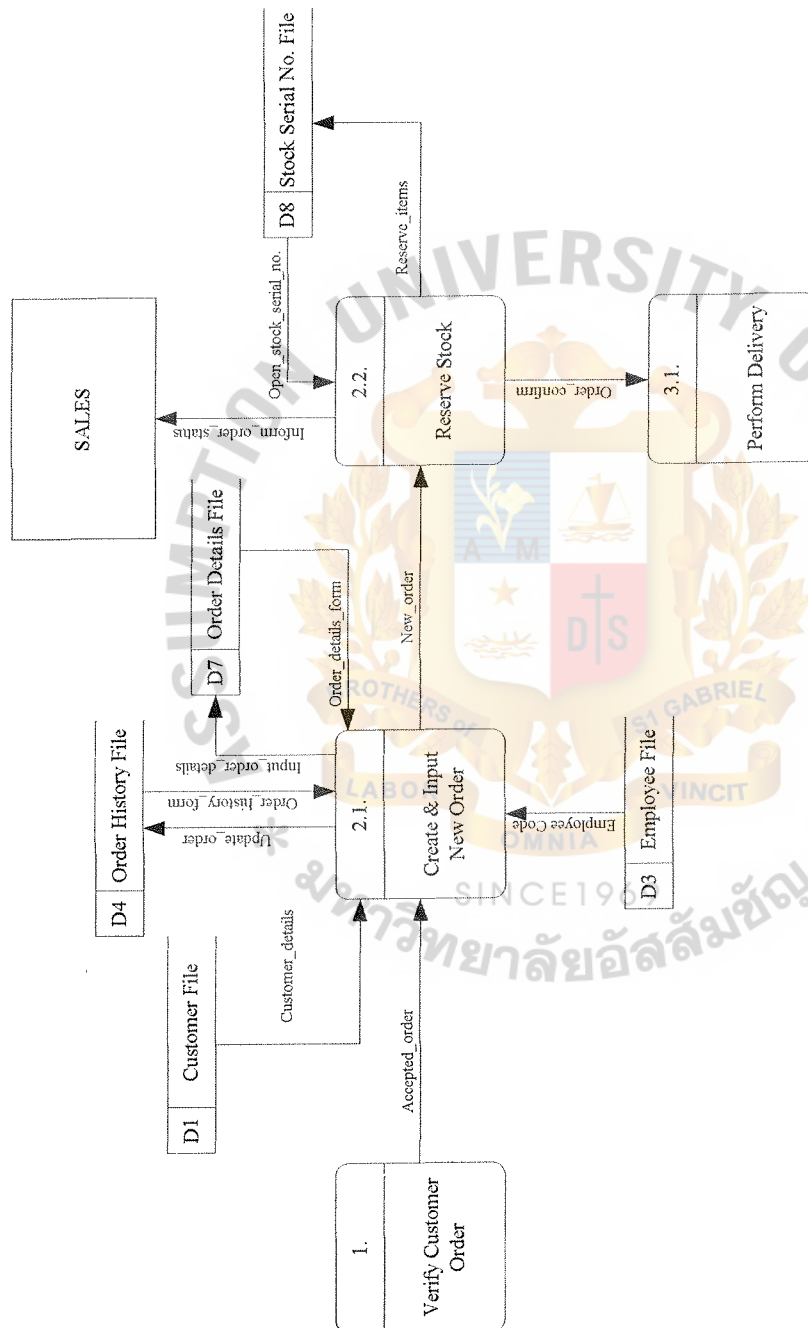


Figure A.4. .DFD (Level 1) Process 2. - Open Order.

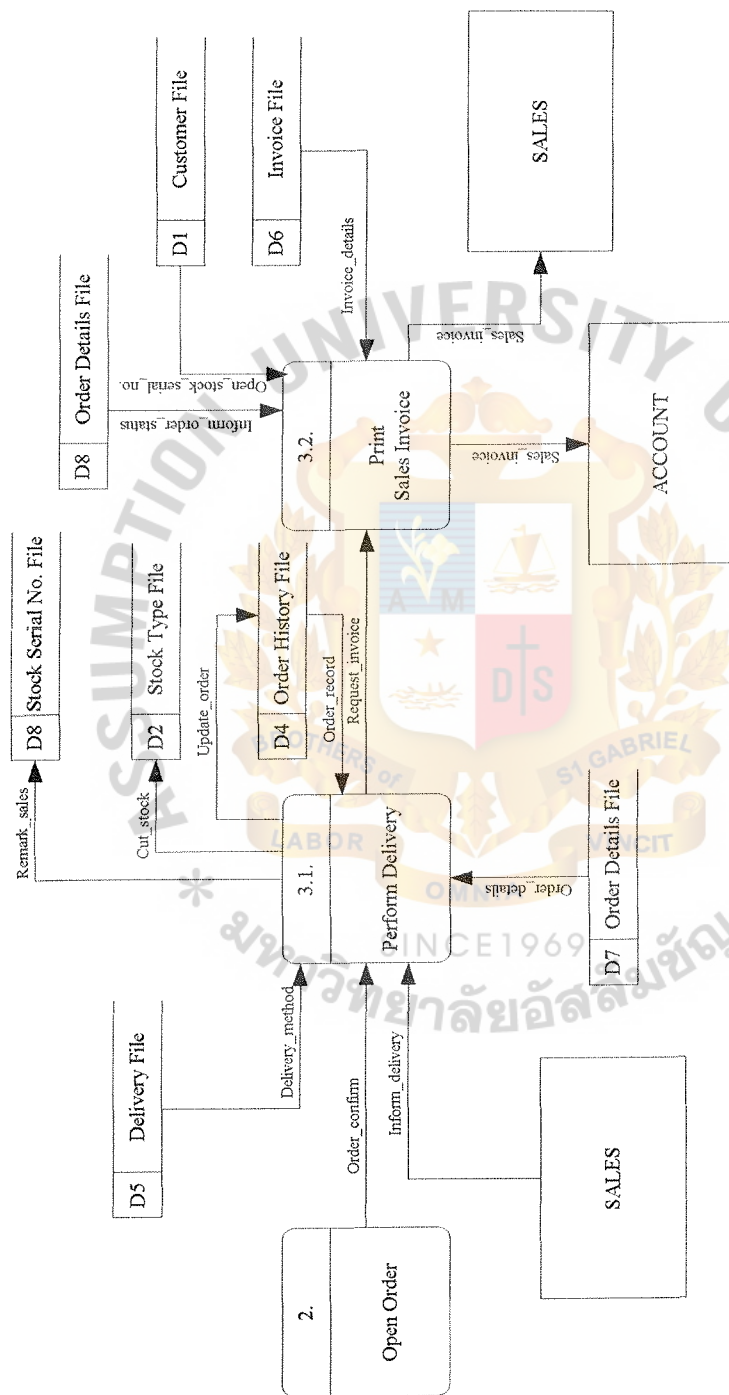


Figure A.5. DFD (Level 1) Process 3. - Delivery Order.

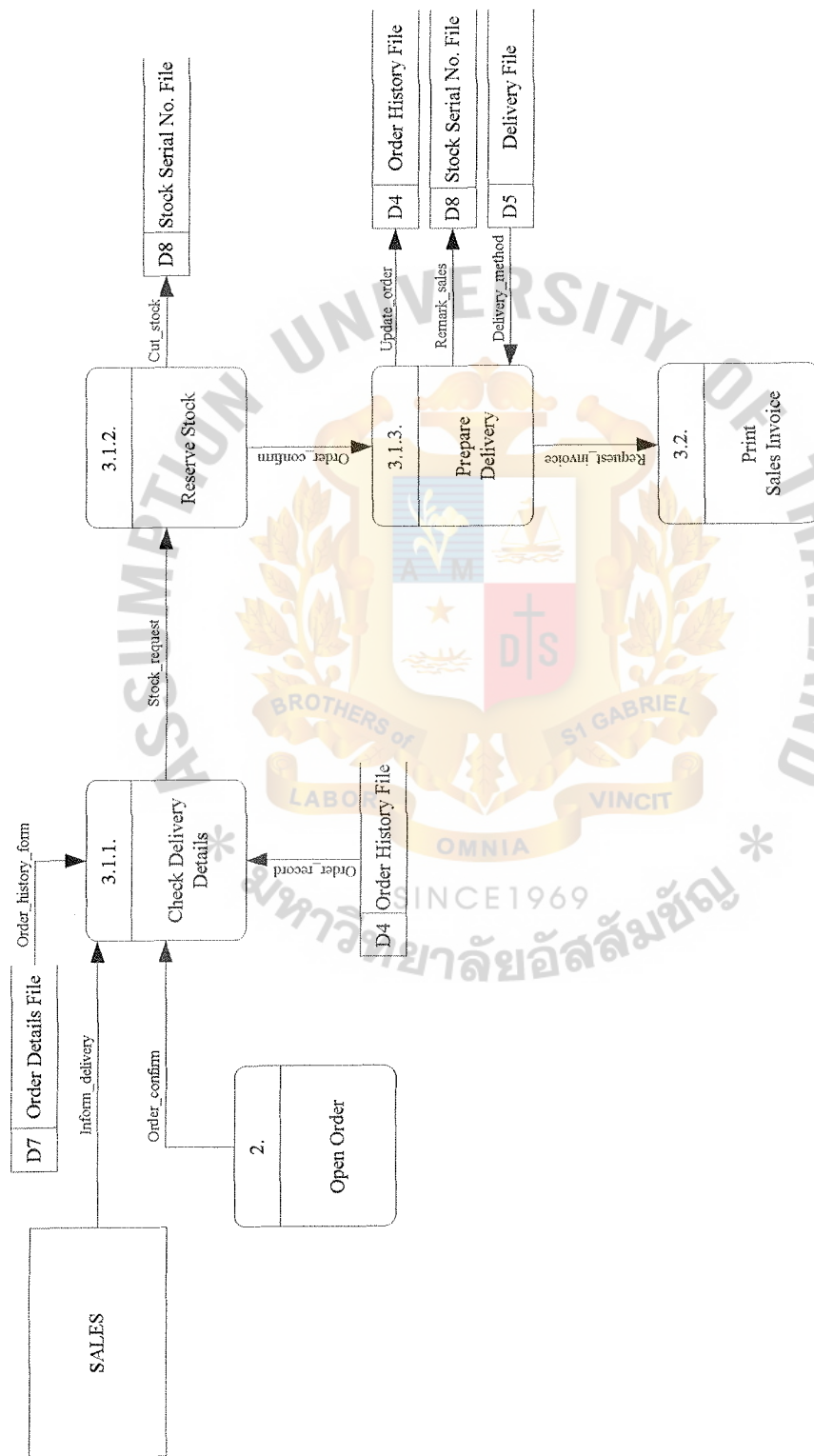


Figure A.6. DFD (Level 2) Process 3.1. - Perform Delivery.

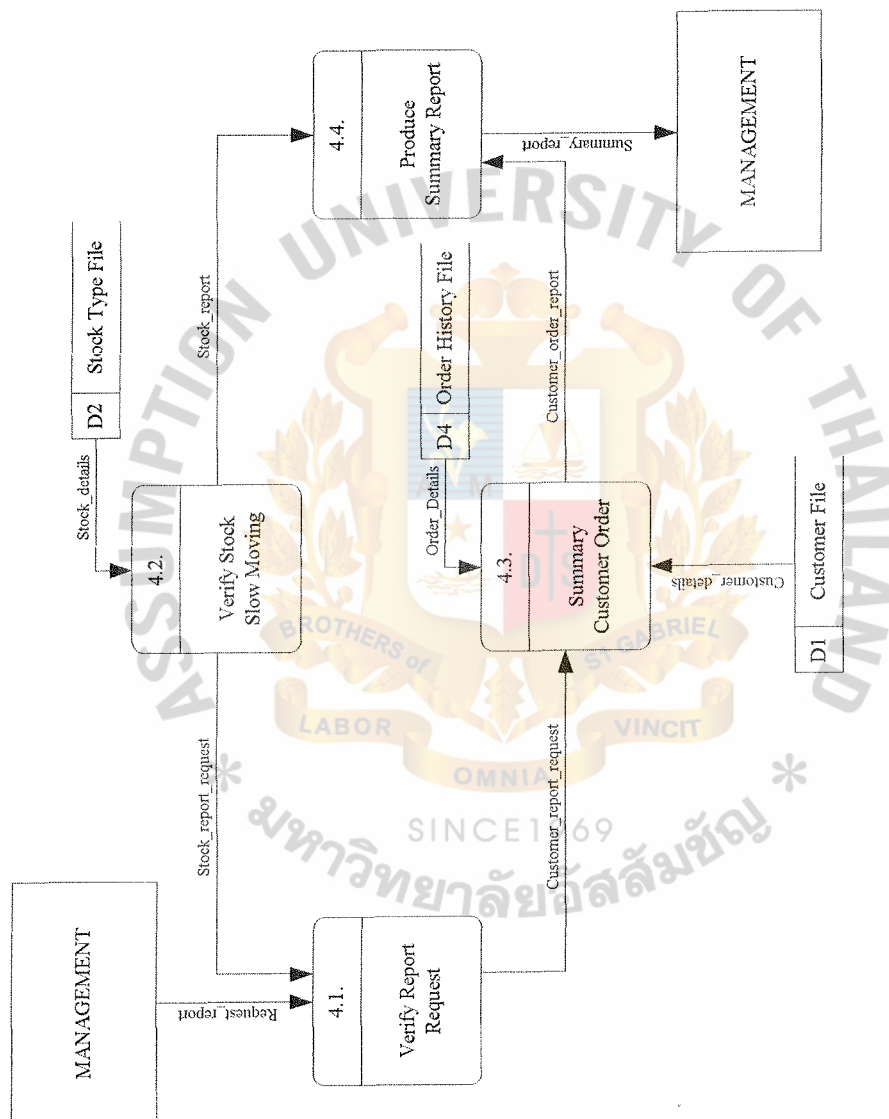
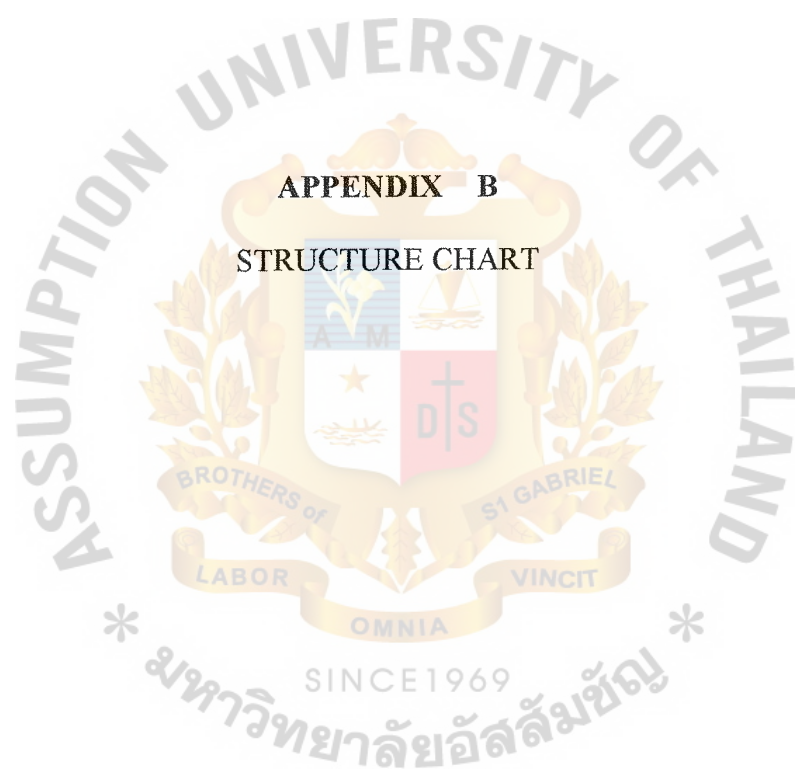


Figure A.7. DFD (Level 1) Process 4. - Generate Report.



APPENDIX B

STRUCTURE CHART

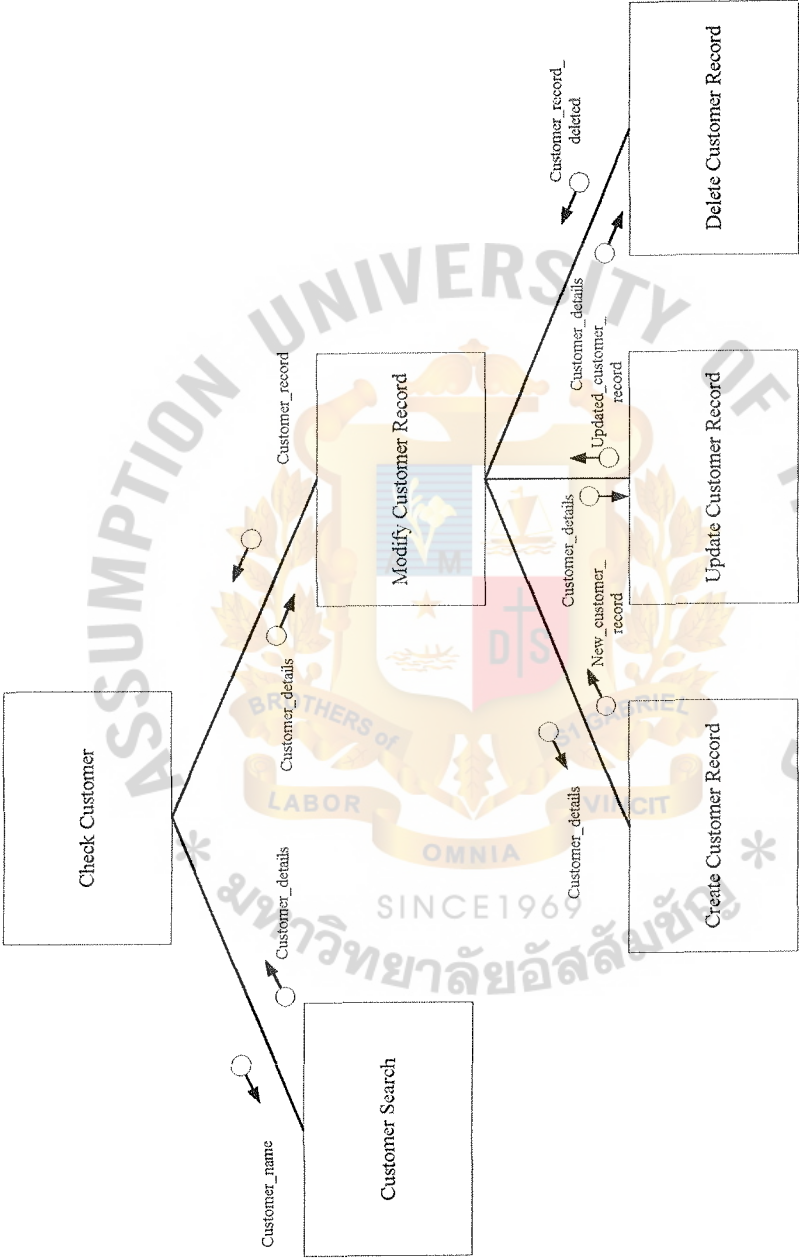


Figure B.1. Structure Chart of Check Customer Process.

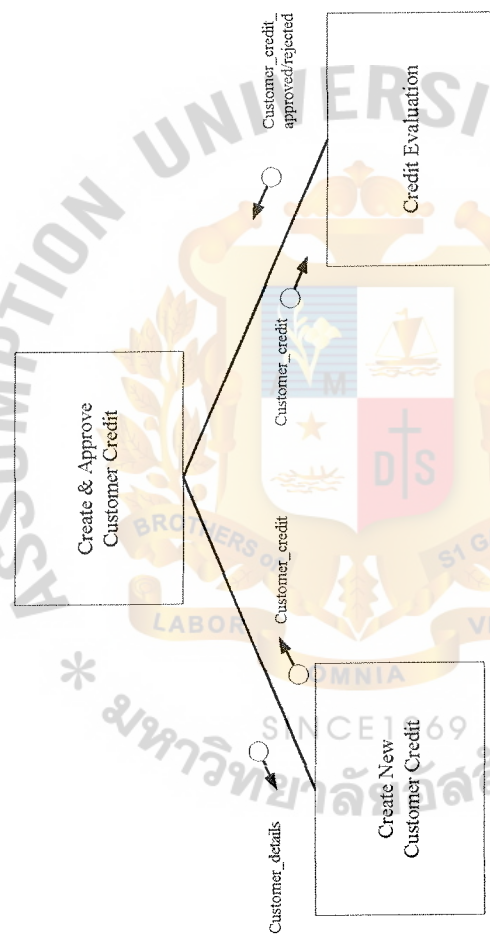


Figure B.2. Structure Chart of Create & Approve Customer Credit Process.

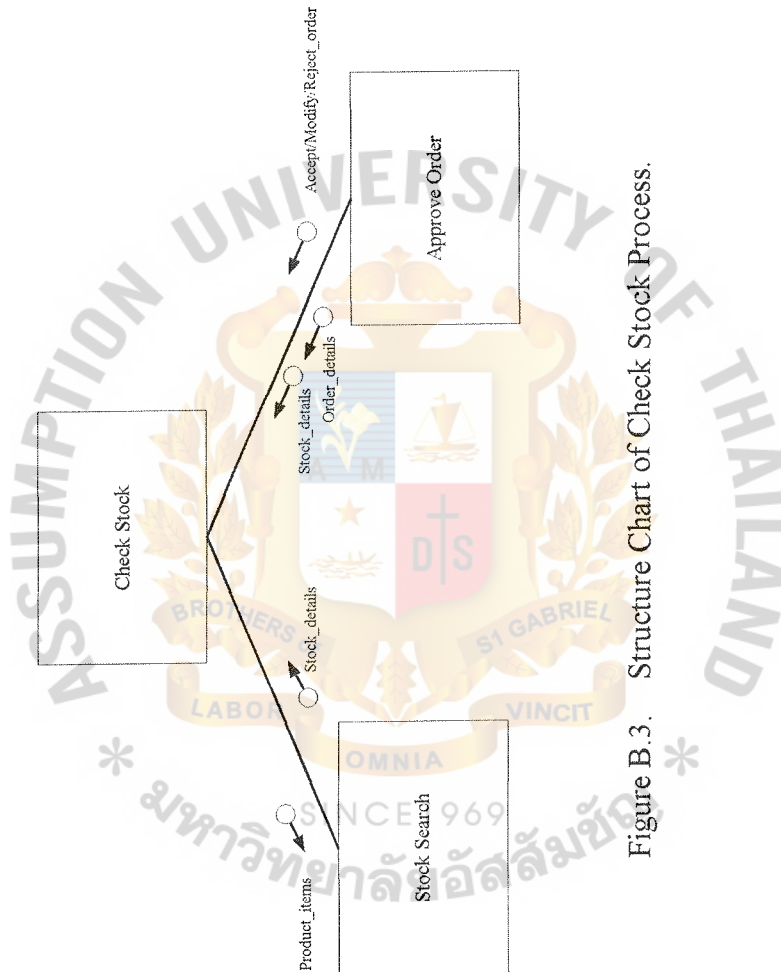


Figure B.3. Structure Chart of Check Stock Process.

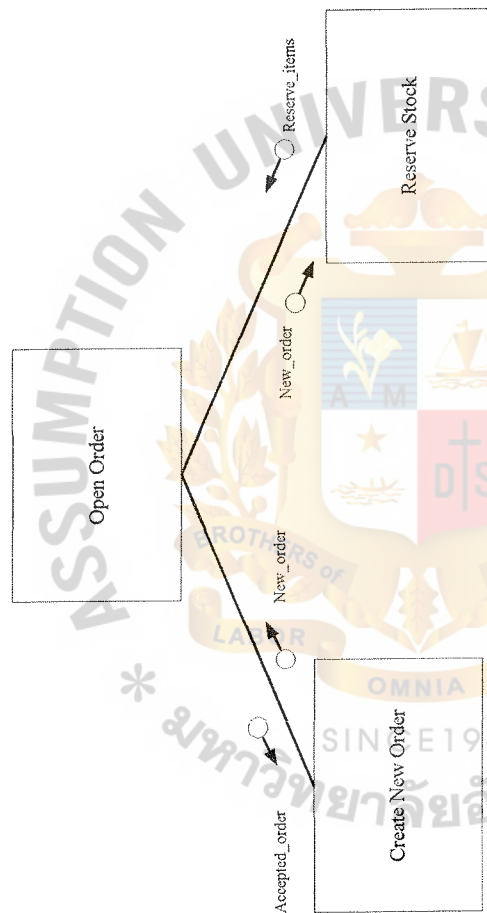


Figure B.4. Structure Chart of Open Order Process.

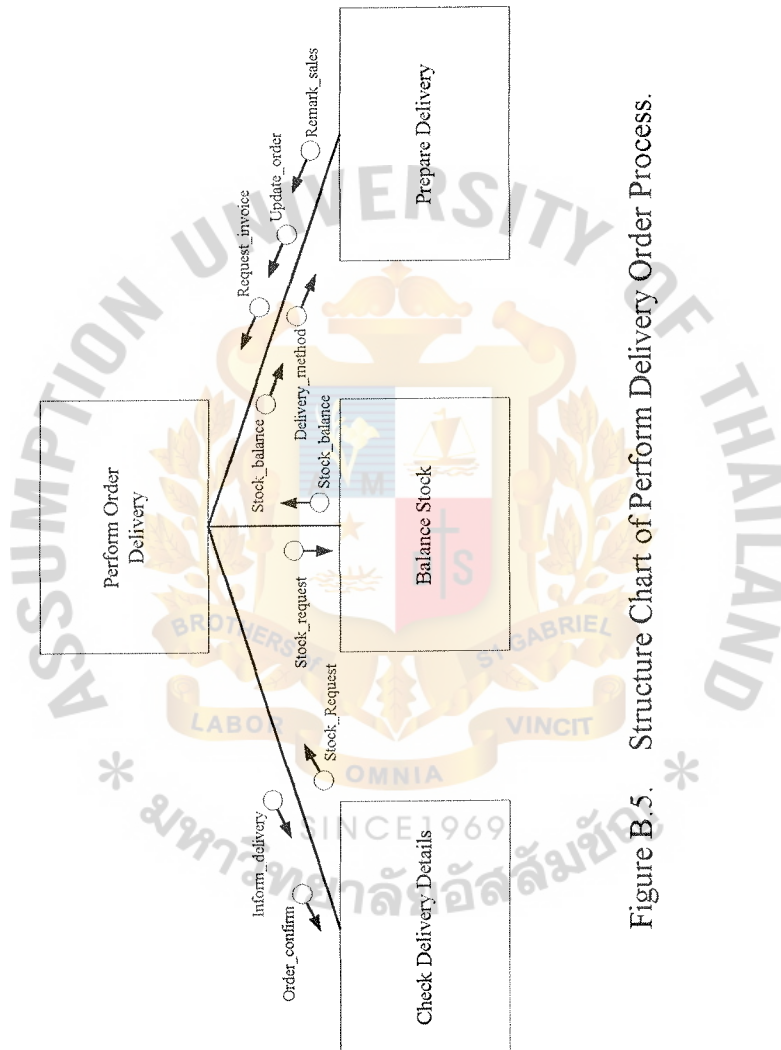


Figure B.5. Structure Chart of Perform Delivery Order Process.

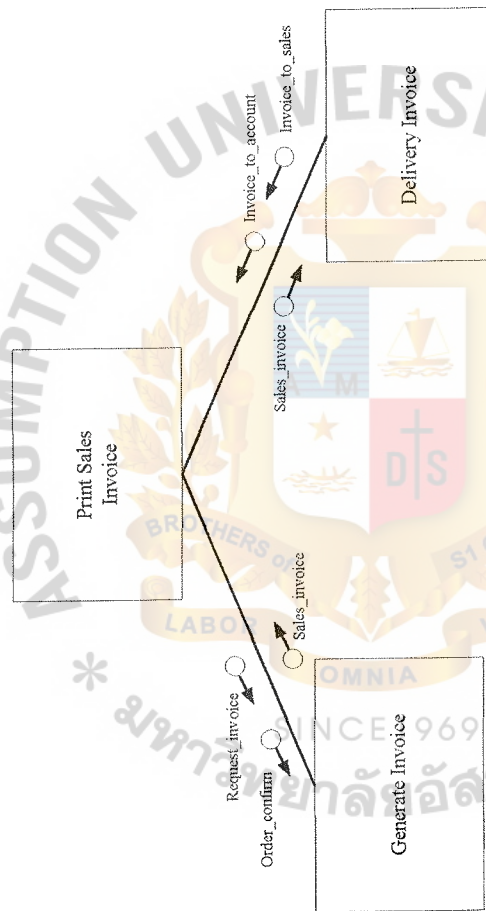


Figure B.6. Structure Chart of Print Sales Invoice Process.

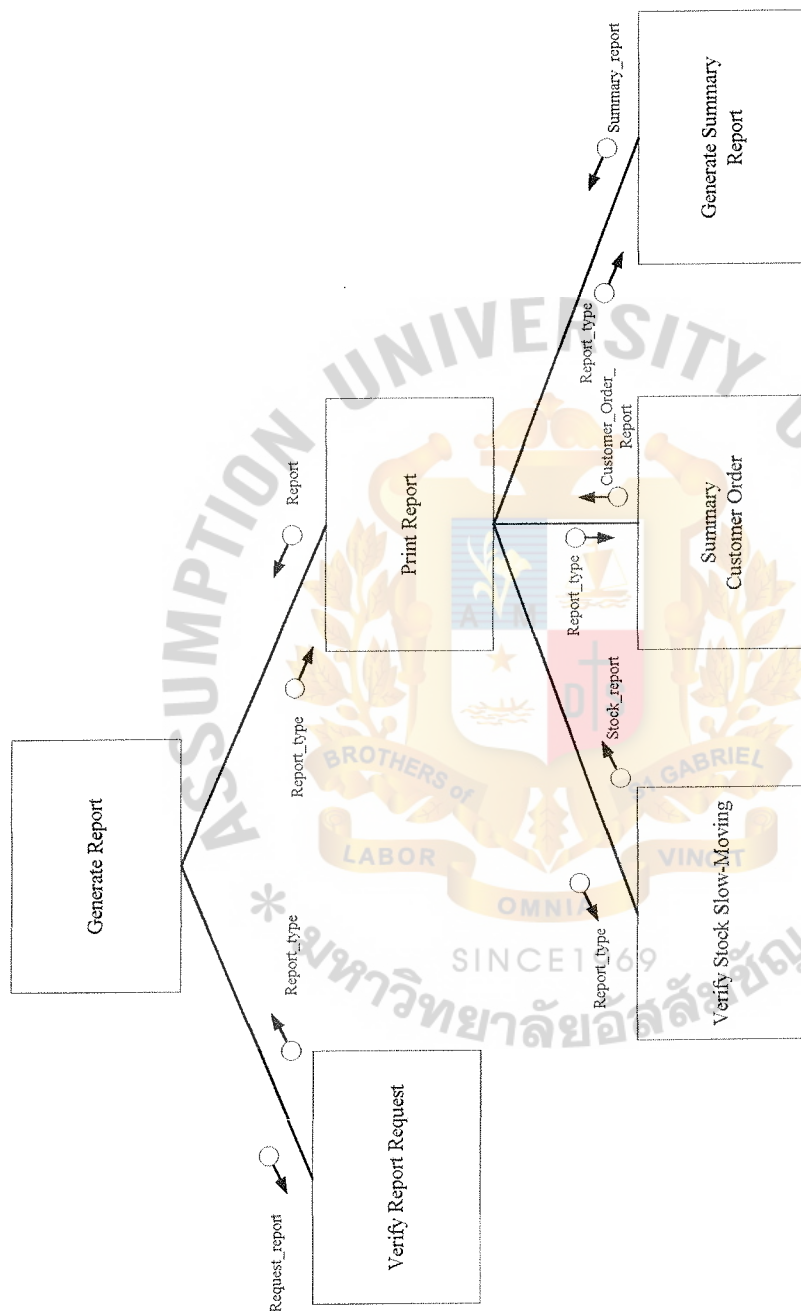
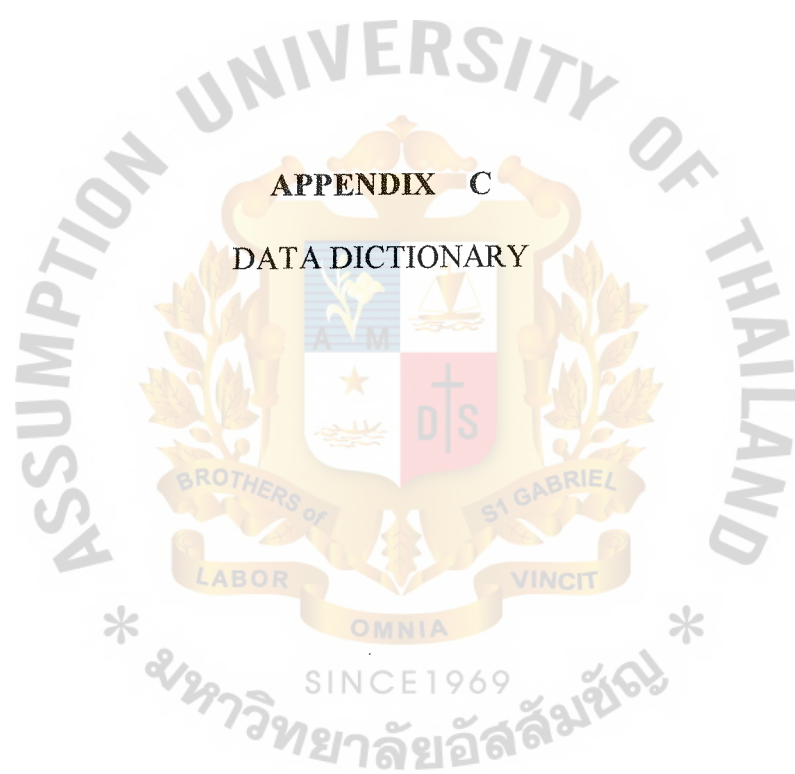


Figure B.7. Structure Chart of Generate Report Process.



DATA DICTIONARY

Accept_order	= * Accept the customer order * [Yes / No]
Accepted_order	= * Confirm customer purchase order after checking customer property * [Yes / No]
Company_name	= * The name of company of customer * { legal-character }
Contact_address	= * The address of customer for contacting * { legal-character }
Contact_name	= * The name of person for contacting * { character }
Courtesy_title	= * the prefix in front of a person's first name * ["Mr." "Mrs." "Ms" "Miss"]
Credit_limit	= * Limit credit for customer depends on customer history * { numeric-digit }
Customer	{ Customer_detail }
Customer_credit	= * Account Receivable of a customer for payment at RPF* [numeric-digit]
Customer_credit_approved	= The status of customer credit approval * [Yes / No]
Customer_details	= * The detail of customer *

	@Customer_id + Group + Company_name + Contact_name + Contact_address + Delivery_address + Tel_no + Fax_no + Term_payment + Credit_limit + Credit_status
Customer_form	+ * Input customer form * { Customer_details }
Customer_id	= * The identification of customer * { numeric-digit }
Customer_name	= * The name of customer * { courtesy_title + first_name + last_name }
Customer_on_credit	= * The credit status of customer is in credit limit * { Credit_status }
Customer_over_credit	= * The credit status of customer is over credit limit * { Credit_status }
Customer_order	= * The purchase order received from customer for ordering products * { Order_record }
Customer_report	= * Report that contains summary details concerning customer *
Customer_report_request	= * The request that comes from management concerning about customer *
Customer_record	= * The customer's profile*
Customer_record_deleted	= * The customer's profile that was deleted out off the database *

Customer_search_form	= * The customer form for search customer data * { Customer_details }
Cut_stock	= * To reduce product item quantity in stock * { Out_stock + Stock_remain }
Date_record	= * The date that records the product in, out and remain stock *
Deliver_address	= * The address that customer needs to deliver order * { legal-character }
Delivery_id	= * The identification for delivery * { numeric-digit }
Delivery_method	= * The way to deliver the product order to customer * @Delivery_id + Deliver_method
Delivery_method	= * The method that use for delivery * { character }
Discount	= The percentage for discount product list price * { numeric-digit + "%" }
Employee	@Employee_code _ Employee_name _ Department + Employee_address + Home_phone + Mobile_no + Pager_no
Employee_address	= * The address of employee * { legal_character }
Employee_code	= * The identification for employee * { legal-character }
Employee_name	= * The name of employee *

	(courtery_title + first name + last name }
Fax_no	= * Fax number * { numeric-digit }
First_name	= * A person's first name * { character }
Group	= * Category customer by group * [Bank / Finance / Computer / Manufacture / Education / Project by government / Healthcare / Airlines]
Home_phone	= * Phone number *
In_stock	= * The product quantity in stock *
Inform_delivery	= * Inform by sale, request to prepare delivery order to customer *
Invoice_to_account	= * Sales invoice that send to Accounting Department *
Invoice_to_sales	= * Sales invoice that send to Sales Department *
Margin	= * The profit in percentage term included in sale price * { numeric-digit : " % " }
Modify_order	= * Adjust the customer order to the product available *
Mobile_no	= * Mobile phone number *
New_credit_approved	= * New credit create for new customer *
New_customer	= * New customer order product * { Customer_details }

	(courtery_title + first name + last name)
Fax_no	= * Fax number * { numeric-digit }
First_name	= * A person's first name * { character }
Group	= * Category customer by group * [Bank / Finance / Computer / Manufacture / Education / Project by government / Healthcare / Airlines]
Home_phone	= * Phone number *
In_stock	= * The product quantity in stock *
Inform_delivery	= * Inform by sale, request to prepare delivery order to customer *
Invoice_to_account	= * Sales invoice that send to Accounting Department *
Invoice_to_sales	= * Sales invoice that send to Sales Department *
Margin	= * The profit in percentage term included in sale price * { numeric-digit : " % " }
Modify_order	= * Adjust the customer order to the product available *
Mobile_no	= * Mobile phone number *
New_credit_approved	= * New credit create for new customer *
New_customer	= * New customer order product * { Customer_details }

New_customer_record = * Create new record for new customer *
{ Customer_details }

New_order = * The new record for open order *
{ Order-history + Order_details }
{ On_order_details }

On_order { On_order_details }

On_order_details @Product_no + @Purchase_request_no +
On_order_qty

On_order_qty = * The quantity of product in on order *

Open_new_credit = * Request for open new credit for new customer *

Open_stock_serial_no = * To update the product serial no status *
{ Stock_serial_no }

Order_confirm = * confirmation for create new order *

Order_credit_approved = * Approval for customer purchase order credit *

Order_date = * The date that received order from customer *

Order_details * @Order_details_id + Sale_price + Order_qty +
sales_discount

Order_details_form = * Input form for order details *
{ Order_details }

Order_details_id = * The identification for order details *
(numeric-digit)

Order_discount = * The discount for customer order *
{ numeric-digit : " % " }

Order_history @Order_no + Order_date + Margin + Require_date +

	Term_delivery + Sale_tax
Order_history_form	= * Input form for order history * { Order_history }
Order_no	= * The identification for order history * { numeric-digit }
Order_qty	= * Quantity for item order from customer * { numeric-digit }
Order_record	= * The record of order details * { Order_detials }
Out_stock	= * The product quantity that is out from stock * { numeric-digit : Units }
Over_credit_rejected	= * Rejected the over credit customer * { Credit_status }
Pager_no	= * Pager number *
Product_description	= * the description of the product * { legal-character }
Product_details	= * The details of product * { Stock_details }
Product_items	= * The product items are requested for checking with stock * { Stock_details }
Product_name	= * The short name of product * { character }
Product_no	= * The identification for product *

Product_on_order	= * The product status in stock or under purchase order * { On_order_details }
Record_rejected_item	= * Update product item that fails after quality check *
Reject_customer_over_credit	= * Reject customer credit that over credit limit * { Credit_limit }
Reject_order	= * Reject customer purchase order due to customer over credit *
Remark_sale	= * Update status for stock serial no with "Sale" * { Stock_serial_no : Status }
Report	= * General name of report*
Report_type	= * There are three types – Stock slow-moving, Customer order and Summary report*
Request_credit_approve	= * Request credit approve for customer whose purchase order over credit limit *
Request_date	= * The date purchase request is issued *
Request_invoice	= * Request for issue invoice printed * { Invoice_details + Order_history + Order_details }
Request_quality_check	= * Check quality of product from shipment arrival *
Request_report	= * Management request report concerning customer order, purchase order and stock moving *
Require_date	= * The required date for this order from customer *
Reserve_items	= * Remark status in Stock serial no as "Reserve" * { Stock_serial_no : Status }

Sale_invoice	= * Print sale invoice for delivery * { Invoice_detail + Order_history + Order_details + Customer_details }
Sale_price	= * The sale price to customer * { numeric-digit }
Sale_tax	= * The value added tax (VAT) that has to be included in term of percentage * { numeric-digit : " % " }
Serial_no	= * Serial no in stock serial no * { alphanumeric }
Status	= * The status for product * [Reject / Reserve / Sale]
Stock_balance	= * Request to balance stock when delivery order to customer *
Stock_details	= * The details of stock type file * @Product_no + Product_name + Product_description + List_price + Discount + Unit_price + Import_tax + Frieght_charge + In_stock + Out_stock + Stock_remain + Date_record
Stock_remain	= * The remain product quantity in stock * { numeric-digit : Units }
Stock_report	= * The report concerning with stock * { Stock_details }
Stock_report_request	= * Request for generate stock report *



APPENDIX D

PROCESS SPECIFICATION

PROCESS SPECIFICATION

Process 1.1. Check Customer

Precondition

Receive Customer Purchase Order

Begin

Get Customer_search_form

Put Customer_name into Customer_search_form

Get Customer_detail from Customer File

If no customer detail, Then to Process 1.2

Else send Customer_over_credit

Or Customer_on_credit to Process 1.3

Endif

Get Reject_customer_over_credit form Process 1.3

Send Reject_order to Sate

End

Postcondition

Verify customer condition or prepare to create new customer record

Process 1.2. Create New Customer

Precondition

No customer record in Customer File

Begin

Get Customer_form from Customer File

Edit New_customer_record

Send Open_new_credit to Process 1.3

End

Postcondition

Customer detail is edited in Customer File



Process 1.3. Create & Approve Customer Credit

Precondition

Received customer credit details or open new credit for customer to approve

Begin

Get Customer_over_credit or Customer_on_credit

If Customer_on_credit Then

 Send Customer_credit_approve to Process 1.4

Else Send report_credit_approve to Account

 If Over_credit_approved = Yes Then

 Send Customer_credit_approve to Process 1.4

 Else Over_credit_approved = No Then

 Send Reject_customer_over_credit to Process 1.1

Endif

Get Open_new_credit

Send to Account for approve

Get New_credit_approve

End

Postcondition

Inform reject order to sale or record customer credit approve

Process 1.4. Check Stock

Precondition

Received customer credit approved confirmation

Begin

Get Stock_search_form from Stock type file

Put Product_items

Get Stock_details

Send Accept_order to Process 2.1

End

Postcondition

Receive product status in stock



Process 2.1. Create & Input New Order

Precondition

Verify customer complete and accepted customer order confirmation

Begin

Get Customer_details from Customer File

Get Employee_code from Employee File

Get Order_history_form and Order_detail_form

Put Customer details into Order_history_form

Put Employee Code into Order_history_form

Put Input_order_details into order details form

Send New_order to Process 2.2

End

Postcondition

New order record was created and sent to reserve product in stock.

Process 2.2. Reserve Stock

Precondition

New order was created.

Begin

Get New_order from Process 2.1

Get Open_stock_serial_no from Stock Serial No. File

Put Reserve_items into Stock Serial No. File

Send Inform_order_status to Sale

End

Postcondition

Product serial no. was reserved by order.



Process 3.1.1. Check Delivery Details

Precondition

Inform delivery from sales with confirm order

Begin

Get Order_record from Order history file

Get Order_detail from Order details file

Send Stock_request to Process 3.1.2

End

Postcondition

Retrieve information for delivery and prepare to perform balance stock before
delivery



Process 3.1.2. Balance Stock

Precondition

Received stock request prepare for delivery

Begin

Put Cut_stock into Stock type file

Put Remark_sales into Stock serial no file

Send Stock_balance to Process 3.1.3

End

Postcondition

Product serial no and balance stock was performed



Process 3.1.3. Prepare Delivery

Precondition

Confirm stock balance was performed

Begin

Get Delivery_method from Delivery file

Match Delivery_method with Order_details

Put Update_order onto Order history file

Send Request_invoice to Process 3.2

End

Postcondition

Select delivery method matching with order and update order history record



Process 3.2. Print Sales Invoice

Precondition

Request issue invoice with completely in delivery and order confirmation

Begin

Get Order_record from Order history file

Get Order_details from Order details file

Get Customer_details from Customer file

Get Serial_no from Stock serial no file

Edit invoice_details from Invoice file

Print Sales_invoice

Send Sales_invoice to Sale

Send Sales_invoice_copy to Account

End

Postcondition

Sales invoice has been printed for delivery order

Process 4.1. Verify Report Request

Precondition

Request report from Management

Begin

Get Report_request from Management

If Report_request = Stock_report_request

Then go to Process 4.2

Else If Report_request = Customer_report_request

Then go to Process 6.3

Endif

End

Postcondition

Separate request report by property



Process 4.2. Verify Stock Slow Moving

Precondition

Received Stock_report_request after being separated by report requirement

Begin

Get Stock_details from Stock type file

Sum Stock value amount by Product name by month

Send Stock_report to Process 4.4

End

Postcondition

Stock value amount remaining in stock by month



Process 4.3. Summary Customer Order

Precondition

Received request for Customer_report_request

Begin

Get Customer_details from Customer file

Get Order_details from Order history file

Sum Order amount value by Customer

Sum Order amount value by Customer group

Sum Order amount value by Month

Send Customer_report to Process 4.4

End

Postcondition

Report concerning about customer has been generated

Process 4.4. Produce Summary Report

Precondition

Received report category by Stock, Customer, Purchase

Begin

Get Stock_report from Process 4.2

Get Customer_report from Process 4.3

Edit Summary report

Send Summary_report to Management

End

Postcondition

Conclude all reports by Management Requirement





APPENDIX E

ENTITY RELATIONSHIP DIAGRAM

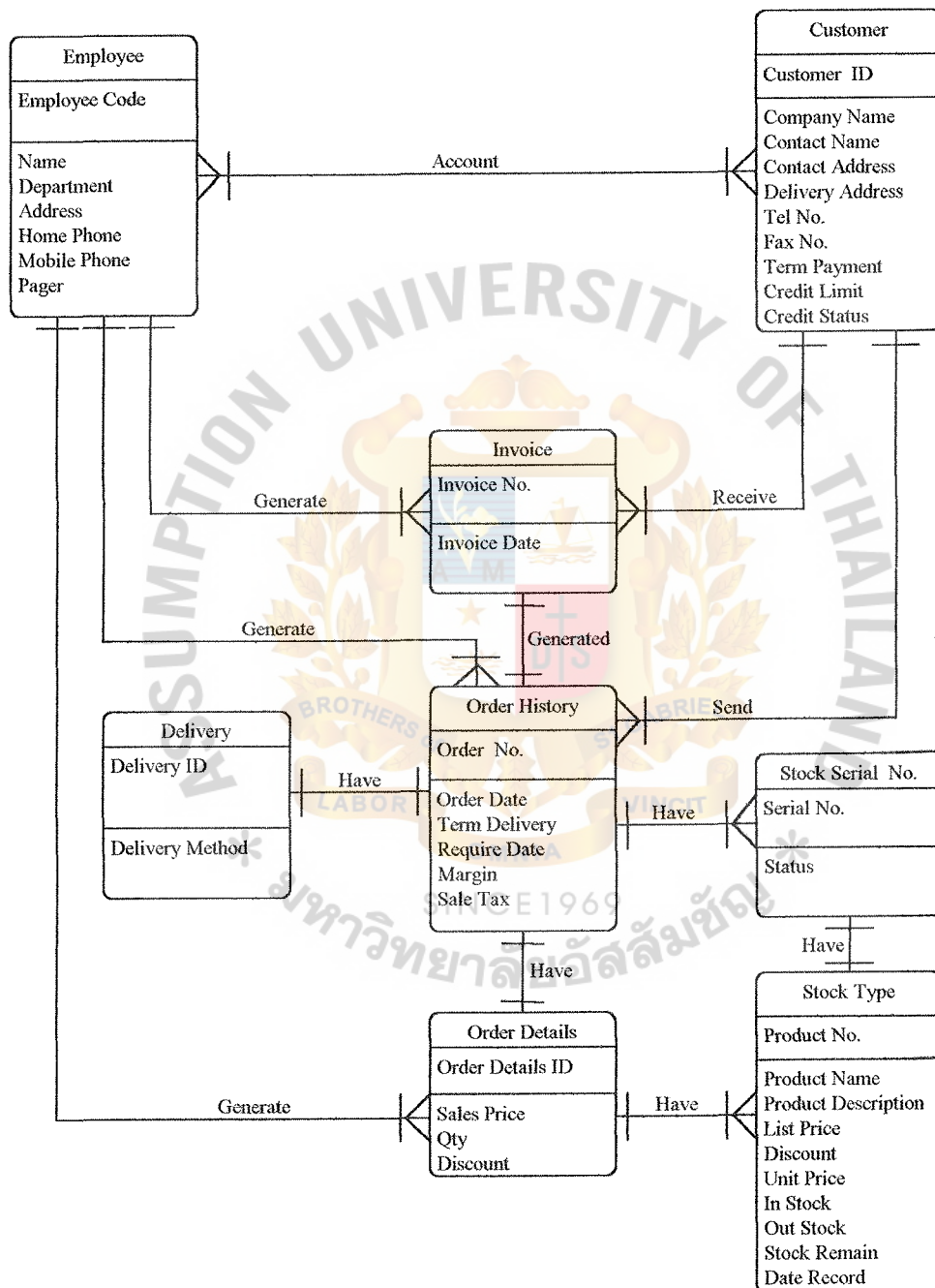


Figure E.1. Entity Relationship Diagram.

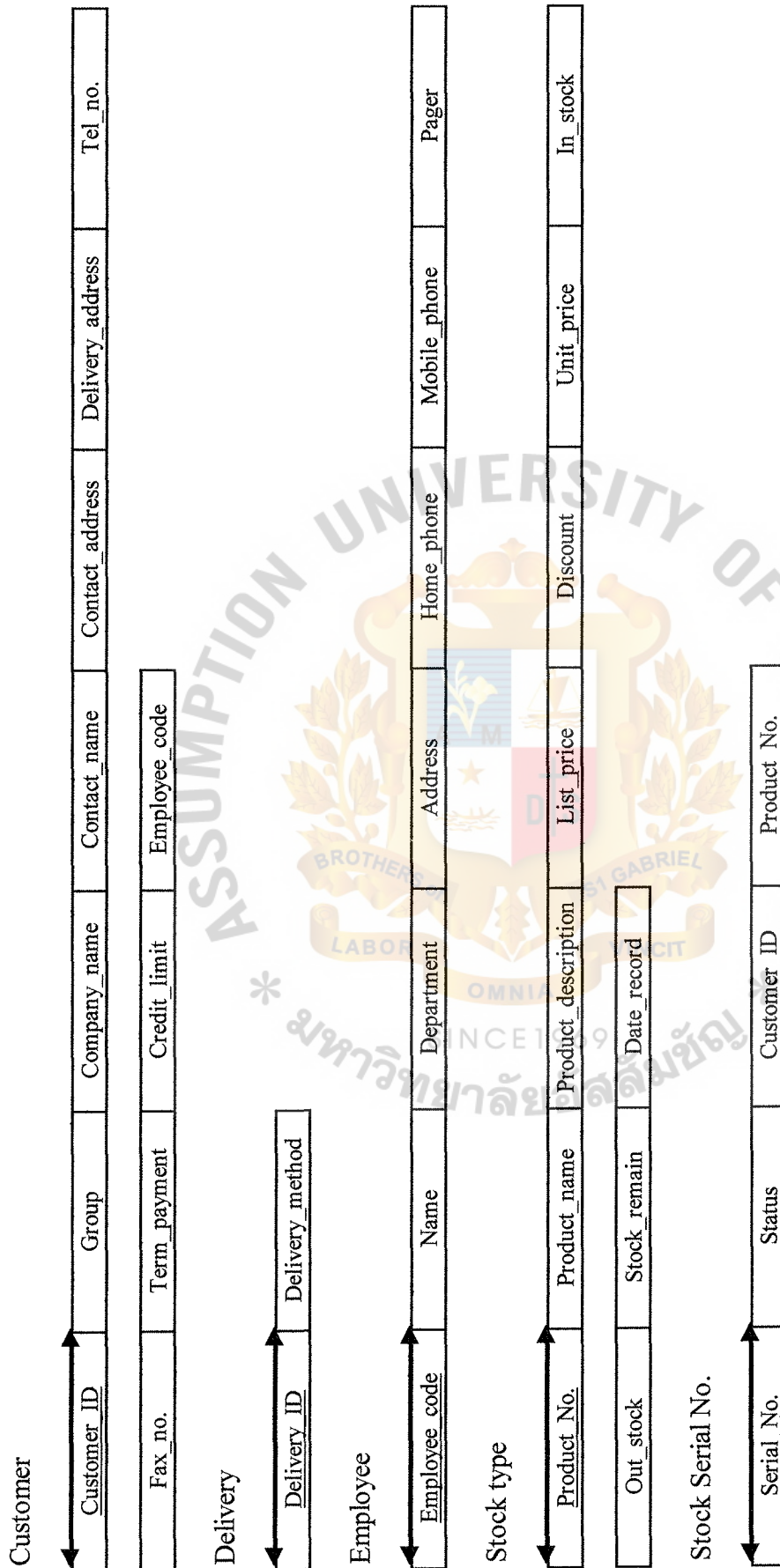


Figure E.2. Table Design.

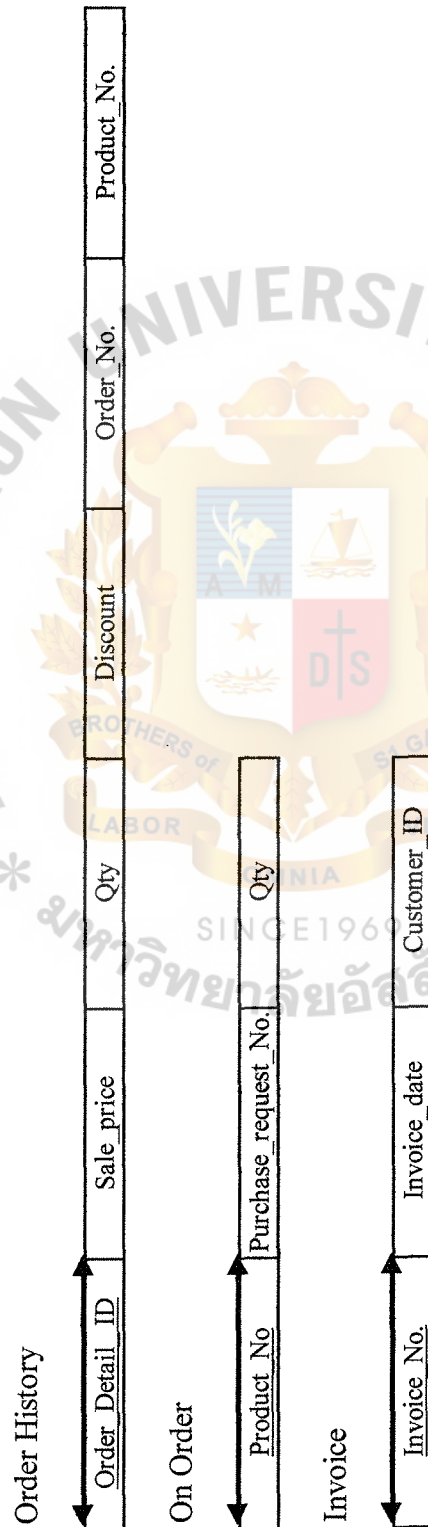


Figure E.3. Table Design (Continued).



APPENDIX F

WEB INTERFACE

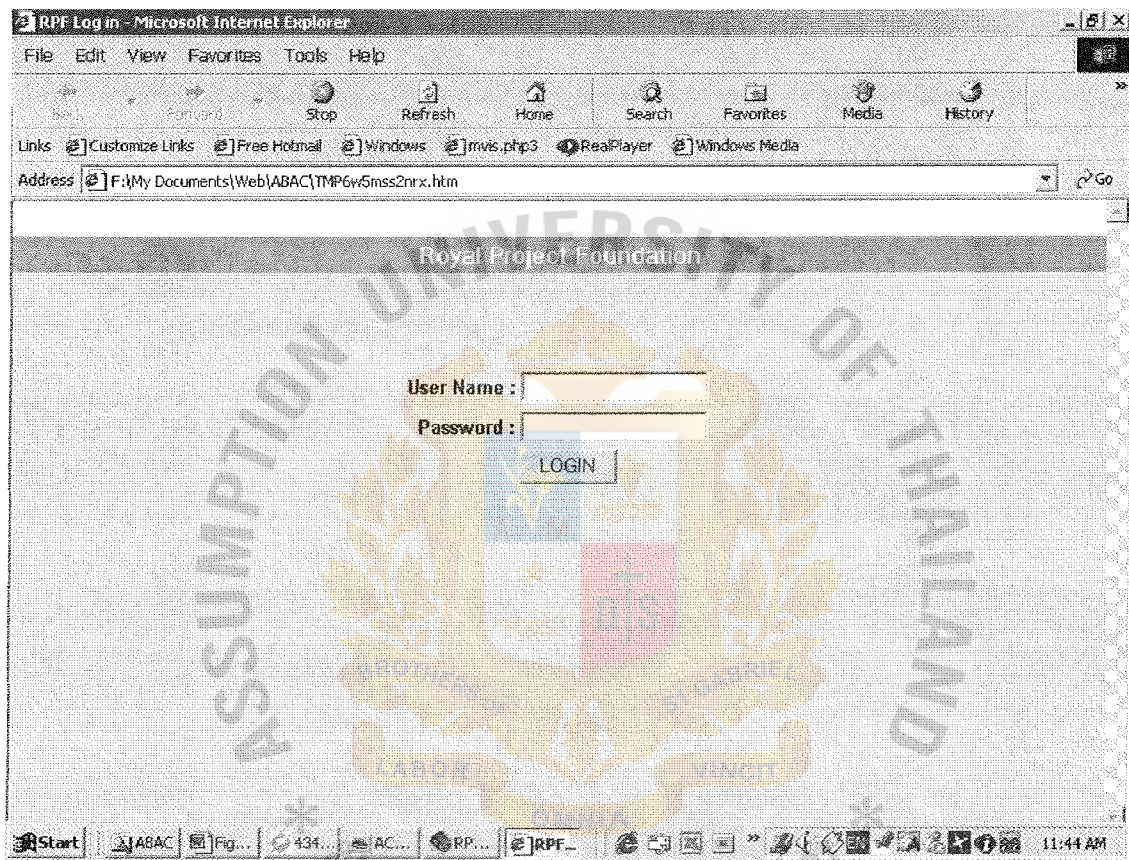


Figure F.1. Log in Window.

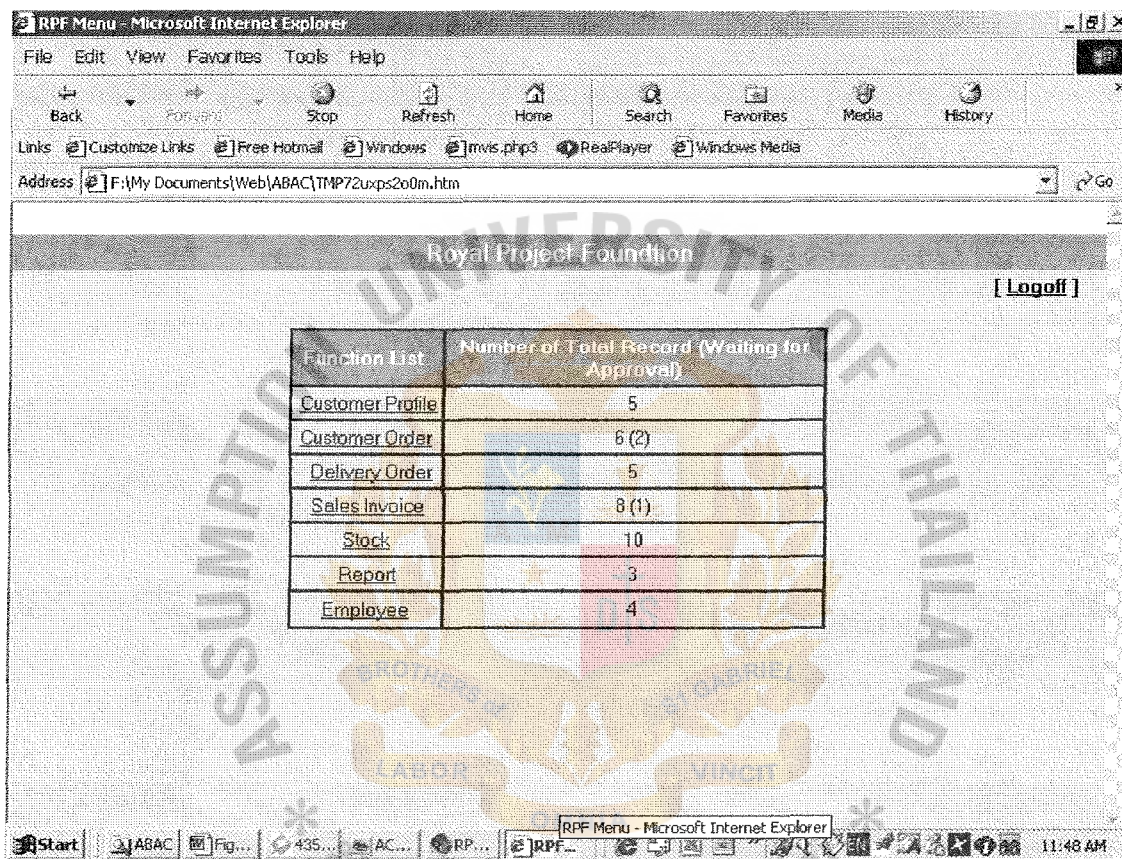


Figure F.2. Main Menu Window.

RPF Cust. Profile - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites Media History

Links: Customize Links Free Hotmail Windows mvis.php3 RealPlayer Windows Media

Address: F:\My Documents\Web\ABAC\TMP79pgzs2o9h.htm

Search

Customer ID: Search

Company Name:

Customer Name: Nuchanart

Hint: Searching box allows you to input more than one criteria.

Result: 1 record(s)

No.	Select	Customer ID	Company Name	Customer Name	Record Date (DD/MM/YYYY)	Delete
1.	<input type="checkbox"/>	100001	Charpensub Limited	Nuchanart Wangmuang	22/10/2001	<input type="checkbox"/>

Page 1

1 Record Found

Hint: 1. Check record(s) in Select column to delete.
2. Click Customer ID to edit information.
3. Accessibility is depending on your permission.

Select All Cancel All Add to Order View Profile Delete Profile Create New

Done, but with errors on page. My Computer

Figure F.3. Customer Search Window.

RPF Edit Cust Profile - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites Media History

Links Customize Links Free Hotmail Windows mvis.php3 RealPlayer Windows Media

Address F:\My Documents\Web\ABAC\TMP190kzs32ht.htm Go

Customer Profile (Add/Edit)

[Back to Main Menu] [Logoff]

Customer Profile

Customer ID : 100001

Company Name : Chareonsub Limited

Customer Name : Nuchanart Wangmuang

Group : Whoseller

Tax ID : 310-150-1440

Billing Address : 254 Vibhavadee Rd. Ladyao Jatujak Bangkok 10100

Delivery Address : 254 Vibhavadee Rd. Ladyao Jatujak Bangkok 10100

Telephone : 02-626-4795

Fax : 02-626-4796

E-mail : N/A

Done My Computer

Figure F.4. Customer Profile (Add/Edit) Window.

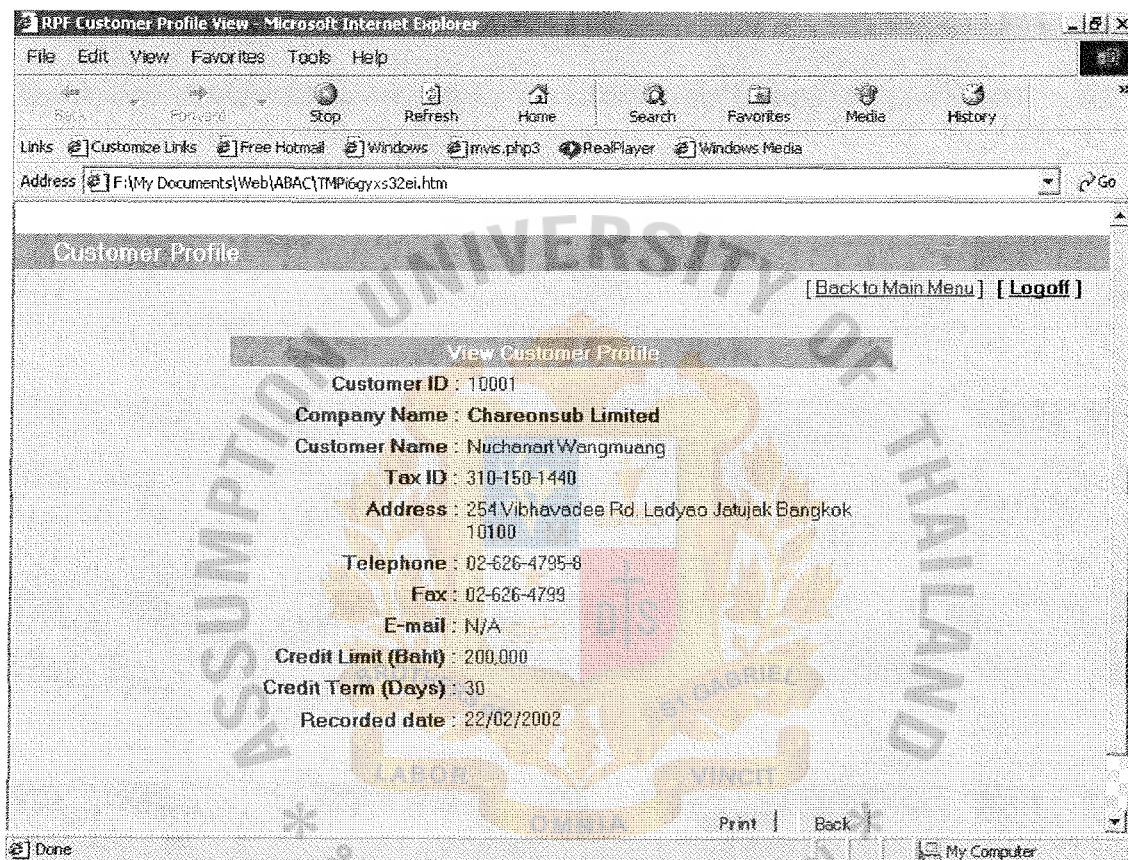


Figure F.5. Customer Profile (View) Window.

RPF Order Search - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites Media History

Links Customize Links Free Hotmail Windows mvis.php3 RealPlayer Windows Media

Address F:\My Documents\Web\TMPid.xjs32o6.htm Go

Search

Customer Order ID: Search

Customer Name:

Company Name:

Order Date From: 14 02 2002 To: 14 02 2002

Hint: Searching box allows you to input more than one criteria.

Result: 1 record(s)

No.	Select	Order ID	Company Name	Customer Name	Order Date (DD/MM/YYYY)	Delivery	Invoice
1.	<input type="checkbox"/>	000015	Siemens Co., Ltd	Teeravat Boonjay	14/02/02	<input type="checkbox"/>	<input type="checkbox"/>

Page 1

1 Record Found

Hint: 1. Check record(s) in Select column to delete.
2. Click Order ID to edit information.
3. Accessibility is depending on your permission.

Select All Cancell All * Create Invoice View Order Delete Order Create New

Done My Computer

Figure F.6. Customer Order Search Window.

RPF Order Edit - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites Media History

Links Customize Links Free Hotmail Windows nvis.php3 RealPlayer Windows Media

Address F:\My Documents\Web\TMPay1hxs2t0z.htm Go

Customer Order(Edit / Cancel)

[Back to Main Menu] [Logoff]

Customer Order ID : 000015

Customer ID: 000054

Customer Name: [Dropdown] First Name: Teeravat Middle Name: Last Name: Boonjay

Company Name: Siemens Co., Ltd

Telephone No.: 02-664-9991

Fax No.: 02-665-9966

E-mail Address: teeravat@siemens.co.th

Payment Method: Credit (30 days)

Hint : To add the customer details, press " Add Customer" to go to Customer(Add/Edit) Page.

Add Customer Clear

Done My Computer

Figure F.7. Customer Order (Add/Edit) Window - Upper Part.

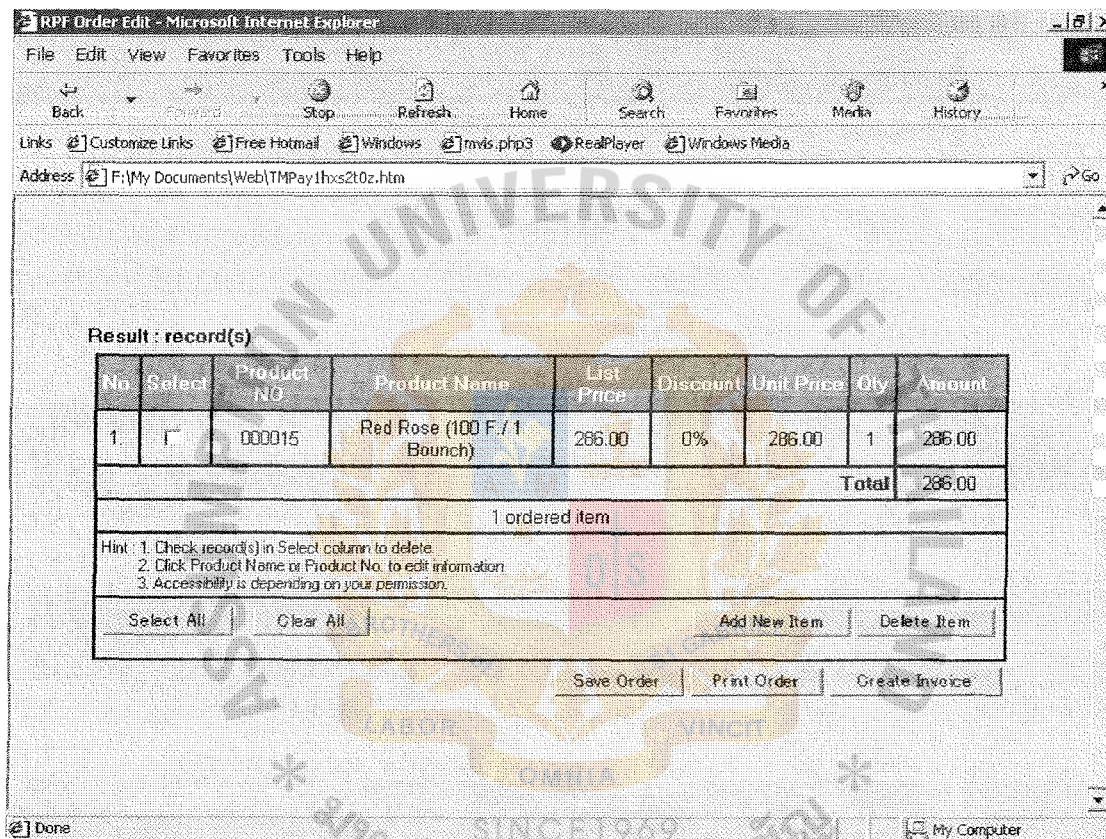


Figure F.8. Customer Order (Add/Edit) Window - Lower Part.

RPF Invoice - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites Media History

Links Customize Links Free Hotmail Windows mvis.php3 RealPlayer Windows Media

Address F:\My Documents\Web\TMPbfy10s2to7.htm Go

Royal Project Foundation
Bangkok Market Section - Bangkok
1752 Kasetsart University, Bangkok, Bangkok 10200
Tel: 662-896-6985
Fax: 662-588-6935

Customer Order

Company Name : Siemens Co., Ltd. **Order ID** : 000015
Address : 254/96 Charn Issara Tower 2, Bangkok 10253
Tel :02-664-9991
Fax :02-665-9966

Order ID	Order Date	Sales Person	Payment Method
000015	14/02/2002	Somporn	Credit (30 Days)

No.	Product No.	Description	Price	Qty	Discount	Amount
1.	000001	Red Rose 100 F.11 bunch	286.00	1	0.00%	286.00
Total Amount						286.00
VAT 7%						20.02
Grand Total						265.98

Print Back to Order Create Invoice Close

Done, but with errors on page. My Computer

Figure F.9. Customer Order (View/Print) Window.

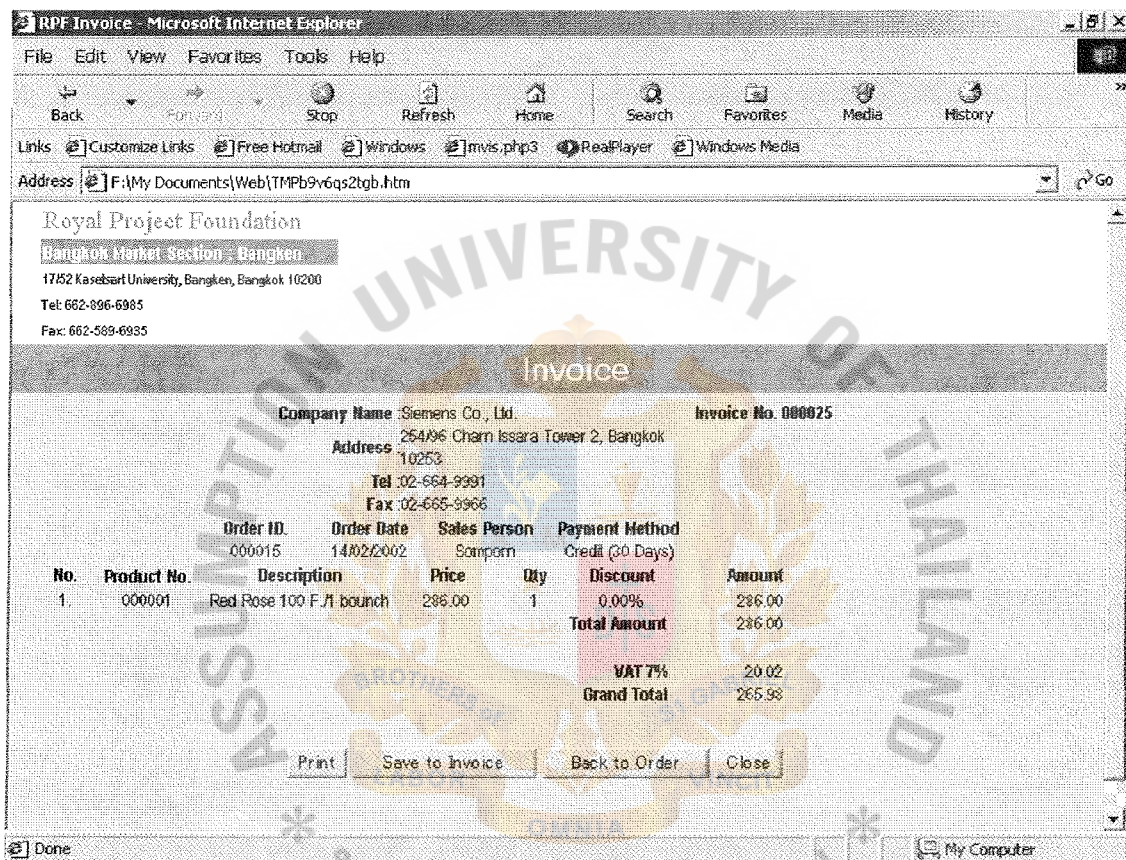


Figure F.10. Print Invoice Window.

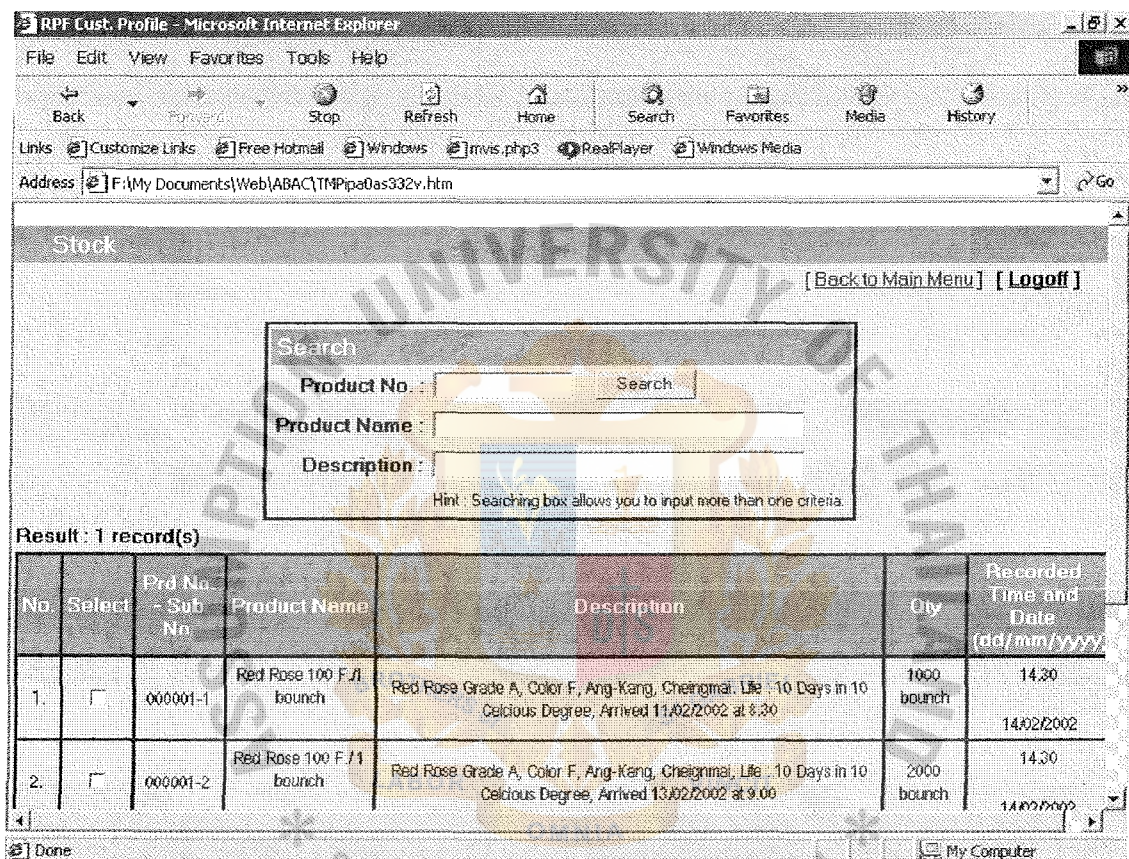


Figure F.11. Stock Search Window.

RPT Edit Cust Profile - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address C:\My Documents\project\New Report\Web\ABAC\Stock edit.html Go Links

Stock (Add/Edit)

[Back to Main Menu] [Logoff]

Stock Details

Product No. : 000001

Product Sub No. : 1

Product Name : Red Rose 100 F/1 Bunch

Description : Red Rose Grade A, Color F

Life : 10 Days in 10 Celcius Degree

(00 : 00) 24-hour System

Arrival Time : 14 : 30

(dd/mm/yyyy)

Arrival Date : 11 02 2002

Current Qty : 1000 Bunch

Recorded Time : 00 : 00 24-hour System

My Computer

Figure F.12. Stock (Add/Edit) Window.

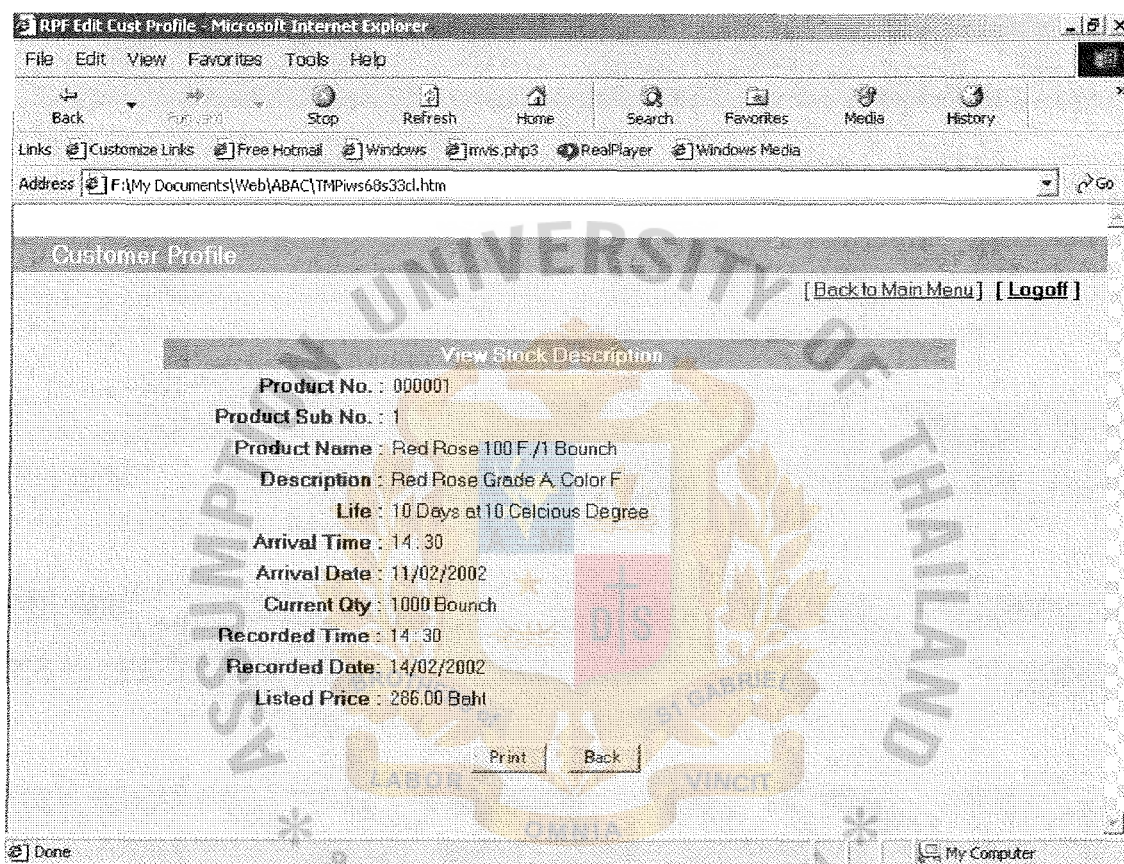


Figure F.13. Stock (View) Window.

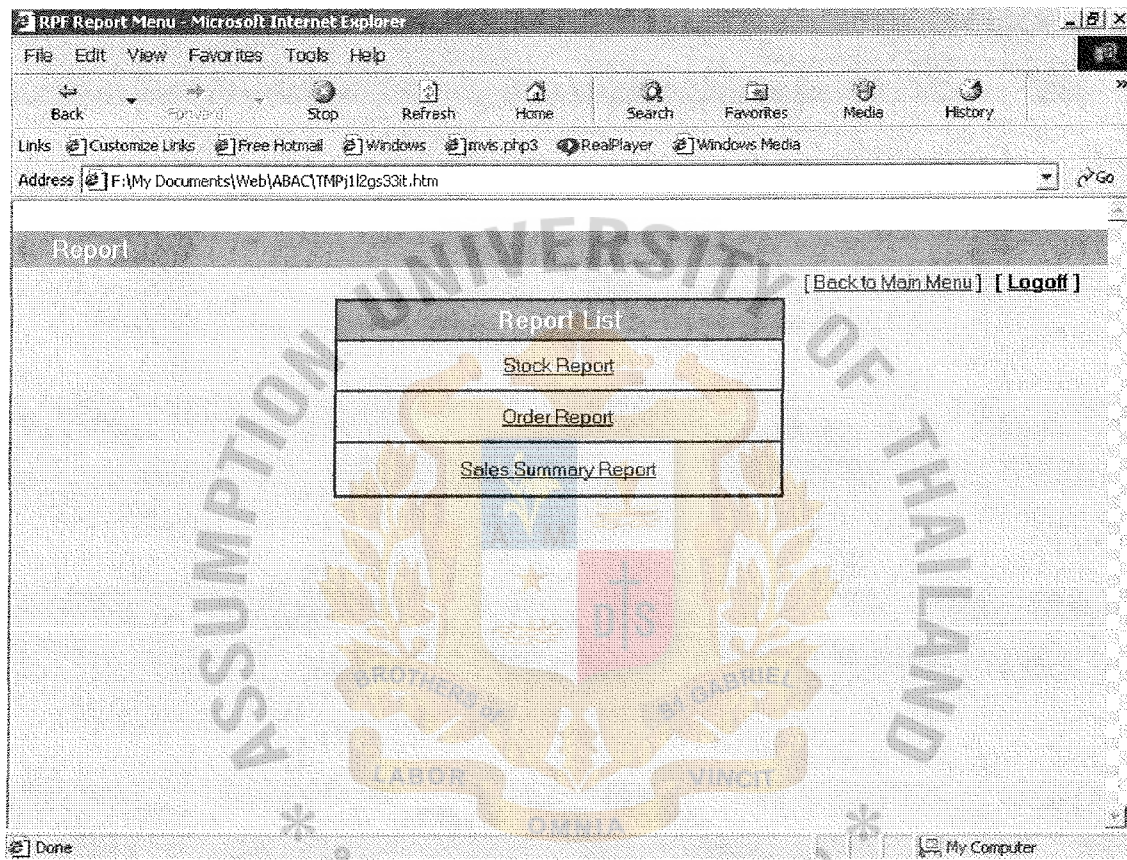


Figure F.14. Select Report Window.

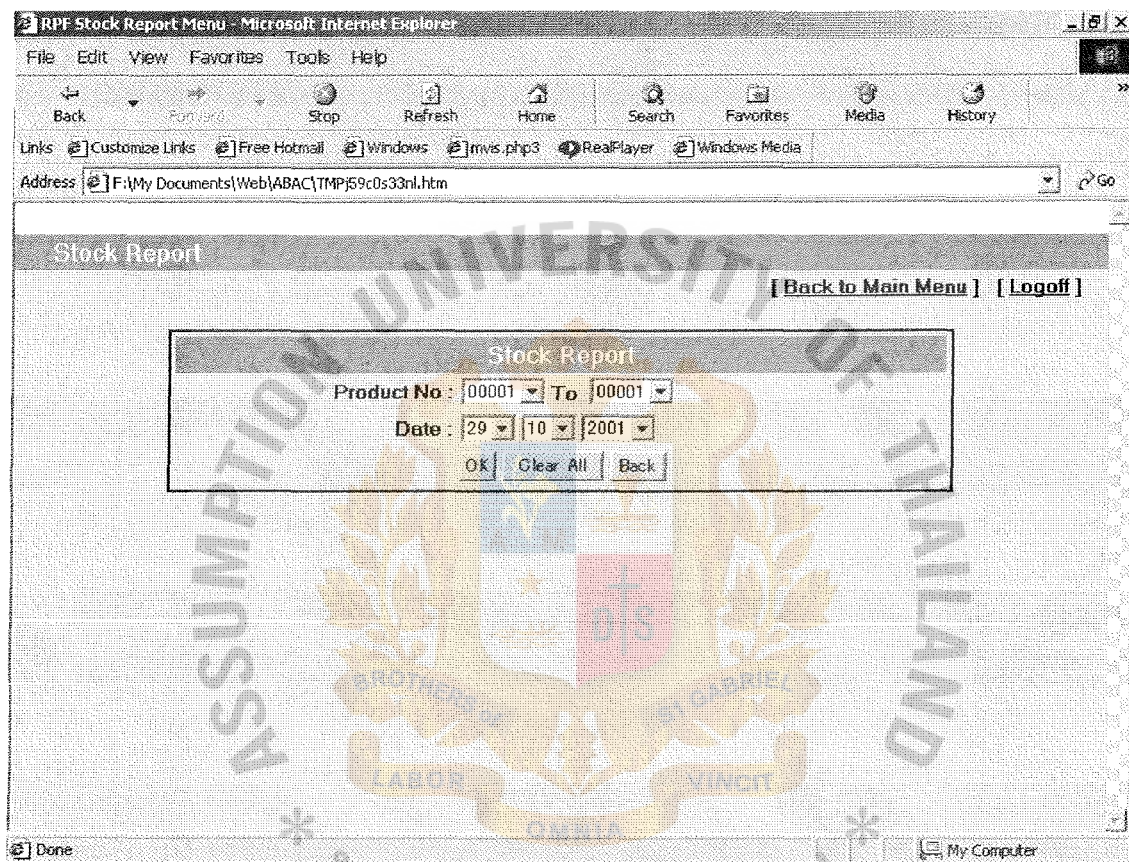


Figure F.15. Generate Stock Report Window.

RPF Stock Report - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites Media History

Links Customize Links Free Hotmail Windows mvis.php3 RealPlayer Windows Media

Address F:\My Documents\Web\ABAC\TMPcdiy7s2uyp.htm Go

Stock Report Result(s)

[Back to Main Menu] [Logoff]

No	Select	Product No	Product Name	Product Description	Listed Price	Discount	Unit Price	Stock
1	<input type="checkbox"/>	00001	Red Rose	Red Rose - 100 Flowers	286.00	0.00%	286.00	5.0
2	<input type="checkbox"/>	00002	Orange Rose	Orange Rose - 100 Flowers	290.00	0.00%	290.00	6.0
3	<input type="checkbox"/>	00003	Carrot A	Carrot A - 1 kg.	300.00	0.00%	300.00	4.0
4	<input type="checkbox"/>	00004	Cabbage A	Cabbage A - 1 kg.	150.00	0.00%	150.00	5.0
5	<input type="checkbox"/>	00005	Brockerly	Brockerly A - 1 kg.	450.00	0.00%	450.00	1.0

Page 1 of 1

Select All Clear All Add to Order Delete Print Back

Done, but with errors on page. My Computer

Figure F.16. Stock Report Window.

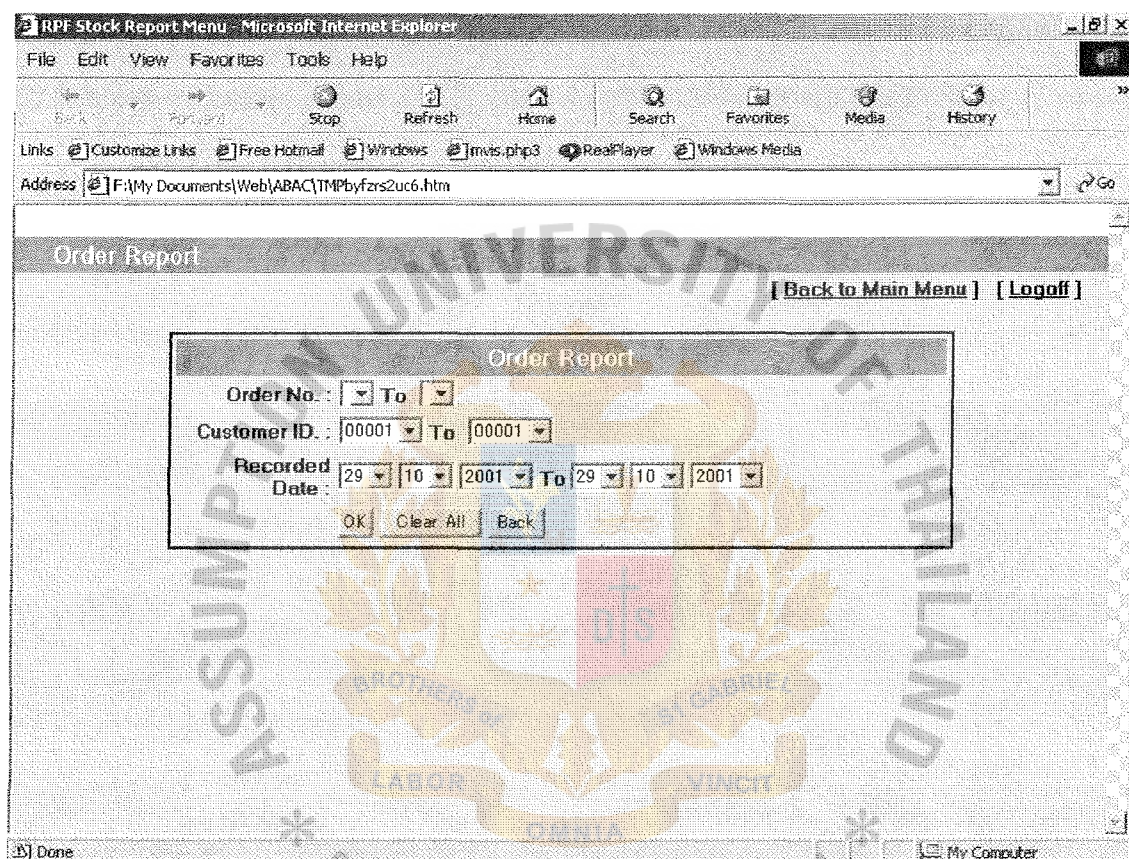


Figure F.17. Generate Order Report Window.

RPF Order Report - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites Media History

Links Customize Links Free Hotmail Windows Invis.php3 RealPlayer Windows Media

Address F:\My Documents\Web\ABAC\TMPc2173s2uhj.htm Go

Order Report Result(s) [Back to Main Menu] [Logoff]

No.	Select	Order No.	Customer ID	Company Name	Total Amount	Approval Status	Delivery Status	Cancel
1	<input type="checkbox"/>	0524	100005	Natural Value Co., Ltd.	22,900	Yes	Yes	<input type="checkbox"/>
2	<input type="checkbox"/>	0525	100046	Central Group	150,000.00	Yes	No	<input type="checkbox"/>
3	<input type="checkbox"/>	0526	100033	Herbal World Co. Ltd.	32,000.00	Yes	No	<input type="checkbox"/>
4	<input type="checkbox"/>	0527	100185	Pan Pacific Hotel	70,500.00	Yes	Yes	<input type="checkbox"/>
5	<input type="checkbox"/>	0528	100092	Oriental Hotel	290,000.00	Yes	Yes	<input type="checkbox"/>

Page 1 of 2

Page 1 >>2

Select All Clear All Cancel Print Back

Done My Computer

Figure F.18. Order Report Window.

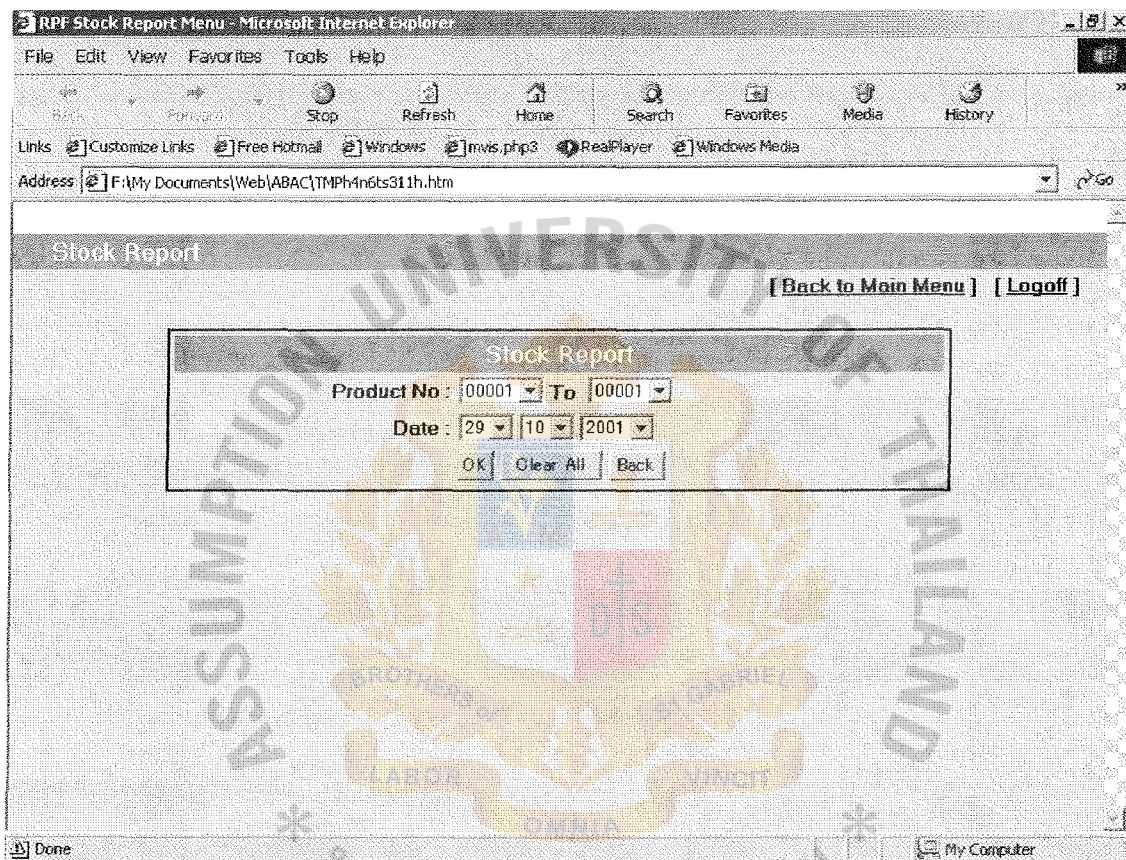


Figure F.19. Generate Stock Report Window.

RPF Stock Report - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites Media History

Links Customize Links Free Hotmail Windows mvis.php3 RealPlayer Windows Media

Address F:\My Documents\Web\ABAC\TMPcdy7s2uyp.htm Go

Stock Report Result(s)

[Back to Main Menu] [Logoff]

No.	Select	Product No.	Product Name	Product Description	Listed Price	Discount	Unit Price	Stock
1	<input type="checkbox"/>	00001	Red Rose	Red Rose - 100 Flowers	286.00	0.00%	286.00	5.0
2	<input type="checkbox"/>	00002	Orange Rose	Orange Rose - 100 Flowers	290.00	0.00%	290.00	6.0
3	<input type="checkbox"/>	00003	Carrot A	Carrot A - 1 kg.	300.00	0.00%	300.00	4.0
4	<input type="checkbox"/>	00004	Cabbage A	Cabbage A - 1 kg.	150.00	0.00%	150.00	5.0
5	<input type="checkbox"/>	00005	Brockerry	Brockerry A - 1 kg.	450.00	0.00%	450.00	1.0

Page 1 of 1

Select All Clear All Add to Order Delete Print Back

Done, but with errors on page. My Computer

Figure F.20. Stock Report Window.



APPENDIX G

RISK MANAGEMENT

RISK MANAGEMENT

Risk management is implemented to preserve confidentiality, integrity, and availability of system and data. First, we have to determine risk that may occur and damage our system. Second, we determine probability that risk occurs and how much loss if it occurs, then find the way to protect, detect, and recovery the risk.

Risk Identification

- (1) Intentional Risk: Unauthorized access
- (2) Unintentional Risk: Human Error, Disaster, Electric Failure, and System Failure.

Risk Management and Control

Unauthorized Access

Unauthorized access is a very important risk that we should protect, even though the probability of occurrence seems to be less. Unauthorized party may access the system, damage or modify the information for private benefits. Protection may be setting the authentication window for staff before entering the system. We can detect unauthorized party accessing our system by detecting the person who uses the system, detecting the modification of data compared with back-up file and so on. Recovery the data lost or modification is using the back-up file. The back-up file is very important. In case of the sales department, we can use CD-RW to back up important file twice daily.

Human error is something occurring very often. Human error may be the error of data when the staff converts information on paper to computer file. We can detect those data error by comparing with the back-up file or the original document as well. Protection is controlling the human operations, such as input data and others, whether

they follow the procedure designed. It can reduce human error. Recovery, in case of the human error causes data integrity damage, is using the back-up data as well.

Disaster

Bangkok has a few chances for the disaster occurs. There may be storm to damage electric wire and cause electric failure. The other disaster, such as earthquake, has never happened. Therefore, let's risk.

Electric Failure

Electric failure is approximately 10 times a year maximum. It may be caused by storm or other situations. Electric failure can be protected by using UPS. Staff can save data before the system shut down. Electric failure in Thailand takes a short time to recover. If it takes a long time, we have to use manual operation instead. Therefore, practicing the staff to use manual operation is needed as a preparation during the system shut downs. When electricity fails, some data may be lost. We can use back-up file to recover the data.

System Failure

System failure is caused by hardware or software failure. In case of hardware failure, we can use another same device instead or wait for reparation. In case of software failure, we can use another computer that has the same software. If the data are lost by software or hardware failure, we can use the back-up data also.

In case the over all system downs or fails, we should train the staff to use the manual operation instead.

However, the organization must have computer staff who know and can recover these hardware and software failure. Moreover, if the computer staff can not solve the problems, the organization must know the MIS company and employs them to recover the system.

BIBLIOGRAPHY

1. Couger, J. D. and M. A. Colter. Maintenance Programming: Improved Productivity through Motivation, Second Edition. New Jersey: Prentice-Hall Inc., 1985.
2. Date, C. J. An Introduction to Database System, Seventh Edition. United States of America: Addison-Wesley Publishing Company, 1998.
3. Greer, Tyson. Understanding Intranets. Redmond, WA: Microsoft Press, 1998.
4. Korth, Henry F. and Abraham Silberschatz. Database System Concepts, Second Edition. New York: Irwin McGraw-Hill, 1991.
5. Kosiur, David. Understanding Electronic Commerce. WA: Microsoft Press, 1997.
6. Laudon, Kenneth C. and Jane P. Laudon. Management Information System: Organization and Technology. United States of America: Prentice-Hall, Inc., 1996.
7. Loomis, Mary E. S. Data Management and File Structure, Second Edition. New Jersey: Prentice-Hall Inc., 1989.
8. Mcnurlin, Barbara C. and Ralph H. Sprague. Information System Management in Practice, Fourth Edition. New Jersey: Prentice-Hall Inc., 1989.
9. Rapaport, Richard. The Network Is the Company: An Interview with John Gage. New York: Fast Company. Premier Issue, 1995.
10. Stallings, William. Computer Organization and Architecture, Fifth Edition. New Jersey: Prentice-Hall Inc., 2000.
11. Stallings, William. Operating System, Third Edition. New Jersey: Prentice-Hall Inc., 1998.
12. Trepper, Charles. E-Commerce Strategies. USA: Microsoft Press, 2000.
13. Whitten, Jeffrey L. and Lonnie D. Bentley. System Analysis and Design Methods, Fourth Edition. New York: Irwin McGraw-Hill, 1998.