



INVENTORY TRACKING SYSTEM
FOR P & S WHOLESALE CO., LTD.

by

Ms. Monchaya Charagone

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, 2000

MS (CIS)
St. Gabriel's Library

**Inventory Tracking System
for P&S Wholesale Co., Ltd.**

by
Ms. Monchaya Charagone

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 2000


Project Title	Inventory Tracking System for P&S Wholesale Co., Ltd.
Name	Ms. Monchaya Charagone
Project Advisor	Dr. Ketchayong Skowratananont
Academic Year	July 2000


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.


Approval Committee:

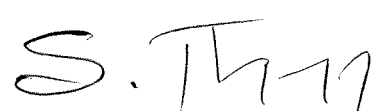



(Dr. Ketchayong Skowratananont)
Advisor


(Prof. Dr. Srisakdi Charmonman)
Chairman


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


(Asst. Prof. Dr. Vichit Avatchanakorn)
Member


(Assoc. Prof. Somchai Thayarnyong)
MUA Representative

July 2000

ABSTRACT

At present there are many sizes of the organization and company, and every organization increases in term of size very fast. The demand and needs of reliable, accurate, timely and information by people in the organization also grow very fast. Therefore this system is developed to improve the capability and work efficiency to support and serve the inventory tracking system of the company.

The scope of this project is to analyze the existing system and design the new computer system to meet the requirement of the users, providing the computerize system to the employees at the inventory department in order to carry out their work accurately and more efficiently. The employees will give up-to-date information to plan for the new market and reduce the risks in inventory and purchasing.

The new system proposed is developed according to organization needs by using the system analysis and design technique. Such as dataflow diagrams we use to describe the information flow and the new system can use this information to find out the solution to solve the problem and meet the user requirement. The new system also focuses on the user requirements, system design, software and hard requirements security and control, also including the design of input screen which chose Microsoft Visual Basic 6.0 as the program development tool on the computer network.

ACKNOWLEDGEMENTS

This system development project is completed through the contributions from several people. The writer sincerely acknowledges their efforts and thank them for their contribution and useful suggestions.

Firstly, the writer would like to thank Dr. Ketchayong Skowratananont, the advisor of this project, for his valuable suggestions, advise and comments throughout the whole project. And it also give me the great pleasure to express my deep sense of gratitude to the committee of the degree of Master of Science in Computer Information Systems, Prof.Dr. Srisakdi Charmonman, Air Marshal Dr. Chulit Meesajjee, Asst.Prof.Dr. Vichit Avatchanakorn and Assoc.Prof. Somchai Thayarnyong for their constructive feedback which are very valuable guidance on the modifications for this project.

The writer is also indebted to all staffs from the P&S wholesale company for their assistance and providing all information to her while collecting the required data to do this project.

TABLE OF CONTENTS

<u>Chapter</u>	<u>Page</u>
ABSTRACT	i
ACKNOWLEDGEMENTS	ii
LIST OF FIGURES	v
LIST OF TABLES	viii
I. INTRODUCTION	1
1.1 Background of the Project	1
1.2 Objective of the Project	2
1.3 Scope of the Project	2
II. EXISTING SYSTEM	4
2.1 Background of Organization	4
2.2 Existing Business Functions	4
2.3 Current Problems and Areas for Improvement	6
III. PROPOSED SYSTEM	7
3.1 User Requirements	7
3.2 System Design	8
3.3 Hardware and Software Requirement	12
3.4 Network Configuration	14
3.5 Process Design	16
3.6 Database Design	18
3.7 Security and Controls	19
3.8 Cost and Benefit Analysis	20

<u>Chapter</u>	<u>Page</u>
IV. PROJECT IMPLEMENTATION	28
4.1 Overview of Project Implementation	28
4.2 Project Implementation	28
4.3 Testing	29
4.4 Complete the Documentation	30
V. CONCLUSIONS AND RECOMMENDATIONS	31
5.1 Conclusions	31
5.2 Recommendations	32
APPENDIX A PAYBACK ANALYSIS	34
APPENDIX B CONTEXT DIAGRAM	40
APPENDIX C DATA FLOW DIAGRAM	42
APPENDIX D STRUCTURE CHART	49
APPENDIX E FILE STRUCTURE	55
APPENDIX F DATA DICTIONARY	61
APPENDIX G PROCESS SPECIFICATION	64
APPENDIX H DATABASE DESIGN	70
APPENDIX I REPORT DESIGN	75
APPENDIX J SCREEN DESIGN	87
APPENDIX K PROJECT PLAN	96
BIBLIOGRAPHY	97

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
2.1 Organization Chart of P&S Wholesaler	5
3.1 Network Configuration of the Proposed System	15
3.2 Break-Even Chart	27
A.1 Payback Analysis Graph for Candidate Solution 1	35
A.2 Payback Analysis Graph for Candidate Solution 2	37
A.3 Payback Analysis Graph for Candidate Solution 3	39
B.1 Context Diagram of Existing System	40
B.2 Context Diagram of Proposed System	41
C.1 Data Flow Diagram Level 0	42
C.2 Data Flow Diagram Level 1 Process 1: Verify Stock and Customer Order	43
C.3 Data Flow Diagram Level 1 Process 2: Check Monthly Inventory	44
C.4 Data Flow Diagram Level 1 Process 3: Create P/O Form	45
C.5 Data Flow Diagram Level 1 Process 4: Receive and Reject Goods	46
C.6 Data Flow Diagram Level 1 Process 5: Delivery Goods	47
C.7 Data Flow Diagram Level 1 Process 6: Create Report	48
D.1 Structure Chart of Verify Stock and Customer Order Process	49
D.2 Structure Chart of Check Monthly Inventory Process	50
D.3 Structure Chart of Create P/O Form Process	51
D.4 Structure Chart of Receive and Reject Goods Process	52
D.5 Structure Chart of Delivery Goods Process	53
D.6 Structure Chart of Create Report Process	54
H.1 Database Schema	70

<u>Figure</u>	<u>Page</u>
H.2 Database Schema (Continued)	70
H.3 Context Data Model	72
H.4 Key-Based Attribute Data Model	73
H.5 Fully Attribute Data Model	74
I.1 Product Status Report	75
I.2 Monthly Product Purchase Order Report	76
I.3 Product Purchased Report Classified by Supplier	77
I.4 Monthly Return Product Report	78
I.5 Monthly Product Requisition Report	79
I.6 Daily Product Delivery Report	80
I.7 Product Delivery Report Classified by Customer	81
I.8 Product List for Each Customer	82
I.9 Customer Information Report	83
I.10 Supplier Information Report	84
I.11 Supplier Report (Arrange by Supplier's Name)	85
I.12 Supplier Report (Arrange by Amount of Purchase)	86
J.1 Login Screen	87
J.2 Main Menu Screen	88
J.3 Add Menu Screen	89
J.4 Customer Screen	90
J.5 Product Screen	91
J.6 Employee Screen	92
J.7 Supplier Screen	93

<u>Figure</u>	<u>Page</u>
J.8 Check Inventory Screen	94
J.9 Search Screen	95
K.1 Project Plan	96



LIST OF TABLES

<u>Table</u>	<u>Page</u>
3.1 Candidate System Matrix	10
3.2 Feasibility Analysis Matrix	11
3.3 Cost of Existing System	25
3.4 Cost of Proposed System	26
5.1 Degree of Achievement of the Proposed System	32
A.1 Payback Analysis for Candidate Solution 1	28
A.2 Payback Analysis for Candidate Solution 2	30
A.3 Payback Analysis for Candidate Solution 3	32
E.1 File Structure of Customer File	55
E.2 File Structure of Supplier File	56
E.3 File Structure of Product File	57
E.4 File Structure of Category File	57
E.5 File Structure of Employee File	58
E.6 File Structure of Invoice File	59
E.7 File Structure of Invoice Detail File	59
E.8 File Structure of Order File	60
E.9 File Structure of Order Detail File	60
F.1 Data Dictionary	61

I. INTRODUCTION

1.1 Background of the Project

At present, the information system plays a vital role in the business world. Information nowadays is a weapon to gain advantages over other competitors. To control and maintenance of inventory of each company is a common problem. As P&S Wholesale company, the inventory tracking system is a critical success of the trading company business as the investment of inventory is more than 80% of total cost of trading.

The stock control is the worst problem of many trading firms. They must control the level of the inventory, which must be suitable to the marketing demand. Now the company's routine tasks are handled with a manual system, which brings about many problems. The manual system cannot maintain an up-to-date and accurate information on stock on hand. So, the manager could not have an up-to-date, accurate information on stock on hand and hence result in the poor take-in-order by the salesman. Therefore, the computerized system is necessary to provide the accurate information to support management decision making which helps the firm gain a strategic planning.

The new computerize inventory control system also can be used as a means to contribute to the company's fast growing and improve the effectiveness, in the firm's inventory management.

1.2 Objectives of the Project

The objectives of the development of P&S wholesale Inventory Tracking System are as follows:

- (1) To study the existing manual inventory management information system for revise plan, control and design new system for inventory tracking system.
- (2) To design a computer-based information system for Inventory Tracking System to replace the manual system which can help to update the stocks timely, reduce redundancy and inaccuracy of information.
- (3) To enable the analysis of the customer's demand.
- (4) To acquire a more effective stock control.
- (5) To reduce to investment in the inventories, warehousing and holding cost in the inventories by using the reliable reports of the system.
- (6) To improve and develop the Inventory Tracking System for the company.

1.3 Scope of the Project

The scope of this project will cover 3 majors part which are the scope of data, scope of processes, and scope of interfaces. The details in each area are the following:

- (1) The scope of data of this project are included with all of the data or information that play as input or output in the inventory tracking system.

The names of data are listed below.

- (a) Inventory Information
- (b) Supplier Information
- (c) Purchase Order Information

(2) The scope of processes of this project is all of ongoing processes which occur in the Inventory Tracking System. The name of processes are listed below.

- (a) Verify Stock and Customer Order Function.
- (b) Monthly Check Inventory Function.
- (c) Create Purchase Order from Function.
- (d) Receive and Rejected Goods Function.
- (e) Delivery Goods Function.
- (f) Preparing Report Function.

(3) The scope of interfaces

To design screen layout for end users, and the external entities concern with Inventory Tracking System are listed below.

- (a) Customer
- (b) Supplier
- (c) Account
- (d) Management
- (e) Warehouse

II. EXISTING SYSTEM

2.1 Background of Organization

P&S Wholesale was established 30 years ago and located in Lampang Province. The household products. The company's products range from mosquito nets, pillows, blankets, mattresses, bath towels, infant garments, tables, chairs and other household products. As it is a family-owned business and reputable in selling goods at reasonable prices, customers are not only people in Lampang but also from the nearby province. Therefore 70% of P&S wholesale turnover are from wholesales.

As a result of the growth, the company faces a critical problem. Presently the company handles with the manual system. So a computer based system is needed to fulfill the company's requirement of accurate and more efficient operations in inventory tracking system.

2.2 Existing Business Function

This company has departments that have different functions and responsibilities in the company. Each department's function is given below: (see organization chart)

(1) The Inventory Department

This department's function is to receive the customer order from the sales and marketing department and to check the requirements for order. After calculating the total requirement that they required, they sent the requisition of goods lists to the purchase department to order the goods.

(2) Sales & Marketing Department

There are 4 main functions in this department that are to take the order from the customer, selling and providing goods for customer, collecting

information which is important to marketing activities and planning for the marketing researches.

(3) Accounting & Finance Department

The function of this department is concerned with the record of all transactions which take place in the company, collects the customer's payment and pays the suppliers and preparing the financial and accounting report for the company, and managing the financial revenue and expenses of the company.

(4) Purchasing Department

The main function of this department is to receive the requisition of the goods list from the inventory department, choosing the appropriate suppliers, and making a decision of buying goods for the company.

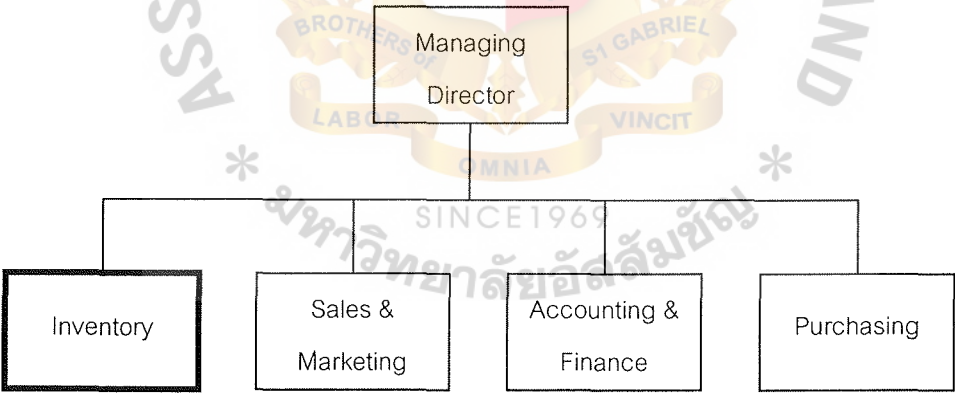


Figure 2.1 Organization Chart.

2.3 Current Problems and Areas for Improvement

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

- (1) The quantities and values of products in the stock are not up-to-date and too difficult to manage because there are abundant information of goods detail and many kinds of stock items.
- (2) It takes a long time on checking the inventory status and is difficult to collect the current items from the inventory.
- (3) It is difficult to implement the inventory purchasing process because the inventory information system cannot provide correct and on time information.
- (4) Stock checking is usually incorrect due to human errors.
- (5) Customer's demand is unpredictable, and purchasing cannot be planned because the insufficiency of information base of inventory information.

III. PROPOSED SYSTEM

3.1 User Requirements

The user requirement of the proposed system can be divided into 3 major categories as the following:

3.1.1 Input Requirements

- (1) To provide the automatic data collection in order to verify the correctness of input data.
- (2) To provide the user friendly of computer program to serve the users who are not used to computer much.

3.1.2 Process Requirements

- (1) To update the details of inventory goods list automatically when the goods are issued and received.
- (2) To remove data redundancy and to store data in the suitable format.

3.1.3 Output Requirements

- (1) To provide the up-date and reliable information which is important to the management department.
- (2) To provide the security for the computer system by the unauthorized user.
- (3) To provide the on time accessing of the information.
- (4) To reduce the manual work and increase the knowledge base of computer in person of organization.

3.2 System Design

The system design for the P&S Wholesale Inventory Tracking System proposes alternative solutions to find the best way to manage the inventory information, which is, each evaluation of alternative solution can be divided into 3 major parts as following.

3.2.1 Candidate Solutions

We have to identify alternative candidate solutions which is suitable to the business requirement. There are three candidates for each candidate addresses how technology may be used to support the system.

(1) Candidate Solution 1

In the first solution, inventory and purchasing control software solutions would be purchased to satisfy and prepare the report and make it easy to use.

(2) Candidate Solution 2

In the second candidate solution, the inventory package software also purchase and provide warehouse operations in relation to order fulfillment.

(3) Candidate Solution 3

This solution creates the powerful application on both client and server side components. Provides the new standard for data access and a complete set of tools for integrating databases with any application.

3.2.2 Candidate System Matrix

The propose of candidate system matrix is to find the best alternative solutions for the organization and evaluate each alternative which is suitable and most appropriate. Then pick up the best one and important characteristics of candidate system matrix consists of portion of system computerize, benefits, servers and workstations. Software

Tools Needed, Application Software, Method of Data Processing, Output Devices and Implications, Input Devices and Implications and Storage Devices and Implications.

3.2.3 Feasibility Analysis Design

The one important activity to evaluate the alternative candidate solutions is feasibility analysis design. Feasibility analysis should be limited to costs and benefits of the project. Then in our project, we have set the four criteria in evaluating the candidate solutions, as following:

- (1) Technical feasibility is an assessment of the maturity, availability and desirability of the computer technology needed to support the candidate solutions.
- (2) Economic feasibility is the method for finding the best cost to develop the system, pay back period and net present value of each candidate solution.
- (3) Operational feasibility is the description of, to what degree the candidate would benefit the organization and how well the system would work, which we can collect from the organization survey.
- (4) Schedule feasibility the purpose of this feasibility is to find out how long the solution will take to design and implement.

For more information of the feasibility analysis of this system, the next page show the all details in each candidate solution feasibility.

Table 3.1. Candidate System Matrix.

Characteristics	Candidate 1	Candidate 2	Candidate 3
Portion of System Computerized	Software package would be purchased to serve the inventory tracking and purchasing control and satisfy the system user	Same as candidate 1 and inventory control and warehouse operation in relation to order fulfillment	Same as candidate 2
Benefits	Fully supports user required business process for company	Can be implemented quickly and provide more efficiency in accessing	Same as candidate 2
Servers and Workstations	Pentium III 550E, SD RAM 128 MB, MS Windows NT Server 4.0, Pentium III 550 E, SD RAM 64 MB, MS Windows 98 (clients)	Pentium III 600 (Server) Pentium III 550 (Client)	Pentium III 550 MHz Window 98
Software Tools Needs	MS Visual Basic 6.0 for user interface	MS Access for user interface	MS Access for user interface
Application Software	Custom Solution helps user easily process project activities	Same as candidate 1	Stand alone
Method of Data Processing	Client/Server	Same as candidate 1	Same as candidate 1
Output Devices and Implications	HP LaserJet 1100 HP DeskJet 830C	Same as candidate 1	Same as candidate 1
Input Devices and Implications	Keyboard & Mouse	Same as candidate 1	Same as candidate 1
Storage Devices and Implications	MS Visual Basic 6.0 for server database Harddisk 10.2 GB	Same as candidate 1	MS Access for workstation Database

MS (CIS)
St. Gabriel's Library

1520 e.1

Table 3.2. Feasibility Analysis Matrix.

Feasibility Criteria	Weight	Candidate 1	Candidate 2	Candidate 3
Operational Feasibility	30%	Fully supports user required functionality Score : 100	Fully supports user required functionality Score : 100	Only supports Inventory system requirements and current business processes would have to be modified to take advantage of computerized system Score : 60
Technical Feasibility - Technology - Expertise	30%	MS Visual Basic 5.0 helps customize the users' requirements and is much better user interface. It can be revised to be use through the internet for further development plan. Required programmer and training for the end user. Score : 100	Microsoft Windows NT with Microsoft Access can implement inventory and purchasing control easily and quickly. Same as candidate 1 Score : 90	For current system, we use manual system that is very slow. So, we change to use standalone computerize system with MS Access. Microsoft Access is a mature technology based on version number Score : 65
Economic Feasibility - Cost of develop: - Payback period (discounted): - Net Present Value: - Detailed calculations:	30%	Approximately 608,100Baht Approximately 2 years Approximately 1,371,236 Baht See Appendix A Score : 95	Approximately 487,250 Baht Approximately 3 year Approximately 502,682 Baht See Appendix A Score : 90	Approximately 350,000Baht Approximately 3 years and 2 months Approximately 166,946 Baht See Appendix A Score : 65
Schedule Feasibility	10%	7 months Score : 80	6 months Score : 85	3 months Score : 90
Ranking	100%	96.5	92.5	66

3.3 Hardware and Software Requirement

Hardware and software requirement for the new system is to provide the effective access, update, create and achieve data. So the new system network has to be linked together via communication lines, and the data processing is a centralized system by using one computer file server to serve the entire organization.

The following are the details of hardware and software requirement for the new network system.

3.3.1 Hardware Requirement

In the new propose system the hardware requirement can classified as following:

- (1) Database File Server
 - Processor Pentium III 550E
 - External Cache 512KB
 - RAM/MAX 128 MB
 - Floppy Drive 1.44
 - CD ROM Drive 40X
 - Hard Disk 10.2 GB
 - Bus Architecture LANCARD 10/100 Mbs UTP port
 - Monitor size/type Standard Color 15"
 - Video Ram 8 MB
 - Sound Card PCI 32 BIT
 - Network Card HUB 5 Port 10 BASE-T

The database file server is a centralized system which serves the data processing and data storage for the entire system, so it is necessary to have the high capacity in

accessing the data and the big storage space. Then the server used in this system has 10.2 GB to keep the application software and information.

(2) Database File Server

- Processor Pentium III 550E
- External Cache 512KB
- RAM/MAX SD Ram 64 MB PC-100 HITACHI
- Floppy Drive 1.44
- CD ROM Drive 40X
- Hard Disk 4.3 GB
- Bus Architecture LANCARD 10/100 Mbs UTP port
- Monitor size/type CTX-NOW 15"
- Video Ram 8 MB
- Sound Card X-WAVE 320 3D
- Network Card HUB 5 Port 10 BASE-T

The workstation computers of the new system are used for supporting report preparation, accessing and generating and for routine paper work. So the private software is installed to support such works.

(3) Printer

- HP LaserJet 1100
- HP DeskJet 830C

(4) Other Device

- UPS D3 750 VA

3.3.3 Software Requirement

(1) Operation System

- Microsoft Windows NT 4.0 Server (Thai)
- Microsoft Windows NT 4.0 Workstation (Thai)

(2) Software Package

- Microsoft Word 97
- Microsoft Access 97
- Microsoft Excel 97
- Microsoft PowerPoint 97

3.4 Network Configuration

For the network configuration for this project, the printer of Dot Matrix is needed because the numbers of invoice and purchase order per day are not more than 60 copies. The laser printer, we use for printing the report and other paper work. Since this project is developing, using networking hardware such as printer can be shared. For the server we set up in the room to contact all workstations and every report will be printed in this room. All workstation can share the printer and other resources.

Figure 3.1 shows more detail of the network configuration of the proposed system.

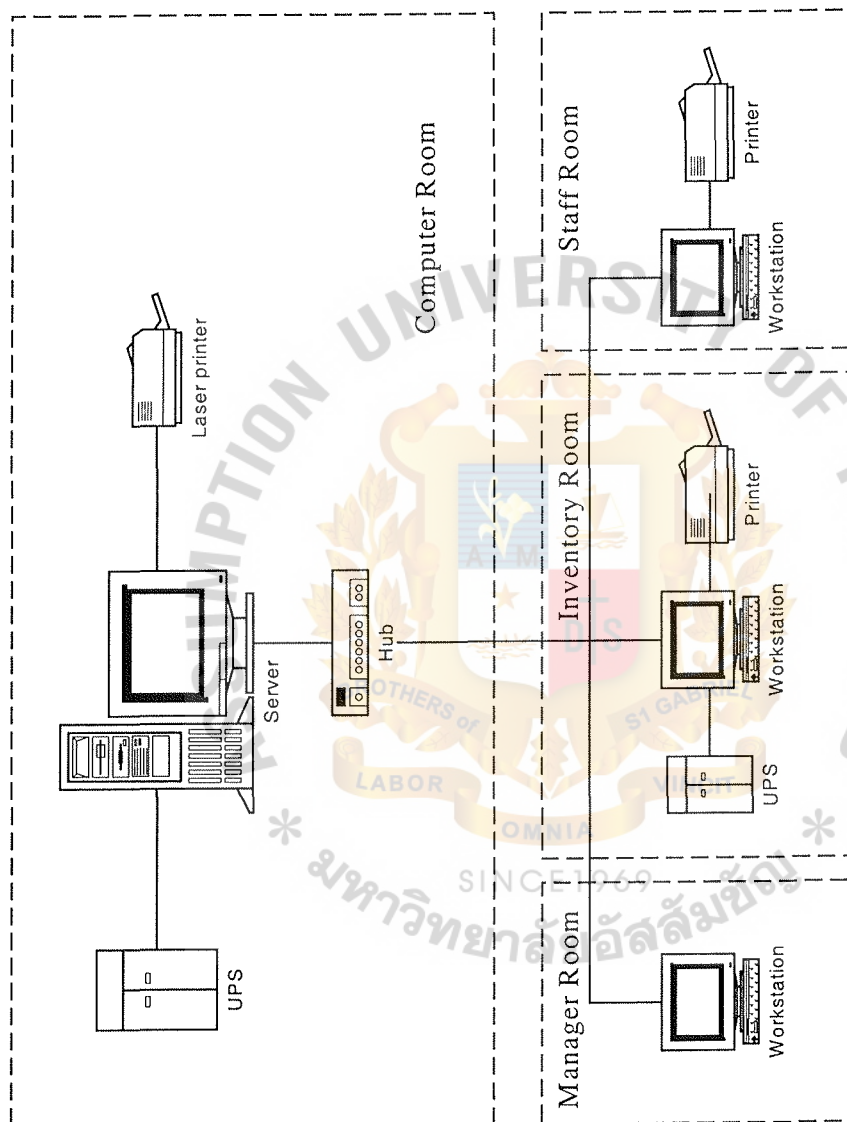


Figure 3.1. Network Configuration of the Proposed System.

3.5 Process Design

The propose process design was based on Data Flow Diagram (DFD). The designing of the propose process, we had to analyze the existing process and improve the new DFD which is shown in Appendix B-C. The detail of the new system can be described as follows:

3.5.1 The Context of the Proposed System

When the customers want to order the products, they will send the order to the system. If there are the sufficient products the system will send the confirmed order back to the customer. And if the system could not supply the customer order, the system will send back to inform the customer. On the other hand, customers will send the returned order if the products are not correct or the customer would like to change the products.

After the system receives the order, the ordered information and invoice will be sent to the Accounting division or in case there are returned order the rejected invoice will be sent back to the system. After that the system will send the picking ticket to the warehouse to prepare delivery of the products to the customers. And for returned order the system will send the list of the products to the supplier. The supplier also sends the update products list to the system.

The system provides the report of all activity and information, which is in this system and send to Management checking every month.

3.5.2 The Process of the Proposed System

To achieve the objective of the proposed system there are 6 important processes as follows:

(1) Process 1: Verify Stock and Customer Order

When the customers send the order or products to inform their requirement to the system, the system will verify the stock of products and customer order. The system checks the available products and then issue confirmation form and send back to customer. The requisition order will provide at this process and send to the process of delivery goods. On the other hand if the stock or products do not reach to the customer order, the system will issue the invalid customer order and inform the customer. And the requisition for inventory will be prepared and sent to the process to create purchase order.

(2) Process 2: Monthly Check Inventory

This process system will provide the information of the current status of the inventory and check the items every month to prepare the requisition of inventory if the quantity of product reaches to be ordered. In this process the system also receive the goods record and estimate the goods items for the process to verify stock and customer order.

(3) Process 3: Create Purchase Order Form

When the system receives the requisition for inventory from the process 1 and 2, the system will create the purchase order according to the requisition and send the purchase order to the supplier and record the information in the purchase order file.

(4) Process 4: Receive & Rejected Goods

The process will verify the purchase order and delivery bill which is received from the customer. If there are not any mistake the system will

pass to the accounting department. But if there are some returned products the system will issue the returned goods list and send back to the supplier and inform the accounting department.

(5) Process 5: Delivery Goods

After receiving the requisition order the system will issue the picking ticket and send to warehouse to prepare the goods. The system delivers goods to the customers with the invoice and also sends invoice to the Accounting department. When the customer received the goods there may be some returned order, the system will send the sale and returned order to record in the inventory file after the delivery of the goods.

(6) Process 6: Prepare Report

There are 2 kinds of report that this system provides, first is report prepared by daily, weekly, monthly and quarterly. Second is the report that managers or executives can retrieve for any time. Then when they want to know the information, the system will collect the data by retrieving the data from the data stored and arrange into the easy form for use.

3.6 Database Design

The database of the propose system has to be developed by preparing the data model in the simple form, non-redundant and using the entity relationship diagram (ERD) technique which is shown in Appendix B. The data will be in the 3rd normal form after we used the ERD technique and then use the database schema to represent the technical implementation of the logical data model. This is presented in Appendix H.

3.7 Security and Control

Security in the computer is the most important issue for every company because the major assets of the computer system are software, hardware and data which are vulnerable to damages. So the security of the computer system should start from login to the system. There must be passwords for login security control to prevent unauthorized users from accessing the system. However, the attack to the computer data can be defined as the most serious problem in computing security. Therefore data must be input on the same day or after the transactions occurred and the data connection must be made immediately when found the error in the system. The following and control method are proposed for the company's inventory tracking system.

3.7.1 Encryption

In network operating system, there are various programs and data files, transforming and processing in each day. The security of coding is very important and must determine the person who can get access to the programs, to prevent from damage of the data file and computer system.

3.7.2 Software Control

Programs must be secure enough to prevent the outside attack. And they must cover for all general controls. Such as internal program control which controls the part of enforce security restrictions, operating system control which is to protect the system user from the unauthorized user, and also concerned with the development control which cover the quality and standards of the system that the company used.

3.7.3 Hardware Control

The hardware devices, which used to assist in computer security must have implementations of encryption to prevent the unauthorized user, protection from the theft and control access to disk drive in PCs.

3.7.4 Physical Control

The physical control is to use the technicalities such as door locks, guards at entry points, back up of important data and protection from natural disasters such as power supply which has to be provided in the system control.

3.8 Cost and Benefit Analysis

3.8.1 Cost Analysis

(1) Investment Cost

The investment cost, the following shows the cost of hardware and software that are required in this new proposed system.

(a) Hardware Cost

1 set of File Server	110,000 Baht
3 sets of Workstations	120,000 Baht
1 set of Repeater (Hub)	32,900 Baht
1 set of Laser Printer	36,500 Baht
1 set of Dot Matrix	26,900 Baht
1 set of Cross over	1,000 Baht
1 set of UPS 1500 VA	15,300 Baht
1 set of UPS 1200 VA	16,000 Baht

1 set of APC Back Up 1000 VA	9,900 Baht
Total Hardware Cost	368,500 Baht
(b) Software Cost	
1 set of Windows NT Server 4.0	35,000 Baht
1 set of Windows NT Workstation 4.0	14,600 Baht
3 set of MS Office (Thai)	40,000 Baht
Total Software Cost	89,600 Baht
(c) Implementation Cost	
Software Development	120,000 Baht
Installation and Startup	15,000 Baht
Training	15,000 Baht
Total Implementation Cost	150,000 Baht
Total Investment Cost (368,500+89,600+150,000)	= 608,100 Baht
(2) Annual Operating Cost	
- Hardware: Part and Labor	5,000 Baht
- Software : Maintenance and Upgrade	5,000 Baht
- Software Support	5,000 Baht
Total Annual Operating Cost	15,000 Baht

3.8.2 Benefit Analysis

The benefit of new inventory tracking system can be divided into 2 categories: the first one is tangible benefit and the second is intangible benefit.

(1) Tangible Benefit

Tangible benefits of the proposed system are as follows:

- (a) Increase the efficiency of checking inventory information which reduces the checking time from 1 hr. to 30 minutes per production order.

- Wages/hours 45 baht/person
- Person 1
- Save time $60-30 = 30 \text{ min/production order}$
- Save cost per production order
 $(45/60) * 30 = 22.5 \text{ baht/production order}$
- Average production order/day 6 orders
- Cost saving/day $22.5 \times 6 = 135$
- Cost saving/year $135 \times 26 \times 12 = 42,120 \text{ baht}$

- (b) Reduce office supply expense

- Reduce from 18,000 baht/month to 5,000 baht/month
- Cost saving/month = 13,000 baht
- Cost saving/year = 156,000 baht

- (c) Increase the efficiency of purchasing order which reduces the price comparison and collecting price information from 3 hrs/purchasing order to 30 mins/purchasing order.

- Wages/hour 50 Baht

St. Gabriel's Library

- Person 1
- Time saving $3 - 0.5 = 1.5$ hrs/purchasing order
- Cost saving/purchasing order $1.5 \times 50 = 75$
- Average purchasing order/month 26 orders
- Cost saving/month $75 \times 26 = 1,950$ baht
- Cost saving/year $1,950 \times 12 = 23,400$ baht

(d) Increase the efficiency of updating inventory information and reduce the error information from 5 hr. to zero time of updating

- Wages/hour 45 Baht/person
- Require person 3 persons
- Time saving/checking 5 hrs
- Cost saving/checking $(5 \times 45) \times 3 = 675$
- Cost saving/month 5,400 Baht
- Cost saving/year 64,800 Baht

(e) Reduce time for preparing report from 12 hrs. to 2 hrs.

- Wages/hour 45 Baht/person
- Person requirement 3 persons
- Time saving 10 hrs.
- Cost saving/preparation $45 \times 3 \times 10 = 1,350$
- Average report preparation/month 1 times
- Cost saving/month 1,350 baht
- Cost saving/year 16,200 baht

Total tangible benefit $(72,000 + 156,000 + 23,400 + 64,800 + 16,200)$
 $= 332,400$ baht

3.8.3 Calculations of Payback Period

$$\text{Payback Period} = \frac{I}{(1 - T) R}$$

I = Investment Cost

R = Average annual return on the investment
(tangible benefit subtracted by operating cost)

T = Corporate tax rate in percentage (30%)

$$\begin{aligned}\text{Payback Period} &= \frac{332,400}{(1 - 0.3) (332,400 - 15,000)} \\ &= 1.5 \text{ years}\end{aligned}$$

Payback period (after tax) for the proposed system is 1.46 years.

3.8.4 Calculation of Break Even Year

(1) Break Even Analysis

It is reasonable to apply the concept of break-even analysis to compare between the existing system and the proposed system. In this case, the cost the proposed system is compared with the cost of the existing system to determine whether the proposed system costs the same as the old one.

Figure 3.2 shows such the break-even analysis, in which the cost of the proposed system initially would be higher than the existing system. In 2 years, the proposed system would have reached the break-even point and thereafter, becomes more economical to operate than the existing system.

Table 3.3. Cost of Existing System.

Cost items	Years				
	1	2	3	4	5
1. Personal					
- Supervisor (1 person and 13,000 + 10% increase per year)	180,000	198,000	217,800	239,580	263,538
- Operators (3 persons and 8,000 + 10% increase per year)	408,000	448,800	493,680	543,048	597,353
2. Office Equipment	42,000	36,000	36,000	36,000	36,000
3. Office Supplies Cost (increase 5% per year)	60,000	66,000	72,600	79,860	87,846
4. Utility and Other Cost (increase 5% per year)	36,000	39,600	43,560	47,916	52,708
Total Cost (Baht)	726,000	788,400	863,640	946,404	1,037,444
Accumulative Cost (Baht)	726,000	1,514,400	2,378,040	3,324,444	4,361,888

Table 3.4. Cost of Proposed System.

Cost items	Years				
	1	2	3	4	5
1. Hardware Cost	73,700	73,700	73,700	73,700	73,700
2. Software Cost	17,920	17,920	17,920	17,920	17,920
3. Installation Cost	15,000	-	-	-	-
4. Development Cost	120,000	-	-	-	-
5. Office Equipment Cost	30,000	40,000	40,000	40,000	40,000
6. Manpower					
- Supervisor (increase 5% per year)	192,000	201,600	211,680	222,264	233,377
- Operator (increase 5% per year)	204,000	214,200	224,910	236,156	247,963
7. Maintenance (increase 10% per year)	20,000	22,000	24,200	26,620	29,282
8. Office Supplies Cost (increase 5% per year)	50,000	52,500	57,750	63,525	69,878
9. Training Cost	15,000	15,000	15,000	15,000	15,000
10. Utility Cost (increase 5% per year)	70,000	73,500	80,850	88,935	97,829
Total Cost (Baht)	807,620	710,420	746,010	784,120	824,948
Accumulative Cost (Baht)	807,620	1,518,040	2,264,050	3,048,170	3,873,118

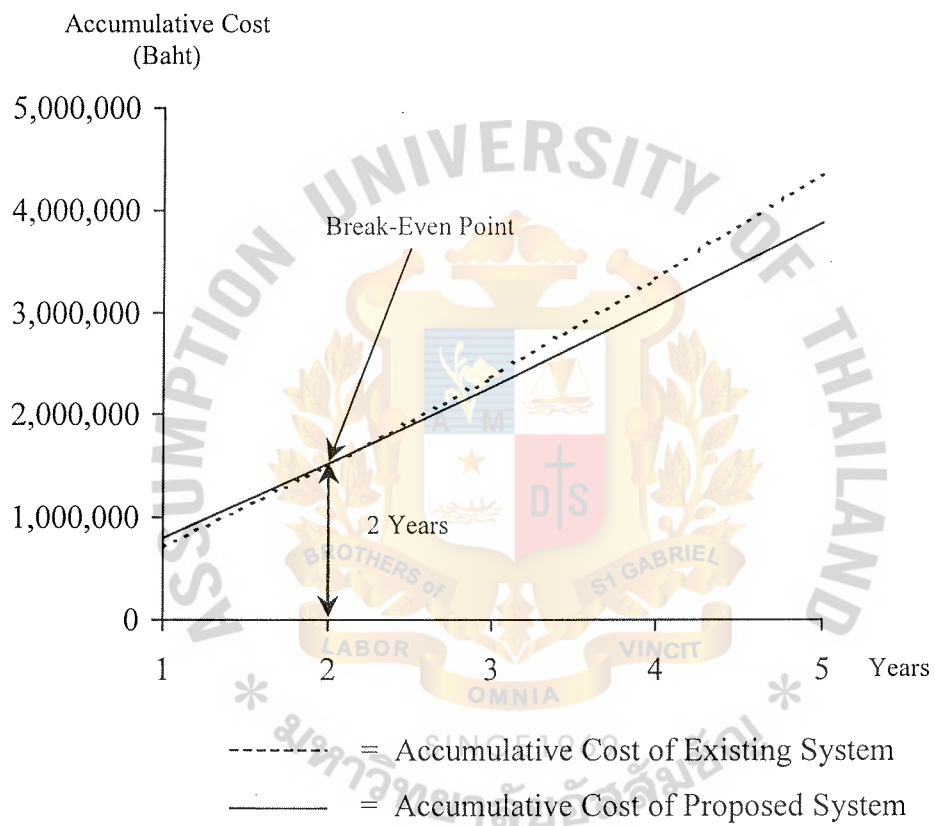


Figure 3.2. Break-Even Chart.

IV. PROJECT IMPLEMENTATION

4.1 Overview of Project Implementation

Before starting to implement the new system, the management must accept the proposed system. Because there are many factors concerned, the most significant factor is costs versus benefits comparison. The computer hardware, software and personnel are also involves the installation of the new system. The project schedule is the important one, Figure K.1 shows the project schedule. From the chart we can estimate the time that will be used in each job and enable the analysts to utilize their work more efficiently and effectively.

4.2 Project Implementation

The project implementation is the installation of the new system and removal of the current system. Then the main activity of implementing a new system is training, conversion and post-implementation review.

4.2.1 Training

The one critical success of the new system is the quality of training system. No matter how good a system the company has, it will be useless if users are not ready to utilize the operation and features of well-designed and developed system. The good training system is very important to help to ensure the people can interact with the new system efficiently.

4.2.2 Conversion

Convert the existing data to new system, parallel conversion is recommended for this new system. The parallel approach allows the existing system operated along with the proposed system until the new system has proven its reliability. So this method is appropriate for replacing the manual system with the computerized system and offers

greatest security, then could ensure that all the error or problem of the new system have been solved before the old system is discarded.

4.2.3 Post-Implementation Review

When the implementation of the new system and conversion is complete, the review of the system is conducted to ensure that the system is acceptable or whether adjustments are needed. The important thing that must be concerned during post-implementation review is whether it met the objective plan or not. The information can be collected by questionnaire, interview, sampling and observation.

4.3 Testing

Testing is the process for measuring the quality of the computerized system with intent of finding an error. System testing is a significant part of the system. We can estimate the cost of software project related to testing. Testing process is conducted to detect and correct the errors. It also tests the unification of each module in the entire system. It will test from the general level to more specific level in order to ensure that the program runs in the expected way. The following are the other varieties of testing.

4.3.1 Program Testing

Testing the program and making sure that it performs satisfactorily. The programmer must create the valid and invalid test data and test all possible situations that might occur in the future.

4.3.2 Peak Load Testing

To determine whether the system is able to handle the volume of activities that occur when the system is at the peak of its processing demand.

4.3.3 Storage Testing

Determine the capacity of the system to store transaction data on disk or in the other files, when there are a lot of information to store.

4.3.4 System Testing

To test the program runs properly and the users are able to use the data properly when all the programs are interconnected.

4.3.5 Performance Time Testing

To test the system processing time, to find out the proper length of time that the system uses to process transaction data.

4.3.6 Human Factors Testing

To test how users will use the system efficiently when they perform their work.

4.4 Complete the Documentation

After completion of the test, completeness documentation of the proposed system is needed. Because of a common failure to document as an ongoing activity during the life cycle, the best quality and completeness of documentation is important. Everyone can easily understand the framework and inner workings of the whole system, and it also can reveal strengths and weaknesses of the system over the other. Over time, the company also can bring the old information to rethink or may be create the new concept easily and also be useful for the future.

V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

P&S company is a wholesale company which sells various kinds of household products and textile products. At present the company still uses a manual system to manage and control the inventory tracking system. The existing system faced a lot of problems and urgently needs to solve the problems. That is the reason why P&S company wants to change the existing system from manual to be computerized system.

In order to solve the existing problems, this new system is developed to help user to work more easily and many parts of the program will run automatically. The new system also has been designed to develop workflow, reduce work processing time (developing an effectiveness and efficiency of the work) provides timely reorder point information, accurate, complete and update information. And should reduce the carrying cost and control the stock loss.

Maintaining the computer to work properly is important. The system maintenance needs to know how to control the new system and how to manage maintenance when there are problems.

However the new system can provide the better function of working than the manual system. Although the investment cost of the first year is high, it will be less in the long term.

Furthermore, the networking of the new system provides more standard and security control. Although the investment cost is quite high in the first year it will be less in the long term.

Degree of achievement of the proposed system compared with the existing system. Table 5.1 illustrates the time spent on each process of the proposed system

compared with the existing system. The table shows the difference of the time that each process of the proposed system spends less time than each process of the existing system.

Table 5.1. Degree of Achievement of the Proposed System.

Process	Existing System	Proposed System
Verify Stock and Customer Order Process	2 hrs.	20 mins.
Monthly Check Inventory Process	8 hrs.	1 hrs.
Create P/O Form Process	20 mins.	10 mins.
Receive and Rejected Goods Process	20 mins.	10 mins.
Delivery Goods Process	1 hrs.	15 mins.
Prepare Report Process	3 hrs.	1 hrs.
Total	14 hrs. 40 mins.	2 hrs. 55 mins.

5.2 Recommendations

In order to improve the company inventory tracking system efficiently and effectively and able to carry out the activities related to the organization, the company should realize the following:

- (1) The company must set up the person who will be responsible for which position and provide the good training facilities for them to improve their skill to be able to work with the new system.

- (2) Ensure that the proposed system is fully functioning before stopping the current system.
- (3) The selected technology, both hardware and software should be planned for the future expansion and is possible for improving in the future.
- (4) Frequently review and keep up to date of the user requirements to correct the mistake and development in the future.
- (5) Prepare the required reports as often as possible

However, the further development to be the fully computerized system should be established in all sections of the company and each department can be developed individually and integrated by using LAN (local area network) to connect the system. So the proposed computerized system should be planned for the long term use not just for the improvement of day-to-day, this is one important thing that the management must be concerned with.



APPENDIX A

PAYBACK ANALYSIS

Table A.1. Payback Analysis for Candidate Solution 1, in Baht.

Cost items	Years					
	0	1	2	3	4	5
Investment Cost	-608,100					
Operation Cost		-15,000	-16,500	-18,150	-19,965	-21,962
Discount Factor for 12%	1.000	0.893	0.797	0.712	0.636	0.567
Time-adjusted cost	-608,100	-13,395	-13,151	-12,923	-12,698	-12,452
Cumulative Time-adjusted cost over lifetime	-608,100	-621,495	-634,646	-647,568	-660,266	-672,718
Benefits derived from operation of new system	0	332,400	432,120	561,756	730,283	949,368
Discount Factor for 12%	1.000	0.893	0.797	0.712	0.636	0.567
Time-adjusted cost	0	296,833	344,400	399,970	464,460	538,291
Cumulative Time-adjusted cost over lifetime	0	296,833	641,233	1,041,203	1,505,663	2,043,954
Cumulative lifetime time-adjusted cost+benefit	-608,100	-324,662	6,587	393,635	845,397	1,371,236

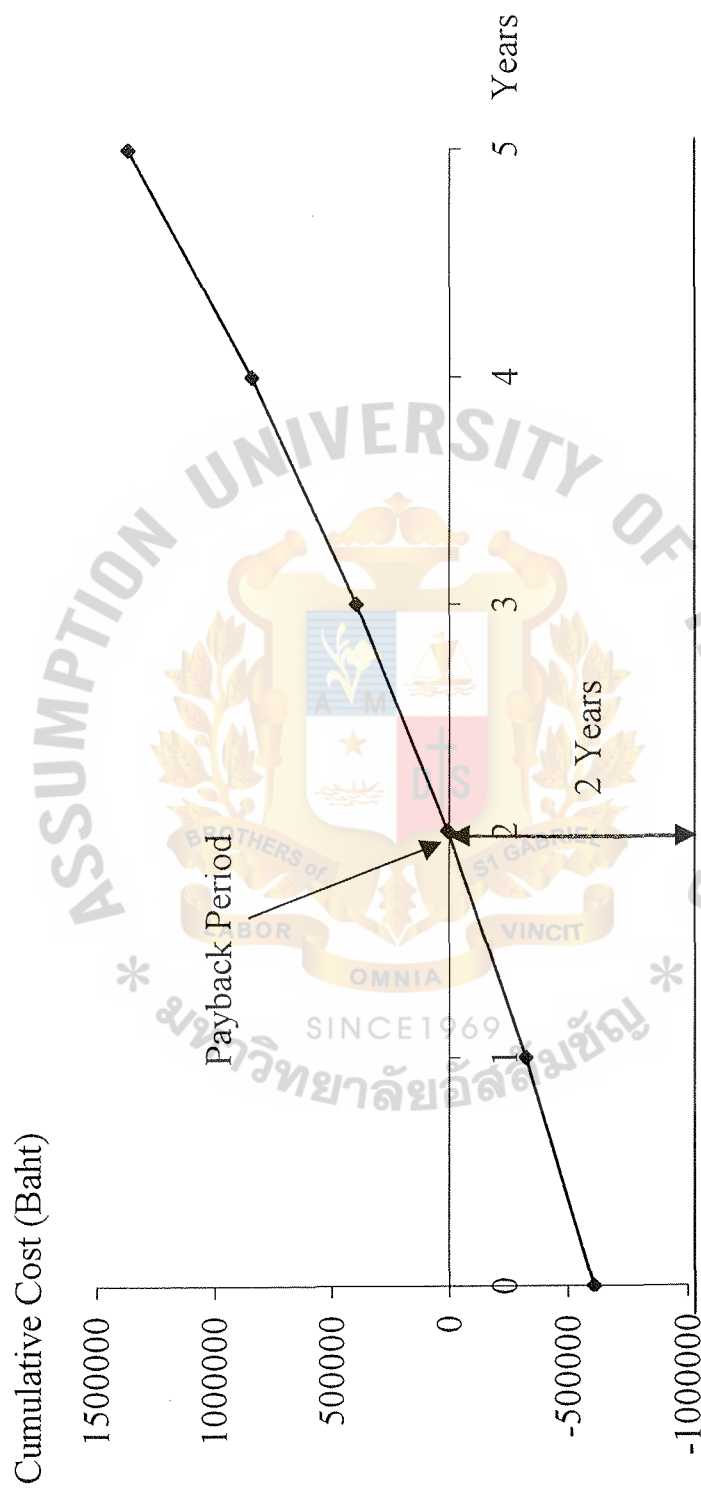


Figure A.1. Payback Analysis Graph for Candidate Solution 1.

Table A.2. Payback Analysis for Candidate Solution 2, in Baht.

Cost items	Years					
	0	1	2	3	4	5
Investment Cost	-487,250					
Operation Cost		-20,000	-22,000	-24,200	-26,620	-29,282
Discount Factor for 12%	1.000	0.893	0.797	0.712	0.636	0.567
Time-adjusted cost	-487,250	-17,860	-17,534	-17,230	-16,930	-16,603
Cumulative Time-adjusted cost over lifetime	-487,250	-505,110	-522,644	-539,874	-556,805	-573,408
Benefits derived from operation of new system	0	175,000	227,500	295,750	384,475	499,818
Discount Factor for 12%	1.000	0.893	0.797	0.712	0.636	0.567
Time-adjusted cost	0	156,275	181,318	210,574	244,526	283,397
Cumulative Time-adjusted cost over lifetime	0	156,275	337,593	548,167	792,693	1,076,089
Cumulative lifetime time-adjusted cost+benefit	-487,250	-348,835	-185,052	8,292	235,888	502,682

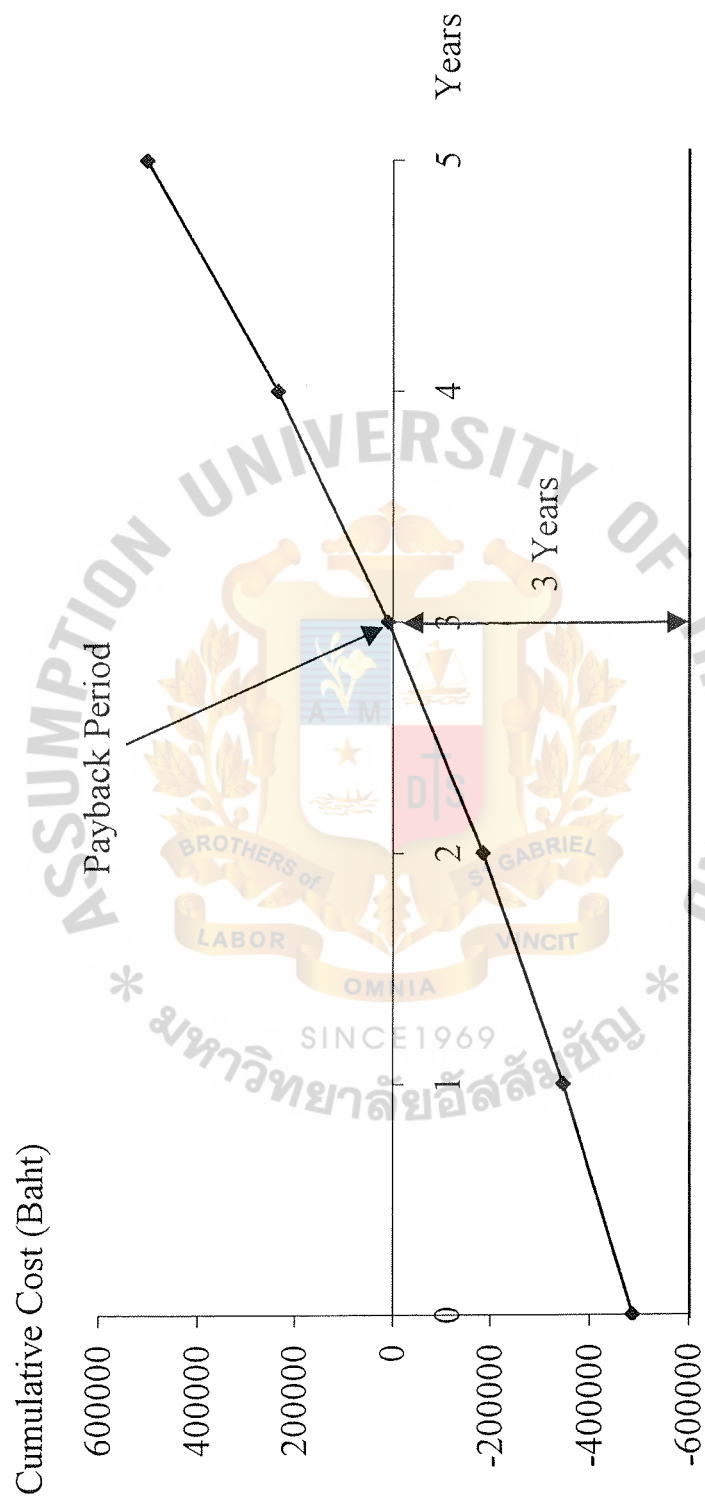


Figure A.2. Payback Analysis Graph for Candidate Solution 2.

Table A.3. Payback Analysis for Candidate Solution 3, in Baht.

Cost items	Years					
	0	1	2	3	4	5
Investment Cost	-350,000					
Operation Cost		-10,000	-11,000	-12,100	-13,310	-14,641
Discount Factor for 12%	1.000	0.893	0.797	0.712	0.636	0.567
Time-adjusted cost	-350,000	-8,930	-8,767	-8,615	-8,465	-8,301
Cumulative Time-adjusted cost over lifetime	-350,000	-358,930	-367,697	-376,312	-384,777	-393,079
Benefits derived from operation of new system	0	130,000	143,000	157,300	173,030	190,333
Discount Factor for 12%	1.000	0.893	0.797	0.712	0.636	0.567
Time-adjusted cost	0	116,090	113,971	111,998	110,047	107,919
Cumulative Time-adjusted cost over lifetime	0	116,090	230,061	342,059	452,106	560,024
Cumulative lifetime time-adjusted cost+benefit	-350,000	-242,840	-137,636	-34,254	67,328	166,946

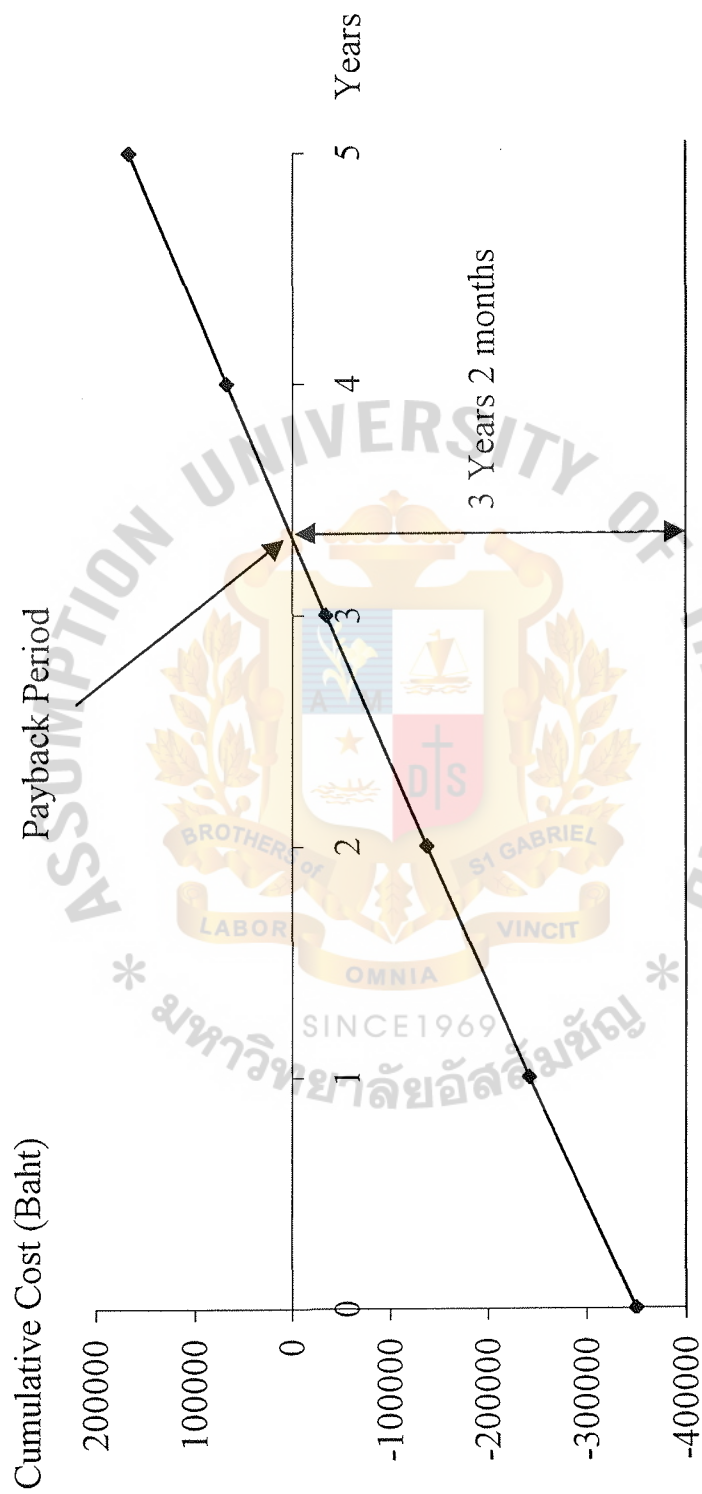


Figure A.3. Payback Analysis Graph for Candidate Solution 3.



APPENDIX B
CONTEXT DIAGRAM

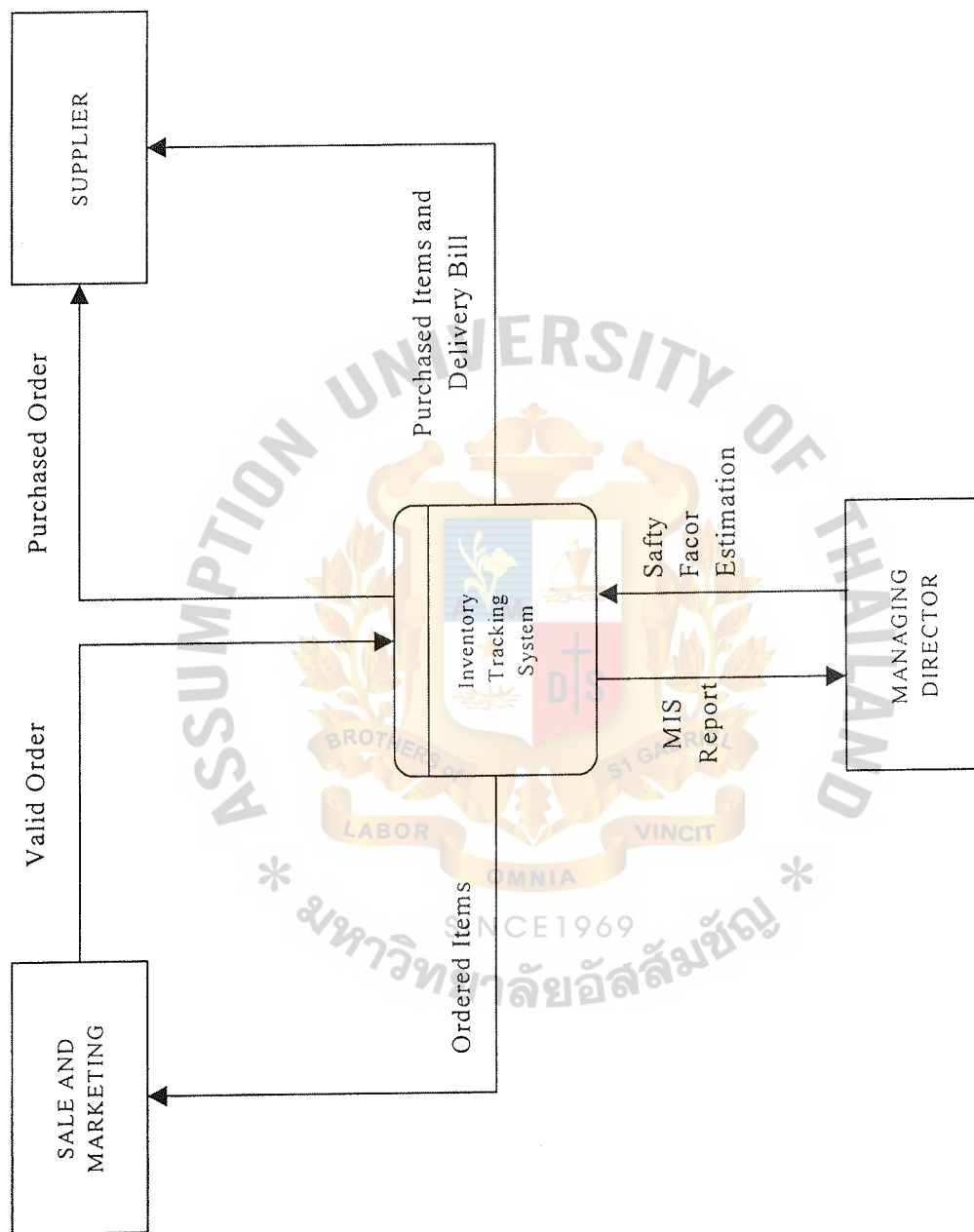


Figure B.1. Context Diagram of Existing System.

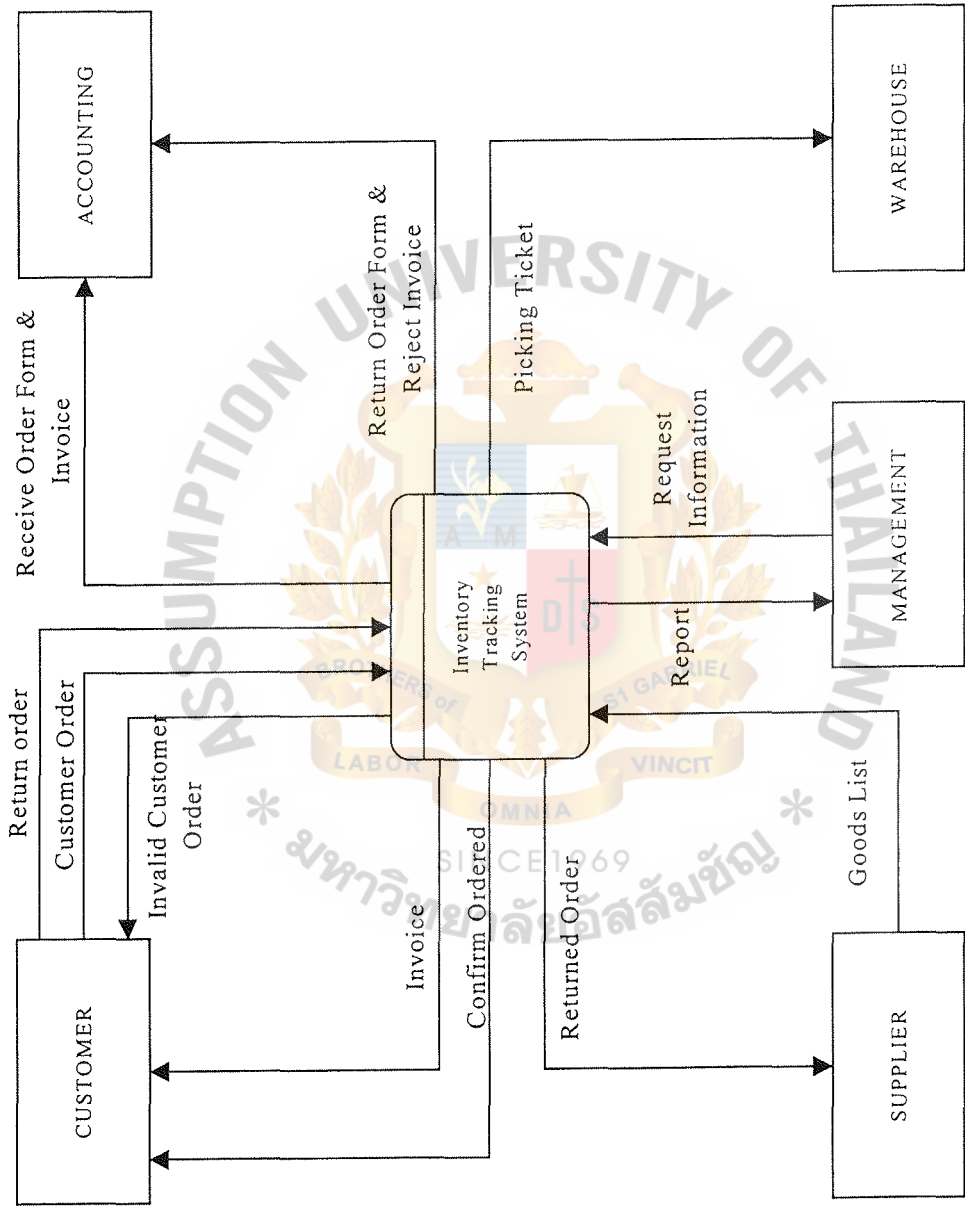
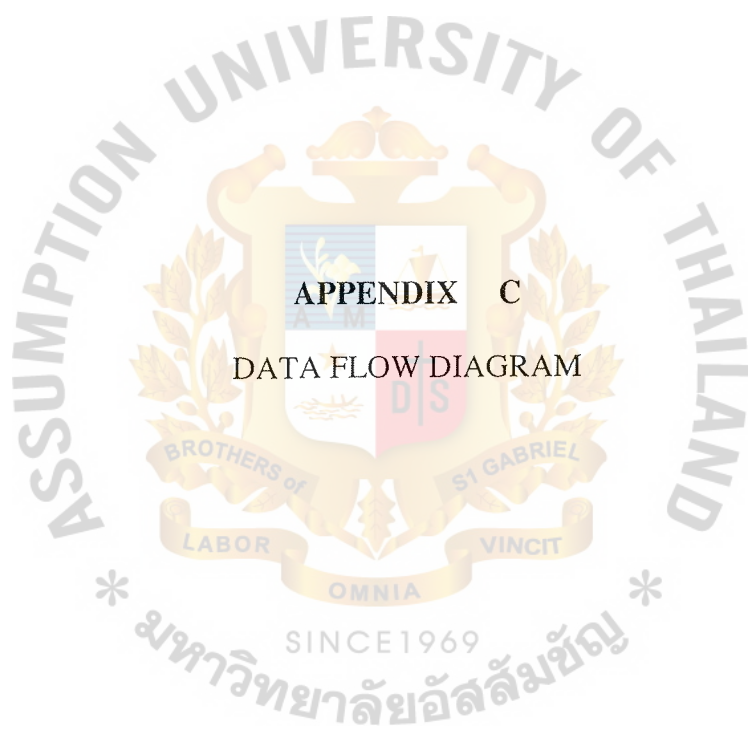


Figure B.2. Context Diagram of Proposed System.



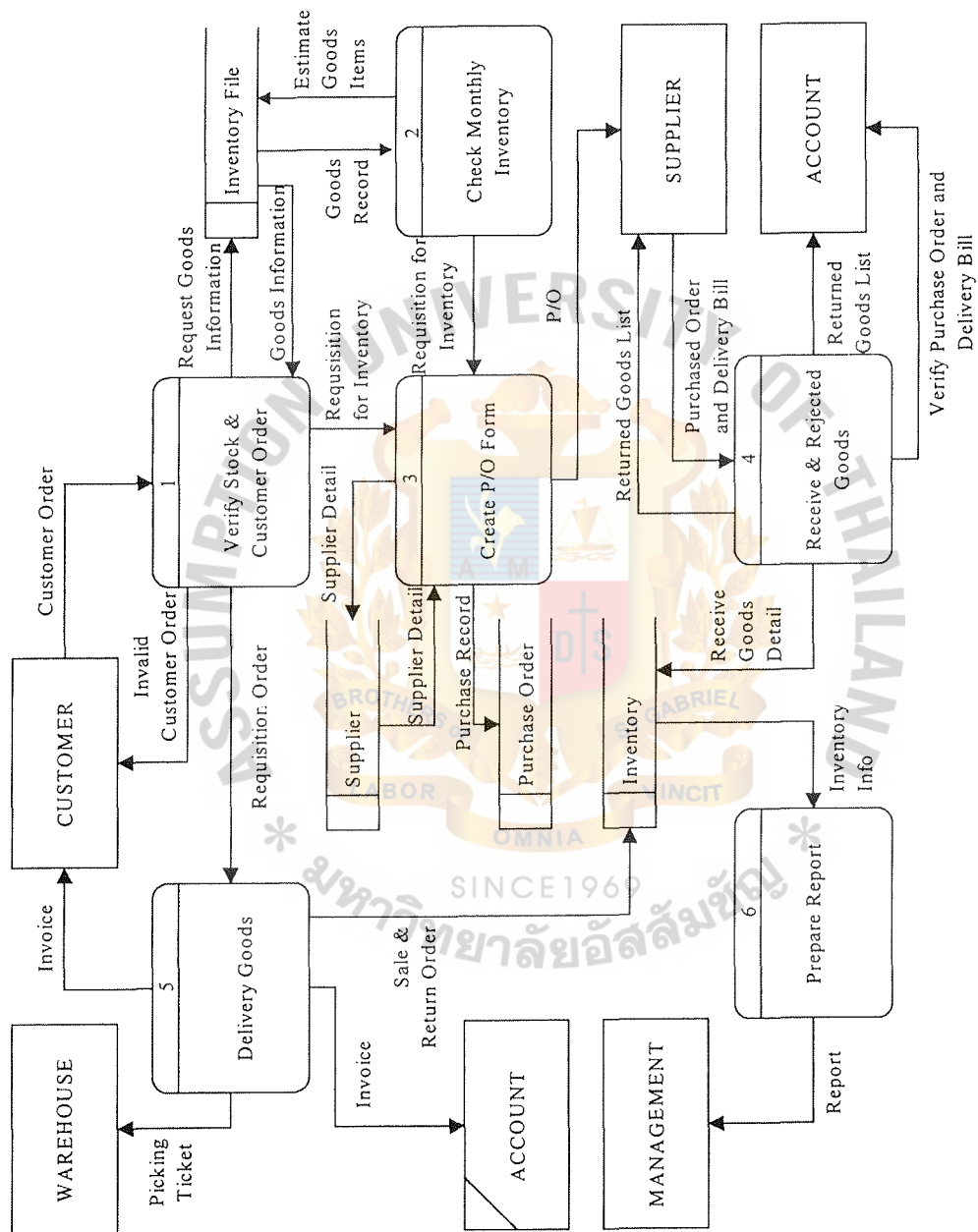


Figure C.1. Data Flow Diagram Level 0.

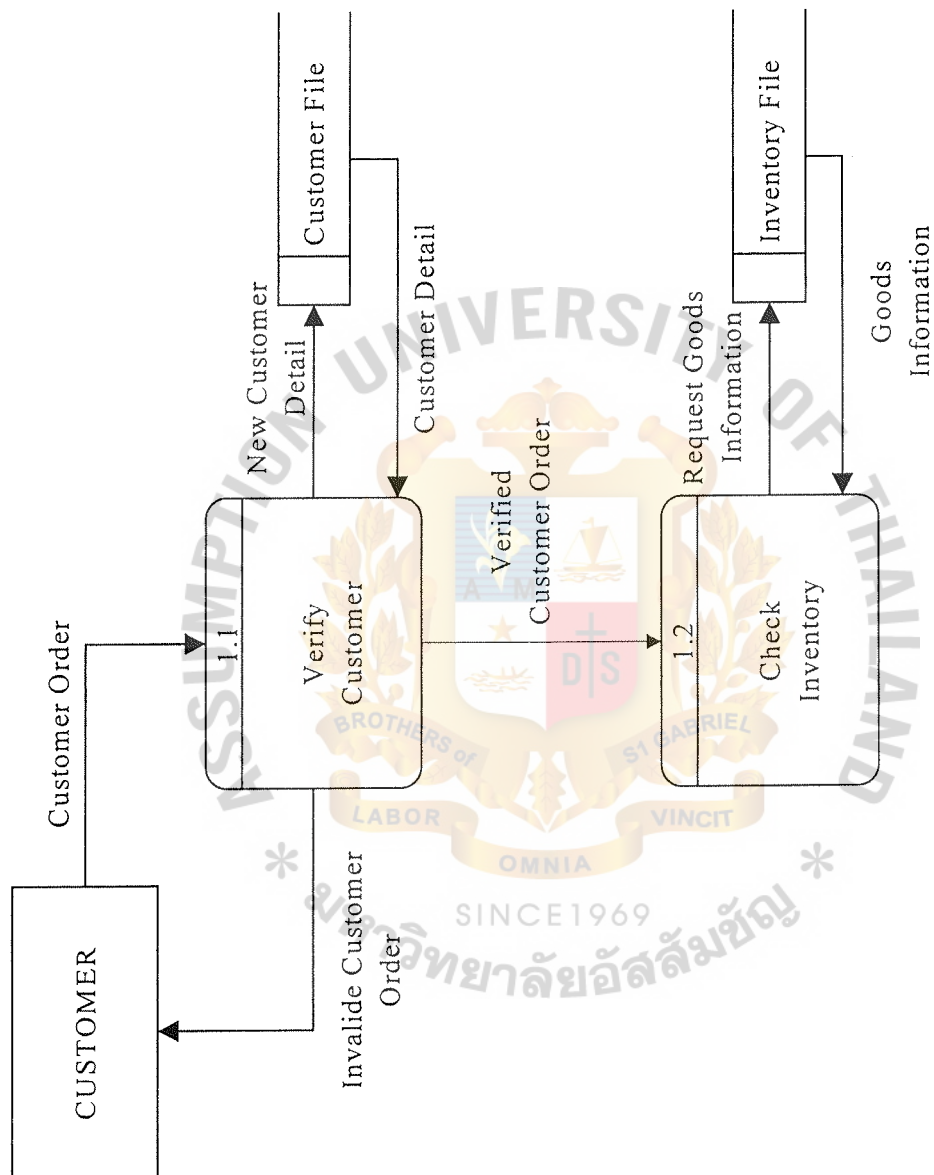


Figure C.2. Data Flow Diagram Level 1 (Verify Stock and Customer Order Process).

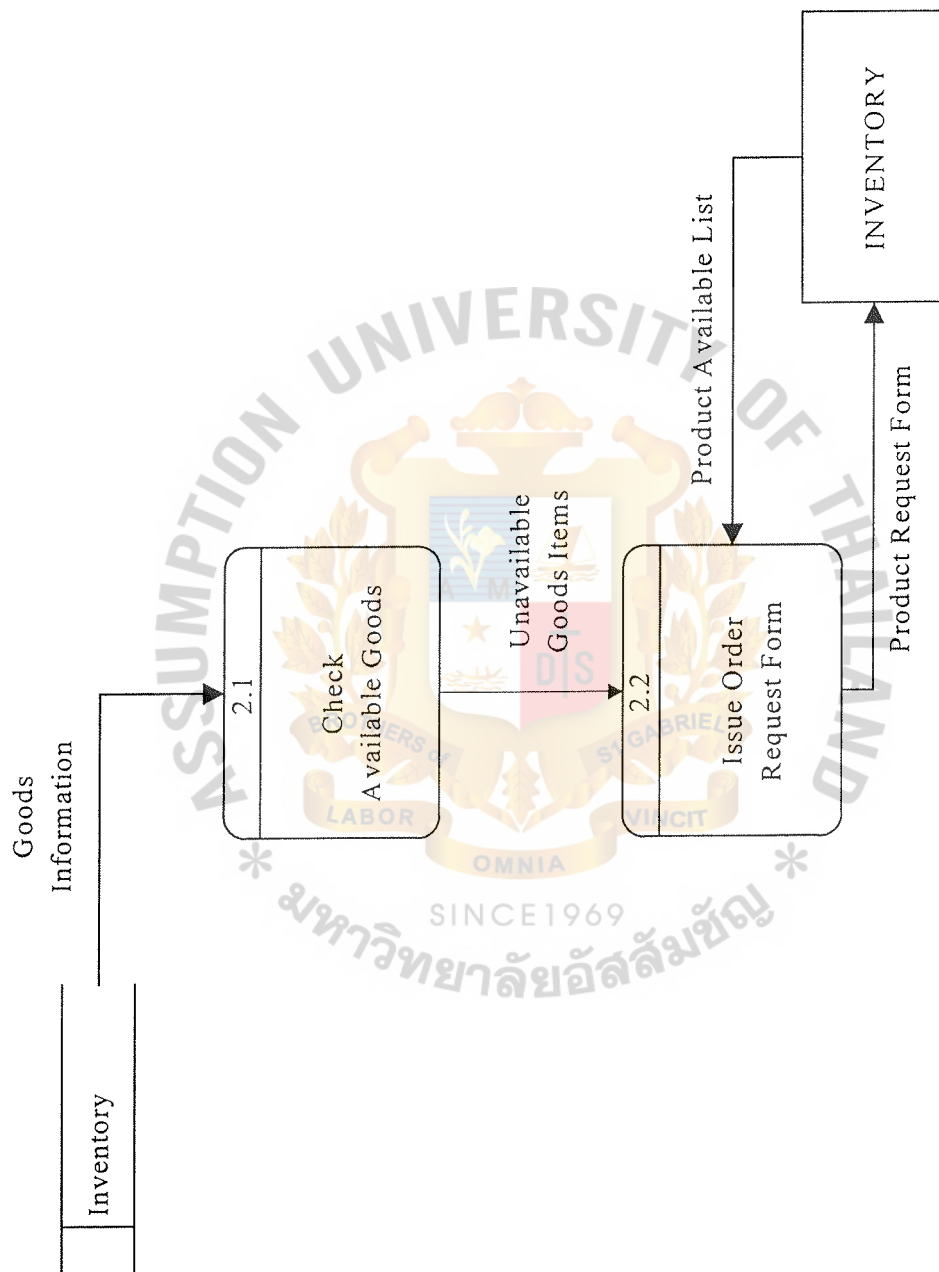


Figure C.3. Data Flow Diagram Level 1 (Check Monthly Inventory Process).

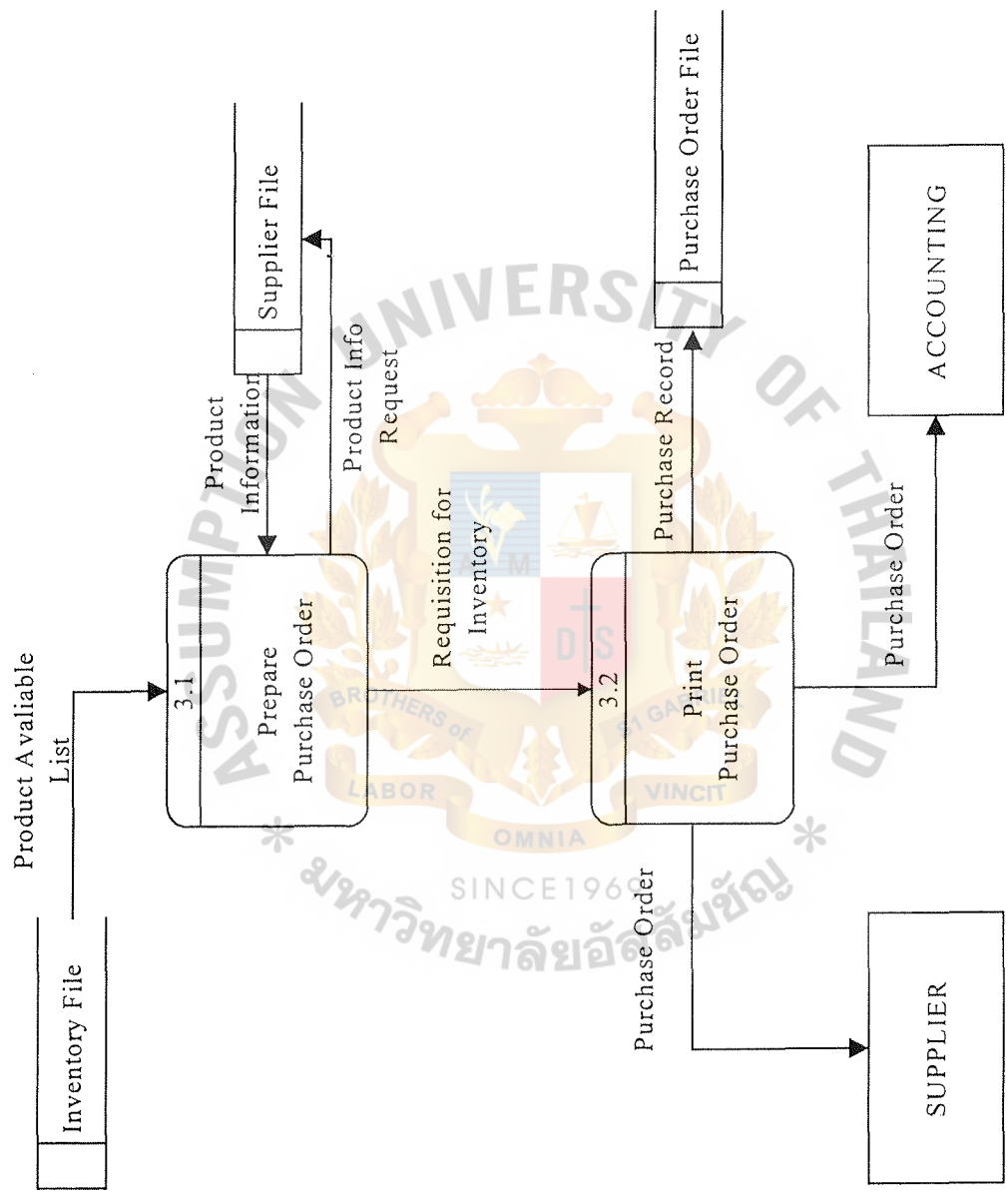


Figure C.4. Data Flow Diagram Level 1 (Create P/O Form Process).

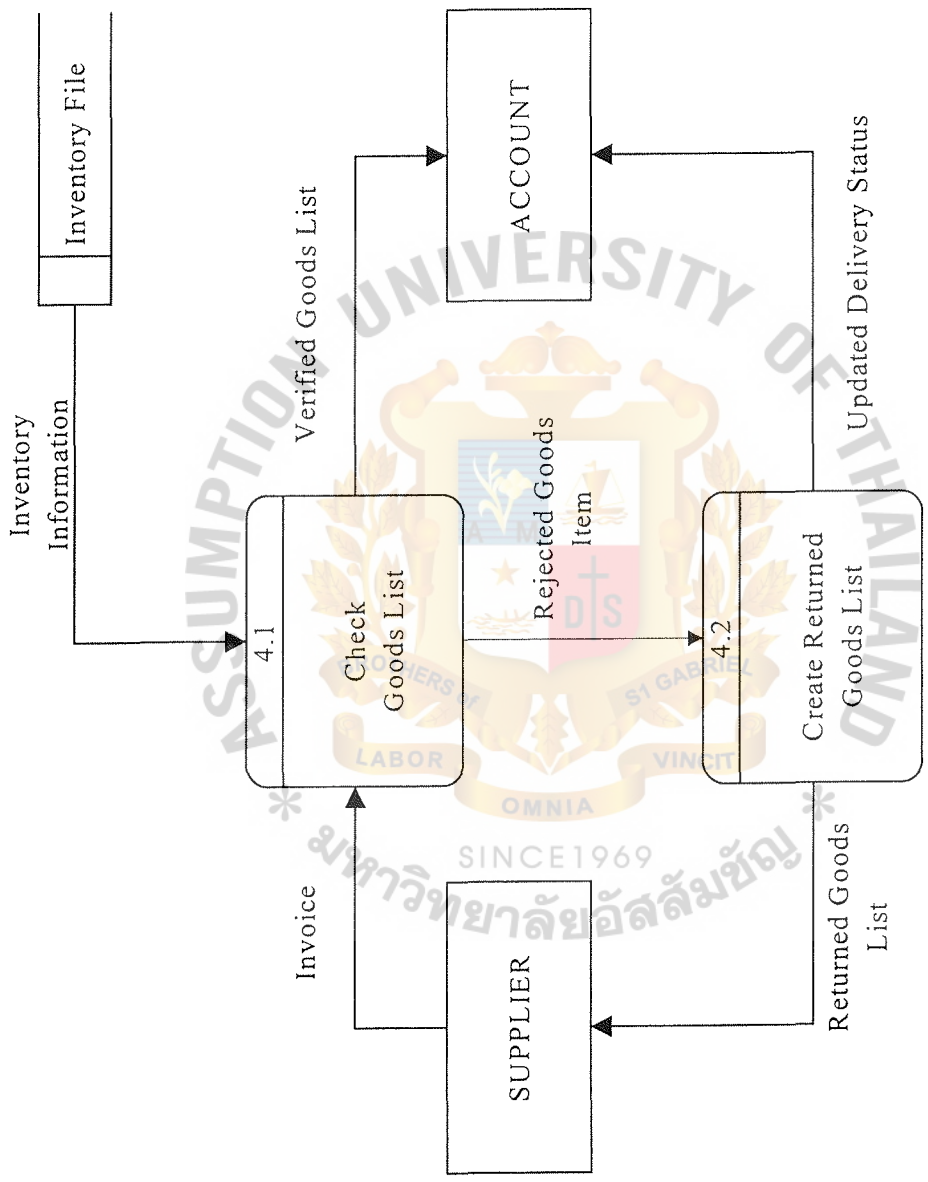


Figure C.5. Data Flow Diagram Level 1 (Receive and Reject Goods Process).

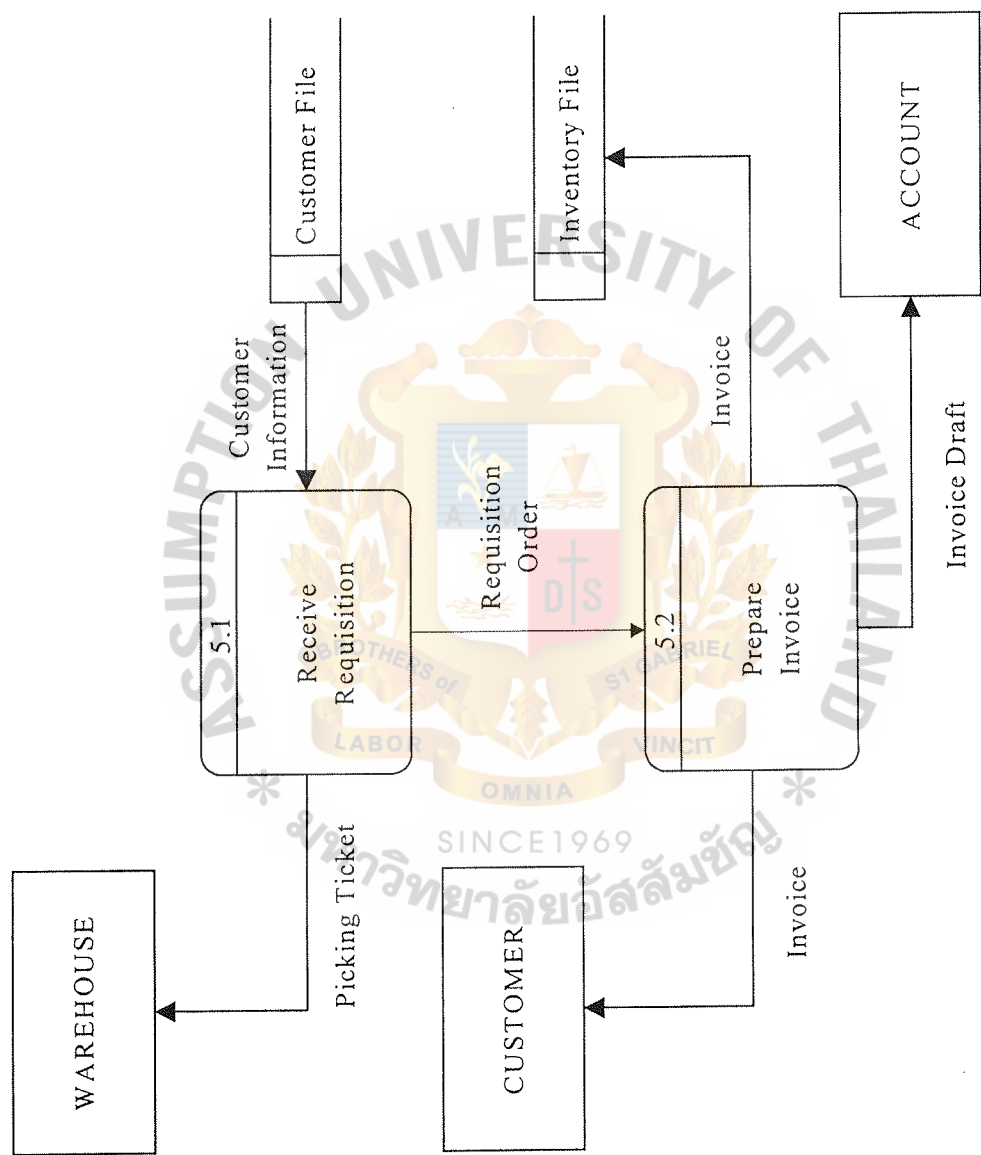


Figure C.6. Data Flow Diagram Level 1 (Delivery Goods Process).

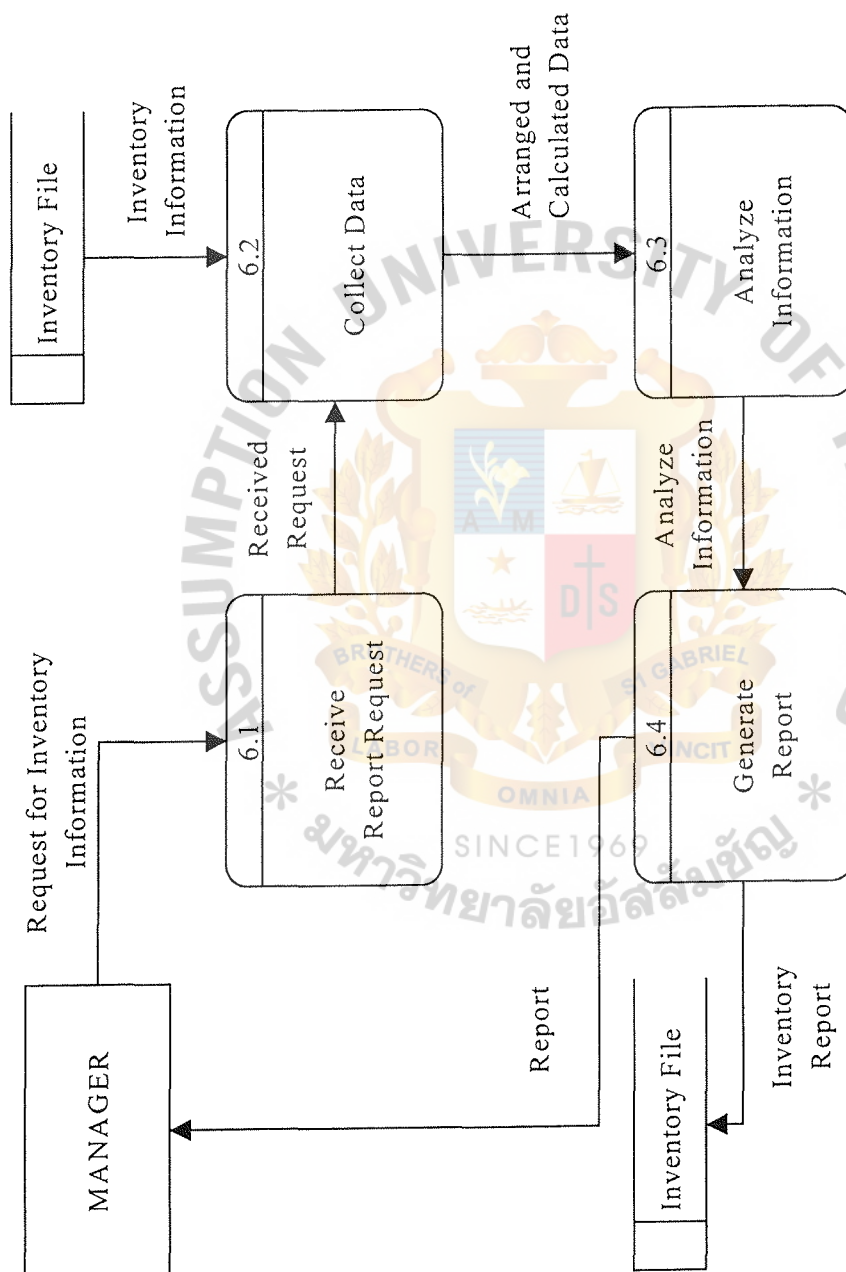
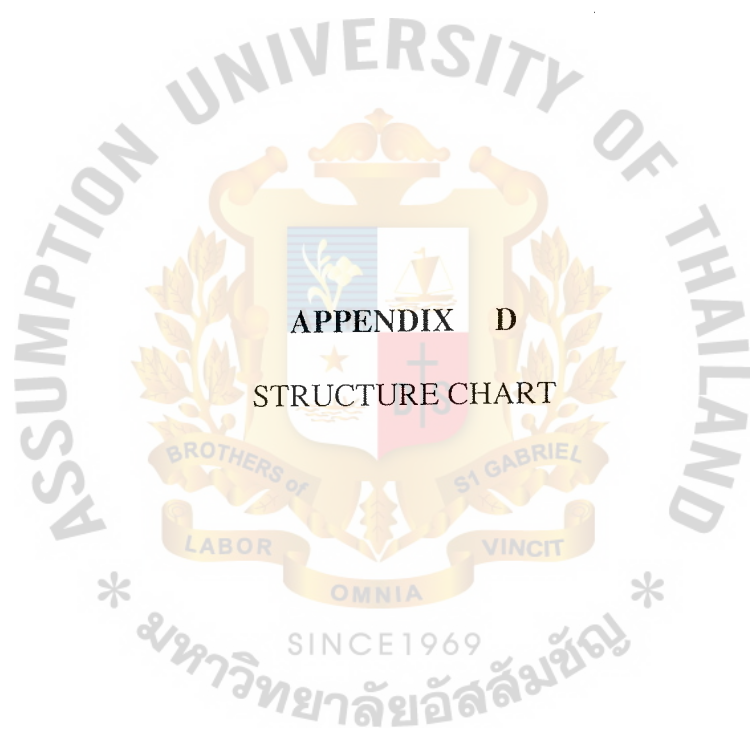


Figure C.7. Data Flow Diagram Level 1 (Create Report Process).



APPENDIX D
STRUCTURE CHART

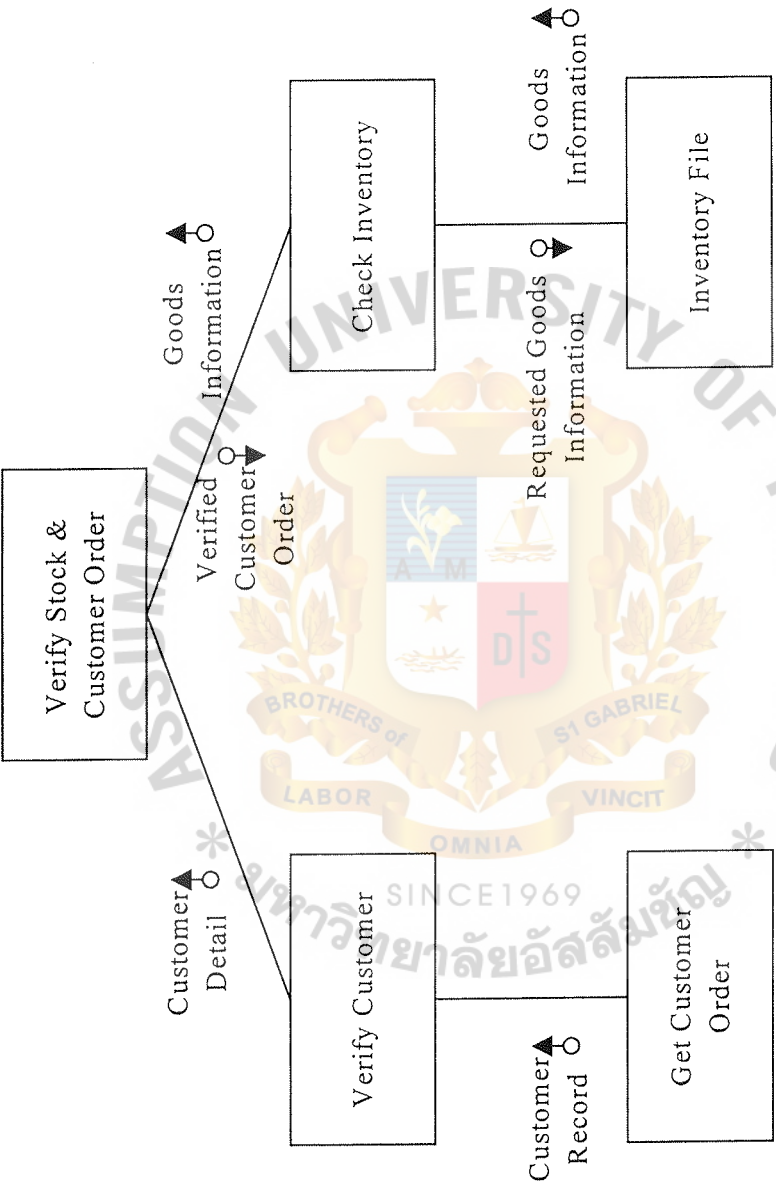


Figure D.1. Structure Chart of Verify Stock and Customer Order.

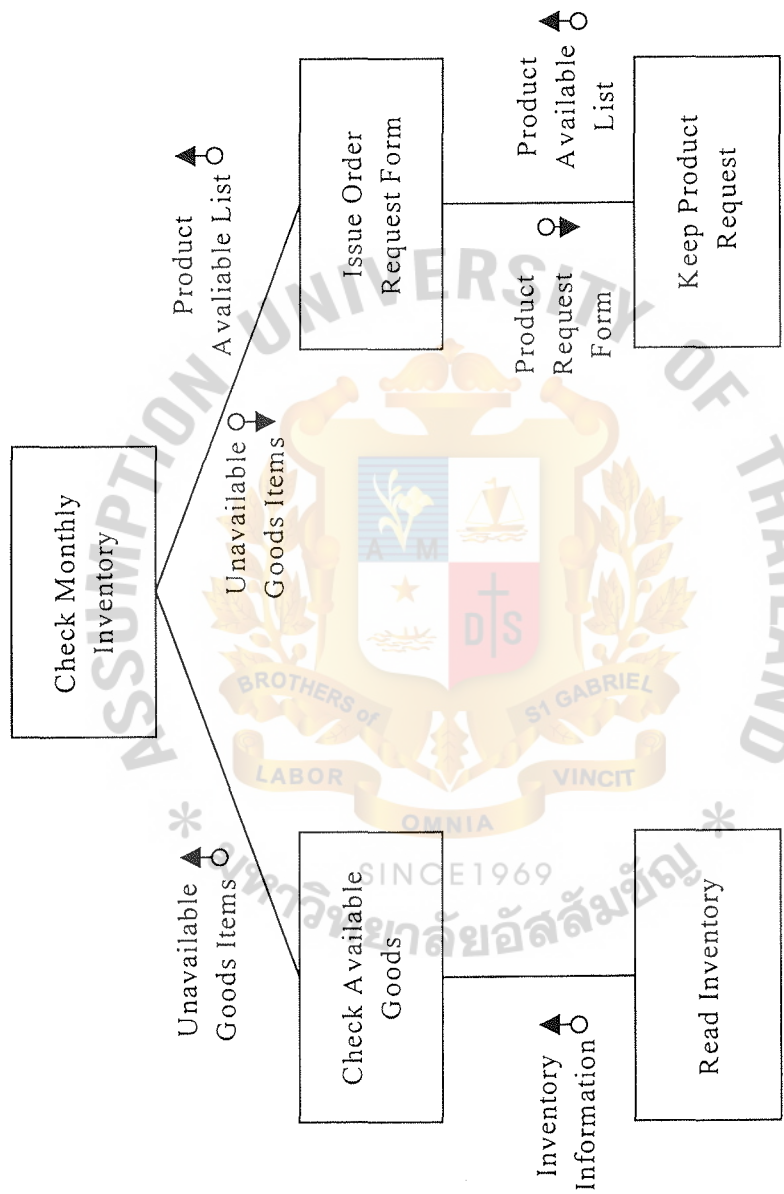


Figure D.2. Structure Chart of Check Monthly Inventory.

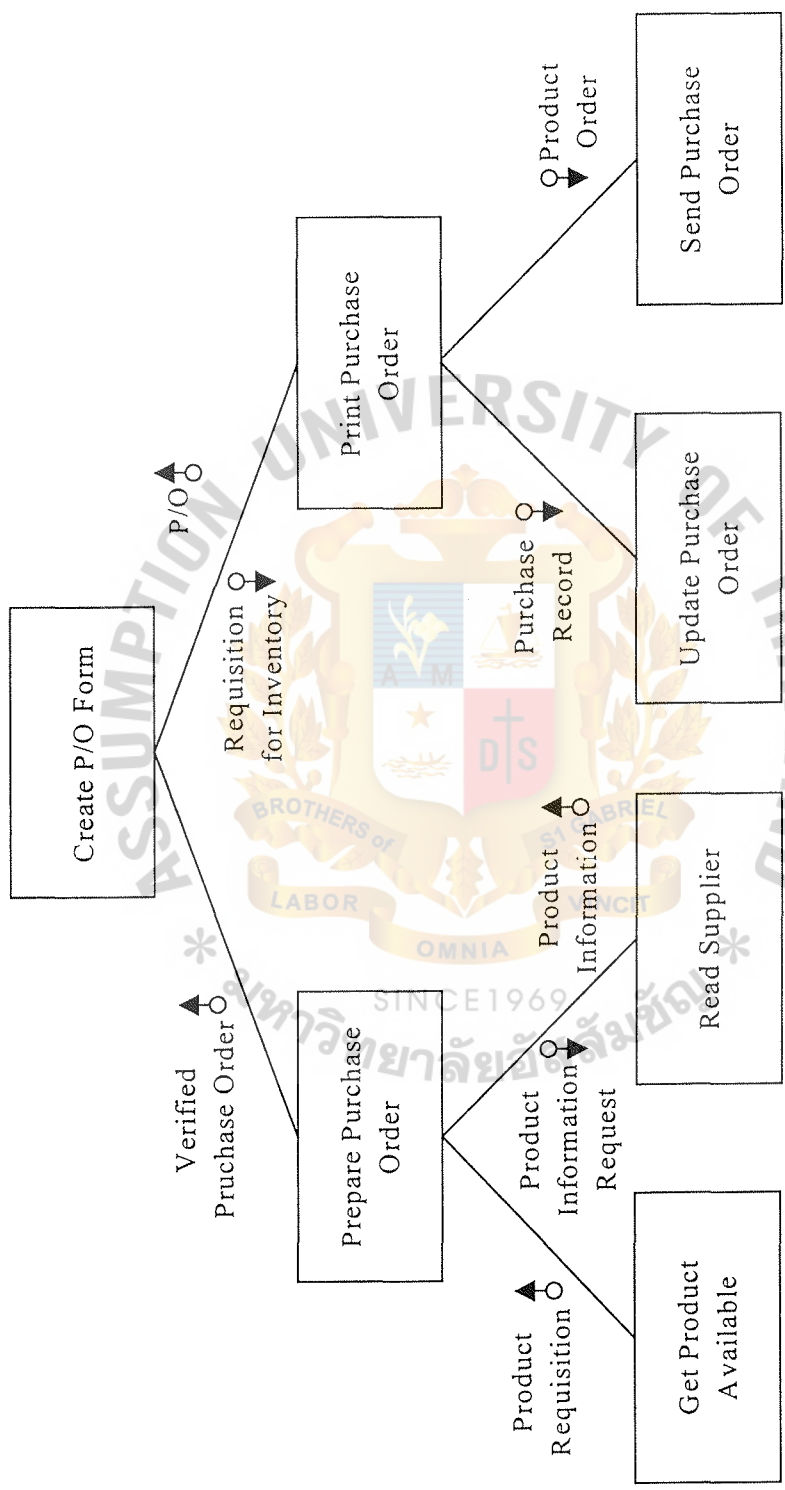


Figure D.3. Structure Chart of Create P/O Form.

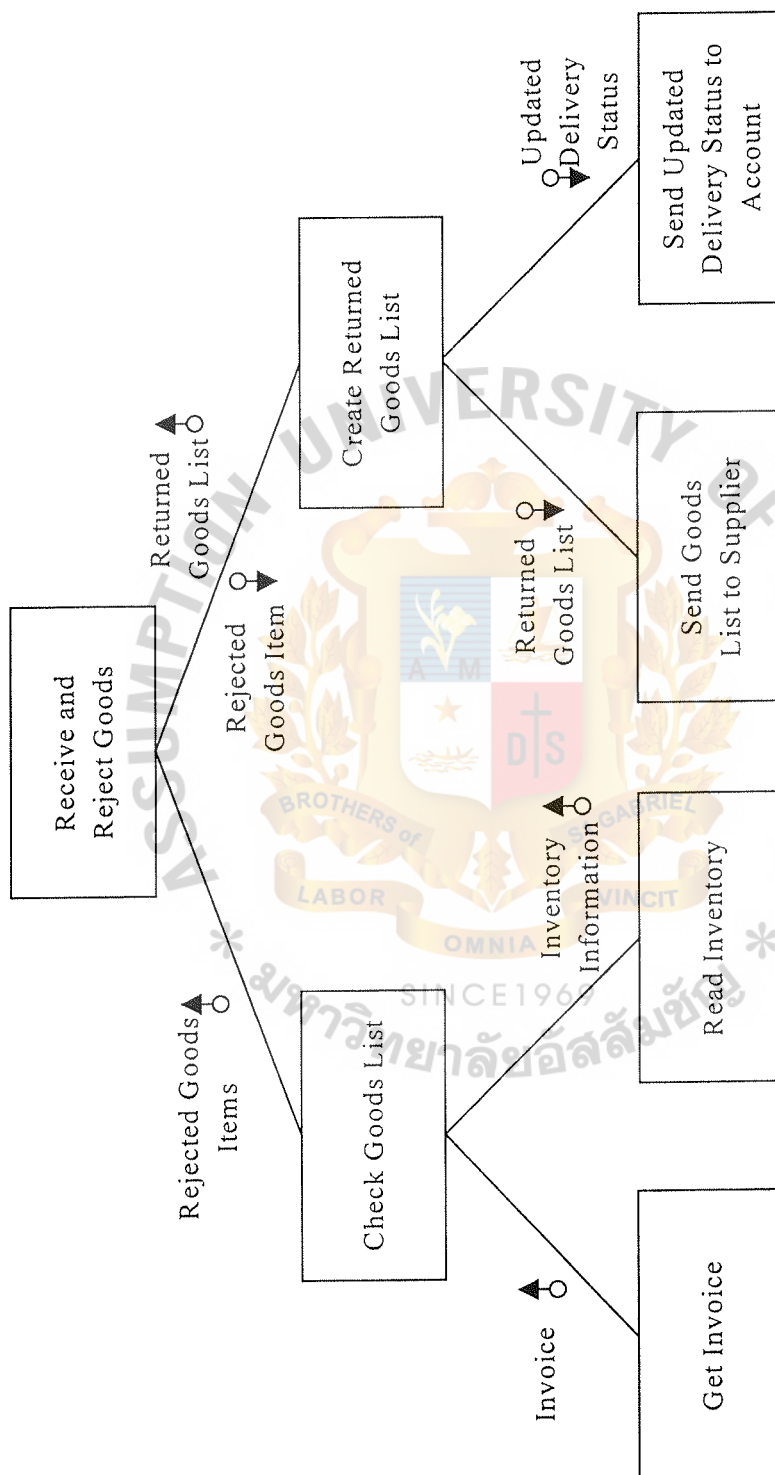


Figure D.4. Structure Chart of Receive and Reject Goods.

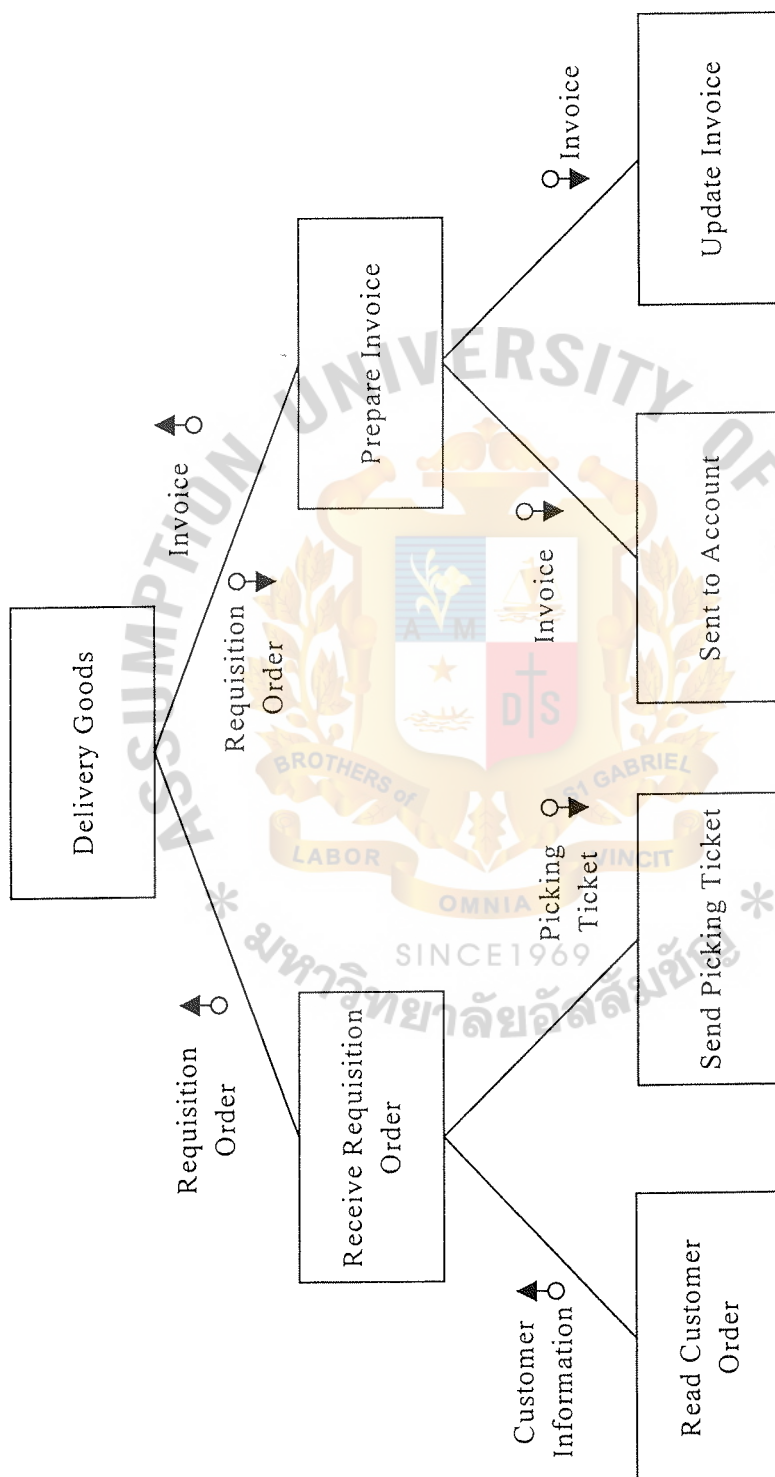


Figure D.5. Structure Chart of Delivery Goods.

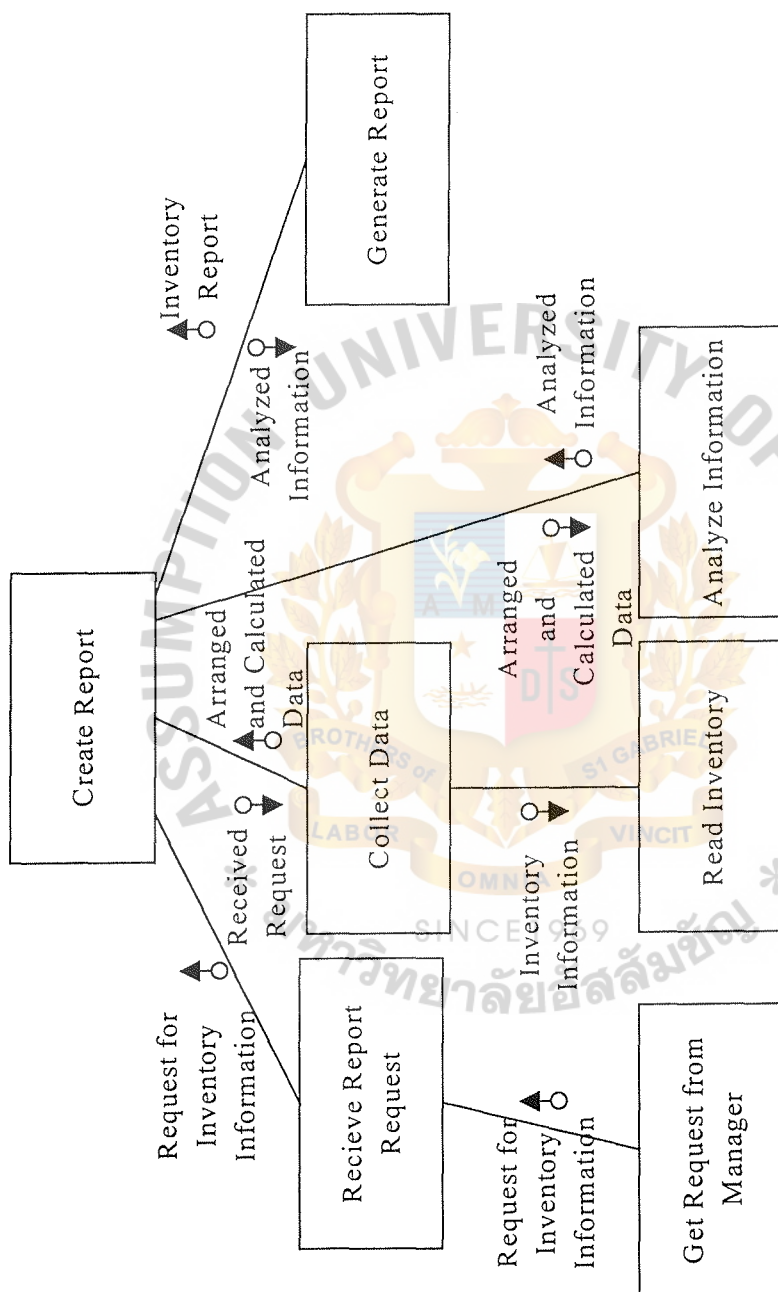


Figure D.6. Structure Chart of Create Report.

Table E.1. File Structure of Customer File.

FILE STRUCTURE			
FILE NAME: CUSTOMER FILE			
FIELD NAME	TYPE	WIDTH	DEC
CUS_NO	CHARACTER	10	
COURTESY_TITLE	CHARACTER	5	
CUS_NAME	CHARACTER	60	
CUS_LASTNAME	CHARACTER	60	
ADDR	CHARACTER	40	
TEL	CHARACTER	10	
FAX	CHARACTER	10	
ZIP1	NUMERIC	10	
PROVINCE	CHARACTER	20	
CE_MAIL	CHARACTER	40	
MOBILE	CHARACTER	20	

Table E.2. File Structure of Supplier File.

FILE STRUCTURE			
FILE NAME: SUPPLIER FILE			
FIELD NAME	TYPE	WIDTH	DEC
SUP_NO	CHARACTER	10	
SUP_NAME	CHARACTER	60	
COURTESY TITLE	CHARACTER	5	
CONTAC_NAME	CHARACTER	100	
ADDR	CHARACTER	40	
PROVINCE	CHARACTER	20	
ZIP2	NUMERIC	10	
TEL	CHARACTER	10	
FAX	CHARACTER	10	
BALANCE DUE	DATE	10	
SE_MAIL	CHARACTER	40	
MOBILE	CHARACTER	20	

Table E.3. File Structure of Product File.

FILE STRUCTURE			
FILE NAME:		PRODUCT FILE	
FIELD NAME	TYPE	WIDTH	DEC
PRO_NO	CHARACTER	10	
PRO_NAME	CHARACTER	20	
DESCRIPTION	CHARACTER	60	
SUP_NO	CHARACTER	10	
SELL_PRICE	NUMERIC	10	2
UNIT_IN_STOCK	NUMERIC	10	
UNIT SOLD	NUMERIC	10	
UNITS_ON_ORDER	NUMERIC	10	

Table E.4. File Structure of Category File.

FILE STRUCTURE			
FILE NAME:		CATEGORY FILE	
FIELD NAME	TYPE	WIDTH	DEC
CAT_NO	CHARACTER	10	
CAT_DETAIL	CHARACTER	50	

Table E.5. File Structure of Employee File.

FILE STRUCTURE			
FILE NAME:		EMPLOYEE FILE	
FIELD NAME	TYPE	WIDTH	DEC
EMP_NO	CHARACTER	10	
COURTESY_TITLE	CHARACTER	5	
EMP_NAME	CHARACTER	100	
POSITION	CHARACTER	20	
HIRE DATE	DATE	10	
ADDR	CHARACTER	40	
PROVINCE	CHARACTER	20	
ZIP3	NUMERIC	10	
TEL	CHARACTER	10	

Table E.6. File Structure of Invoice File.

FILE STRUCTURE			
FILE NAME:		INVOICE FILE	
FIELD NAME	TYPE	WIDTH	DEC
INV_NO	CHARACTER	10	
CUS_NO	CHARACTER	10	
EMP_NO	CHARACTER	10	
INV_DATE	DATE	10	
DATE_DELIVERY	DATE	10	

Table E.7. File Structure of Invoice Detail File.

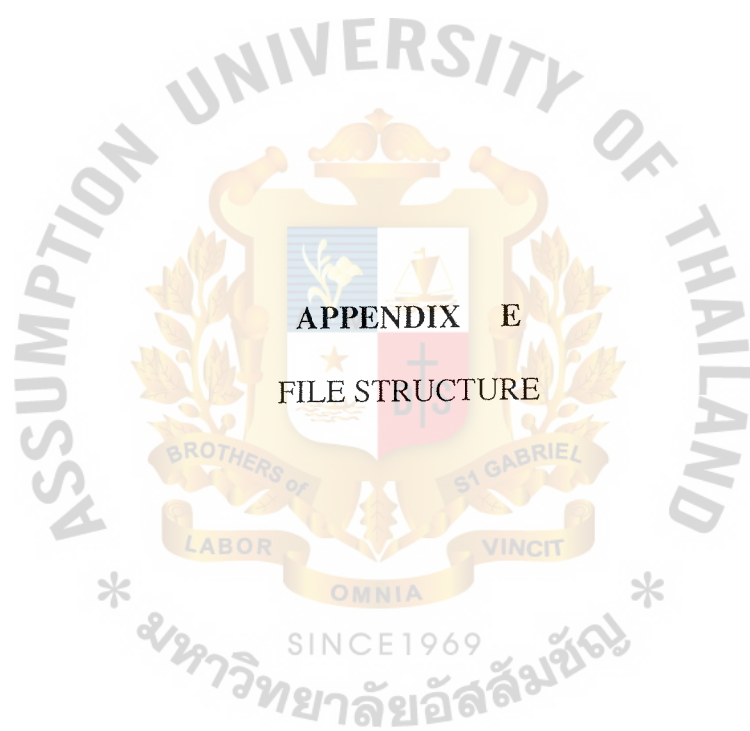
FILE STRUCTURE			
FILE NAME:		INVOICE DETAIL FILE	
FIELD NAME	TYPE	WIDTH	DEC
INV_NO	CHARACTER	10	
ITEM_NO	CHARACTER	10	
PRO_NO	CHARACTER	10	
UNIT_SOLD	NUMERIC	10	

Table E.8. File Structure of Order File.

FILE STRUCTURE			
FILE NAME:		ORDER FILE	
FIELD NAME	TYPE	WIDTH	DEC
ORDER_NO	CHARACTER	10	
SUP_NO	CHARACTER	10	
ORDER_DATE	DATE	10	
EMP_NO	CHARACTER	10	

Table E.9. File Structure of Order Detail File.

FILE STRUCTURE			
FILE NAME:		ORDER DETAIL FILE	
FIELD NAME	TYPE	WIDTH	DEC
ORDER_NO	CHARACTER	10	
ITEM_NO	CHARACTER	10	
PRO_NO	CHARACTER	10	
UNIT_PRICE	NUMERIC	10	
UNIT_ON_ORDER	NUMERIC	10	





APPENDIX F
DATA DICTIONARY

DATA DICTIONARY

Cat_Detail	=	*The information about the product in each category*
Cat_No	=	*Number that indicate product category*
Contact_Name_Lastname	=	*The name and last name of the contact supplier*
Courtesy_title	=	*The courtesy title of the person*
CUSTOMER INFORMATION	=	{customer information}
Addr_1	=	*The address of the customer*
CE_mail	=	*The customer's E-mail address*
CUS_Name	=	*The name of the customer*
CUS_No	=	*The identification number used as customer reference number*
CUS_Lastname	=	*The last name of the customer*
FAX1	=	*The customer's facsimile number*
Province1	=	*The name of the province specified in the documents as the destination city of customer*
Tel1	=	*The telephone number of customer*
Zip1	=	*The zip code of customer*
EMPLOYEE INFORMATION	=	{employee}
Addr_3	=	*The address of the employee*
Emp_Name	=	*The full name of the employee*

Emp_No	=	*The identification number used as employee reference number*
FAX3	=	*The employee's facsimile number*
Hire_Date	=	*The starting date of hiring employee*
Position	=	*The employee's position in the company*
Province3	=	*The name of the province specified in the documents as the destination city of employee*
Tel3	=	*The telephone number of employee*
Zip3	=	*The zip code of employee*
INVENTORY INFORMATION	=	{inventory information}
Description	=	*The details of the products*
Inv_date	=	*The invoice date*
Inv_No	=	*The invoice identification number*
Item_No	=	*The item of product shown in the product information records*
Pro_No	=	*The identification number used as product reference number*
Units_In_Stock	=	*The number of products available in stock*
Units_On_Order	=	*The number of products to be order*
Units_Price	=	*The price per unit of product*
Unit_Sold	=	*The number of products to be sold*
ORDER INFORMATION	=	{order information}

Date_Delivery	=	*The date that the products are delivered to the customer*
Order_Date	=	*The date of placing a customer order to the company*
Order+No	=	*The identification number of order to the company*
SUPPLIER	=	{supplier}
INFORMATION		
Addr_2	=	*The address of the supplier*
Balance Due	=	*Credit term given to the supplier*
FAX2	=	*The supplier's facsimile number*
Province2	=	*The name of the province specified in the documents as the destination city of supplier*
SE-mail	=	*The E-mail of supplier*
Sup_Name	=	*The name of the supplier*
Sup_No	=	*The identification number used as supplier reference number*
Tel2	=	*The telephone number of supplier*
Zip2	=	*The zip code of supplier*



APPENDIX G
PROCESS SPECIFICATION

PROCESS SPECIFICATION

Process Name : Verify Stock and Customer Order

Process Number : 1.0

Input :

- Customer Order
- Information of Goods

Output :

- Invalid Customer Order
- Requisition Order
- Request Goods Information
- Requisition for Inventory

Process :

BEGIN

- Receive Customer Order Details from Customer Order
- FIND Customer Name in Customer File

IF Customer Name not found

THEN Customer ID = the next available Customer ID

ACCEPT Customer Order Details

END IF;

- Read the information of goods from Inventory

IF the Customer Order invalid

THEN send the Invalid Order to inform Customer

ELSE send Requisition Order for inventory to prepare Purchase Order

END IF;

END

Process Name : Monthly Check Inventory

Process Number : 2.0

Input : - Goods Record

Output : - Requisition for Inventory
- Estimate Goods Items

Process :

BEGIN

- Read Goods Record from the Inventory File
- Check the stock on hand

IF the Product on hand reach reorder point

THEN send the Requisition Form

END IF;

END



Process Name : Create Purchase Order Form

Process Number : 3.0

Input : - Requisition for Inventory

- Supplier Detail

Output : - Purchase Order

- Purchase Record

- Supplier Name

Process :

BEGIN

- Receive Requisition for Inventory from process verify stock & customer order and process Monthly Check Inventory
- Read Supplier Details from Supplier File
- Print Purchase Order
- Send Purchase Order to Supplier
- Send Purchase Order to Order Information

END

St. Gabriel's Library

Process Name : Receive and Rejected Goods

Process Number : 4.0

Input : - Purchase Order and Delivery Bill

Output : - Returned Goods List
- Receive Goods Detail
- Verify Purchase Order and Delivery Bill

Process :

BEGIN

- Get Purchase Order and Delivery Bill
- Verify Purchase Order and Delivery Bill

IF Purchase Order = invalid

THEN send Returned Goods List

ELSE send Verify Purchase Order and Delivery Bill

- Send Receive Goods Detail
- Send Return Goods List

END IF

END

Process Name : Delivery Goods

Process Number : 5.0

Input : - Requisition Order

Output : - Invoice
- Sale & Return Order
- Picking Ticket

Process :

BEGIN

- Receive Requisition Order
- Check the Delivery Goods Items

IF the Order Goods available

THEN prepare Picking Ticket

ELSE prepare Invoice

END IF

- Update Sale and Return Order Information

END

Process Name : Prepare Report

Process Number : 6.0

Input : - Inventory Information

Output : - Report

Process :

BEGIN

- Receive information from Inventory
- Prepare Inventory Conclude Report
- Send Report to Management

END





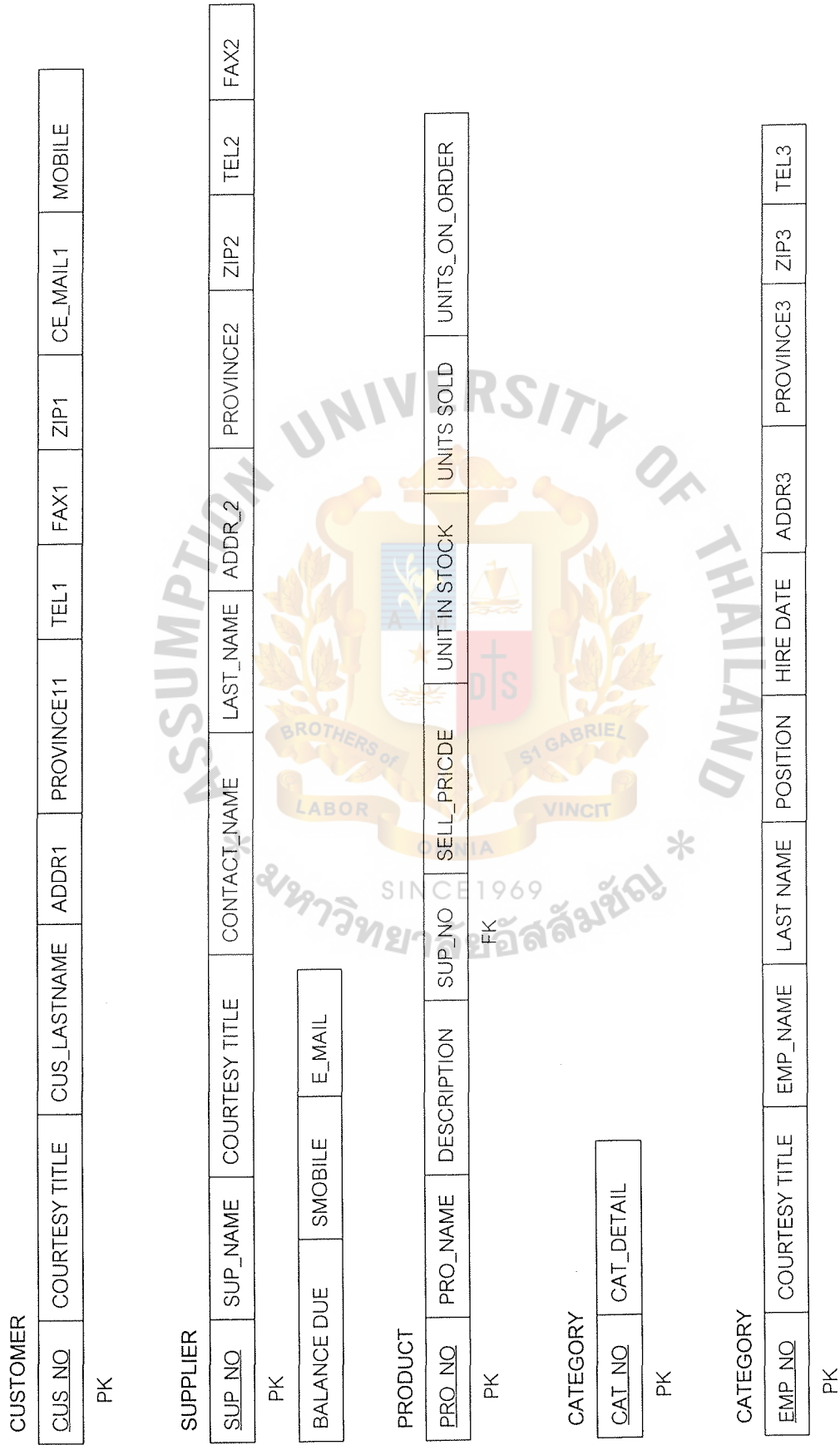


Figure H.1. Database Schema.

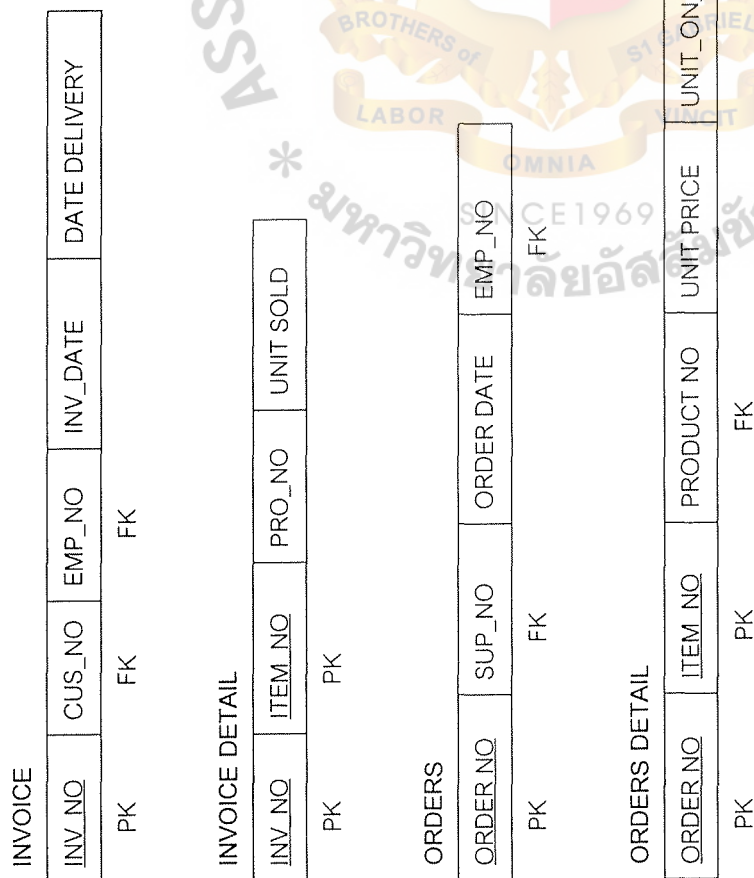


Figure H.2. Database Schema (Continued).

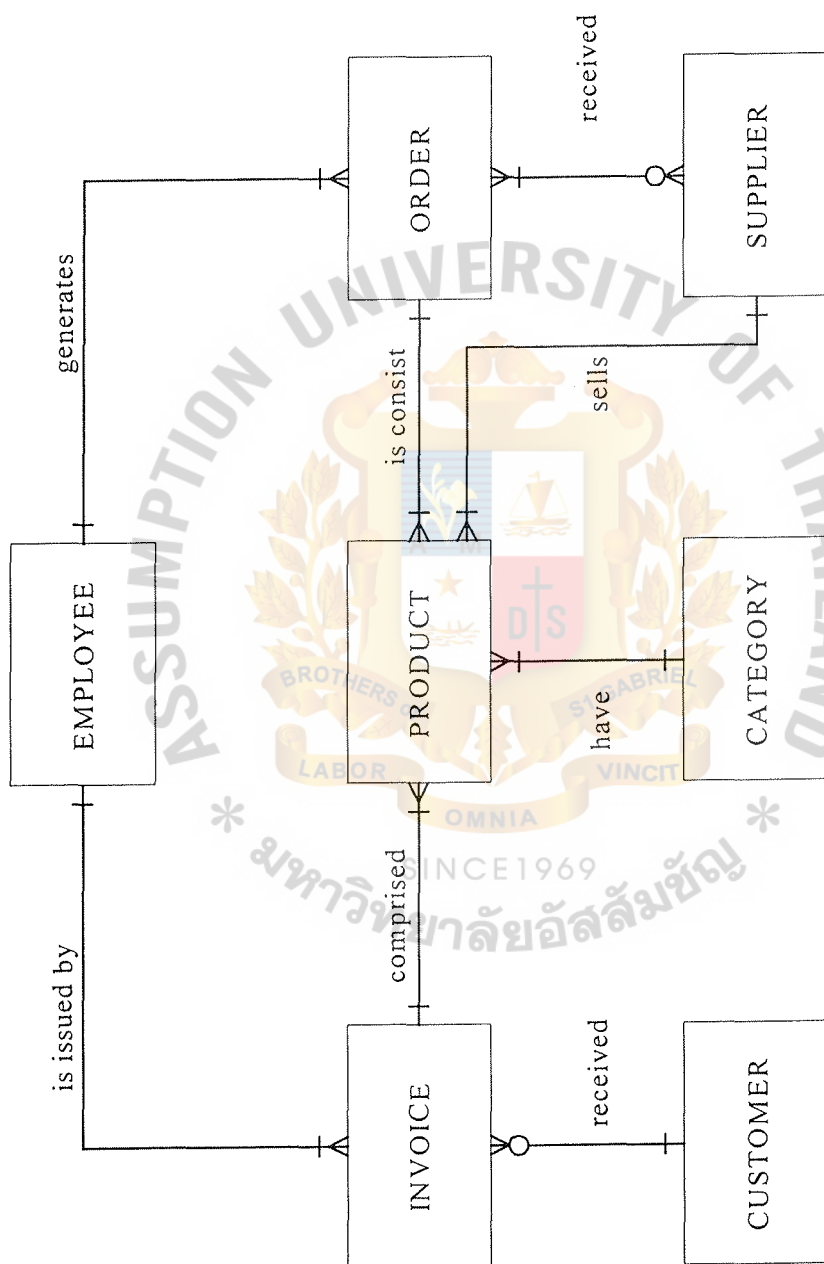


Figure H.3. Context Data model.

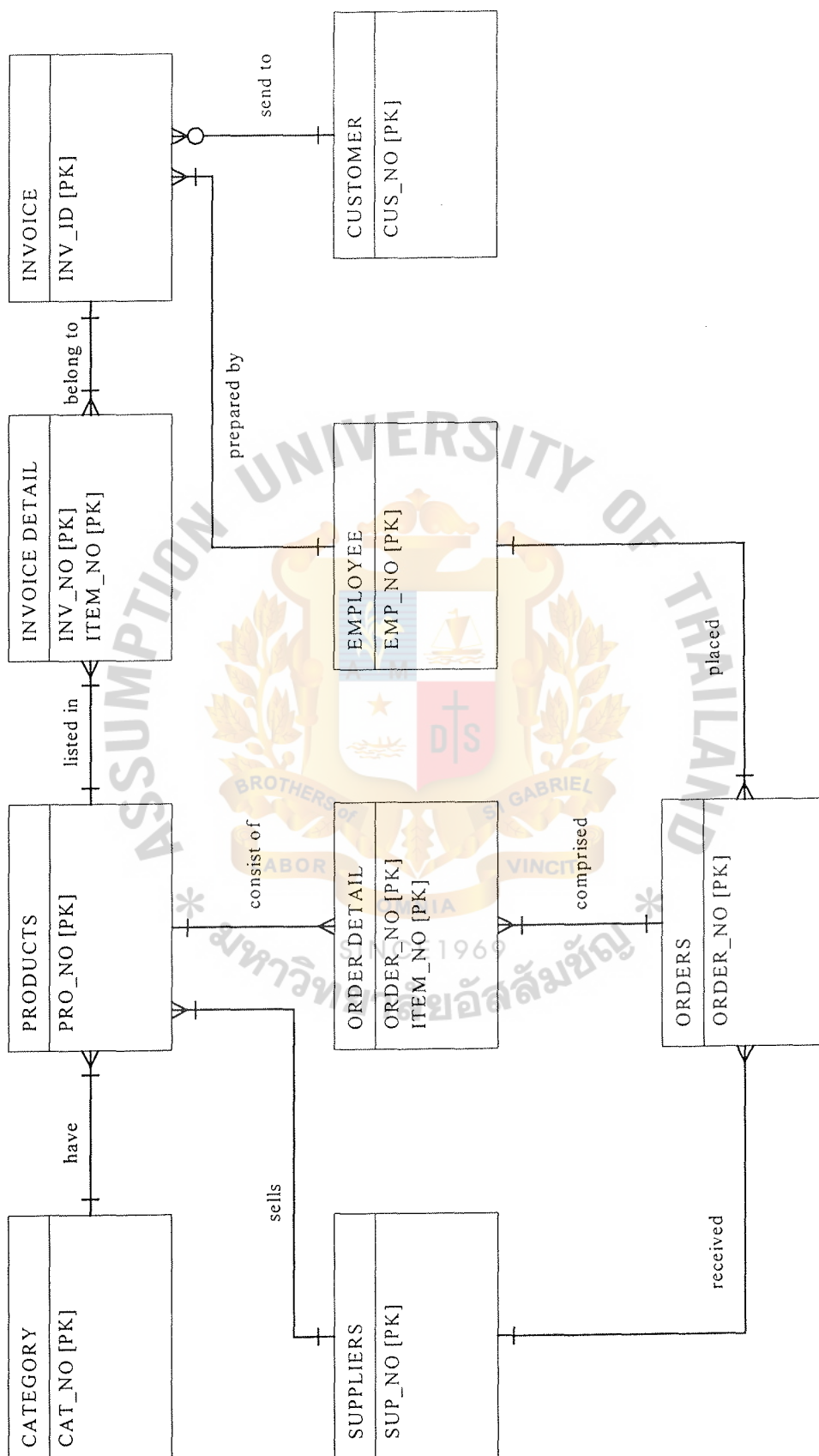


Figure H.4. Key-Based Attribute Data Model.

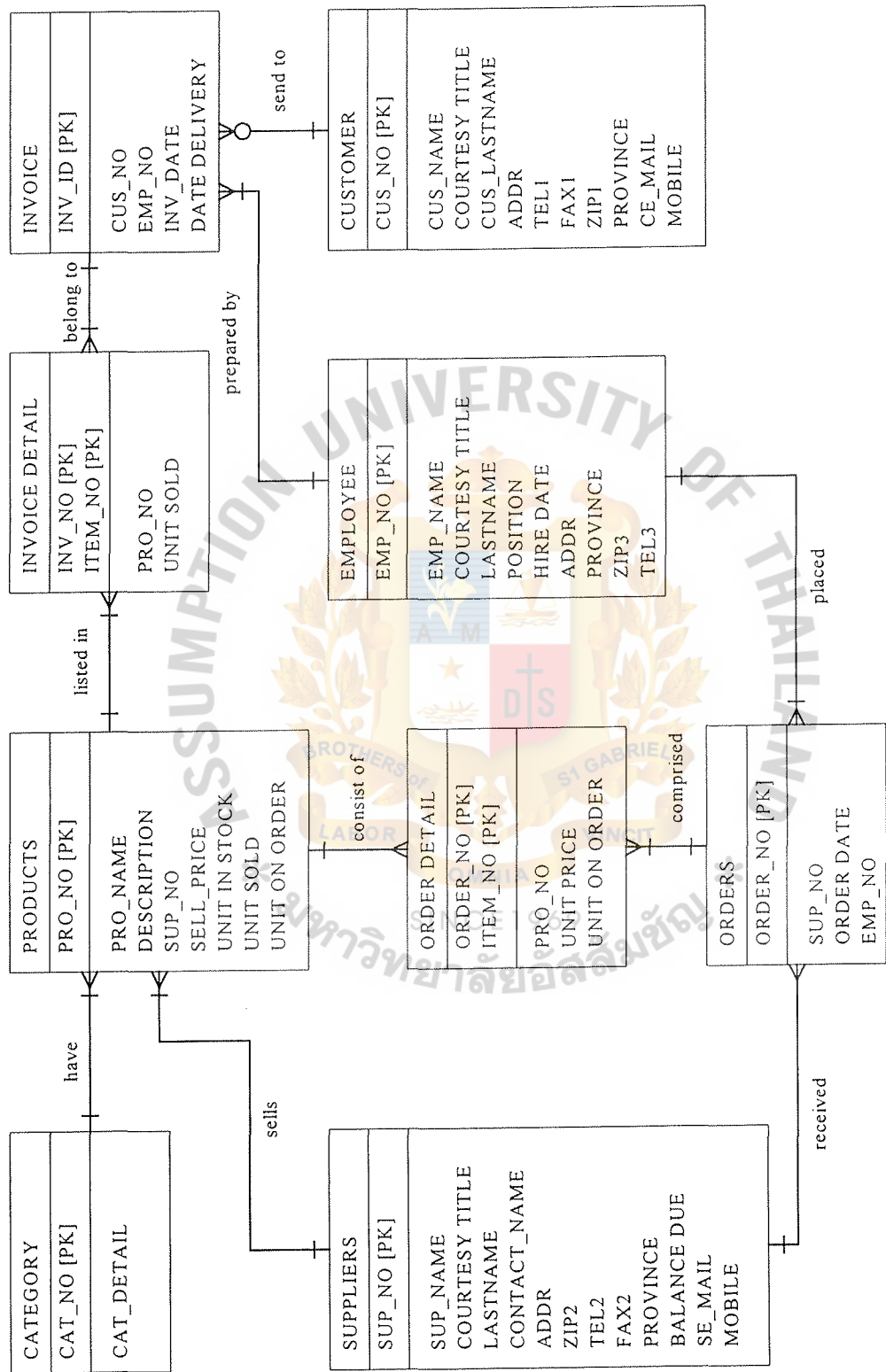


Figure H.5. Fully Attribute Data Model.



APPENDIX I
REPORT DESIGN

P&S WHOLESALER
PRODUCT STATUS REPORT

Item	Product No.	Product Name	Description	Unit in Stock	Price/Unit	Quantity	Status

Figure I.1. Product Status Report.

P&S WHOLESALER

MONTHLY PRODUCT PURCHASE ORDER ORDER

Item	Product No.	Date	Purchase Order No.	Supplier ID	Quotation No.	Total Amount	Quotation No.	Pro. Receive Date	Status
				*					
				*					

Figure I.2. Monthly Product Purchase Order Report.

P&S WHOLESALER

PRODUCT PURCHASED REPORT CLASSIFIED BY SUPPLIER

Supplier Code :

Supplier Name:

Item	Product No.	Date	Description	unit	Price/Unit	Invoice Number	Invoice Issue Date	Purchase Order No.	Purchase Order Issue Date

Figure I.3. Product Purchased Report Classified by Supplier.

P&S WHOLESALER
MONTHLY RETURN PRODUCT REPORT

Month:

Item	Date	Product No.	Supplier Name	Unit	Price/Unit	Order Quantity	Return Quantity	Receive Date	Invoice Number	Invoice Issue Date	Purchase Order No.	Purchase Order Issue Date

Figure I.4. Monthly Return Product Report.

P&S WHOLESALER

MONTHLY PRODUCT REQUISITION REPORT

Month:

Item	Requisition No.	Product No.	Description	Unit	Quantity	Price/Unit	Requester Name

Figure I.5. Monthly Product Requisition Report.

P&S WHOLESALER
DAILY PRODUCT DELIVERY REPORT

Date :

Item	Product No.	Description	Price/Unit	Quantity	Customer ID.	Term of Payment

Figure I.6. Daily Product Delivery Report.

P&S WHOLESALER

PRODUCT DELIVERY REPORT CLASSIFIED BY CUSTOMER

Customer ID :

Customer Name :

Customer Term :

Item	Date	Prodct No.	Description	Unit	Price/Unit	Quantity	Amount

Figure I.7. Product Delivery Report Classified by Customer.

P&S WHOLESALER

PRODUCT LIST FOR EACH CUSTOMER

Customer ID :

Customer Name :

Customer Term :

Item	Product No.	Product Name	Description	Unit	Price/Unit	Minimum Order

Figure I.8. Product List for Each Customer.

P&S WHOLESALER

CUSTOMER INFORMATION REPORT

Item	Customer ID	Customer Name	Address	Tel.	Fax

Figure I.9. Customer Information Report.

P&S WHOLESALER

SUPPLIER INFORMATION REPORT

Item	Supplier No.	Supplier Name	Address	Tel.	Fax	Balance Due

Figure I.10. Supplier Information Report.

P&S WHOLESALER

SUPPLIER REPORT (Arrange by Supplier's Name)

Item	Supplier No.	Supplier Name	Amount of Purchase	Amount of Payment	Amount of Payable

Figure I.11. Supplier Report (Arrange by Supplier's Name).

P&S WHOLESALER

SUPPLIER REPORT (Arrange by Amount of Purchase)

Item	Product No.	Product Name	Purchased Amount	Total Price	Status

Figure I.12. Supplier Report (Arrange by Amount of Purchase).



APPENDIX J
SCREEN DESIGN

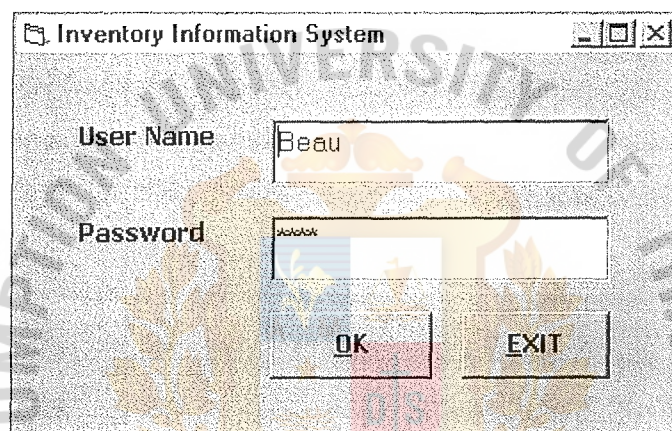


Figure J.1. Login Screen.

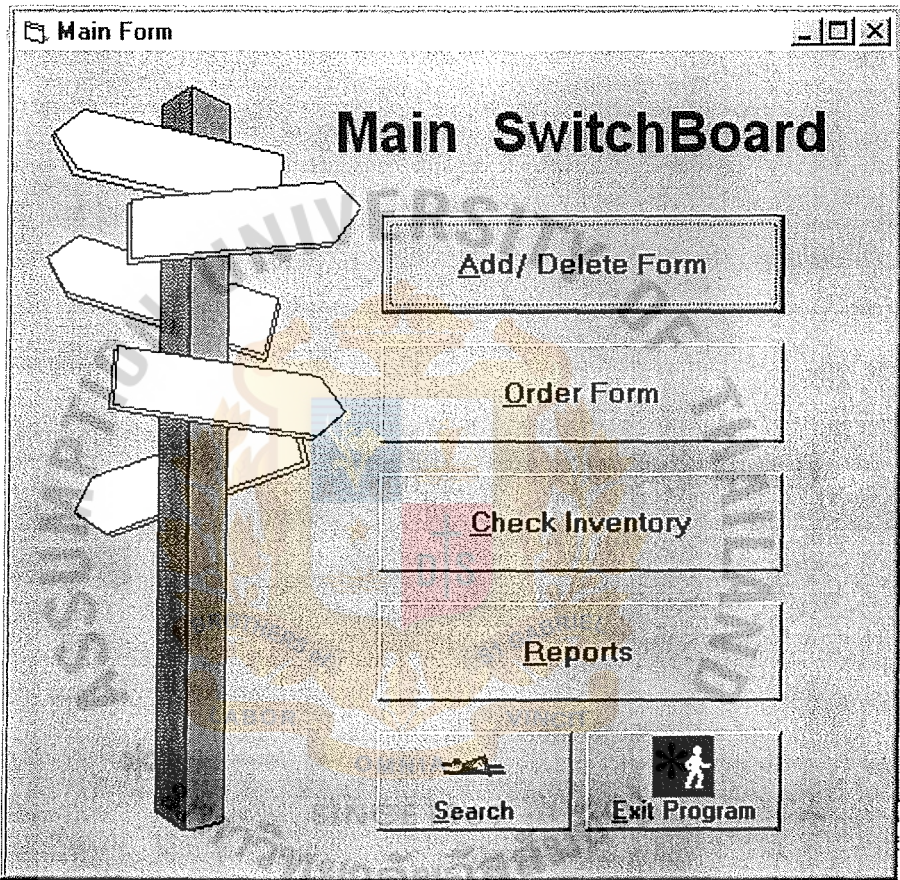


Figure J.2. Main Menu Screen.

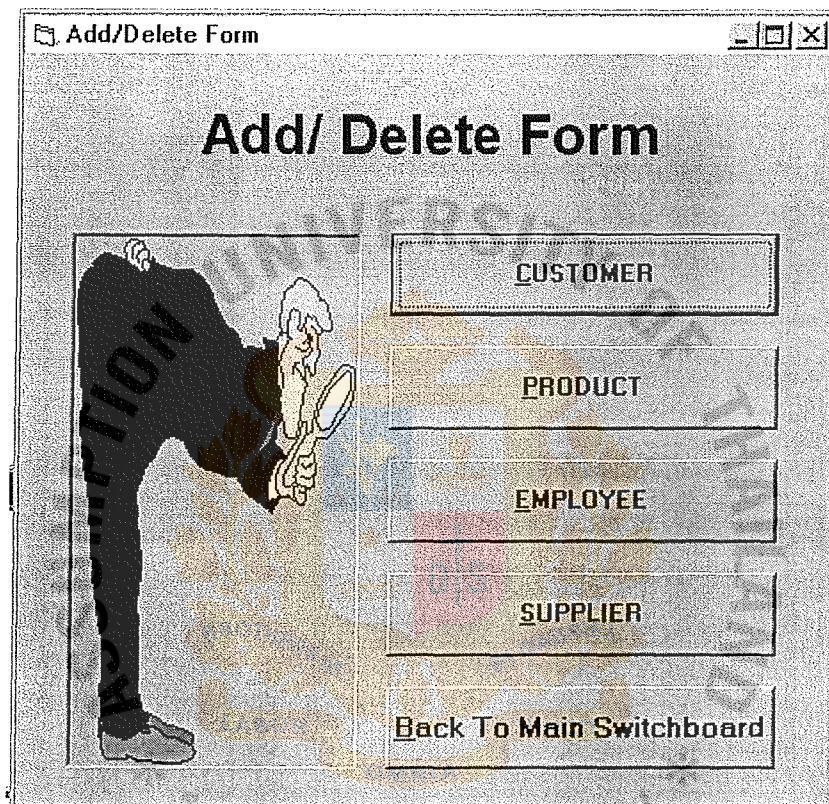











Figure J.3. Add Menu Screen.

Customer Information

Menu Bar

 Add
  Edit
  Save
  Cancel
  Delete
  Search
  Go To Add/Delete
  Back To Main Switchboard
  Exit

Customer Form

Customer ID:

Customer Name:










Customer Information

Address	<input type="text" value="136/171 Suksawad Road, Amphur Muang"/>		
Province	<input type="text" value="(054) 221032"/>	Zipcode	<input type="text" value="52000"/>
Fax Number	<input type="text" value="Lampang"/>	Telephone Number	<input type="text" value="(054) 221091"/>

Figure J.4. Customer Screen.

Product Information

Menu Bar

 Add
  Edit
  Save
  Cancel
  Delete
  Search
  Go To Add/ Delete
  Back To Main Switchboard
  Exit

Product Form

Product Number:

Product Name:

Supplier Name:

Product Detail

Sell Price	<input type="text" value="200"/>	Unit In Stock	<input type="text" value="55"/>
Unit Sold	<input type="text" value="20"/>	Unit On Order	<input type="text" value="20"/>
Description	<input type="text" value="2 pillows, 1 bed sheet 5"/>		

Figure J.5. Product Screen.

Employee Information

Menu Bar

Add Edit Save Cancel Delete Search Go To Add/Delete Back To Main Switchboard Exit

Employee Form

Employee ID: E009 First Next Back Last

Employee Name: Miss Namtip Weeraarapachai

Position: Sales Manager Hire Date: 10 January, 1999

Employee Information

Address: 124 Parkham Road, Amphur Muang

Province: Lampang Zip Code: 52000

Fax Number: (054) 227997 Telephone Number: (054) 227998

Figure J.6. Employee Screen.

St. Gabriel's Library

Supplier Information

Menu Bar

Add

Edit

Save

Cancel

Delete

Search

Go To Add/
Delete

Back To Main
Switchboard

Exit

Supplier Form

Supplier ID

S010

First

Next

Back

Last

Supplier Name

Globe Compnay Limited

Contact Name

Mr.

Khashane

Ratanachainont

Balance Due

90 Days

Supplier Information

Address

354 Petchburi 31 Ratchatawee

Zip Code

10400

Province

Bangkok

Fax Number

(02) 2534655

Telephone
Number

(02) 2532083

Figure J.7. Supplier Screen.

Check Inventory

Menu Bar

First Next Back Last Search Back To Main Switchboard Exit

Check Inventory Form

Category Number CA001 Date 20 January 2000

Category Detail Bed Sheet

Product Number	Product Name	Supplier name	Description	Unit
P001	ABC	Lotus	2 pillows, 1 bed sheet, 5"	55
P002	Kitty Cat	Lotus	1 pillows, 1 bed sheet, 3.5"	24
P003	Looney Toon	Sunflower	2 pillows, 1 bed sheet, 6"	30
P004	Micky Mouse	Sunflower	1 pillows, 1 bed sheet, 3"	15
P005	Sweet	Tulip	2 pillows, 1 bed sheet, 6"	20

Figure J.8. Check Inventory Screen.

Search

Search :

Please Select one

<input type="radio"/> Customer ID	<input type="radio"/> Customer Name
<input checked="" type="radio"/> Supplier ID	<input type="radio"/> Supplier Name
<input type="radio"/> Employee ID	<input type="radio"/> Employee Name
<input type="radio"/> Product ID	<input type="radio"/> Product Name

Figure J.9. Search Screen.



APPENDIX K
PROJECT PLAN

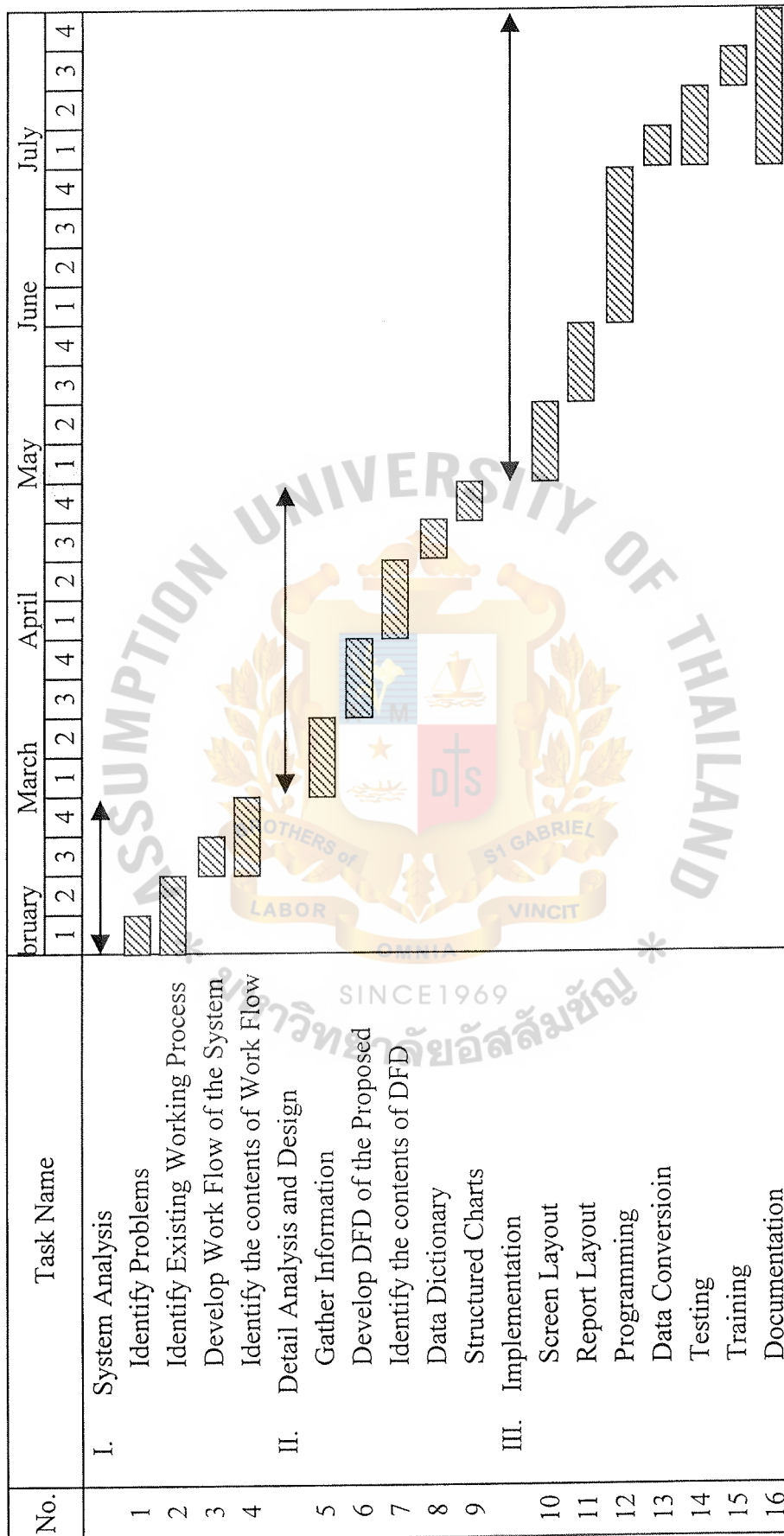


Figure K.1. Project Plan.

BIBLIOGRAPHY

1. Fitzgerald, J. and A. Fitzgerald. Fundamentals of System Analysis, Using Structured Analysis and Design Techniques, 3rd Edition. New York: John Wiley & Sons Inc., 1992.
2. Helmers, S. Data Communications a Beginner's Guide to Concepts and Technology. New York: Prentice-Hall International, Inc., 1989.
3. Kendall, Kenneth E. and Kendall, Julie E. Kendall. System Analysis and Design. Englewood Cliff, NJ: Prentice-Hall International Inc., 1995.
4. Korth, F. Henry and Abraham Silberschatz. Database System Concepts. New York: McGraw-Hill International, 1991.
5. Loomis, Mary E. S. Data Management and File Structures. London: Prentice-Hall International Inc., 1989.
6. Martin, J. and Chapman K. Local Area Networks Architectures and Implementations. Michigan: The Arben Group, Inc., 1991.
7. McLead, Raymond, Jr. System Analysis and Design: An Organizational Approach. Forth Worth: Dryden Press, 1994.
8. Page-Jones, Meilir. The Practical Guide to Structured System Design, 2nd Edition. London: Prentice-Hall International, Inc., 1988.
9. Senn, J. Analysis & Design of Information System, 2nd Edition. New York: McGraw-Hill International Editions, 1989.
10. Whitten, Jeffrey L. and Lonnie D. Bently. System Analysis and Design Methods, 4th Edition. Taipei: McGraw-Hill Inc., 1998.
11. Yourdon, Edward. Modern Structure Analysis. London: Prentice-Hall International Inc., 1989.

St. Gabriel's Library