Raw Material and Production Management System For a Brewery Company

By

Mr. Narin Akkharapichet

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

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

November, 1998

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Project Title	:	Raw Material and Production Management System For a Brewery Company *The tittle has been changed according to the final approval the committees
Name	:	Mr.Narin Akkharapichet
Project Advisor	:	Prof.Dr.Srisakdi Charmonman
Acadamic Year	:	December 1998

The Graduate School of Assumption University had approved this final report of the three-credits 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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December 1998

ABSTRACT

The System Development Project is written under the topic of The Raw Material and Production Management System of Boon Rawd Brewery Company Limited. The main objective of the project development is to create a new system that allows the company to have more opportunity to grow and expand by the use of the computerize system. The core system concerns directly with the inventory of the raw materials and products such as Singha Beer, Singha Soda and Singha Drinking Water. So, this project emphasizes on designing a new system in order to improve the existing system operating in the inventory and production control system of the company instead of using manual system. The study covers the analysis, design, and implementation of the computerized system which improves efficiency in performance of the management system and achieves the company's goal.

This project is not only designed for the Raw Material and Production Management System but also for the Executive Information System that will useful as a Decision Supporting System for the management. In order to increase productivity, company had utilized technology such as Information Technology to gather data in each factory and to generate reports to support decision making for production and sales forecast. Furthermore, there are Management Information System reports that are created to support decision making such as the Effectiveness of Production report and the Maximized Profit Scenario report.

ACKNOWLEDGMENTS

The author desires to express his most sincere appreciate and thanks to the advisor Prof. Dr. Srisakdi Charmonman for his encouragement and advice through the course of this project, And I am also grateful to all the project committee members.

Thanks go to the staff of Boon Rawd Brewery Company Limited, who gave good co-operation, the company information, and other necessary information for the system study in order to finish this project.

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TABLE OF CONTENTS

ASSUMPTION UNIVERSITY OF THAILAND
SINCE 1969
มหาวิทยาลัยอัสสัมชัญ

ASSUMPTION UNIVERSITY OF THAILAND
SINCE 1969
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LIST OF FIGURES

ASSUMPTION UNIVERSITY OF THAILAND SINCE 1969 มหาวิทยาลัยอัสสัมชัญ

ASSUMPTION UNIVERSITY OF THAILAND
SINCE 1969
มหาวิทยาลัยอัสสัมชัญ

LIST OF TABLES

ASSUMPTION UNIVERSITY OF THAILAND
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I. INTRODUCTION

1.1 Background of the Project

The Raw Material and Production Management System is in a Client-Server architecture technology that accumulate data of receiving and distributing raw material and soda and drinking water production system in the Relational Database Management System of each factory. It has many reports of raw material balance sheet and production reports including the analysis of raw material used for each production in each factory. Furthermore, there are Management Information System reports that are created to support decision making such as the Effectiveness of Production report and the Maximized Profit Scenario report.

In order to increase productivity, the company had utilized technology such as Information Technology to gather data in each factory and to generate reports to support decision making for production and sales forecast.

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1.2 Objective of the Project

The objectives of the project on the Raw Material and Production Management System are as follows:

(1) To study the existing system of The Raw Material and Production Management System in order to identify the new development system for the company, and to analyze the system in order to know the real situation of the system in order to design the new system.

(2) To analyze the problem of users' requests.

(3) To design a low cost microcomputer-based information system as a hypothetical system.

(4) To develop and test the software package for the Raw Material and Production Management System.

(5) To utilize the use of Database Management Techniques to provide up-to-date, effective and accurate information for the Raw Material and Production Management System in order to create a management information system and an executive information system as decision supporting systems for the management.

(6) To reduce the redundant work.

(7) To solve the Year 2000 problems.

1.3 Scope of the Project

The project will cover major part of the Raw Material and Production Management System which includes the following areas:

(1) Create Basic Data Construction.

- Branch Factory.
- Department.
- Section.
- User.
- Supplier.
- Raw Material.
- Product.
- Unit.

(2) Receive Raw Material.

(3) Distribute Raw Material.

(4) Enter Production.

(5) Generate Report.

(6) Security.

(7) Replicate Data.

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II. EXISTING SYSTEM

2.1 Background of the Organization

Boon Rawd Brewery Company Limited was established in 1931. The main business of company is producing beverage products such as beers, soda, drinking water and fruit juice. The products that are well known to Thai people are Singha beer, Singha soda , Singha drinking water, Singha fruit juice and Singha fresh. Currently, Singha beer and Singha soda has gained the Thai's beverage market share of 80%. Now, the company has a total of 5 production factories which are located at Samsen, Patumthani, Wangnoi, Chiengmai, Surathani and there are distribution centers across the country.

The Raw Material and Production Management System is developed on the store department and production department as shown in the Figure 2.1

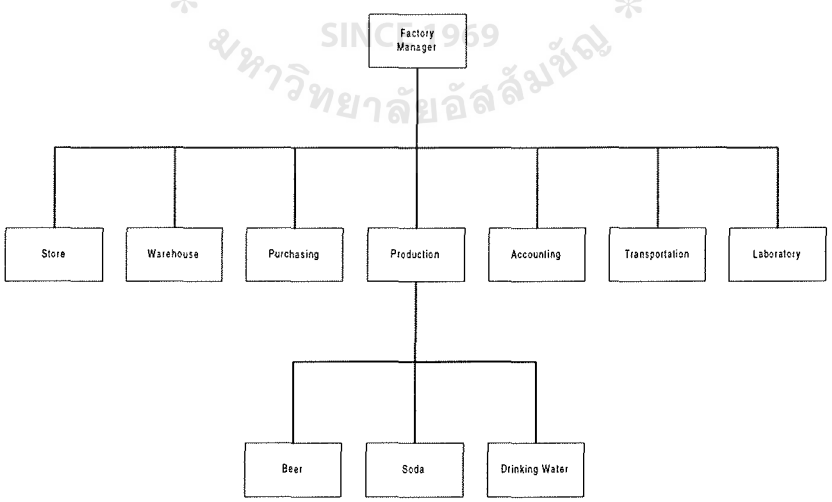

Figure 2.1. Organization Chart

2.2 Existing Business Functions

As the existing system is done on manual basis and PC workstation, the receiving and distributing of raw material for the storage have been done on a manual booking system and the soda production and drinking water use the Microsoft Excel program on the PC. This causes a lot of problems in document management and the data updating of raw material information.

The context diagram for existing business function and data flow diagram is shown in the Figure 2.2 and Figure 2.3

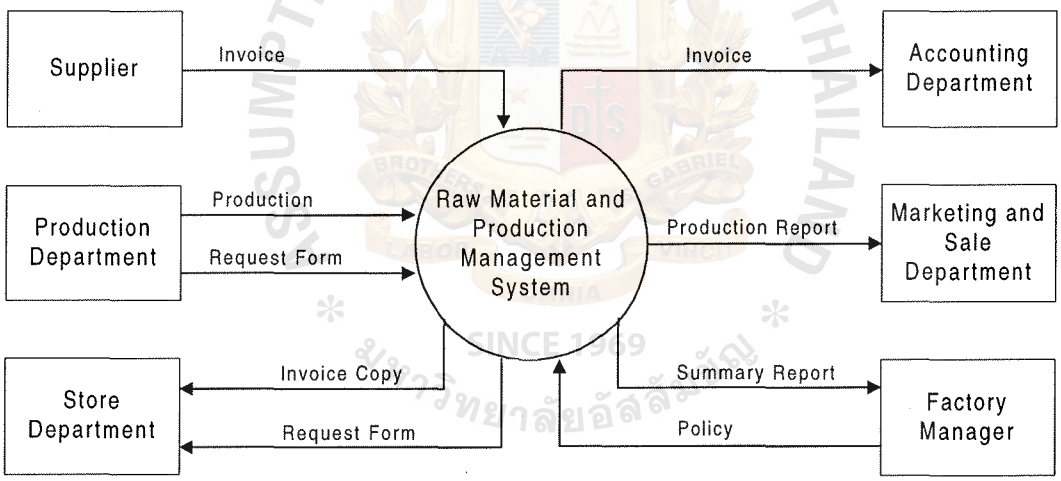

Figure 2.2. Context Diagram for Existing System

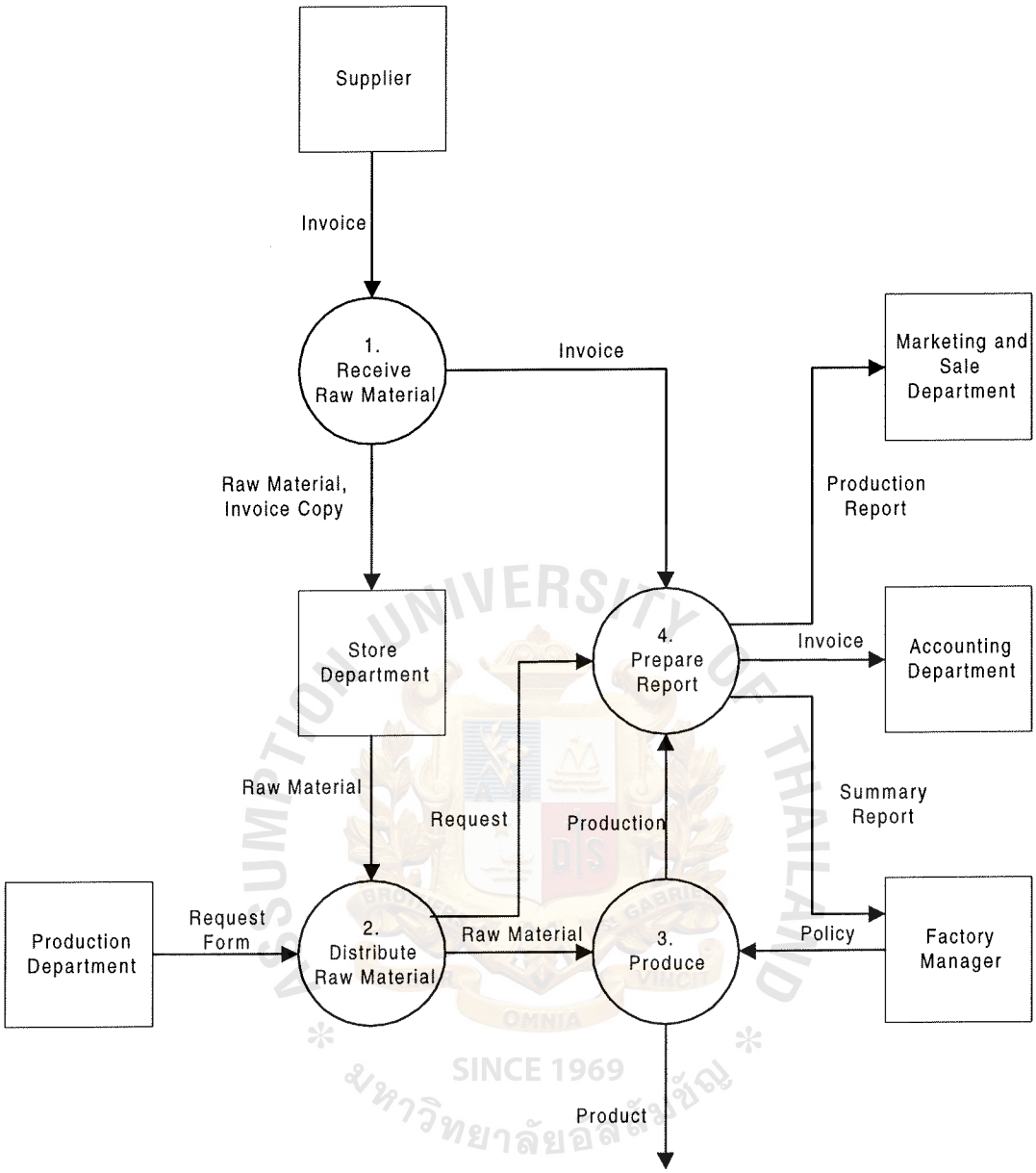

Figure 2.3. Data Flow Diagram Level 0 for Existing System

2.3 Current Problems and Areas for Improvements

The current problems of the Raw Material and Production Management System are the basic problems of the inventory system which are defined in the following details;

(1) There are many transactions of task in the inventory system where each transaction needs accurate information.

(2) The existing system is still a manual system that requires more workers to handle all the transactions of the inventory system.

(3) The old data are still in form of hard copy. So, it has many problems.

- Difficult to retrieve data to make the report.
- Difficult to search data for the information.
- Difficult to compare cost of raw material to calculate the price of product.
- Difficult to count the amount of raw material and production.
- No standard and summary reports of receive invoice, request form, and production.
- Production data is not up-to-date

2.4 Existing Computer Systems

Boon Rawd Brewery Company Limited has an existing computer system. At Samsen and Patumthani it has the Fast Ethernet LAN that uses a network operating system which is WindowsNT to be a server. The existing computer network uses a leased line with high-speed link between Sansen's Server and Patumthani's Server as shown in the Figure 2.4

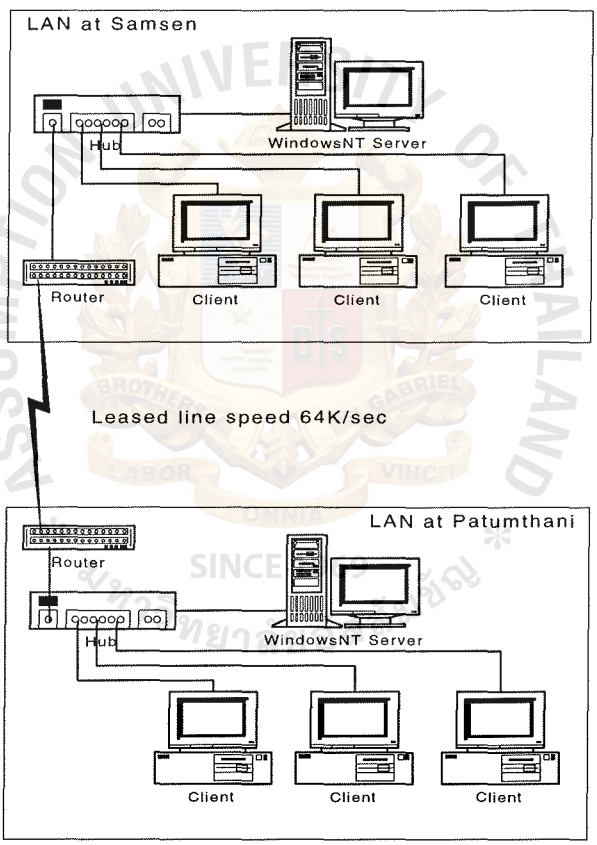

Figure 2.4. Networking of the Existing Computer System

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III. PROPOSED SYSTEM

3.1 Users' Requirements

For the new system, I have conducted a survey in order to summarize all the user's requirements. The following is a typical text requirement specification for the new system application written by a representative for the end user company.

(1) It is support system for raw material and product inventory.

(2) Raw material is received from suppliers who are registered in the database of the company.

(3) The system handles the raw material invoice and add the quantity of raw material into the database automatically.

(4) The system handles the request form and to reduce quantity of raw material from the database automatically.

(5) All production transaction must be recorded into the database.

(6) The system can easily create, update, and delete information about basic data, receive-request raw material, and production in the system.

(7) The system is able to create reports in each transaction with in a period of time such as receive date, request date, or product date. It is able to create the summary reports for each month, tri-master, or year.

(8) The system automatically replicate data between Patumthani's server and Samsen's server.

(9) The system must support multi-users environment.

(10) The system should be of Client-Server architecture.

(11) The system run can run on all popular technical environments (UNIX, Windows, OS/2, etc.) and has a modern graphic user interface (GUI).

(12) The system can support Thai and English character.

(13) The system can be installed at the Wangnoi, Chiengmai, and Surathani branch.

(14) The system must be applicable in year 2000.

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3.2 System Design

The new system design was created to meet all the user's requirements as defined above. The Raw Material and Production Management System was designed under Client-Server architecture. The design phase expands and details the analysis phase by taking into consideration all technical implications and restrictions. The purpose of the design is to specify a working solution that can be easily translated into programming code, such as a database, a users interface, communication, devices, and more.

The design can be divided in two segments:

3.2.1 Server Side

The server's objective is to improve the resource efficiency and reduce network traffic between client and server. Server objects are stored in a central location, which make maintenance and modification easier to administer. The server objects are defined such as database object contains table, view, index, stored procedure, trigger, and relation. Furthermore, in the server side it has a daily process to replicate data between Patumthani's server and Samsen's server at mid-night.

3.2.2 Client Side

The client object is the front-end application containing the user interfaces and business rule. The new system in the client side includes the entire concerned department and all the concerned work processes as shown in the context diagram and the data flow diagram in both level 0 and others.

In the context diagram, the new system has contact with several departments including the;

- Supplier
- Production department
- Store department
- Accounting department
- Marketing and sale department
- Factory manager

In Figure 3.1, Context Diagram for Raw Material and Production Management System also shows the transferring of the information among the system and the concerned departments.

The designed system has also defined the data flow diagram at level 0, which includes 6 processes in the new system as follows:

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3.2.2.1 Create Basic Data Construction

This module is used to insert new records into database, update existing record on database, and delete existing record from database. The basic data construction consist of the following data;

- Branch.
- Department.
- Section.
- User.
- Supplier.
- Raw Material.
- Product.
- Unit.

3.2.2.2 Receive Raw Material

When the staff at store department received raw material invoice from the supplier, the data of invoice was entered into database, automatically increasing the quantity of raw material balance.

3.2.2.3 Distribute Raw Material

When the staff at store department received raw material request form from the production department, the data of request form was entered into database, automatically decreasing the quantity of raw material balance.

3.2.2.4 Enter Production

When the staff at production department received production form, the data of production form was entered into database, automatically increasing the quantity of product balance.

3.2.2.5 Generate Report

When staff or manager needs transaction reports, or summary reports, the reports are created at this module. The reports can generated by length of day, length of month etc. The reports can be sent into several file formats such as text file, excel file, lotus file, and dbf file. After that the user or staff can modify or adjust the report by themselves.

3.2.2.6 Security

This module was managed by user right access; for each staff can access only the module that he or she has permission. The permissions are granted by the administrator or manager.

Charts, shown on the following pages:

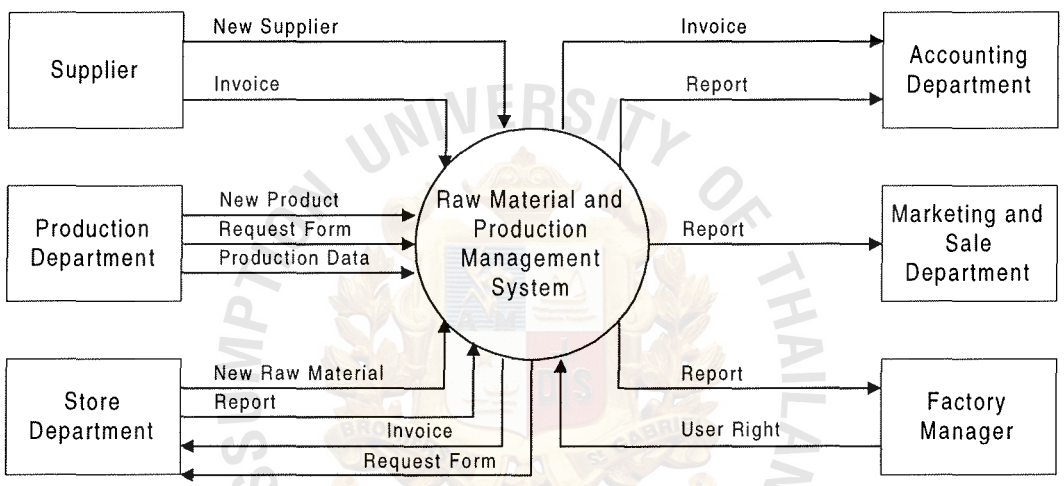

Figure 3.1. Context Diagram for Proposed System

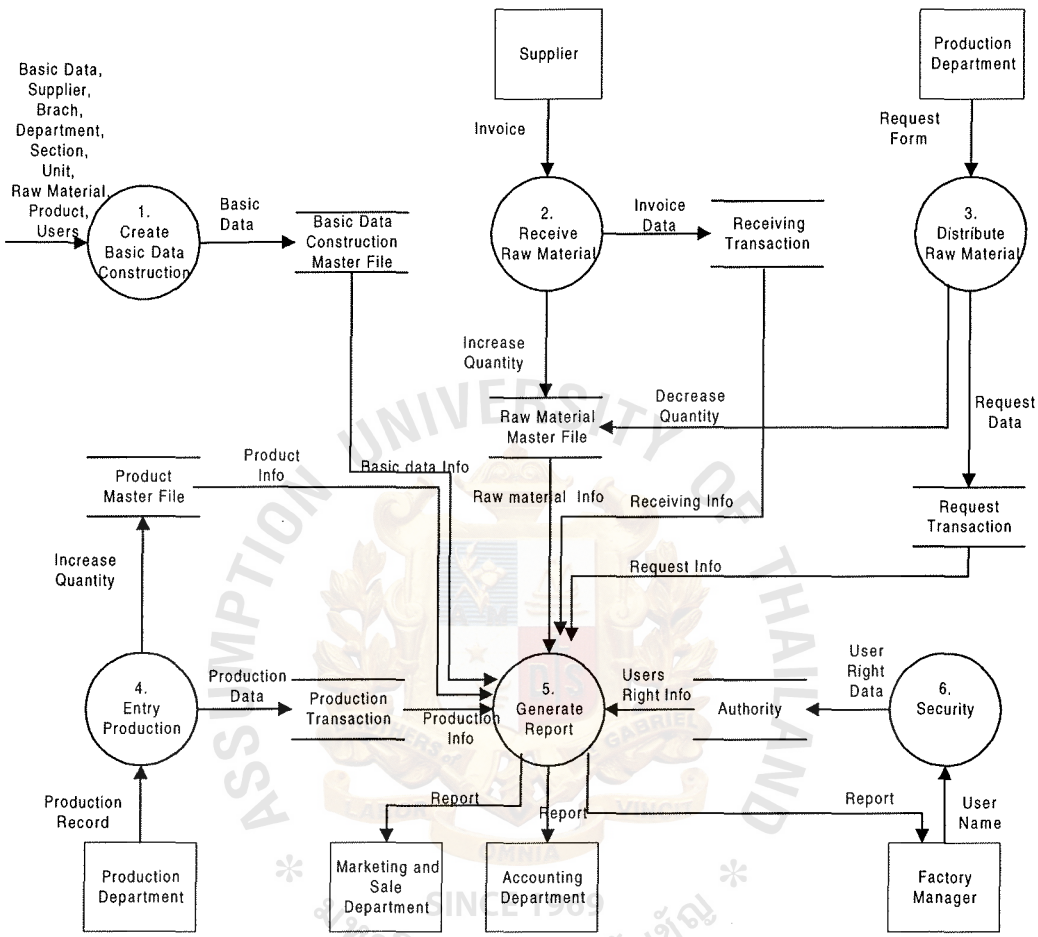

Figure 3.2. Data Flow Diagram Level 0 for Proposed System

3.3 Hardware and Software Requirements

3.3.1 Hardware Requirements

To serve the Raw Material and Production Management System that uses Client-Server architecture, personal computer are used as communication devices for man-machine interface. At least five computers are required and at least one server is required in order to use the local area network. This file server is responsible for serving the database and allows file sharing among computer. The computers will be connected to Fast Ethernet Local Area Network (LAN) by using Windows NT 4 operating system, as shown in the Table 3.1

Table 3.1. Hardware Requirements

Hardware and Specifications	Objectives	Quantity
File Server - CPU Intel Pentuim 200 Mhz. - RAM 64 Mbytes, expand to 128M - Hard Disk Interface SCSI-2, capacity 4 Gbytes Floppy Disk Drive 3.5" capacity 1.44M - CD-ROM Drive Interface SCSI-2 - Ethernet Interface Card 10/100BaseT - 14" SVGA Monitor, Non-Interlace - PS/2 Mouse	- Database Server - File Sharing - Primary Domain Controller	1

Table 3.1. Hardware Requirements (Continue)

Hardware and Specifications	Objectives	Quantity
PC Work Station - CPU Intel Pentuim 166 Mhz. - RAM 16 Mbytes, expand to 64 M - Hard Disk capacity 1.2 Gbytes - Floppy Disk Drive 3.5" capacity 1.44M - Ethernet Interface Card 10/100BaseT - 14" SVGA Monitor, Non-Interlace - PS/2 Mouse	- Data entry - Word processing - Presentation	5
Laser Printer - Printing A4 , 15 pps., 600*600 dpi - 1 Serial Port Interface - 1 Parallel Port Interface - Ethernet Interface Card 10/100BaseT	Print Server	1
HUB - Support SNMP (Simple Network Management Protocol) - 12 Ports 10/100BaseT	Concentrator	1
UPS - Capacity 1 KVA - Backup Power Supply Less 15 minus	Backup Power Supply for File Server	1
UTP Cable - Unsheild Twised Pair,Category 5	Cable	1 Box
RJ-45	Connector	20

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3.3.2 Software Requirements

The new system will be implemented by using Graphic User Interface (GUI) environment. This is achievable by using Windows 95 as the GUI software for the system. The development tool uses Visual Basic 5.0 enterprise edition as application development, Crystal Report as the report generator, and Oracle 7.3 as database management system, as shown in the Table 3.2

Table 3.2. Software Requirements

Software and Specifications	Objectives	Quantity
Network Operating System - Windows NT Advance Server 4 10 Users	Network Operating System for File Server	1
Operating System Windows 95	Operating System for Work Station	5
Relational Database Management System (RDBMS) Oracle 7.3	Database Management System	1
Tools - MS-Visual Basic 5.0 Enterprise Edition Crystal Report 5.0 Professional Edition	Application Development Tools	1 1

3.4 Security and Control

Security in the computing is very importance. Access to the program was controlled by user name and password. The user who has right to access the system should know the user name and password before logging into the system. Security can protect the program and data from unauthorized usage, i.e., user can not access administrator menu. There are 3 categories of the new system as follows:

- System Security
- Data Security
- Application Security

3.4.1 System Security

The new system was designed run on the Windows NT environment. The user has to be assigned User ID and corresponding Password. User Right Access can be granted on directory basis. Windows NT is built to meet Class C2 security standard. Windows NT security system is as follows:

3.4.1.1 Security Directory and File Resource

When the client remote to the NT Server, remote users are given access to local hard disk resource by creating shared directories. Any directory, in any of the three supported file system are such as

- File Allocation Table (FAT)
- High Performance File System (HPFS) and
- Windows NT File System (NTFS)

3.4.1.2 Security the System

Windows NT protects its resources, including files, printer, and applications, by controlling access to them. For each resource to be protected or secured, the resource must be accessible to authorized users and inaccessible to unauthorized users. Windows NT protects its resources by

- Access Control Lists
- Access Control Entries

3.4.2 Data Security

The new system database was designed to run on Oracle 7.3. Database Management System. The user has to be assigned User ID and corresponding Password to have the right to access database. Each user has a different permission to access database on Windows NT Server. In addition, Database Management System can be backuped database every day and the database can be recovered if the database has any problem occuring such as indexing damage.

3.4.3 Application Security

In the new system, the user was manages the user right access for each user can access only the menu that user has permission. The permission has been granted or denied for each user. The menu must be enabled to authorized users and disable unauthorized users.

3.5 Systems Cost Evaluation and Comparison

3.5.1 Cost of the Manual System

The manual raw material and production inventory needs to have more staff to operate all the transactions. The manual system can reduce the hardware and software cost that are also high in the first investment, and it also has no expenditure for maintenance for service cost that will be paid in the future. Cost of the manual system can be estimated only by the store and production department at Patumthani branch, as defined in the Table 3.3

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Table 3.3. Cost of the Manual System

Description	Quantity	Salary/Month	Total (Baht)
Supervisors	2	15,000	30,000
Staffs	6	9,000	54,000
Auditor	1	10,000	10,000
Total	**9**		**94,000**

3.5.2 Cost of the Computerize System

The cost of whole system includes manpower cost, hardware cost, software cost, implementation cost, and maintenance cost.

Table 3.4. Cost of Manpower of the Computerized System

Description	Quantity	Salary/Month	Total (Baht)
Supervisors	1	15,000	15,000
Staffs	3	9,000	27,000
Auditor	1	10,000	10,000
Total	**5**		**52,000**

Table 3.5. Cost of Hardware and Software of the Computerized System

Hardware/Software	Quantity	Price/Unit	Total (Baht)
File Server included Windows NT	1	300,000	300,000
PC Work Station included Windows 95	5	40,000	200,000
Laser Printer	1	50,000	50,000
HUB	1	25,000	25,000
UPS	1	10,000	10,000
UTP Cable	1 Box	5,000	5,000
RJ-45	20	10	200
Oracle 7.3	1	Existing Software	-
Visual Basic 5.0 Enterprise Edition	1	10,000	10,000
Crystal Report 5.0 Professional	1	15,000	15,000
Raw Material and Production Management System	1	100,000	100,000
Total			**715,200**

3.5.3 Comparison between Cost of the Manual System and Cost of the Computerize System

From the comparison of the two system, I found that the manual system has lower cost than the computerized system. If the company compares the cost of manpower between the manual system and the computerized system, I found that the cost of the staffs of the computerized system is cheaper than the manual system, because the computerized system uses only a small group of people to handle the system. But the manual system needs many people to handle the system.

Although the computerized system required a high cost when compared to the manual system, the computerized system can reduce the staffs. So, the company needs an initial investment of a large amount and then the company can save and reduce the labor cost.

3.5.4 Benefit

The benefits can be classified into 2 types, tangible and intangible benefits. For the proposed system, it can provide the benefits as follows:

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3.5.4.1 Tangible Benefit

The proposed system will reduce operating costs by eliminating the number of staff and manual operation. Total annual operating costs of the proposed system is 624,000 baht/year. Total annual operating costs of the existing system is 1,128,000 baht/year. Thus, total annual operating costs of 504,000 baht/year will be saved.

Payback Period

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

Where I = Investment

T = Tax rate

R = Annual Saving

Total of Investment = Cost of hardware + Cost of software

= 125,000 + 590,200

= 715,200

Tax rate = 0.1

Annual Saving = 504,000

$$\text{Payback Period} = \frac{715,200}{(1 - 0.1) * 504,000}$$

= 1.58

≈ 1 year 6 months

Net Present Value (NPV)

Net Present Value is a discount cash flow approach based on the present value of money. The Net Present Value formula is shown below.

$$NPV = \frac{R}{(1+k)^1} + \ldots + \frac{R}{(1+k)^n} - PV$$

Where NPV = Net Present Value

PV = Cost of Proposed System = 715,200

R = Cash Flow (Annual Saving) = 504,000

K = Interest rate = 12%

N = Number of years saving available = 2 years

$$NPV = \frac{504,000}{(1.12)^1} + \frac{504,000}{(1.12)^2} - 715,200$$

= 91,585 baht

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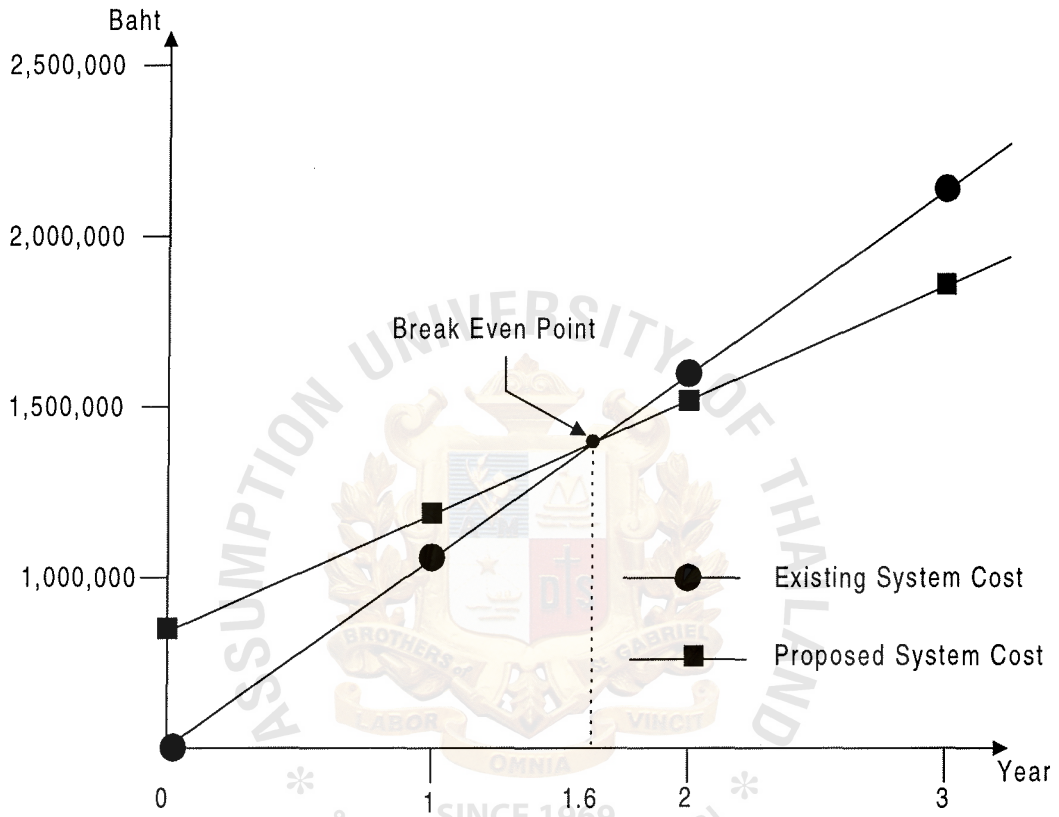

Figure 3.3. Break Even Point

3.5.4.2 Intangible Benefits

Some benefits that are gained by the organization from the use of information system are difficult to measure but they are important. Such a benefit is known as intangible benefit. For the Raw Material and Production Management System it can summarize for intangible benefits as follow:

- To impose discipline for all of the employees and management throughout the system.
- To forecast or improve management planed activities.
- To get more current and accurate information for management and plan for the future.
- Increasing job satisfaction for employees by elimination of tedious tasks.

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IV. PROJECT IMPREMENTATION

4.1 Overview of Project Implementation Schedule

This project can be divided into 3 main part that are;

- To analyze the old system, in order to identify the advantage and disadvantage of the old system, and define the development of the new system.
- To use all the analysis data to design the new system.
- To set up some prototype of the project in order to try an error and step to implement the whole system

This project has been done according to the Gantt chart as shown in the Figure 4.1

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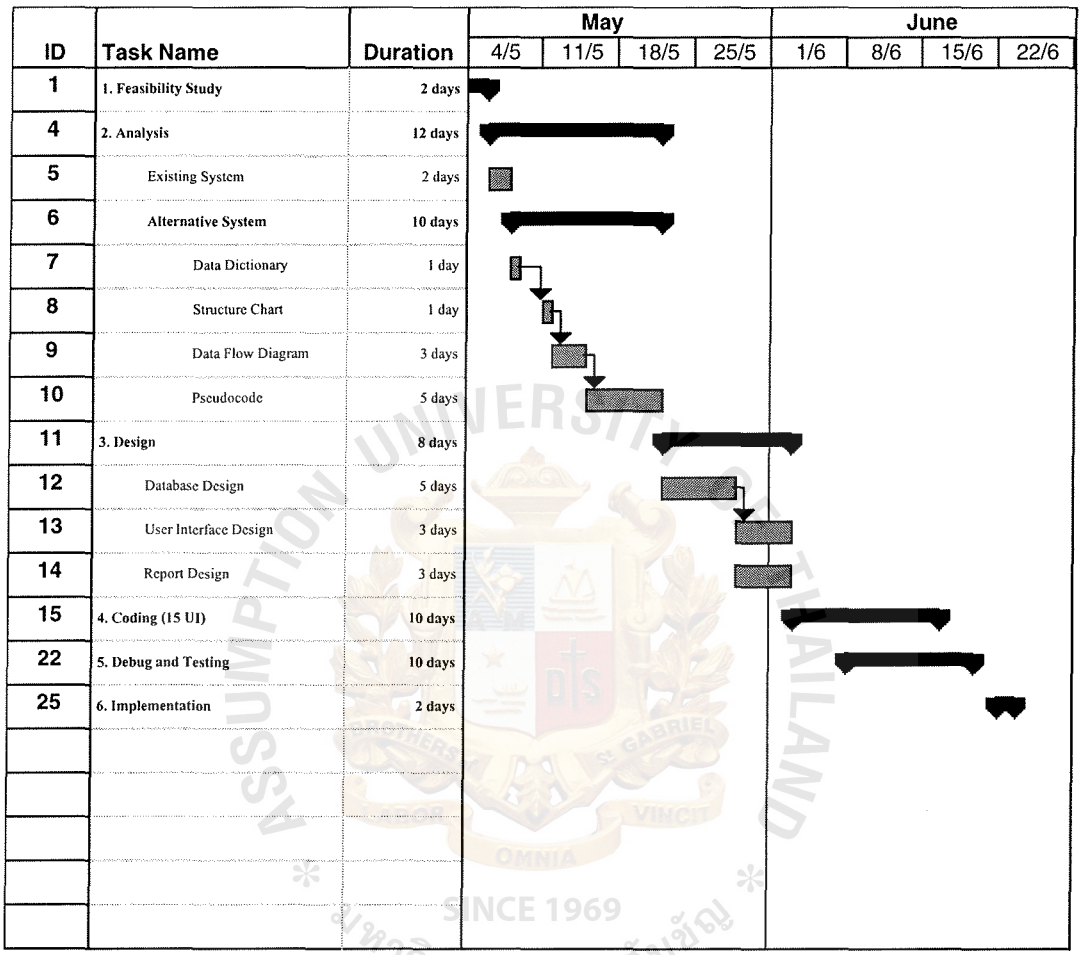

ID	Task Name	Duration
1	1. Feasibility Study	2 days
4	2. Analysis	12 days
5	Existing System	2 days
6	Alternative System	10 days
7	Data Dictionary	1 day
8	Structure Chart	1 day
9	Data Flow Diagram	3 days
10	Pseudocode	5 days
11	3. Design	8 days
12	Database Design	5 days
13	User Interface Design	3 days
14	Report Design	3 days
15	4. Coding (15 UI)	10 days
22	5. Debug and Testing	10 days
25	6. Implementation	2 days

Figure 4.1. Project Plan

4.2 Test Plan and Results

When the project is finished, the company set a working group in order to test the Raw Material and Production Management System to make sure that the system works. Then, the new system started together with the manual system so that the company can compare the effectiveness and efficiency between the manual system and the computerized system.

During the test, the staffs found some mistakes in the system such as the data does not provide modification in the database system, so the user has already corrected it.

After one month, the store department and production department confirms that every transaction run smoothly and is ready to run only the computerized system without the manual system. The management also agrees at this point.

Testing of specific program, subsystems and total systems is essential to quality assurance. Testing in done to turn up any existing problem and interfaces before the system is actually used. The major issues which should be considered:

(1) A large volume of existing data that will be impractical to consider will be converted to the proposed system at once. It needs coordination and planning to converse files and records.

(2) Testing individual program, was completed during the programming task by the development team, Program testing concentrates on the programs themselves in an attempt to make sure that each program works properly.

(3) Data testing consists of running a new or modified program, which appears to be working correctly with sample data.

(4) Link testing test the upstream and downstream feeds between different programs and program modules.

(5) Module testing is the process of testing the individual module that makes up the work program.

(6) User acceptance testing: it is users' responsibility to make their own data to test if the system meets the requirements.

(7) System testing ensures that all the programs that make up the new system work together.

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V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The manual system, that requires many of people to handle many of transactions of the inventory tasks has now become a computerized Raw Material and Production Management System that need just only a small group of people to handle the whole system. That the company can save their expenditure and increase their profit

The existing system, had difficulties in managing the raw material and production inventory system, using stock card to keep records of all transaction of the input and output of the products, and many mistakes of the people error. From the existing system, all information are monthly updated in the form of an official report that the management has to wait for at the end of the month in order to get the completed report for any decision making.

The new system is developed on Client-Server architecture. The new system is a computerized system that will support the operations of the business. Since the management needs an up-to-date, faster, and more accurate information to help them as a decision supporting system for the management, the new system has to fulfill the management's entire requirement.

The new system has followed the objectives of the company and created the system step by step. First, the new system has studied the existing system in order to identify the new development system in every transaction of the existing system.

The new system has to analyze the existing system in order to know the real situation of the system in order to design the new system completely and be able to solve all the existing problems.

5.2 Recommendations

The system should have the stock checking system that will be easy for the user to management the stock and facilitate the controller to manage the inventory system.

The system should have further development so that the system should have a warning light system in order to inform the management when the stock is lower than the minimum rate that should be.

This system should have a program for storing material price data, which contains price that each supplier tender. This data can be used to compare material price over time before ordering new raw material in order to reduce production cost.

Furthermore, it should have a follow-up ordering system. In case that after the company ordered raw material from the supplier but can not be delivered as scheduled, this would create a shortage of raw material for production process. Therefore, the follow-up ordering system would benefit the company because it keeps track of a raw material delivery and help smooth the production.

The system should develop a link with other systems in order to share information with each other and also bring in new technology to be applied to the

system in order to get higher performance and also online into every branch in the near future via the communication infrastructures that are provided.

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APPENDIX A

Context Diagram

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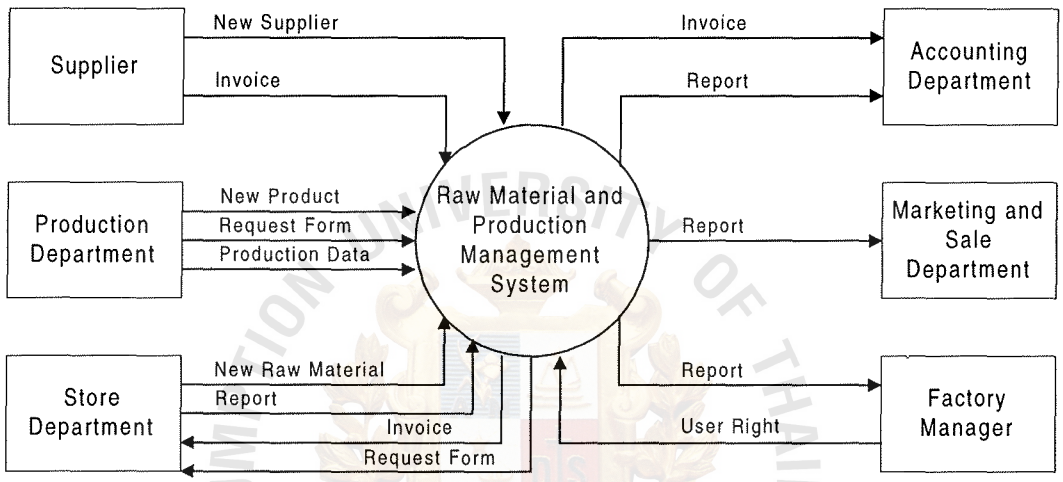

Figure A.1. Context Diagram for Proposed System

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APPENDIX B

Data Flow Diagrams

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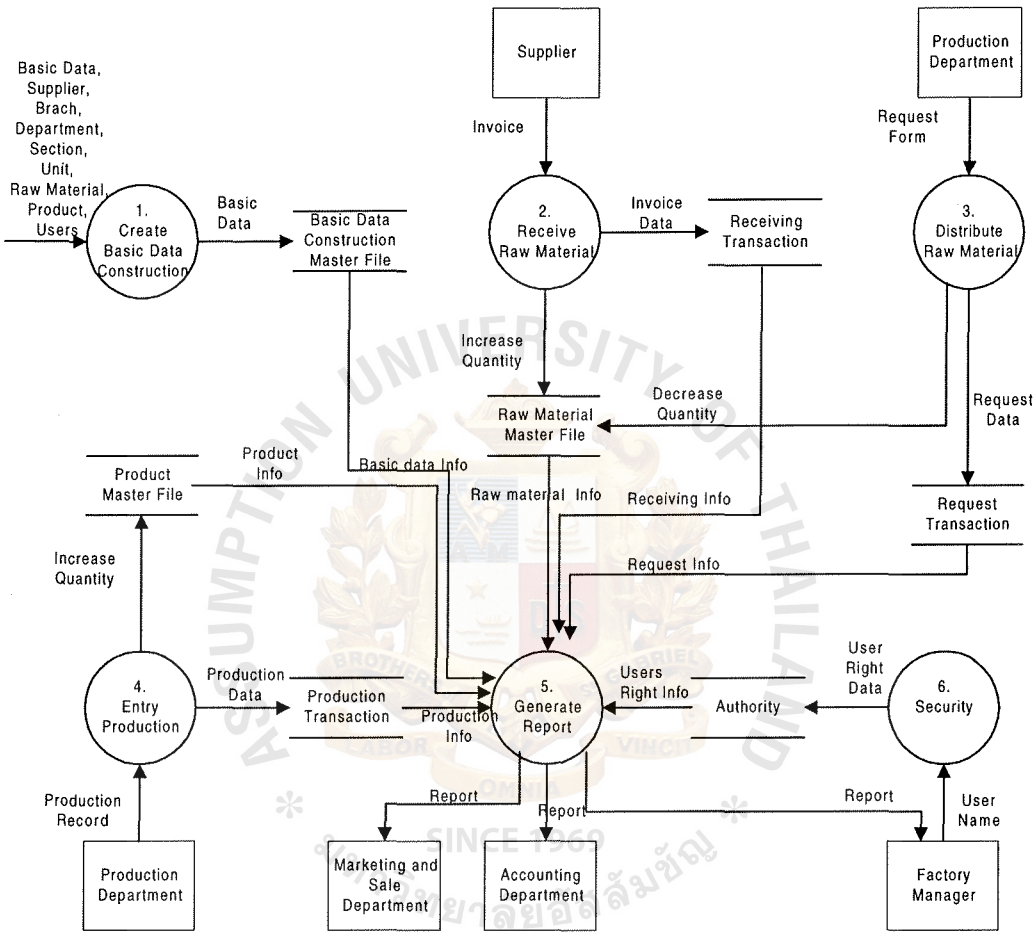

Figure B.1. Data Flow Diagram Level 0 for Proposed System

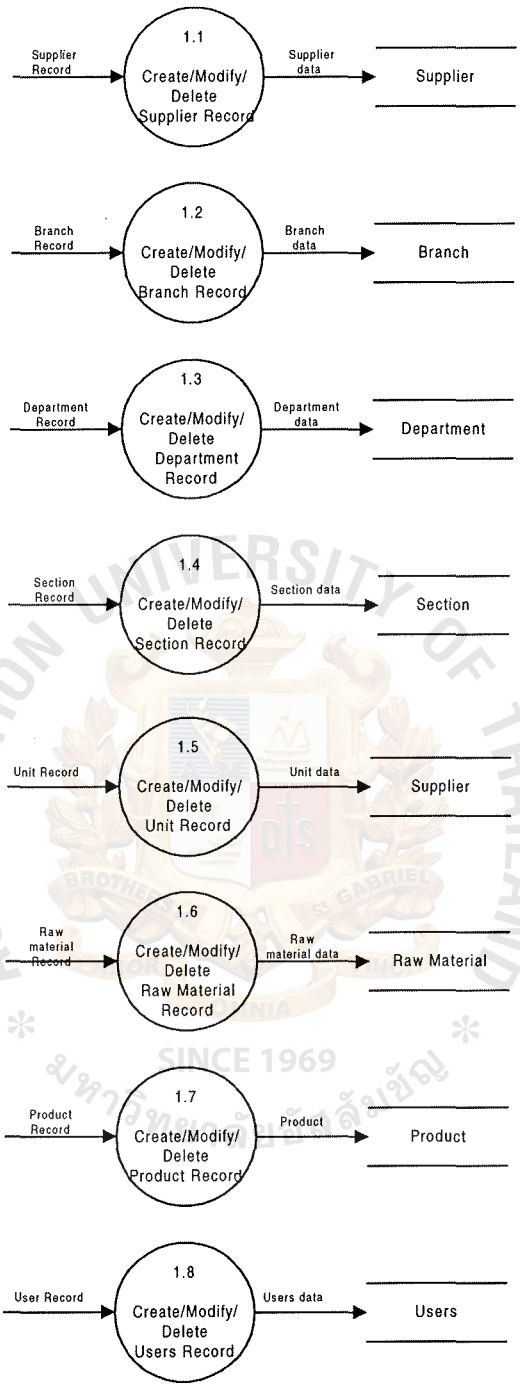

Figure B.2. Data Flow Diagram Level 1 for Create Basic Data Construction

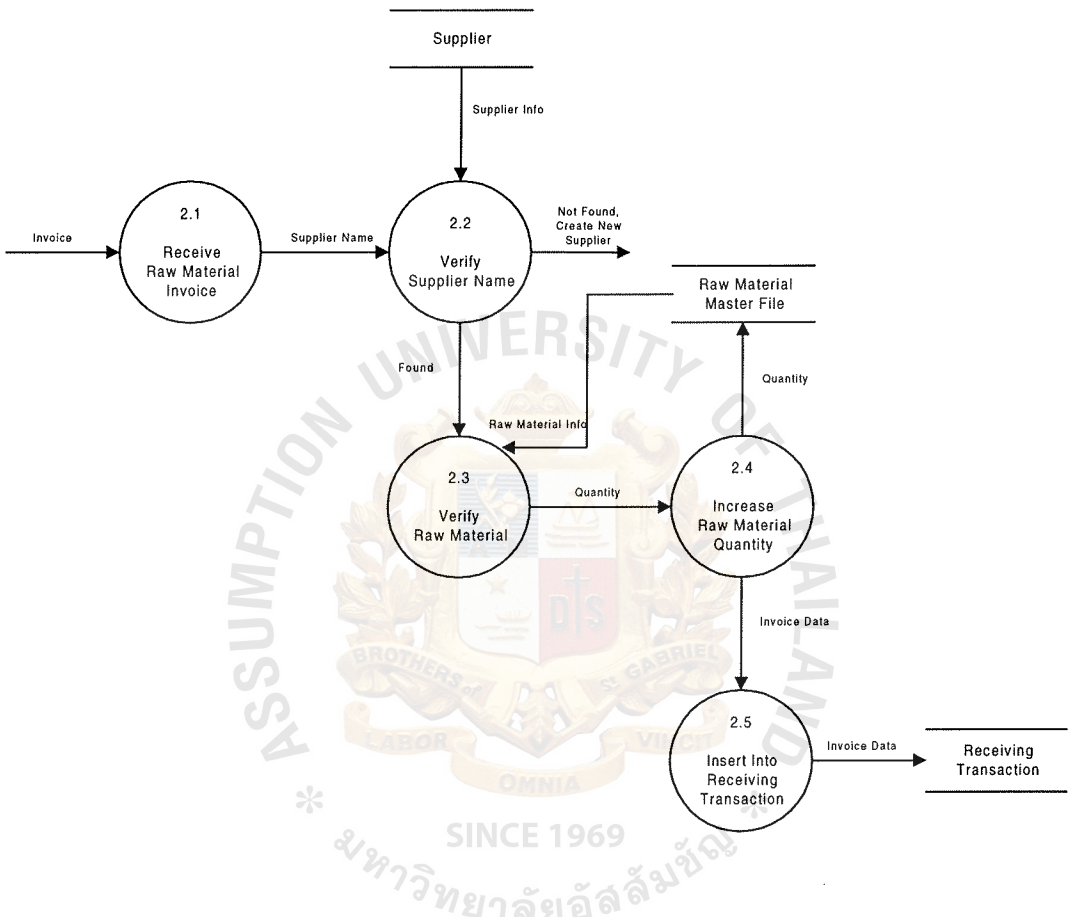

Figure B.3. Data Flow Diagram Level 1 for Receive Raw Material

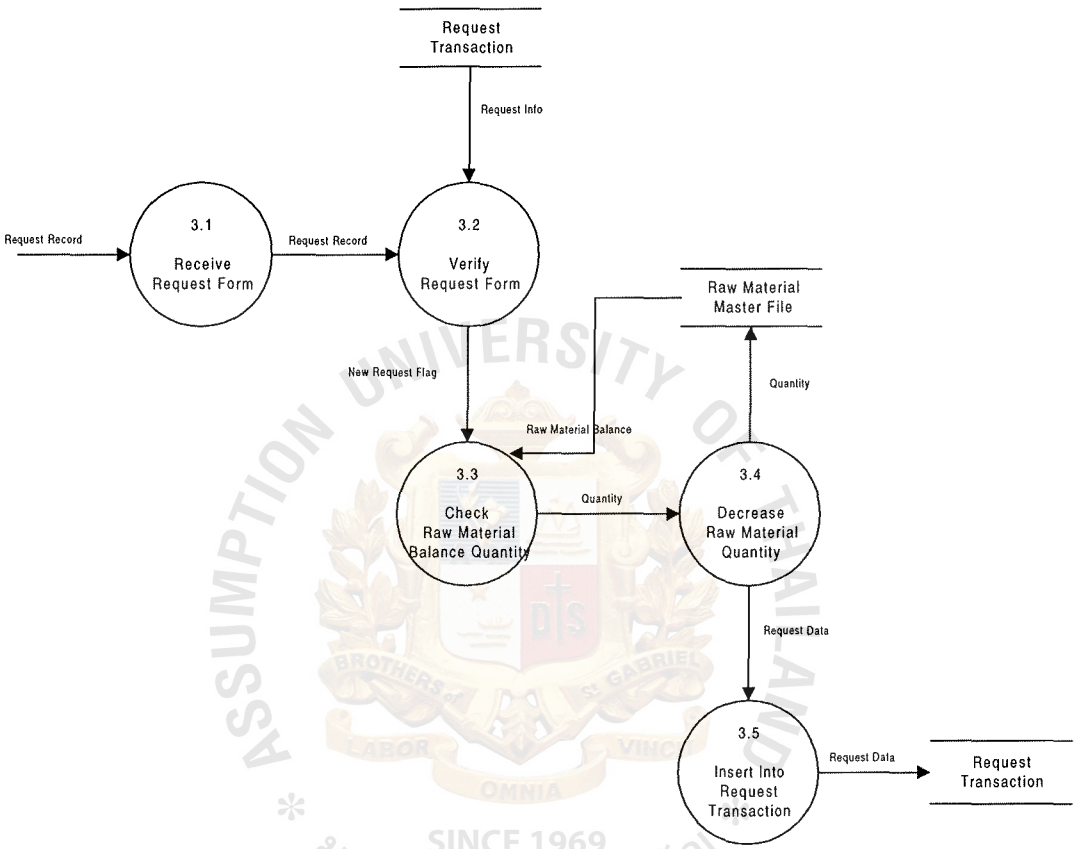

Figure B.4. Data Flow Diagram Level 1 for Distribute Raw Material

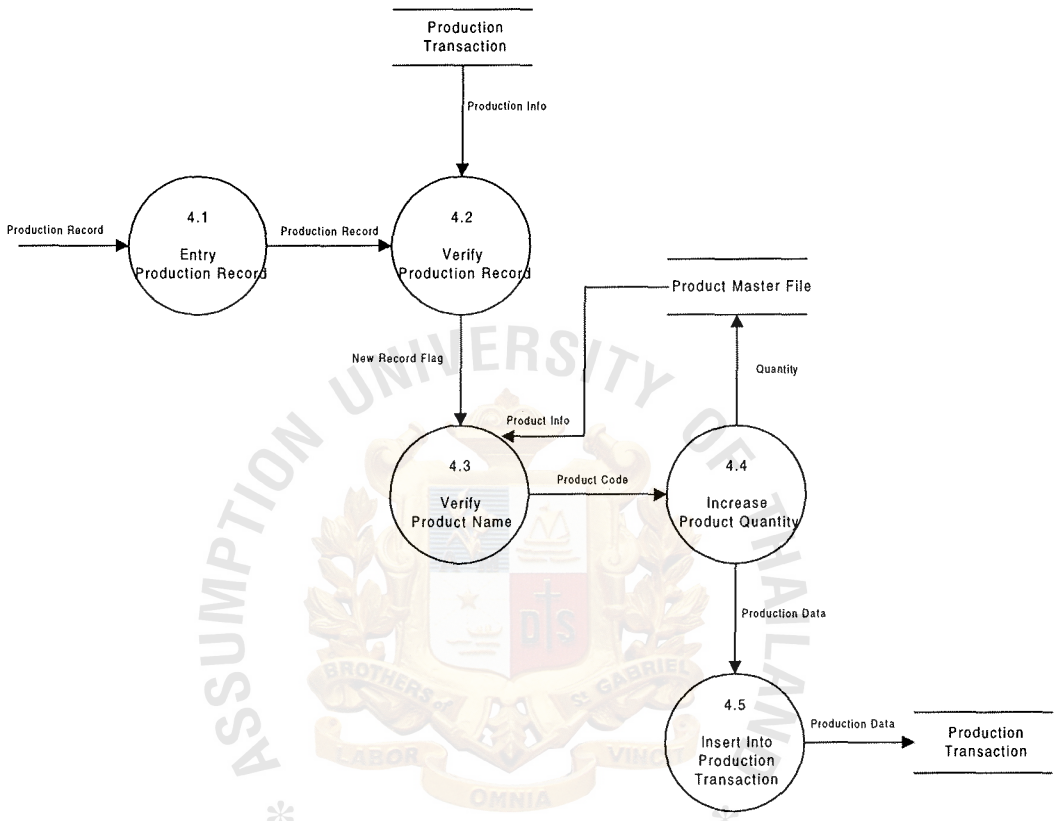

Figure B.5. Data Flow Diagram Level 1 Enter Production

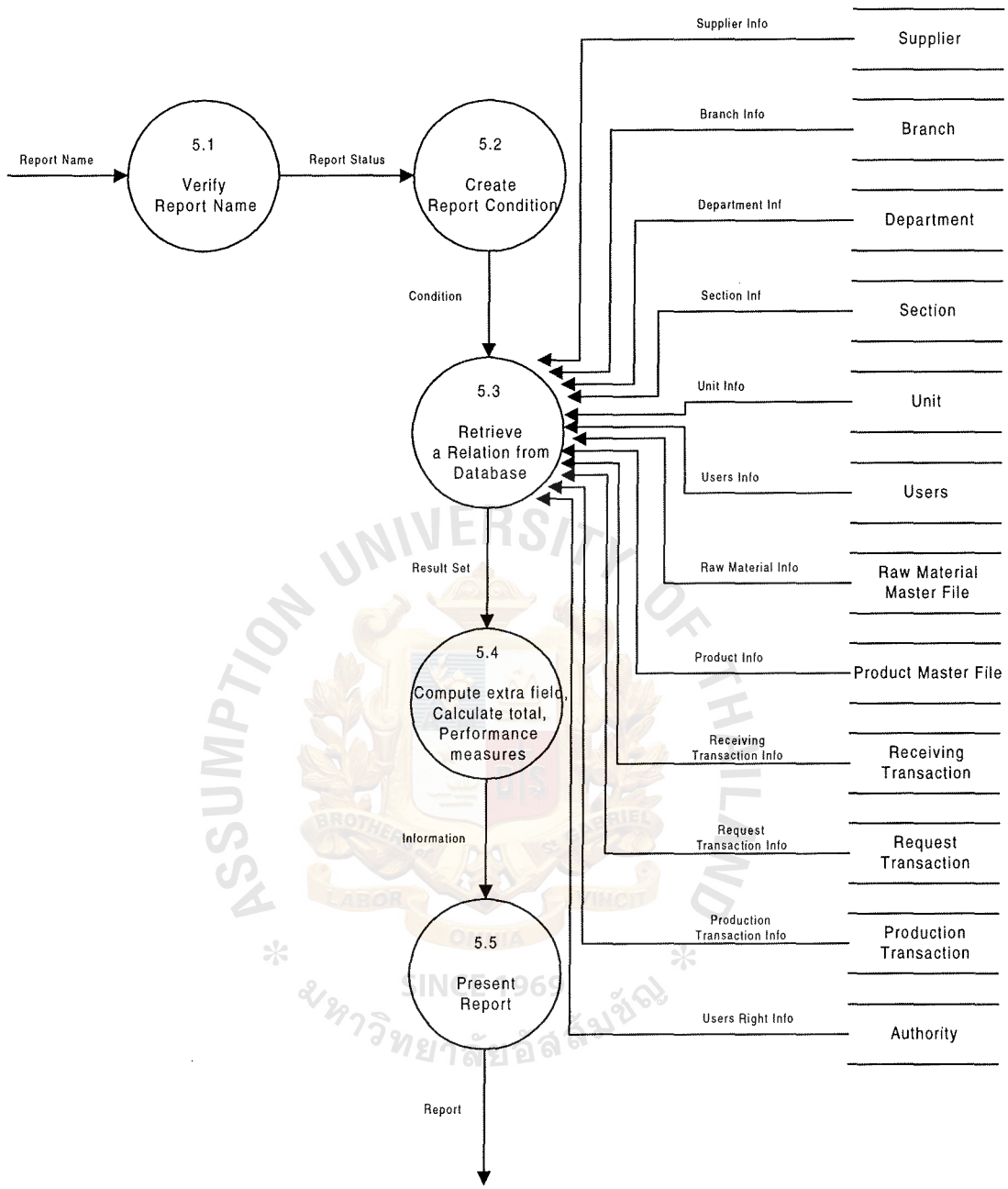

Figure B.6. Data Flow Diagram Level 1 for Generate Reports

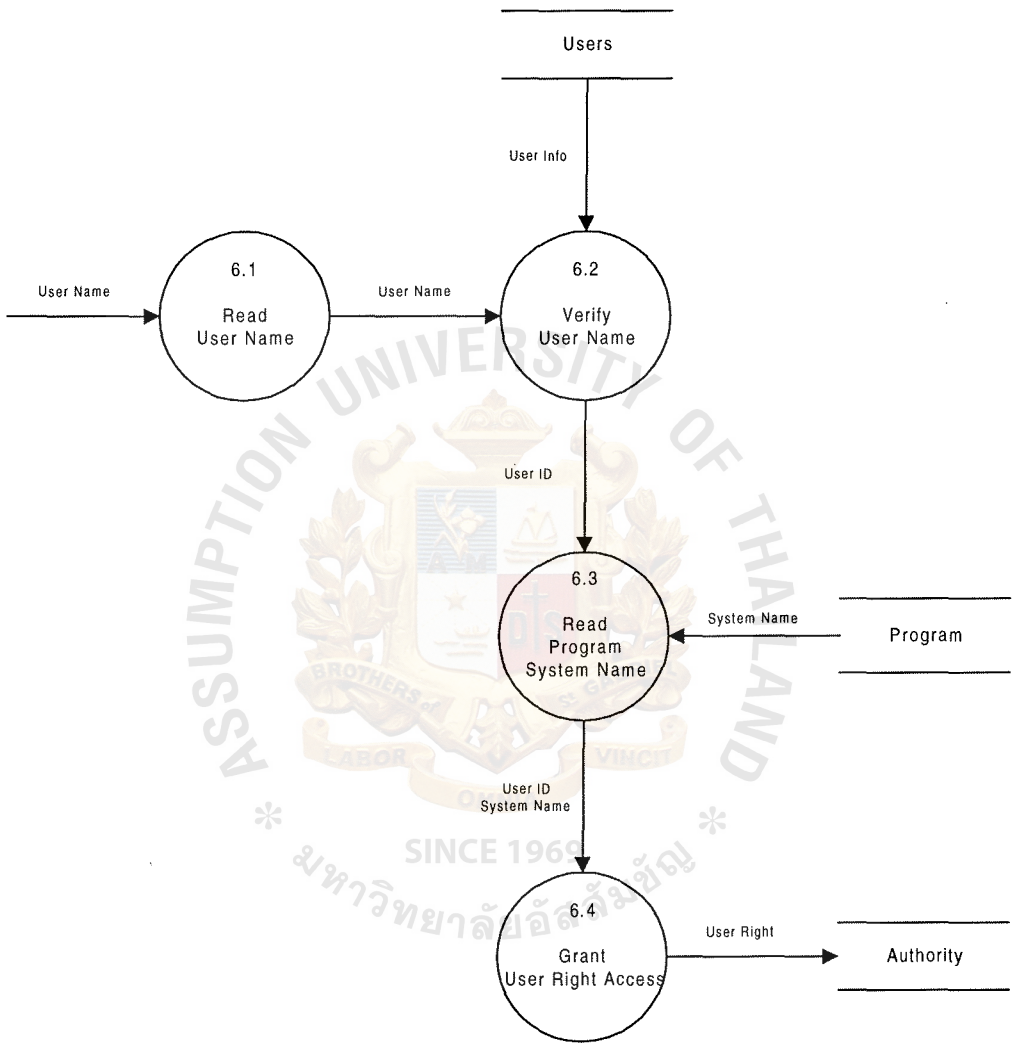

Figure B.7. Data Flow Diagram Level 1 for Security

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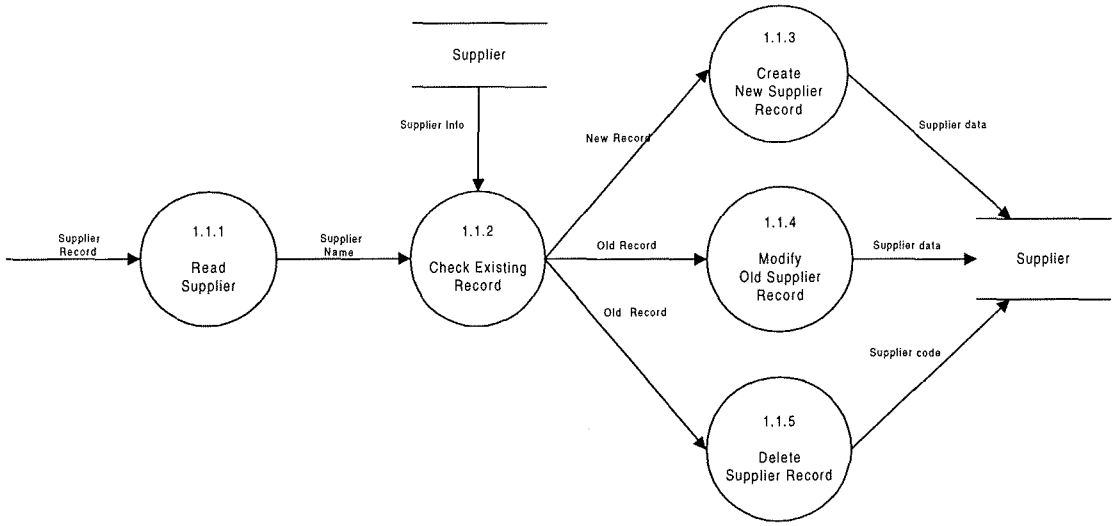

Figure B.8. Data Flow Diagram Level 2 for Create/Modify/Delete Supplier

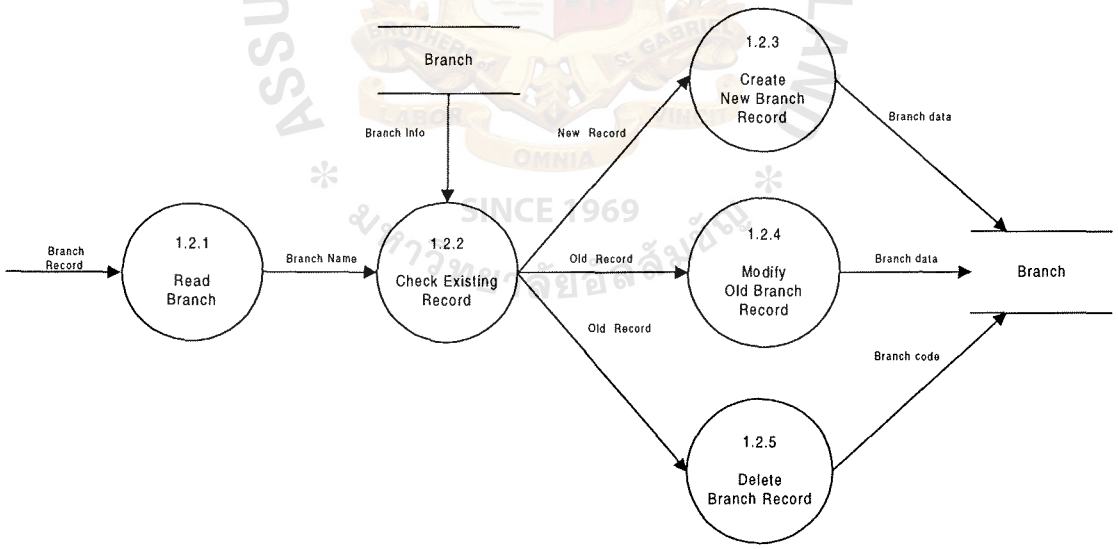

Figure B.9. Data Flow Diagram Level 2 for Create/Modify/Delete Branch

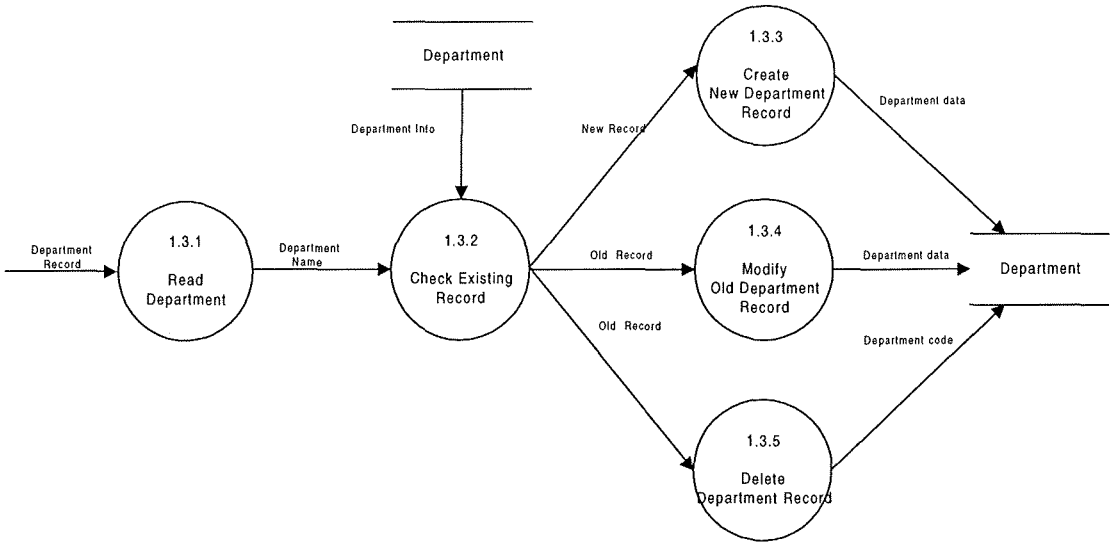

Figure B.10. Data Flow Diagram Level 2 for Create/Modify/Delete Department

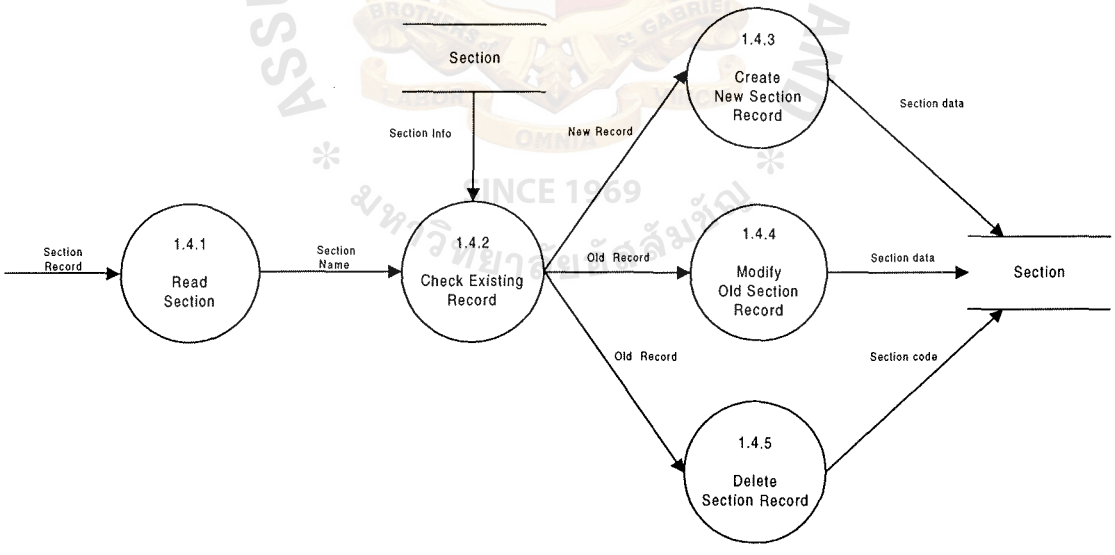

Figure B.11. Data Flow Diagram Level 2 for Create/Modify/Delete Section

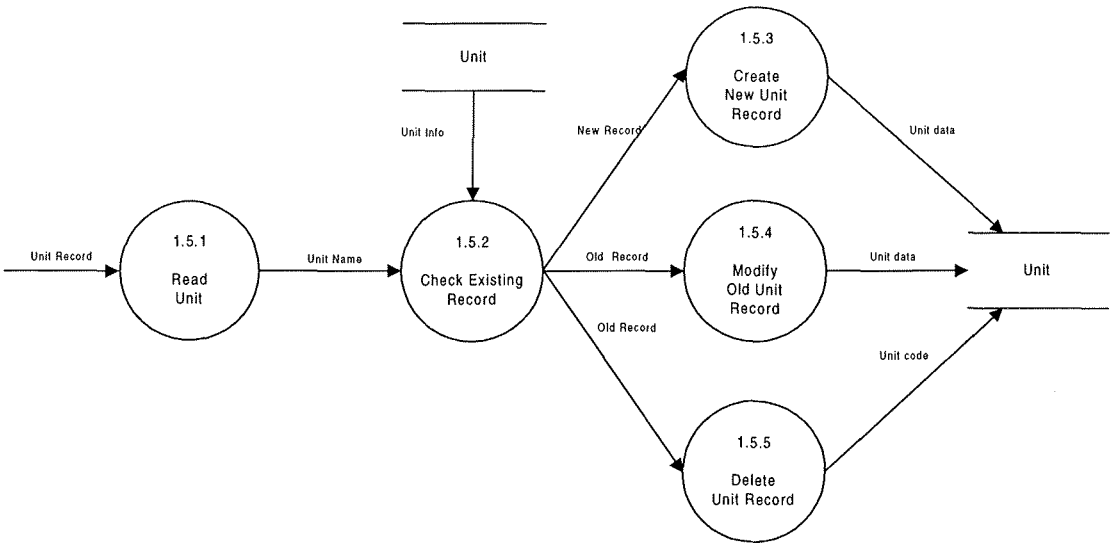

Figure B.12. Data Flow Diagram Level 2 for Create/Modify/Delete Unit

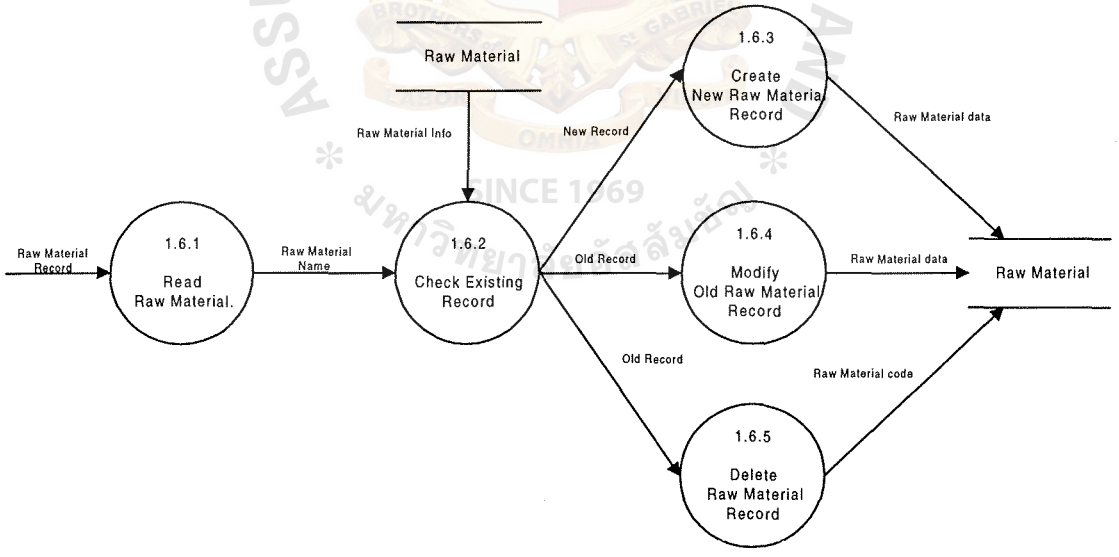

Figure B.13. Data Flow Diagram Level 2 for Create/Modify/Delete Raw Material

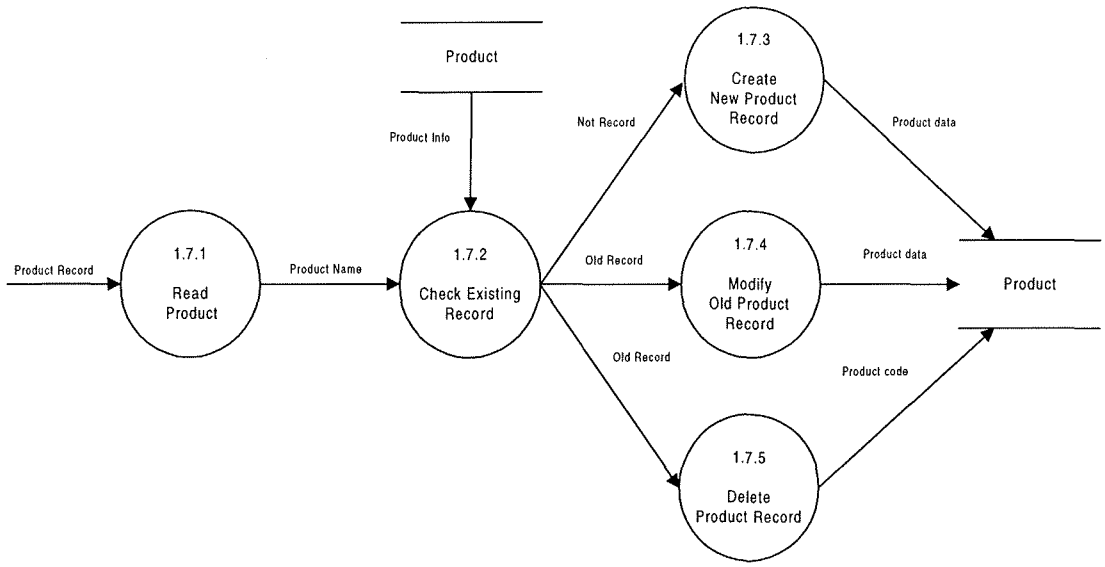

Figure B.14. Data Flow Diagram Level 2 for Create/Modify/Delete Product

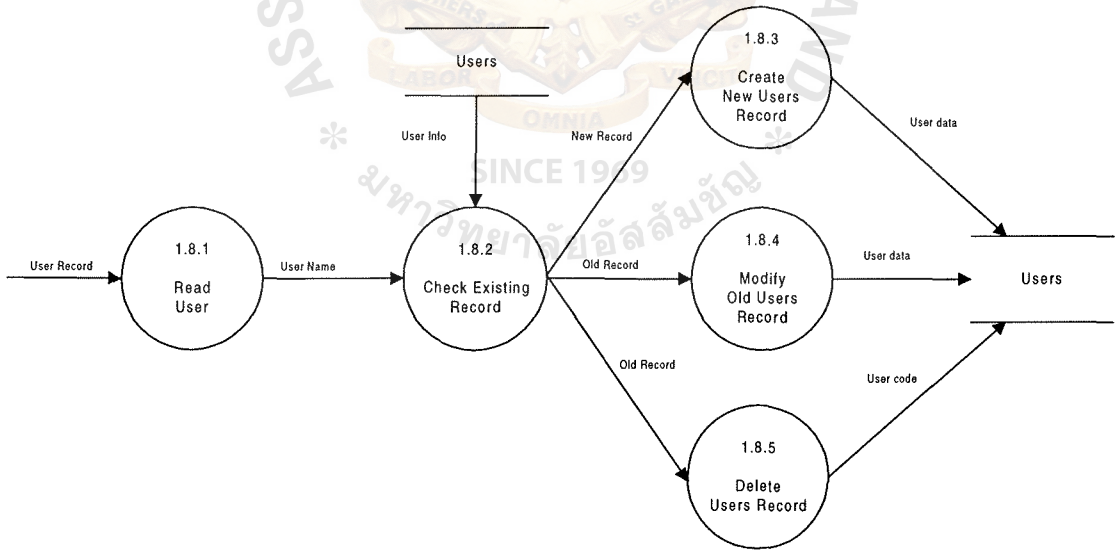

Figure B.15. Data Flow Diagram Level 2 for Create/Modify/Delete User

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APPENDIX C

Structure Chart

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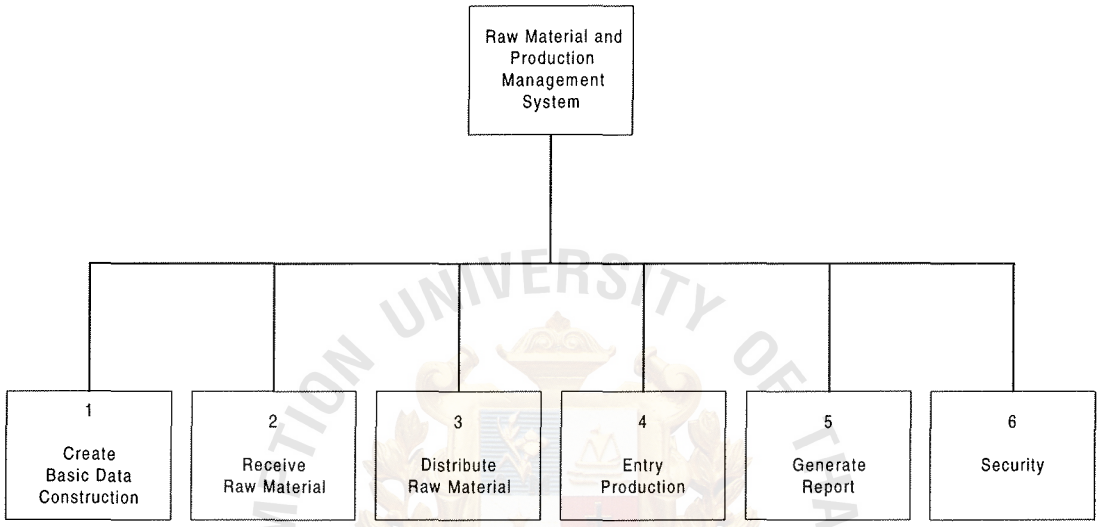

Figure C.1. Structure Chart

ASSUMPTION UNIVERSITY OF THAILAND
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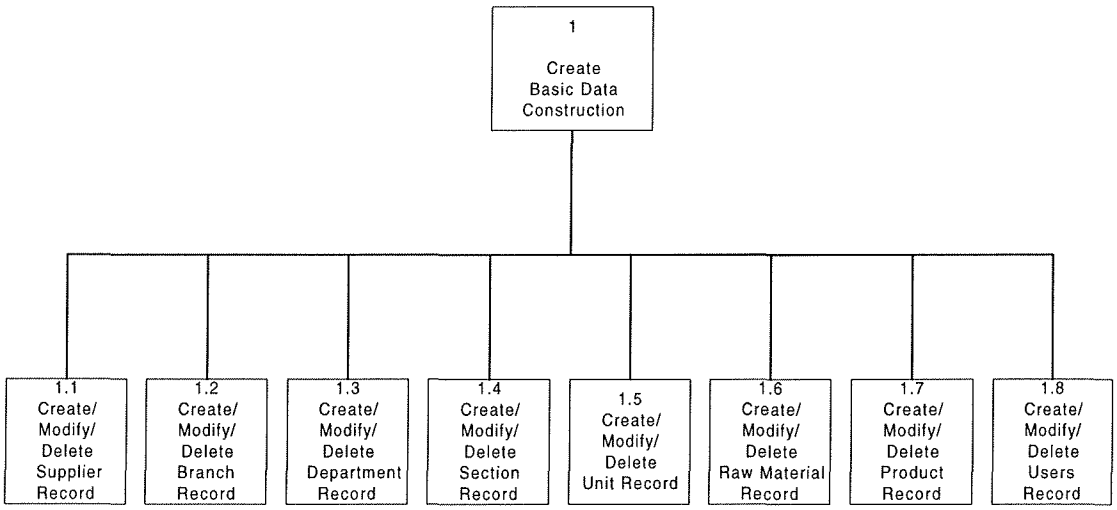

Figure C.2. Structure Chart for Create Basic Data Construction

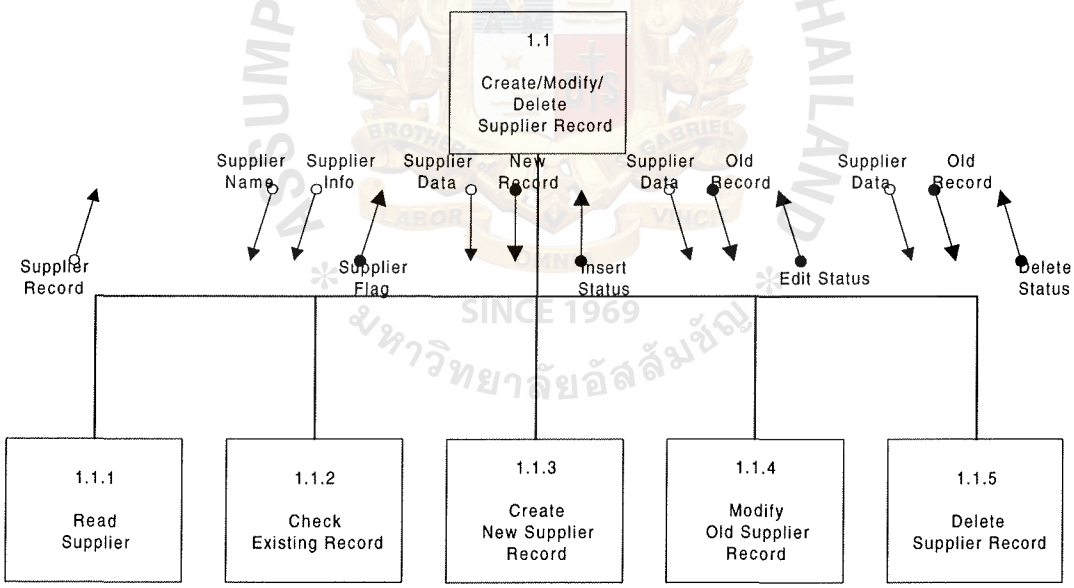

Figure C.3. Structure Chart for Create/Modify/Delete Supplier Record

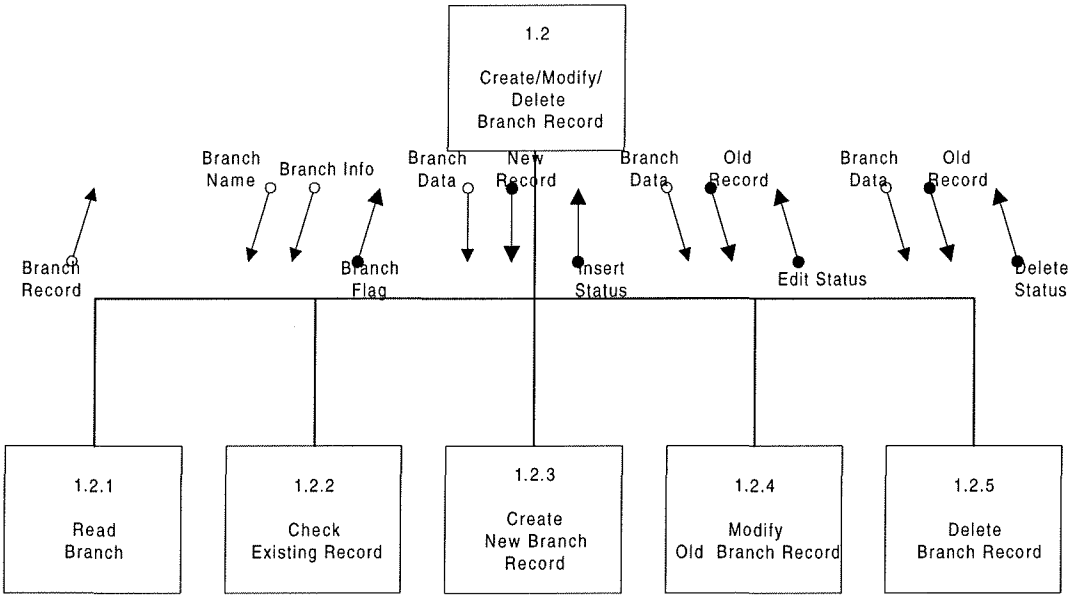

Figure C.4. Structure Chart for Create/Modify/Delete Branch Record

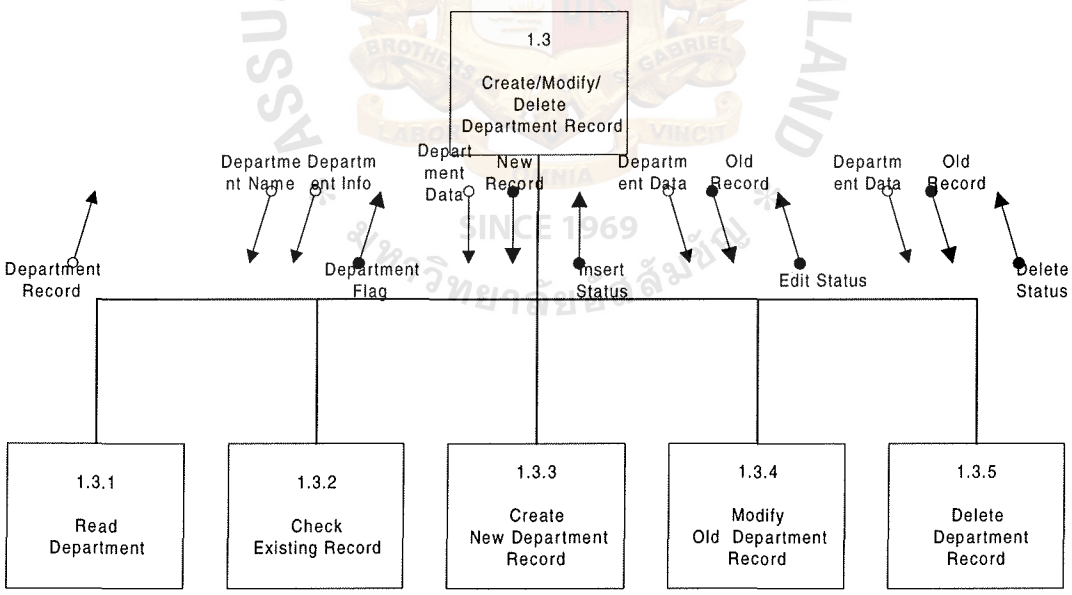

Figure C.5. Structure Chart for Create/Modify/Delete Department Record

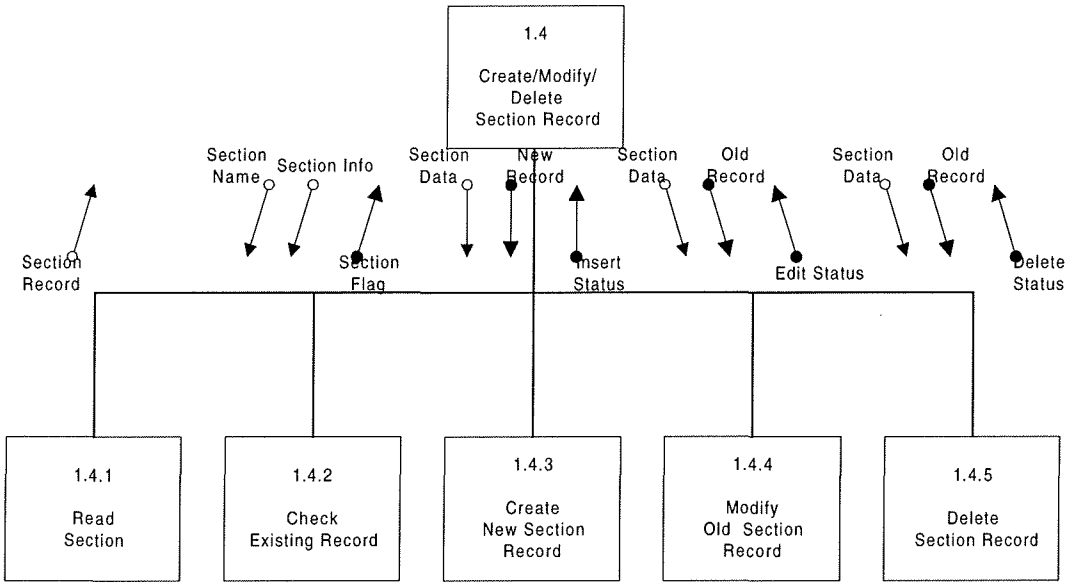

Figure C.6. Structure Chart for Create/Modify/Delete Section Record

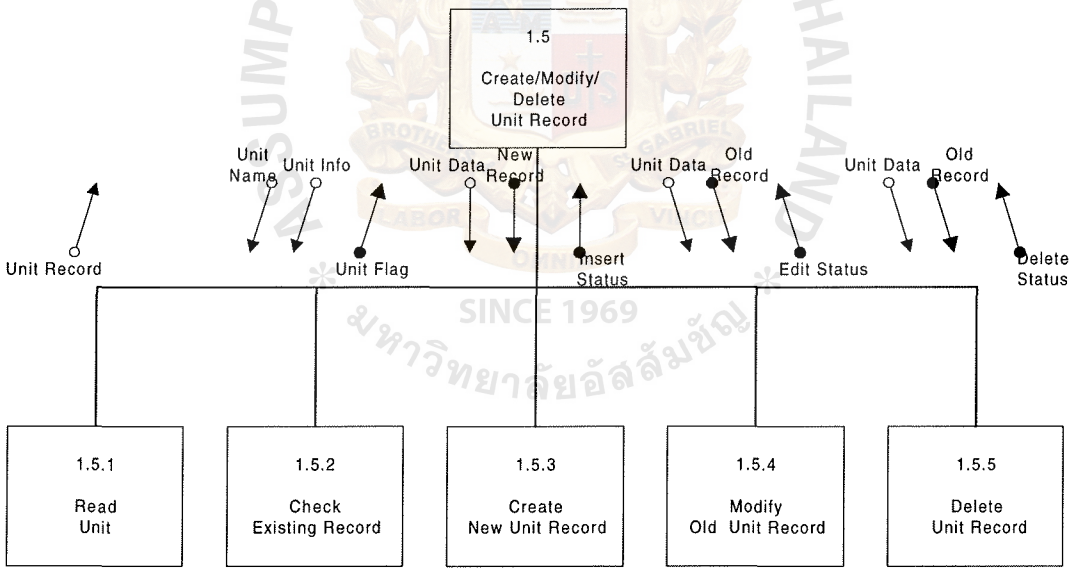

Figure C.7. Structure Chart for Create/Modify/Delete Unit Record

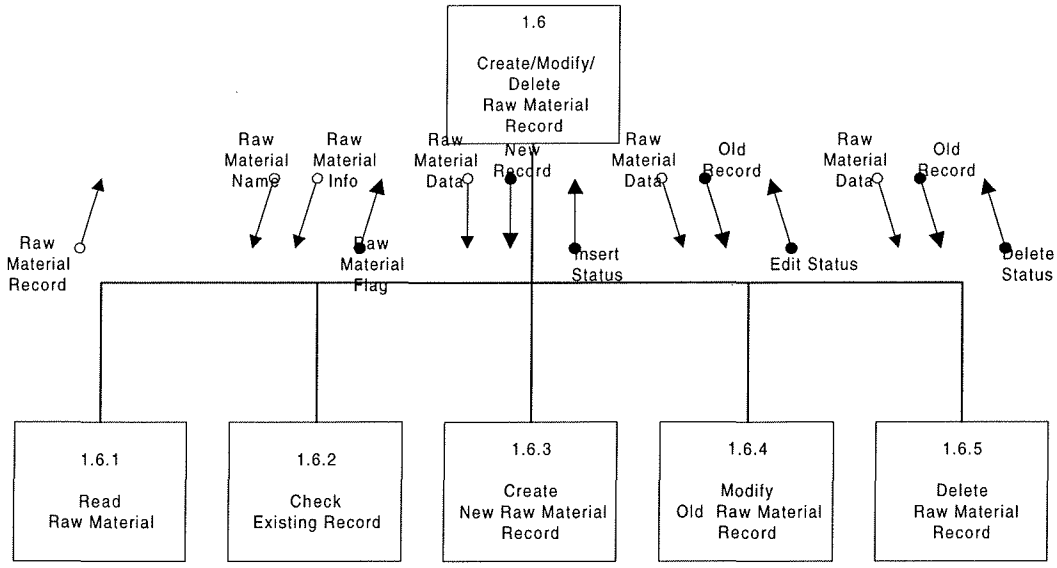

Figure C.8. Structure Chart for Create/Modify/Delete Raw Material Record

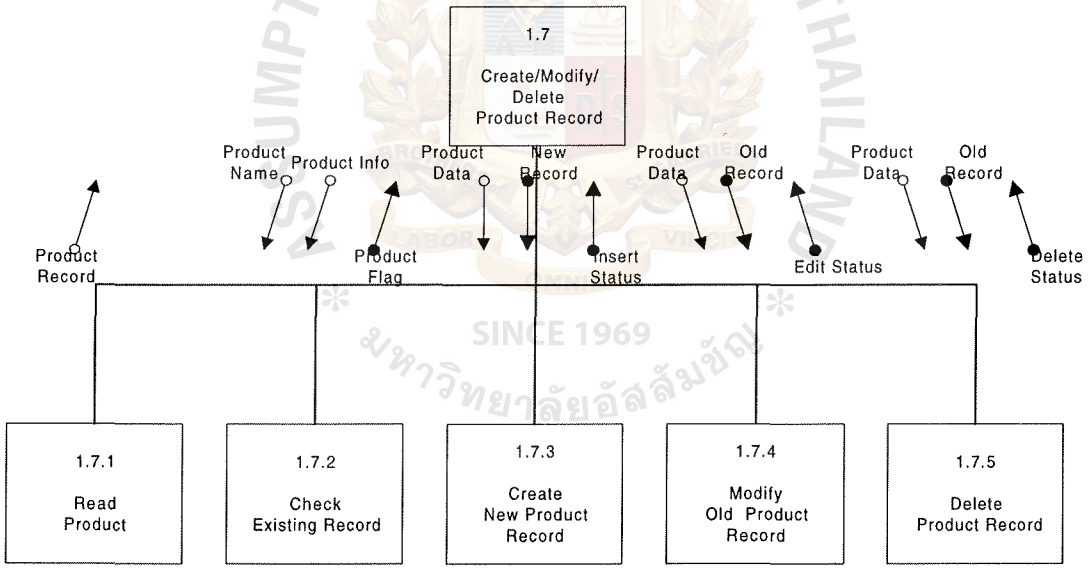

Figure C.9. Structure Chart for Create/Modify/Delete Product Record

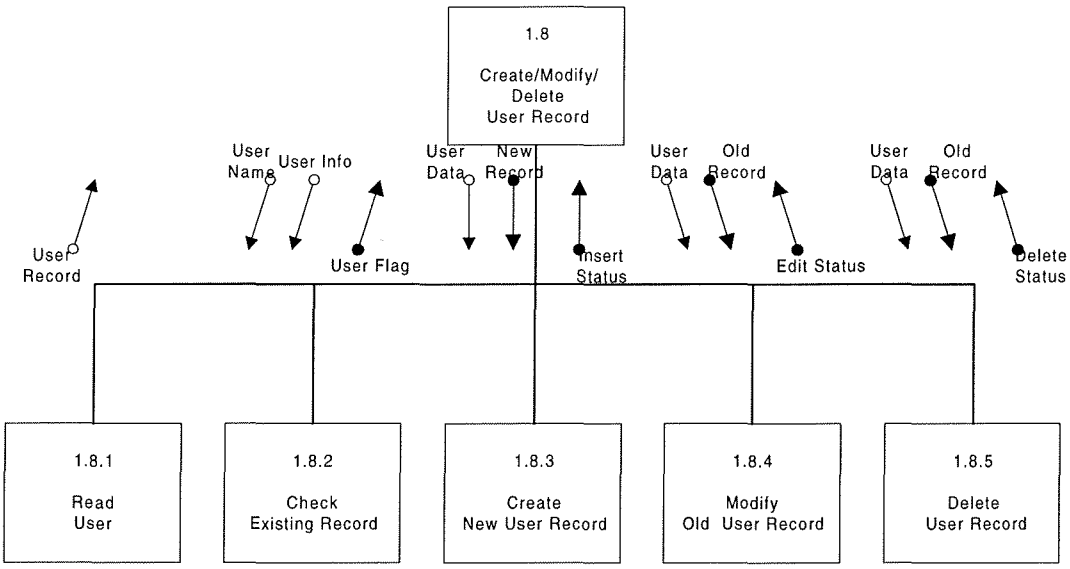

Figure C.10. Structure Chart for Create/Modify/Delete User Record

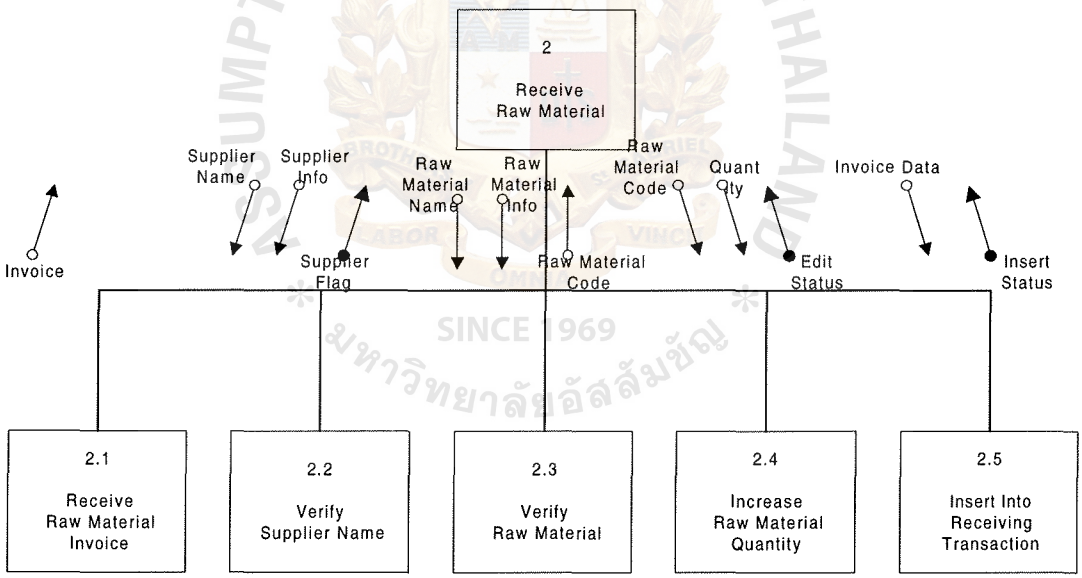

Figure C.11. Structure Chart for Receive Raw Material

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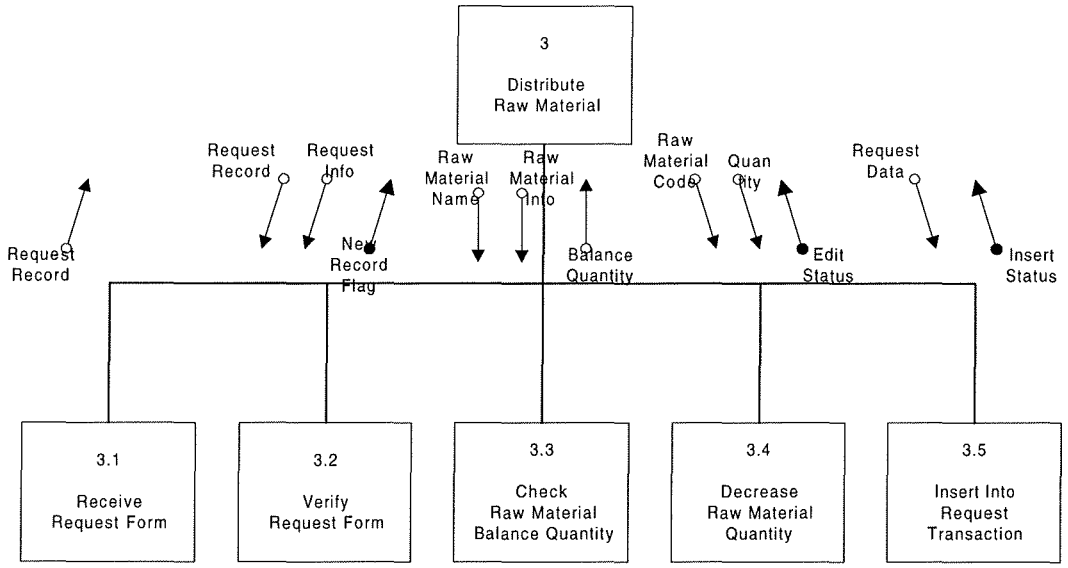

Figure C.12. Structure Chart for Distribute Raw Material

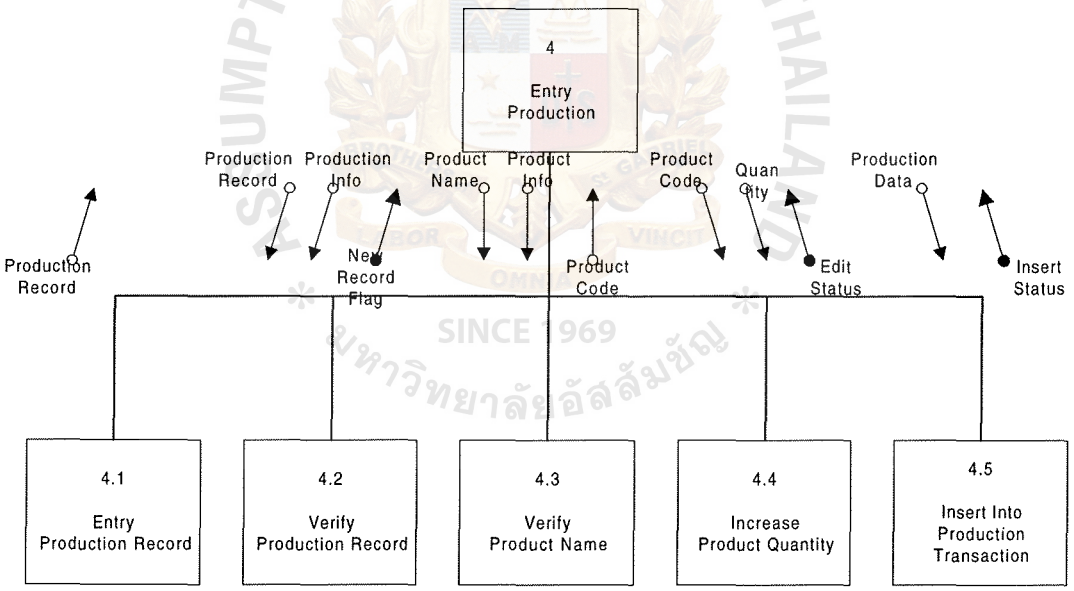

Figure C.13. Structure Chart for Enter Production

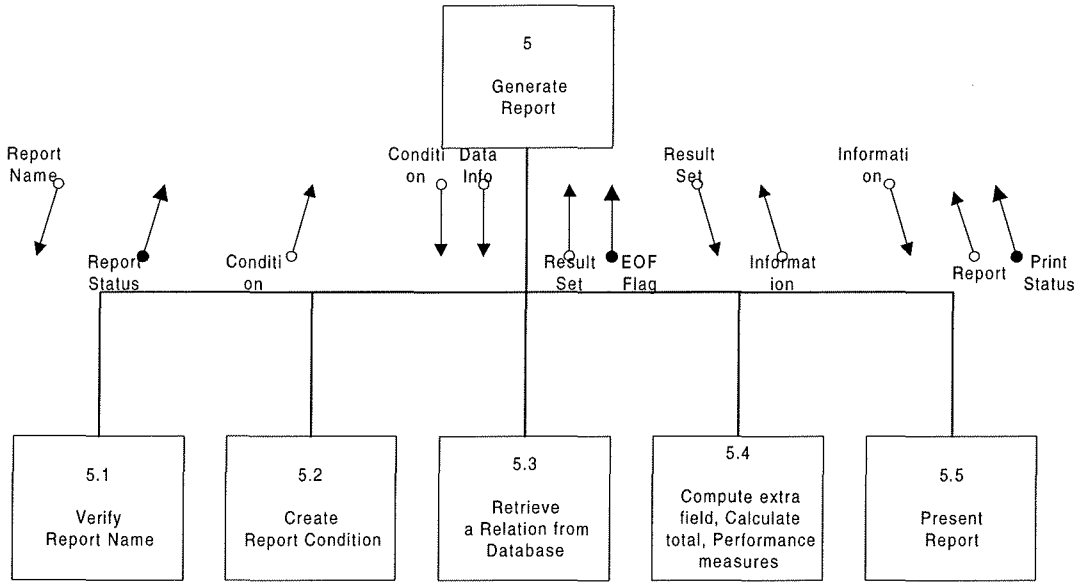

Figure C.14. Structure Chart for Generate Report

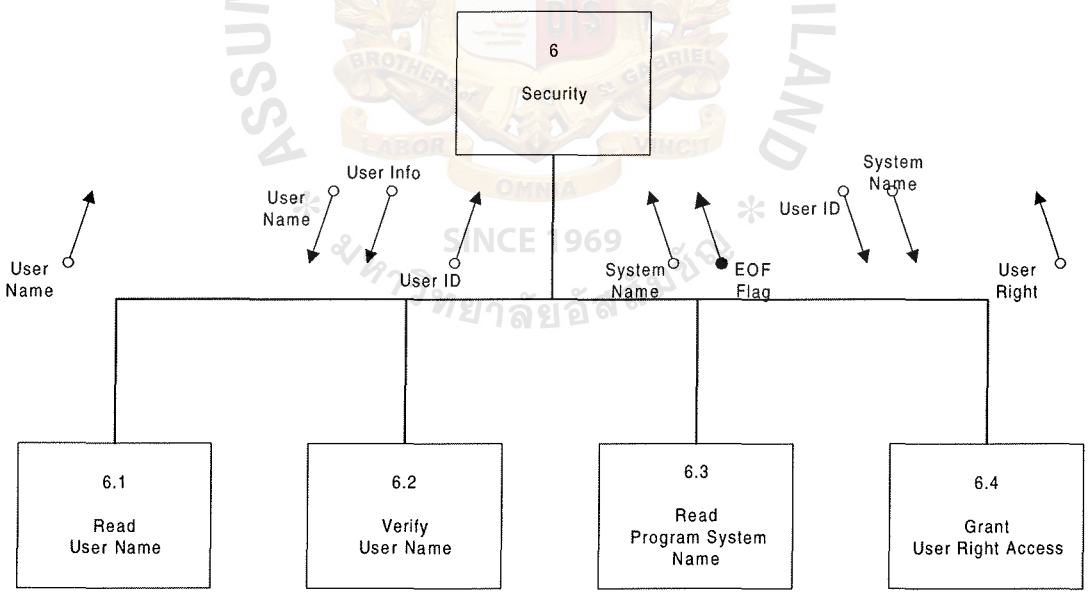

Figure C.15. Structure Chart for Security

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APPENDIX D

Data Structure

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Data Structure for Raw Material and Production Management System

Invoice	=	Supplier Name +
		Address +
		Telephone +
		(Fax) +
		Tax Id +
		Invoice Number +
		Invoice Date +
		Receive Date +
		Approved Name +
		Branch Name +
		Department Name +
		{Available Invoice Items} +
		(Tax) +
		Grand Total
Address	=	Post Box Number +
		(Building Name) +
		(Floor) +
		Street +
		District +
		Amphur +
		Province +
		Zip +

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(Country)

Telephone = (Country Code)
(Area Code) +
Local Number

Fax = (Country Code)
Area Code +
Local Number

Approved Name = First Name +
(Middle Initial) +
Last Name

Available Invoice Items = Raw Material Code +
Raw Material Name +
Unit / Price +
Quantity +
Total

Request Form = Branch Name +
Department Name +
(Section Name) +
(Place) +
Request Number +

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Request Date +

Distribute Date +

Request Name +

{Available Request Items} +

Approved Name

Place = (Building Name) +

Machine Name

Request Name = First Name +

(Middle Initial) +

Last Name

Available Request Items = Raw Material Code +

Raw Material Name +

Quantity +

Production = Branch Name +

Department Name +

(Section Name) +

(Running Number) +

Produce Date +

Start Time +

Stop Time +

(Total Hour) +

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Product Code +

Product Name +

Machine Name +

Capacity / Hour +

Total Quantity +

Efficiency +

{Available Raw Material Items} +

Approved Name

Available Raw Material Items = Raw Material Code +

Raw Material Name +

Quantity +

Good Quantity +

Waste Quantity +

(Good Percent) +

(Waste Percent) +

Amount

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APPENDIX E

Database Design

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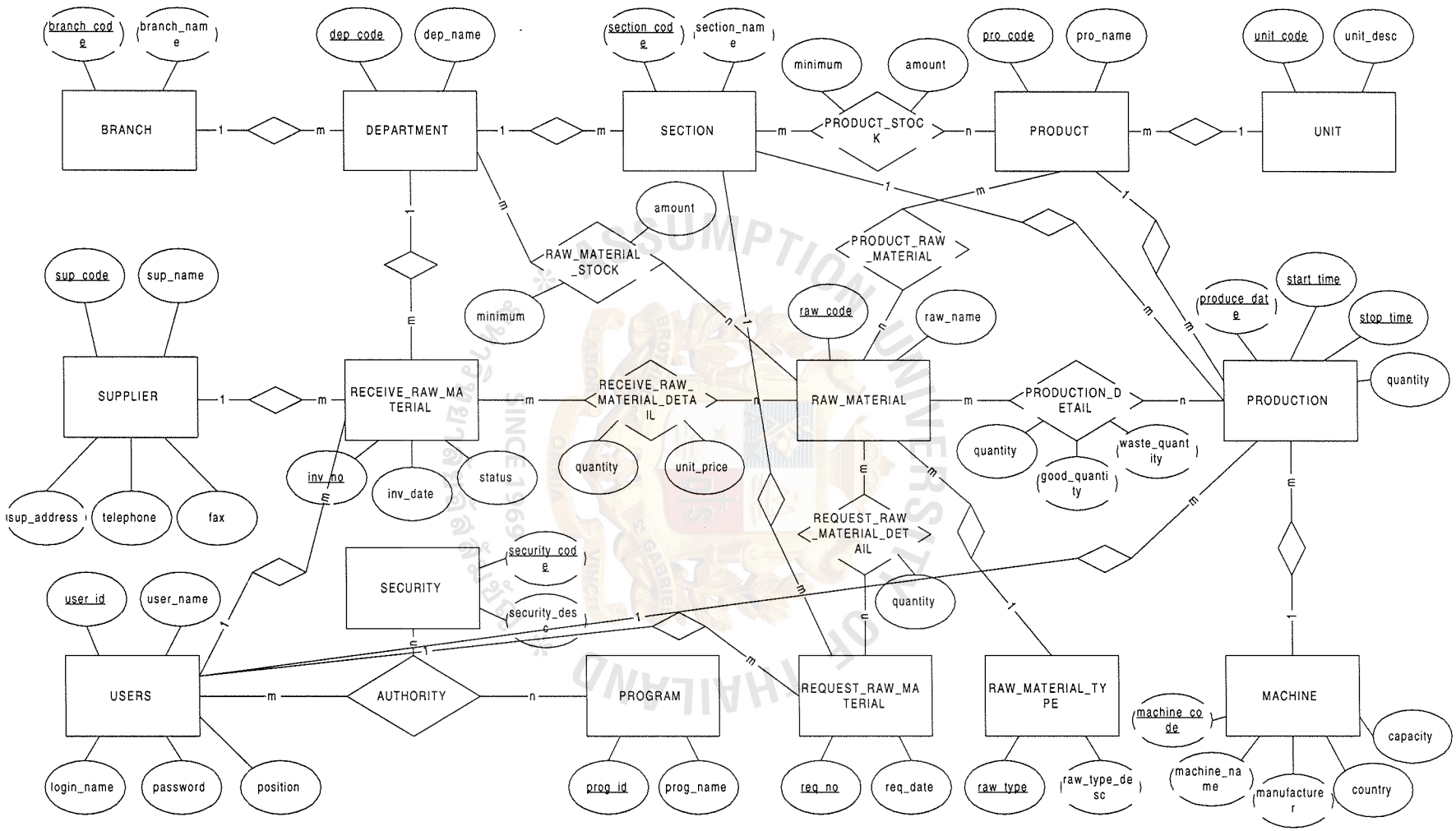

Figure C.1. Entity Relationship Diagram

APPENDIX F

Data Dictionary

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Table F.1. File Layout of Table Branch

Field Name	Data Type	Length	Dec	Description
Branch_code	Char	1		Branch code
Branch_name	Char	50		Branch name

Table F.2. File Layout of Table Department

Field Name	Data Type	Length	Dec	Description
Branch_code	Char	1		Branch code
Dep_code	Char	2		Department code
Dep_name	Char	50		Department name

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Table F.3. File Layout of Table Section

Field Name	Data Type	Length	Dec	Description
Branch_code	Char	1		Branch code
Dep_code	Char	2		Department code
Section_code	Char	2		Section code
Section_name	Char	50		Section name

Table F.4. File Layout of Table Users

Field Name	Data Type	Length	Dec	Description
User_id	Char	10		User id
User_name	Char	50		User name
Login_name	Char	20		Login name
Password	Char	14		Password
Branch_code	Char	1		Branch code
Dep_code	Char	2		Department code
Section_code	Char	2		Section code
Position	Char	30		Position

Table F.5. File Layout of Table Program

Field Name	Data Type	Length	Dec	Description
Prog_id	Integer			Program id
Prog_name	Char	100		Program name

Table F.6. File Layout of Table Security

Field Name	Data Type	Length	Dec	Description
Security_code	Integer			Security code
Security_desc	Char	10		Security description

Table F.7. File Layout of Table Authority

Field Name	Data Type	Length	Dec	Description
user_id	Char	10		User id
Prog_id	Integer			Program id
Security_code	Integer			Security code

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Table F.8. File Layout of Table Supplier

Field Name	Data Type	Length	Dec	Description
Sup_code	Char	10		Supplier code
Sup_name	Char	100		Supplier name
Address_no	Char	20		Address number
Building_name	Char	50		Building name
Floor	Char	3		Floor
Street	Char	50		Street
District	Char	50		District
Amphur	Char	50		Amphur
Province	Char	50		Province
Zip	Char	5		Zip
Country	Char	50		Country
Telephone	Char	30		List of telephone number
Fax	Char	30		List of fax number

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Table F.9. File Layout of Table Machine

Field Name	Data Type	Length	Dec	Description
Machine_code	Char	10		Machine code
Machine_name	Char	50		Machine name
Manufacturer	Char	100		Manufacturer
Country	Char	50		Country
Capacity	Number	10	2	Capacity

Table F.10. File Layout of Table Unit

Field Name	Data Type	Length	Dec	Description
Unit_code	Char	2		Unit code
Unit_desc	Char	10		Unit description

Table F.11. File Layout of Table Raw_Material_Type

Field Name	Data Type	Length	Dec	Description
Raw_type	Char	1		Raw material type code
Raw_type_desc	Char	100		Raw material type description

Table F.12. File Layout of Table Raw_Material

Field Name	Data Type	Length	Dec	Description
Raw_code	Char	10		Raw material code
Raw_name	Char	100		Raw material name
Raw_type	Char	1		Raw material type code
Unit_code	Char	2		Unit code

Table F.13. File Layout of Table Product

Field Name	Data Type	Length	Dec	Description
Pro_code	Char	10		Product code
Pro_name	Char	100		Product name
Unit_code	Char	2		Unit code

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Table F.14. File Layout of Table Raw_Material_Stock

Field Name	Data Type	Length	Dec	Description
Raw_code	Char	10		Raw material code
Branch_code	Char	1		Branch code
Dep_code	Char	2		Department code
Minimum	Number	10	2	Minimum quantity
Amount	Number	10	2	Amount quantity

Table F.15. File Layout of Table Product_Stock

Field Name	Data Type	Length	Dec	Description
Pro_code	Char	10		Product code
Branch_code	Char	1		Branch code
Minimum	Number	10	2	Minimum quantity
Amount	Number	10	2	Amount quantity

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Table F.16. File Layout of Table Receive_Raw_Material

Field Name	Data Type	Length	Dec	Description
Inv_no	Char	10		Invoice number
Inv_date	Date			Invoice date
Receive_date	Date			Receive date
Sup_code	Char	10		Supplier code
Branch_code	Char	1		Branch code
Dep_code	Char	2		Department code
User_id	Char	10		User id
Entry_date	Date			Entry date
Status	Char	1		Status of invoice "0" : Not approved "1" : Approved

Table F.17. File Layout of Table Receive_Raw_Material_Detail

Field Name	Data Type	Length	Dec	Description
Inv_no	Char	10		Invoice number
Raw_code	Char	10		Raw material code
Unit_price	Number	7	2	Price per unit
Quantity	Number	10	2	Quantity

Table F.18. File Layout of Table Request_Raw_Material

Field Name	Data Type	Length	Dec	Description
Req_no	Char	10		Request number
Req_date	Date			Request date
Distribute_date	Date			Distribute date
Branch_code	Char	1		Branch code
Dep_code	Char	2		Department code
Section_code	Char	2		Section code
Place	Char	100		Location used
User_id	Char	10		User id
Entry_date	Date			Entry date
Status	Char	1		Status of invoice "0" : Not approved "1" : Approved

Table F.19. File Layout of Table Request_Raw_Material_Detail

Field Name	Data Type	Length	Dec	Description
Req_no	Char	10		Request number
Raw_code	Char	10		Raw material code
Quantity	Number	10	2	Request Quantity

Table F.20. File Layout of Table Production

Field Name	Data Type	Length	Dec	Description
Produce_no	Number	4		Produce number
Produce_date	Date	5		Produce date
Start_time	Number	2		Start time
Stop_time	Number	2		Stop time
Branch_code	Char	1		Branch code
Dep_code	Char	2		Department code
Section_code	Char	2		Section code
Machine_code	Char	10		Machine code
Pro_code	Char	10		Product code
Quantity	Number	10	2	Quantity
User_id	Char	10		User id
Entry_date	Date			Entry date
Status	Char	1		Status of invoice "0" : Not approved "1" : Approved

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Table F.21. File Layout of Table Production_Detail

Field Name	Data Type	Length	Dec	Description
Produce_date	Date	5		Produce date
Start_time	Number	2		Start time
Stop_time	Number	2		Stop time
Branch_code	Char	1		Branch code
Dep_code	Char	2		Department code
Section_code	Char	2		Section code
Raw_code	Char	10		Raw material code
Quantity	Number	10	2	Quantity
Good_quantity	Number	10	2	Good quantity
Waste_quantity	Number	10	2	Waste quantity

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APPENDIX G

Screen Design

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Application is created by Visual Basic 5.0.Enterprise Edition. All interface forms are Graphic User Interface (GUI) likes this.

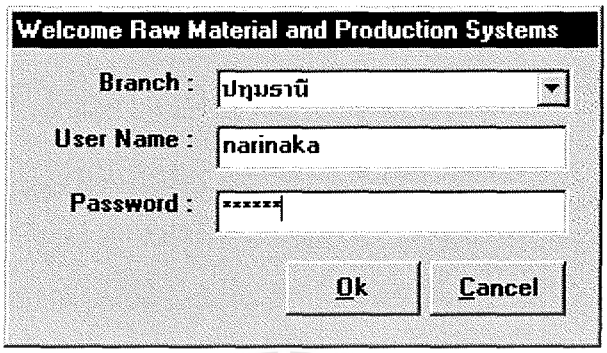

Figure G.1. Log In Interface

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Figure G.2. Main Menu Interface

ASSUMPTION UNIVERSITY THAILAND
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LABOR VINCIT OMNIA
SINCE 1969
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Figure G.3. Sub Menu 1 Interface

ASSUMPTION UNIVERSITY THAILAND
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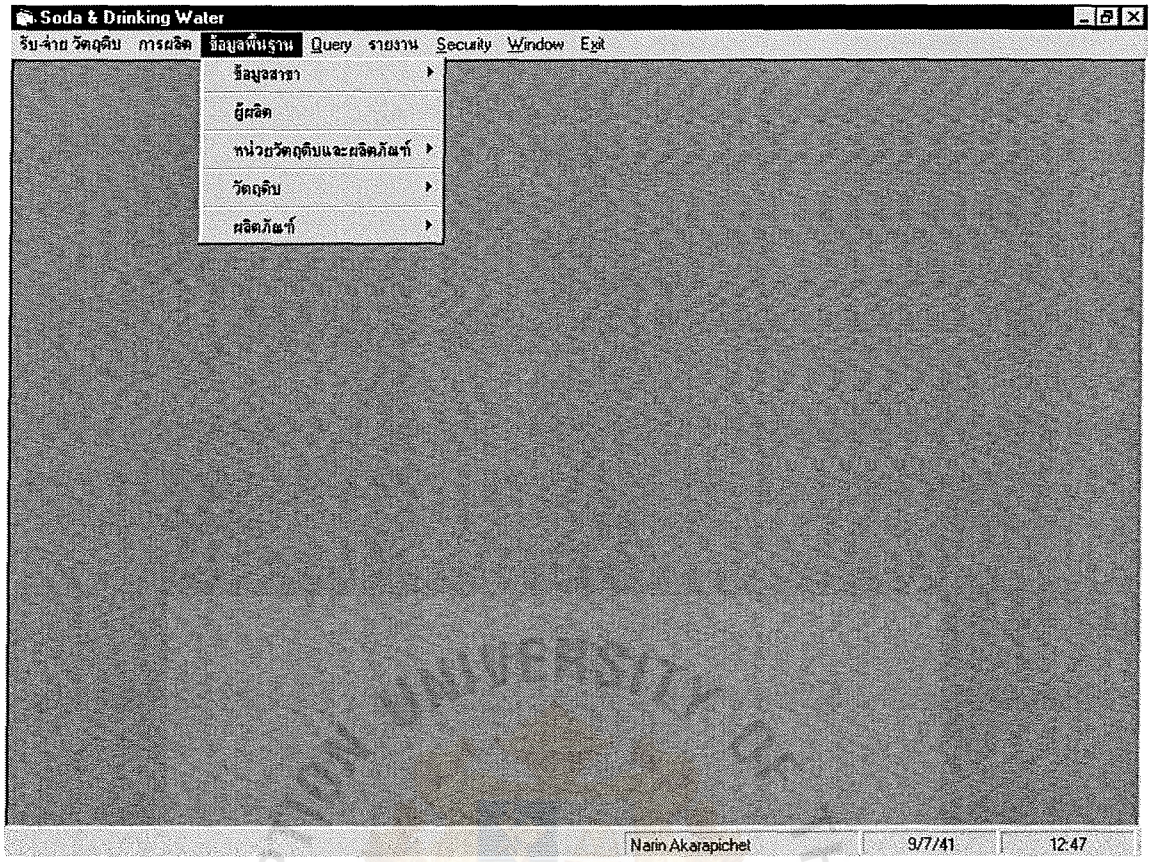

Figure G.4. Sub Menu 2 Interface

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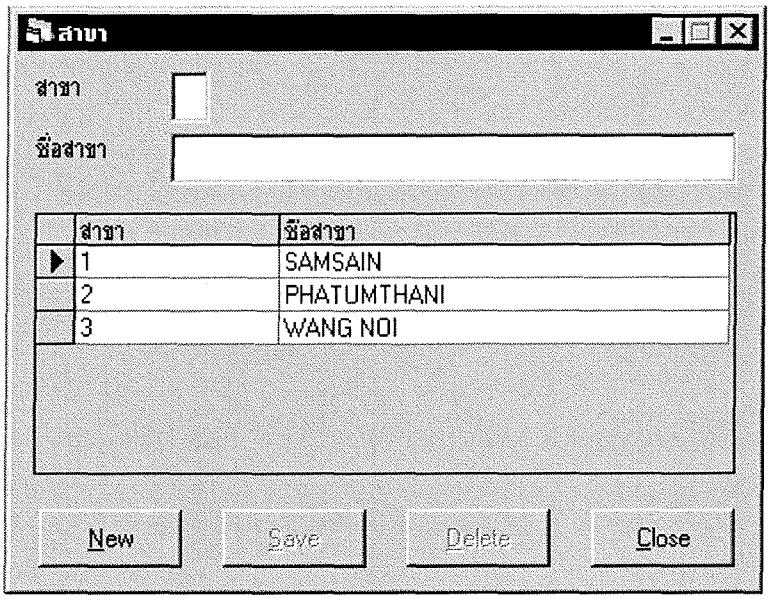

Figure G.5. Branch Factory Input Interface

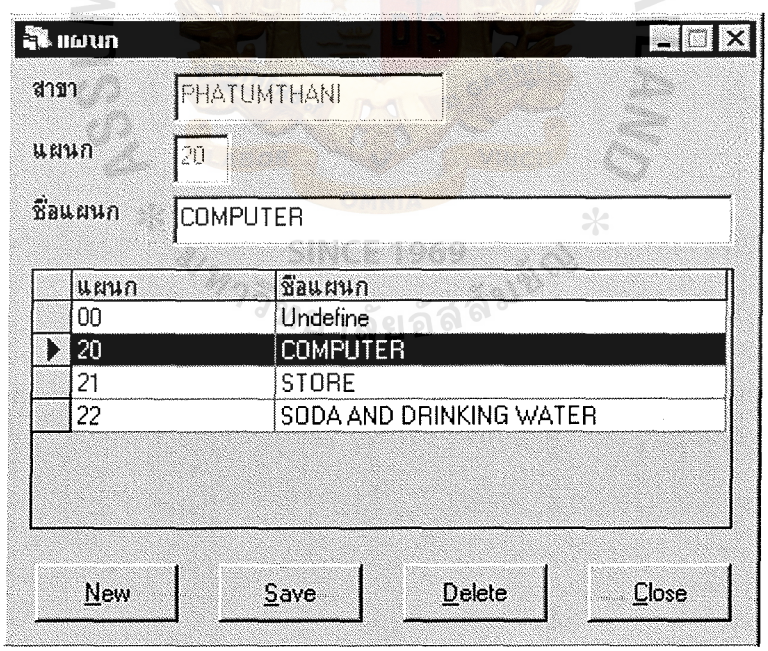

Figure G.6. Department Input Interface

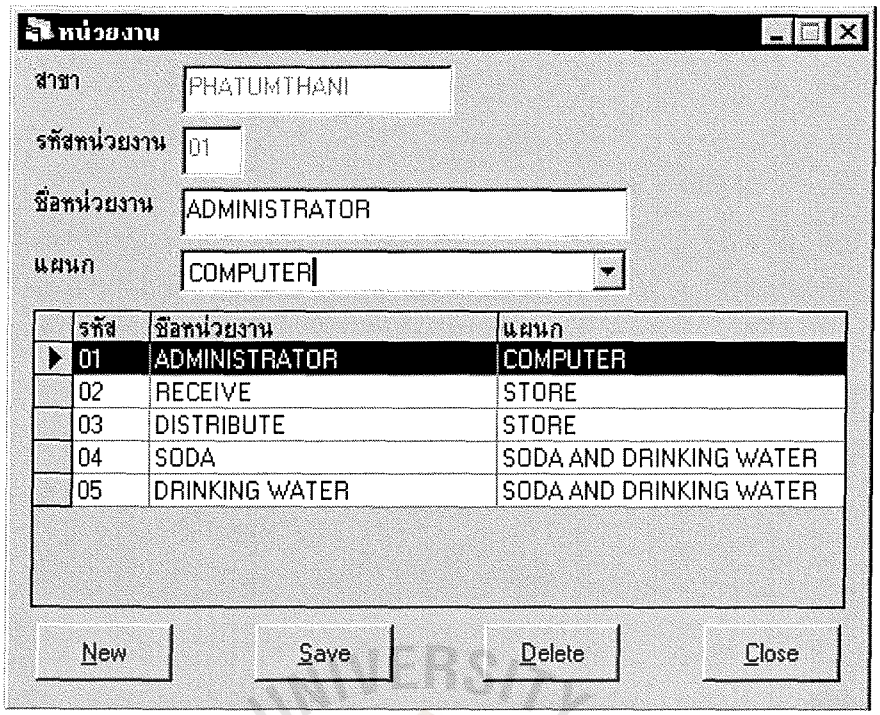

Figure G.7. Section Input Interface

Figure G.8. Unit Input Interface

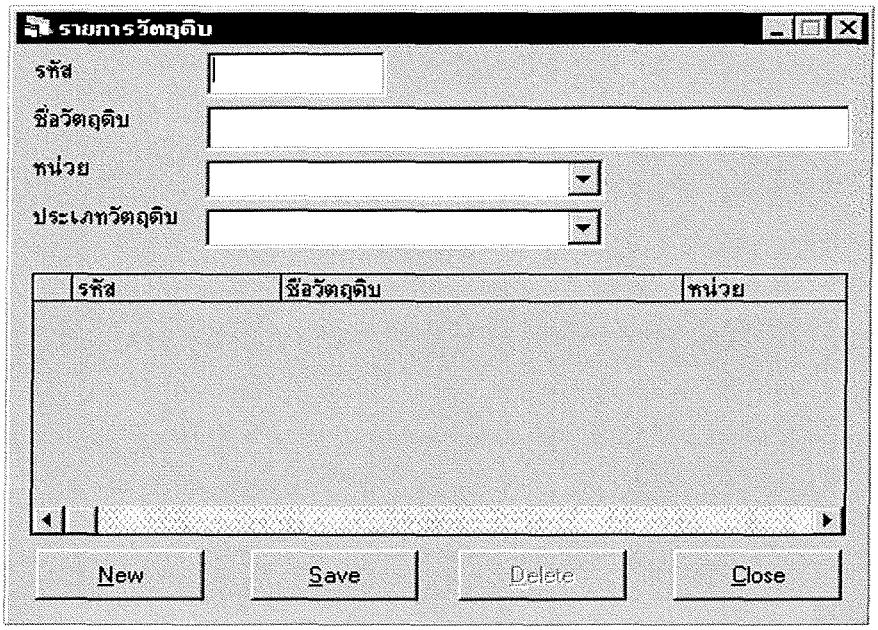

Figure G.9. Raw Material Input Interface

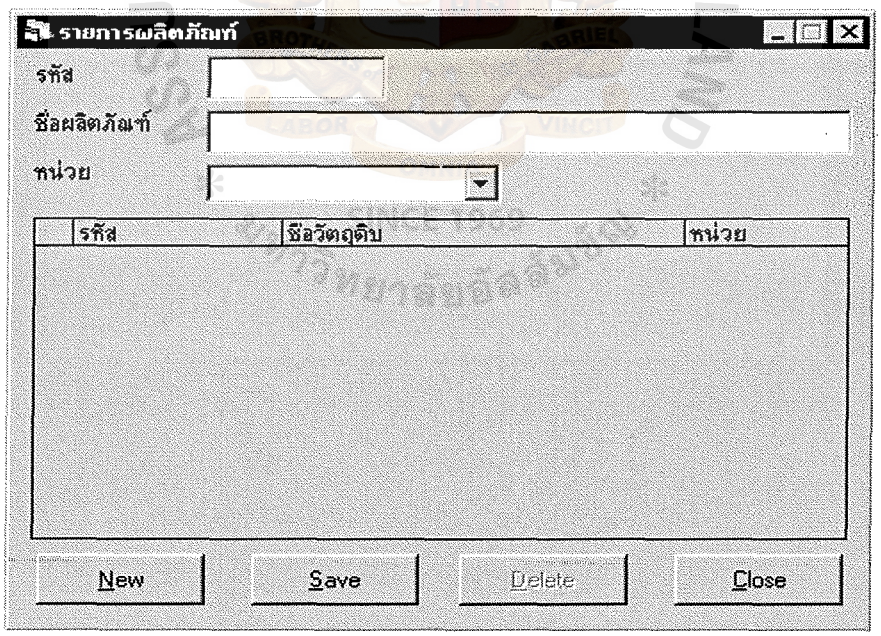

Figure G.10. Product Input Interface

Figure G.11. User Input Interface

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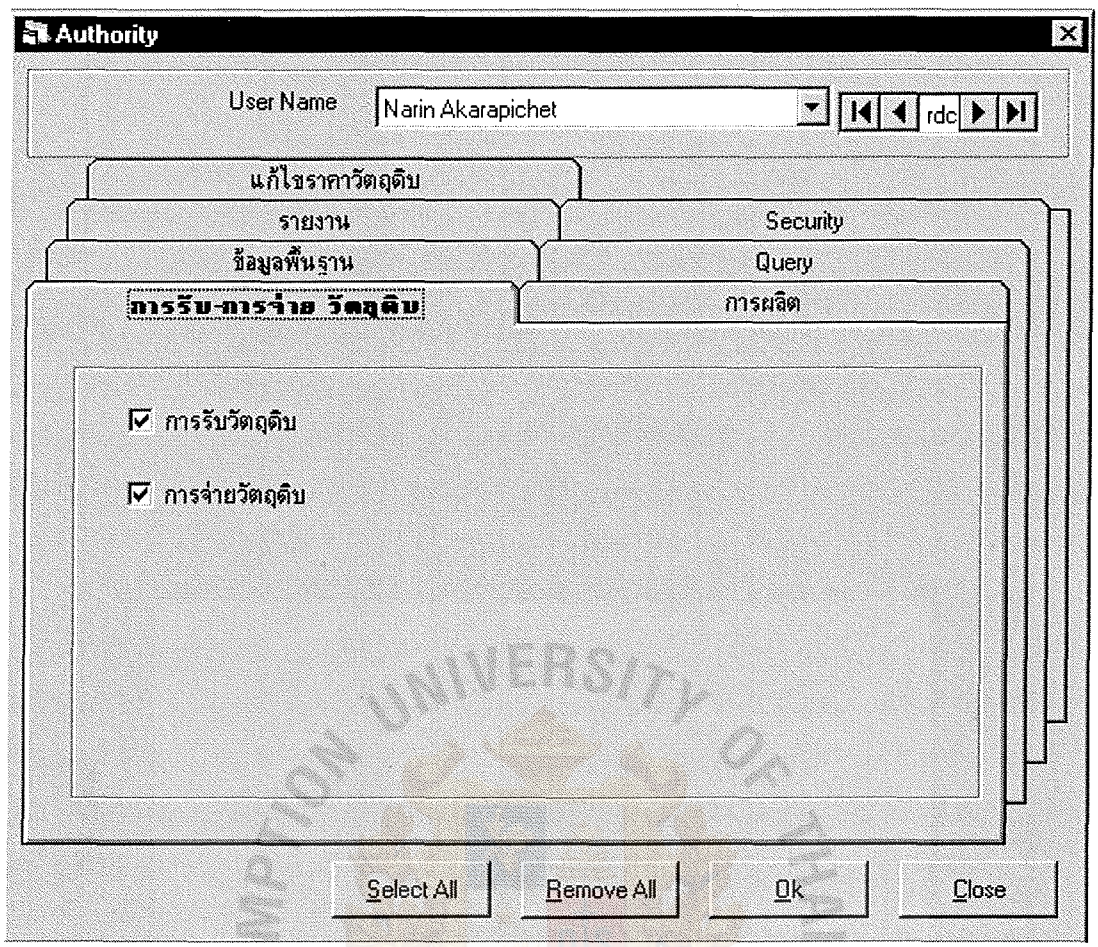

Figure G.12. Security Control Input Interface

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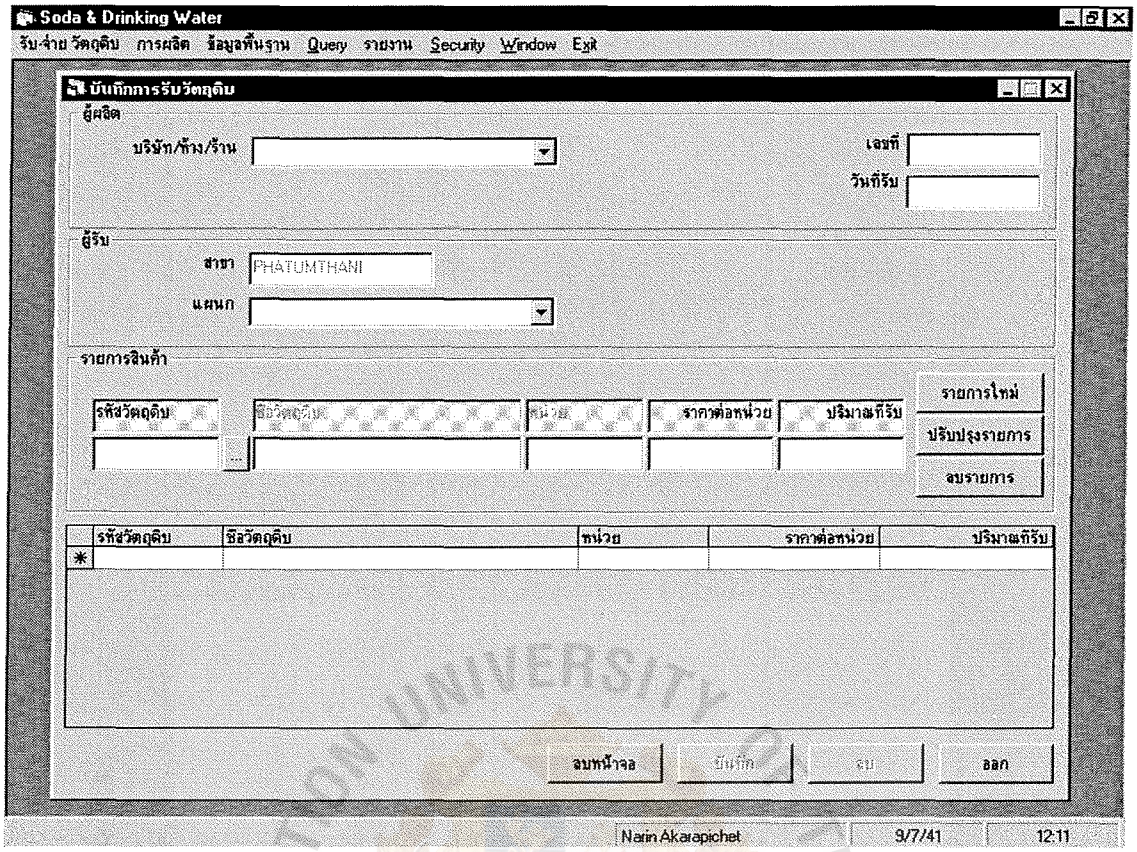

Figure G.13. Receive Raw Material Input Interface

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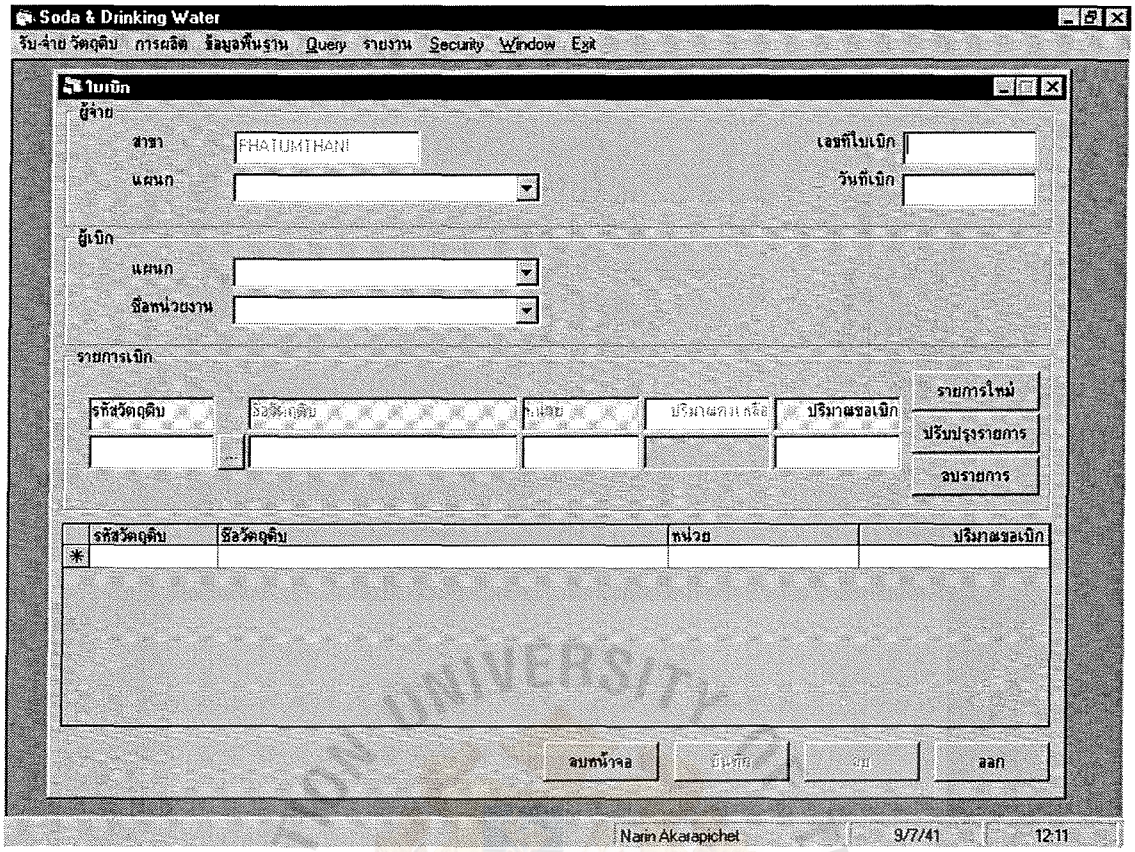

Figure G.14. Distribute Raw Material Input Interface

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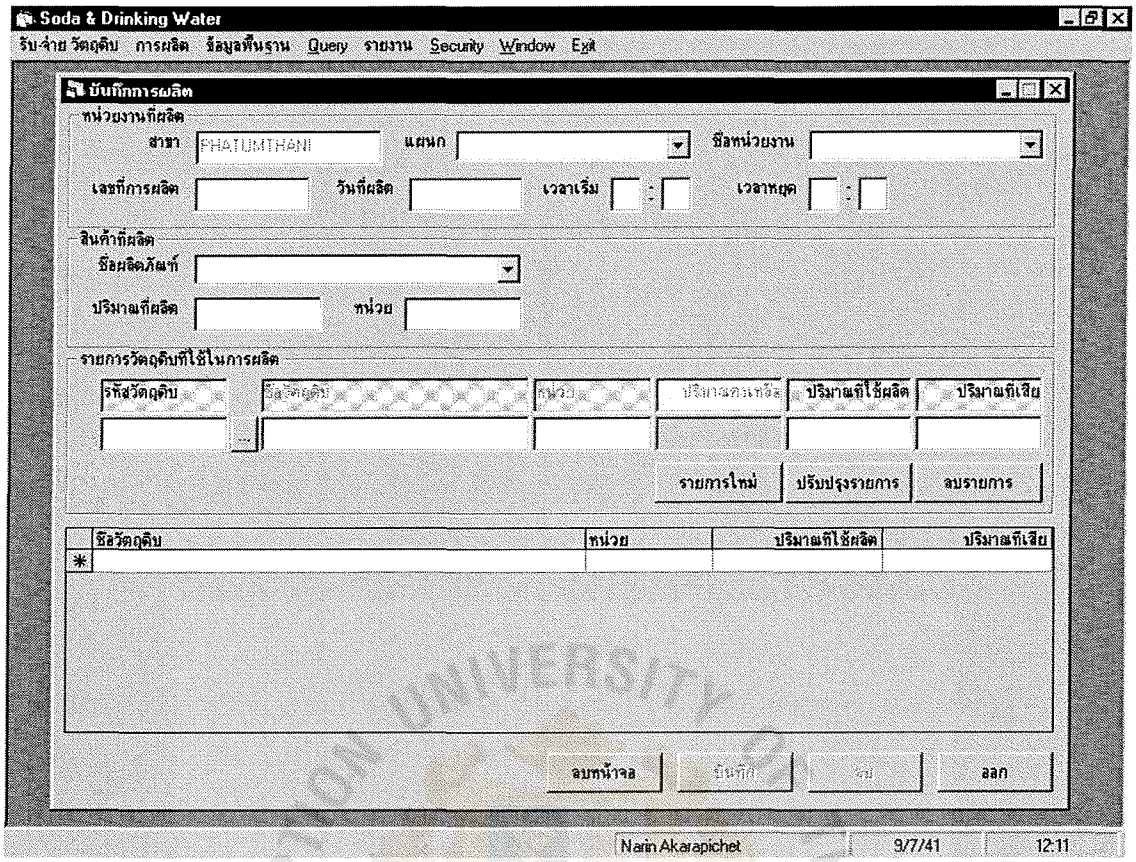

Figure G.15. Production Input Interface

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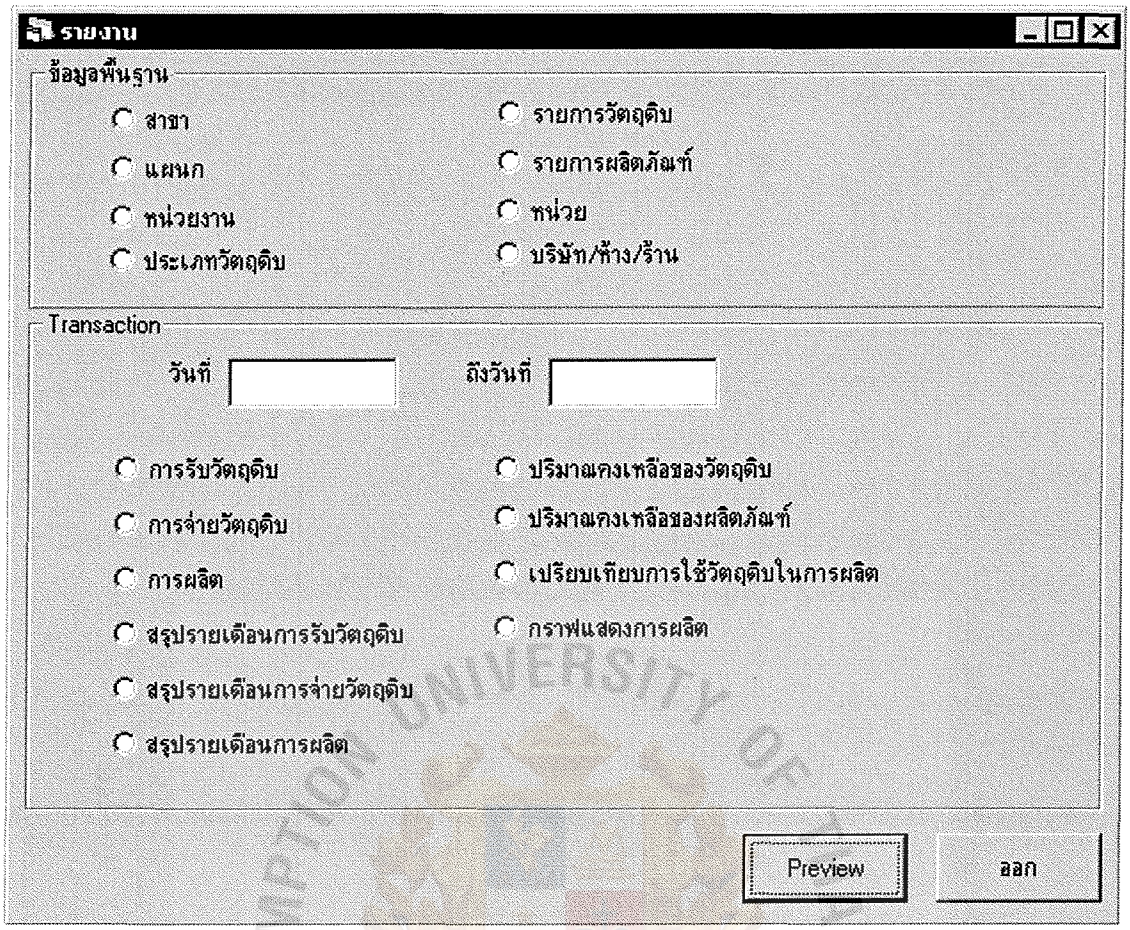

Figure G.16. Generate Report Interface

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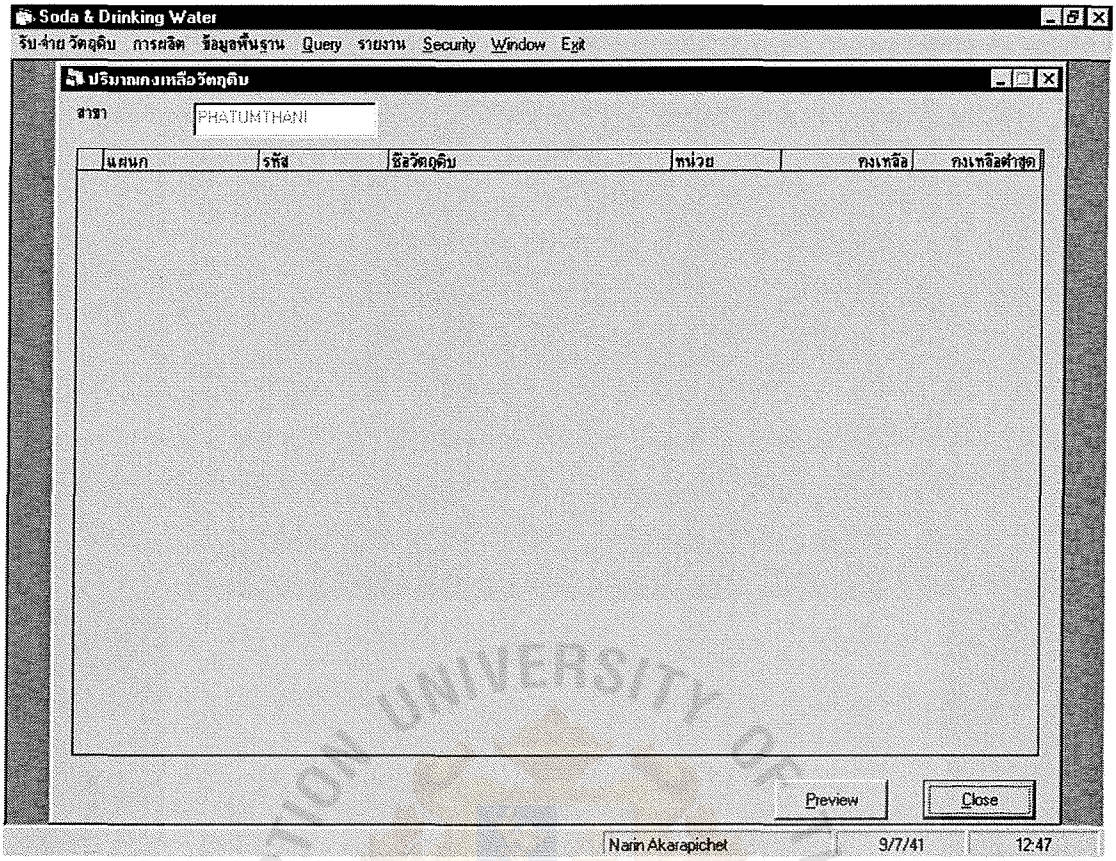

Figure G.17. Query Form of Raw Material Balance

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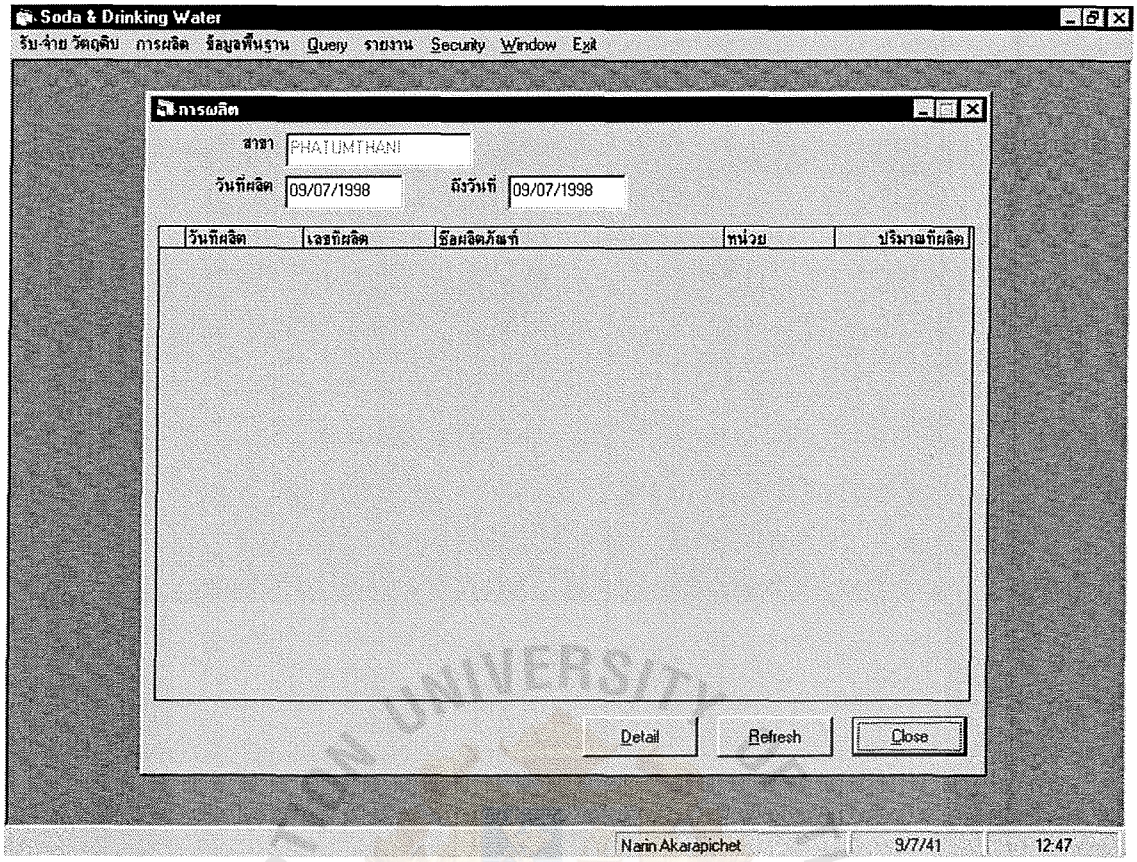

Figure G.18. Query Form of Production

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APPENDIX H

Report Design

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Report Name:Branch

User ID: XXXXX Print Date: dd/mm/yyyy

Branch Code	Branch Name
X	XXXXXXXXXX (50) XXXXXXXXXX
X	XXXXXXXXXX (50) XXXXXXXXXX
X	XXXXXXXXXX (50) XXXXXXXXXX

** End of report **

Figure H.1. Report Layout of Branch Factory

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Report Name:Department

User ID: XXXXX Print Date: dd/mm/yyyy

Branch	Department Code	Department Name
XX (50) XX	XX	XXXXXXXXXX (50) XXXXXXXXXX
	XX	XXXXXXXXXX (50) XXXXXXXXXX
	XX	XXXXXXXXXX (50) XXXXXXXXXX
XX (50) XX	XX	XXXXXXXXXX (50) XXXXXXXXXX
	XX	XXXXXXXXXX (50) XXXXXXXXXX
	XX	XXXXXXXXXX (50) XXXXXXXXXX
XX (50) XX	XX	XXXXXXXXXX (50) XXXXXXXXXX
	XX	XXXXXXXXXX (50) XXXXXXXXXX
	XX	XXXXXXXXXX (50) XXXXXXXXXX

** End of report **

Figure H.2. Report Layout of Department

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Report Name:Section

User ID: XXXXX Print Date: dd/mm/yyyy

Branch	Department	Section Code	Section Name
XX (50) XX	XX (50) XX	XX	XXXXXX (50) XXXXXX
	XX (50) XX	XX	XXXXXX (50) XXXXXX
	XX (50) XX	XX	XXXXXX (50) XXXXXX
XX (50) XX	XX (50) XX	XX	XXXXXX (50) XXXXXX
	XX (50) XX	XX	XXXXXX (50) XXXXXX
	XX (50) XX	XX	XXXXXX (50) XXXXXX
XX (50) XX	XX (50) XX	XX	XXXXXX (50) XXXXXX
	XX (50) XX	XX	XXXXXX (50) XXXXXX
	XX (50) XX	XX	XXXXXX (50) XXXXXX

** End of report **

Figure H.3. Report Layout of Section

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Report Name:Unit

User ID: XXXXX Print Date: dd/mm/yyyy

Unit Code	Unit Description
XX	XXXXXXXXXX (50) XXXXXXXXXX
XX	XXXXXXXXXX (50) XXXXXXXXXX
XX	XXXXXXXXXX (50) XXXXXXXXXX
XX	XXXXXXXXXX (50) XXXXXXXXXX
XX	XXXXXXXXXX (50) XXXXXXXXXX
XX	XXXXXXXXXX (50) XXXXXXXXXX

** End of report **

Figure H.4. Report Layout of Unit

Report Name:User

User ID: XXXXX   Print Date: dd/mm/yyyy

User ID	User Name	Login Name	Department Name	Position
X(10)X	XX(50)XX	XX(20)XX	XXXX (50) XXXX	XXX(30)XXX
X(10)X	XX(50)XX	XX(20)XX	XXXX (50) XXXX	XXX(30)XXX
X(10)X	XX(50)XX	XX(20)XX	XXXX (50) XXXX	XXX(30)XXX
X(10)X	XX(50)XX	XX(20)XX	XXXX (50) XXXX	XXX(30)XXX
X(10)X	XX(50)XX	XX(20)XX	XXXX (50) XXXX	XXX(30)XXX
X(10)X	XX(50)XX	XX(20)XX	XXXX (50) XXXX	XXX(30)XXX
X(10)X	XX(50)XX	XX(20)XX	XXXX (50) XXXX	XXX(30)XXX
X(10)X	XX(50)XX	XX(20)XX	XXXX (50) XXXX	XXX(30)XXX

** End of report **

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Figure H.5.   Report Layout of User

Report Name: Raw Material

User ID: XXXXX Print Date: dd/mm/yyyy

Type	Raw Material Code	Raw Material Name	Unit
X (100) X	XX(10)XX	XX(100)XX	XX(10)XX
	XX(10)XX	XX(100)XX	XX(10)XX
	XX(10)XX	XX(100)XX	XX(10)XX
X (100) X	XX(10)XX	XX(100)XX	XX(10)XX
	XX(10)XX	XX(100)XX	XX(10)XX
	XX(10)XX	XX(100)XX	XX(10)XX
X (100) X	XX(10)XX	XX(100)XX	XX(10)XX
	XX(10)XX	XX(100)XX	XX(10)XX
	XX(10)XX	XX(100)XX	XX(10)XX

** End of report **

Figure H.6. Report Layout of Raw Material

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Report Name: Raw Material Balance Below Minimum Rate

User ID: XXXXX   Print Date: dd/mm/yyyy

Raw Code	Raw Name	Unit	Minimum Rate	Amount
XX(10)XX	XX(100)XX	XX(10)XX	#,###,###.##	#,###,###.##
XX(10)XX	XX(100)XX	XX(10)XX	#,###,###.##	#,###,###.##
XX(10)XX	XX(100)XX	XX(10)XX	#,###,###.##	#,###,###.##
XX(10)XX	XX(100)XX	XX(10)XX	#,###,###.##	#,###,###.##
XX(10)XX	XX(100)XX	XX(10)XX	#,###,###.##	#,###,###.##
XX(10)XX	XX(100)XX	XX(10)XX	#,###,###.##	#,###,###.##
XX(10)XX	XX(100)XX	XX(10)XX	#,###,###.##	#,###,###.##
XX(10)XX	XX(100)XX	XX(10)XX	#,###,###.##	#,###,###.##
XX(10)XX	XX(100)XX	XX(10)XX	#,###,###.##	#,###,###.##

** End of report **

Figure H.7. Report Layout of Raw Material Balance Below Minimum Rate

Report Name: Product

User ID: XXXXX Print Date: dd/mm/yyyy

Product Code	Product Name	Unit	Amount
XX(10)XX	XX(100)XX	XX(10)XX	#,###,###
XX(10)XX	XX(100)XX	XX(10)XX	#,###,###
XX(10)XX	XX(100)XX	XX(10)XX	#,###,###
XX(10)XX	XX(100)XX	XX(10)XX	#,###,###
XX(10)XX	XX(100)XX	XX(10)XX	#,###,###
XX(10)XX	XX(100)XX	XX(10)XX	#,###,###
XX(10)XX	XX(100)XX	XX(10)XX	#,###,###
XX(10)XX	XX(100)XX	XX(10)XX	#,###,###

** End of report **

Figure H.8. Report Layout of Product

Report Name: Raw Material Invoice

User ID: XXXXX Print Date: dd/mm/yyyy

Invoice No. XXXXXXXXXXXXXXX Inv. Date: dd/mm/yyyy

Supplier: XXXXXXXXXXXXXXXXXXXXXXX

Address: XXXXXXXXXXXXXXXXXXXXXXX

XXXXXXXXXXXXXXXXXXXXXXX

Approved by: XXXXXXXXXXXXXX XXXXXXXXX

Raw Code	Raw Name	Unit	Price/Unit	Quantity	Total
XX(10)XX	XX(100)XX	XX(10)XX	###,###.##	###,###.##	#,###,###.##
XX(10)XX	XX(100)XX	XX(10)XX	###,###.##	###,###.##	#,###,###.##
XX(10)XX	XX(100)XX	XX(10)XX	###,###.##	###,###.##	#,###,###.##
XX(10)XX	XX(100)XX	XX(10)XX	###,###.##	###,###.##	#,###,###.##

Sub total	#,###,###.##
Vat 10%	###,###.##
Grand total	#,###,###.##

** End of report **

Figure H.9. Report Layout of Daily Receive Raw Material Invoice Report

Report Name: Request Raw Material

User ID: XXXXX Print Date: dd/mm/yyyy

Request No. XXXXXXXXXXXXXXX Request Date: dd/mm/yyyy

Department: XXXXXXXXXXXXXXXXXXXXXXX

Request by: XXXXXXXXXXXXXXXXXXXXXXX

Approved by: XXXXXXXXXXXXXX XXXXXXXXX

Raw Code	Raw Name	Unit	Request Quantity
XX(10)XX	XX(100)XX	XX(10)XX	#,###,###.##
XX(10)XX	XX(100)XX	XX(10)XX	#,###,###.##
XX(10)XX	XX(100)XX	XX(10)XX	#,###,###.##
XX(10)XX	XX(100)XX	XX(10)XX	#,###,###.##
XX(10)XX	XX(100)XX	XX(10)XX	#,###,###.##
XX(10)XX	XX(100)XX	XX(10)XX	#,###,###.##

** End of report **

Figure H.10. Report Layout of Daily Request Raw Material Report

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Report Name: Production

User ID: XXXXX Print Date: dd/mm/yyyy

Produce No. XXXXXXXXXXXXXXX Produce Date: dd/mm/yyyy

Produce Time: hh:mm AM/PM

Department: XXXXXXXXXXXXXXXXXXXXXXX

Product Code: XXXXXXXXXX Product Name: XXXXXXXXXXXXXXXXXXXX

Produce Quantity #,###,### Unit: XXXXXXXXX

Approved by: XXXXXXXXXXXXXX XXXXXXXXX

Raw Code	Raw Name	Unit	Used Quantity
XX(10)XX	XX(100)XX	XX(10)XX	#,###,###.##
XX(10)XX	XX(100)XX	XX(10)XX	#,###,###.##
XX(10)XX	XX(100)XX	XX(10)XX	#,###,###.##
XX(10)XX	XX(100)XX	XX(10)XX	#,###,###.##
XX(10)XX	XX(100)XX	XX(10)XX	#,###,###.##

** End of report **

Figure H.11. Report Layout of Daily Production Report

Report Name: Monthly Receive Raw Material Invoice

User ID: XXXXX Print Date: dd/mm/yyyy

From Month: XXXXXXXXXX To Month: XXXXXXXXXX

Month	Raw Name	Unit	Price/Unit	Quantity	Total
XXXXXXX	XX(100)XX	XXXX	###,###.##	#,###,###.##	#,###,###.##
	XX(100)XX	XXXX	###,###.##	#,###,###.##	#,###,###.##
	XX(100)XX	XXXX	###,###.##	#,###,###.##	#,###,###.##
				Sub total	#,###,###.##
XXXXXXX	XX(100)XX	XXXX	###,###.##	#,###,###.##	#,###,###.##
	XX(100)XX	XXXX	###,###.##	#,###,###.##	#,###,###.##
	XX(100)XX	XXXX	###,###.##	#,###,###.##	#,###,###.##
				Sub total	#,###,###.##
				Total	#,###,###.##
				Vat 10%	###,###.##
				Grand total	#,###,###.##

** End of report **

Figure H.12. Report Layout of Monthly Receive Raw Material Invoice Report

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Report Name: Monthly Request Raw Material Report

User ID: XXXXX Print Date: dd/mm/yyyy

From Month: XXXXXXXXXX To Month: XXXXXXXXXX

Month	Raw Name	Unit	Request Quantity
XXXXXXX	XX(100)XX	XX(10)XX	#,###,###.##
	XX(100)XX	XX(10)XX	#,###,###.##
	XX(100)XX	XX(10)XX	#,###,###.##
XXXXXXX	XX(100)XX	XX(10)XX	#,###,###.##
	XX(100)XX	XX(10)XX	#,###,###.##
	XX(100)XX	XX(10)XX	#,###,###.##

** End of report **

Figure H.13. Report Layout of Monthly Request Raw Material Report

Report Name: Monthly Production Report

User ID: XXXXX Print Date: dd/mm/yyyy

From Month: XXXXXXXXXX To Month: XXXXXXXXXX

Month	Product Name	Unit	Produce Quantity
XXXXXXX	XX(100)XX	XX(10)XX	#,###,###
	XX(100)XX	XX(10)XX	#,###,###
	XX(100)XX	XX(10)XX	#,###,###
XXXXXXX	XX(100)XX	XX(10)XX	#,###,###
	XX(100)XX	XX(10)XX	#,###,###
	XX(100)XX	XX(10)XX	#,###,###

** End of report **

Figure H.14. Report Layout of Monthly Production Report

APPENDIX I

Process Specific

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Process 1.1 Create/Modify/Delete Supplier Record

Process 1.1.1 and 1.1.2 Read and Check Existing Record

```
Begin
        Read Supplier code
        Check Existing Record
        If found Then
                Display data on screen
        Else
                Msgbox "Record not found"
        End if
End
```

Process 1.1.3 Create Supplier Record

```
Begin
        If Not found Then
                Insert supplier record into database
        End if
End
```

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Process 1.1.4 Modify Supplier Record

```
Begin
    If found Then
        If MsgBox("Do you want to update existing record?") Then
            Modify supplier record
        End if
    End if
End
```

Process 1.1.5 Delete Supplier Record

```
Begin
    If found Then
        If MsgBox("Do you want to delete existing record?") Then
            Remove supplier record from database
        End if
    End if
End
```

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Process 1.2 Create/Modify/Delete Branch Record

Process 1.2.1 and 1.2.2 Read and Check Existing Record

```
Begin
        Read Branch code
        Check Existing Record
        If found Then
                Display data on screen
        Else
                Msgbox "Record not found"
        End if
End
```

Process 1.2.3 Create Branch Record

```
Begin
        If Not found Then
                Insert Branch record into database
        End if
End
```

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Process 1.2.4 Modify Branch Record

```
Begin
    If found Then
        If MsgBox("Do you want to update existing record?") Then
            Modify Branch record
        End if
    End if
End
```

Process 1.2.5 Delete Branch Record

```
Begin
    If found Then
        If MsgBox("Do you want to delete existing record?") Then
            Remove Branch record from database
        End if
    End if
End
```

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Process 1.3 Create/Modify/Delete Department Record

Process 1.3.1 and 1.3.2 Read and Check Existing Record

```
Begin
        Read Department code
        Check Existing Record
        If found Then
                Display data on screen
        Else
                Msgbox "Record not found"
        End if
End
```

Process 1.3.3 Create Department Record

```
Begin
        If Not found Then
                Insert Department record into database
        End if
End
```

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Process 1.3.4 Modify Department Record

```
Begin
    If found Then
        If MsgBox("Do you want to update existing record?") Then
            Modify Department record
        End if
    End if
End
```

Process 1.3.5 Delete Department Record

```
Begin
    If found Then
        If MsgBox("Do you want to delete existing record?") Then
            Remove Department record from database
        End if
    End if
End
```

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Process 1.4 Create/Modify/Delete Section Record

Process 1.4.1 and 1.4.2 Read and Check Existing Record

Begin

Read Section code

Check Existing Record

If found Then

Display data on screen

Else

Msgbox "Record not found"

End if

End

Process 1.4.3 Create Section Record

Begin

If Not found Then

Insert Section record into database

End if

End

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Process 1.4.4 Modify Section Record

```
Begin
    If found Then
        If MsgBox("Do you want to update existing record?") Then
            Modify Section record
        End if
    End if
End
```

Process 1.4.5 Delete Section Record

```
Begin
    If found Then
        If MsgBox("Do you want to delete existing record?") Then
            Remove Section record from database
        End if
    End if
End
```

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Process 1.5 Create/Modify/Delete Unit Record

Process 1.5.1 and 1.5.2 Read and Check Existing Record

```
Begin
        Read Unit code
        Check Existing Record
        If found Then
                Display data on screen
        Else
                Msgbox "Record not found"
        End if
End
```

Process 1.5.3 Create Unit Record

```
Begin
        If Not found Then
                Insert Unit record into database
        End if
End
```

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Process 1.5.4 Modify Unit Record

```
Begin
    If found Then
        If MsgBox("Do you want to update existing record?") Then
            Modify Unit record
        End if
    End if
End
```

Process 1.5.5 Delete Unit Record

```
Begin
    If found Then
        If MsgBox("Do you want to delete existing record?") Then
            Remove Unit record from database
        End if
    End if
End
```

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Process 1.6 Create/Modify/Delete Raw material Record

Process 1.6.1 and 1.6.2 Read and Check Existing Record

Begin

Read Raw material code

Check Existing Record

If found Then

Display data on screen

Else

Msgbox "Record not found"

End if

End

Process 1.6.3 Create Raw Material Record

Begin

If Not found Then

Insert Raw material record into database

End if

End

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Process 1.6.4 Modify Raw Material Record

```
Begin
    If found Then
        If MsgBox("Do you want to update existing record?") Then
            Modify Raw material record
        End if
    End if
End
```

Process 1.6.5 Delete Raw Material Record

```
Begin
    If found Then
        If MsgBox("Do you want to delete existing record?") Then
            Remove Raw material record from database
        End if
    End if
End
```

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Process 1.7 Create/Modify/Delete Product Record

Process 1.7.1 and 1.7.2 Read and Check Existing Record

```
Begin
        Read Product code
        Check Existing Record
        If found Then
                Display data on screen
        Else
                Msgbox "Record not found"
        End if
End
```

Process 1.7.3 Create Product Record

```
Begin
        If Not found Then
                Insert Product record into database
        End if
End
```

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Process 1.7.4 Modify Product Record

```
Begin
    If found Then
        If MsgBox("Do you want to update existing record?") Then
            Modify Product record
        End if
    End if
End
```

Process 1.7.5 Delete Product Record

```
Begin
    If found Then
        If MsgBox("Do you want to delete existing record?") Then
            Remove Product record from database
        End if
    End if
End
```

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Process 1.8 Create/Modify/Delete User Record

Process 1.8.1 and 1.8.2 Read and Check Existing Record

```
Begin
        Read User code
        Check Existing Record
        If found Then
                Display data on screen
        Else
                Msgbox "Record not found"
        End if
End
```

Process 1.8.3 Create User Record

```
Begin
        If Not found Then
                Insert User record into database
        End if
End
```

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Process 1.8.4 Modify User Record

Begin

If found Then

If MsgBox("Do you want to update existing record?") Then

Modify User record

End if

End if

End

Process 1.8.5 Delete User Record

Begin

If found Then

If MsgBox("Do you want to delete existing record?") Then

Remove User record from database

End if

End if

End

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Process 2.0 Receive Raw Material

Process 2.1 and 2.2 Receive Invoice and Check Supplier Record

Begin

Read Invoice No, Supplier

Check Invoice No

If found Then

Display data on screen

Else

Msgbox "Record not found"

End if

End

Process 2.3 Check Raw Material Record

Begin

Read raw material code

If found Then

Call Increase raw material

End if

End

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Process 2.4 Increase Raw Material

Begin

Read Raw Material code

If found Then

Increase raw material balance quantity

Call Insert receive transaction

End if

End

Process 2.5 Insert Receive Transaction

Begin

Insert receive transaction into database

End

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Process 3.0 Request Raw Material

Process 3.1 and 3.2 Receive Requests Form and Check the Request Record

```
Begin
        Read Request No
        Check Request No
        If found request record Then
                Display data on screen
        Else
                Call Check raw material balance
        End if
End
```

Process 3.3 Check Raw Material Balance

```
Begin
        Read Raw Material Code
        If Have balance () Then
                Call decrease raw material
        End if
End
```

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Process 3.4 Decrease Raw Material

Begin

Decrease raw material balance quantity

Call Insert Request transaction

End

Process 3.5 Insert Request Transaction

Begin

Insert Request transaction into database

End

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Process 4.0 Enter Production

Process 4.1 and 4.2 Receive Productions Form and Check the Production Record

Begin

Read production no

If found production record Then

Display data on screen

Else

Call Verify product name

End if

End

Process 4.3 Verify Product Name

Begin

Read raw material code

If found Then

Call increase product balance quantity

End if

End

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Process 4.4 Increase Product Balance Quantity

Begin

Increase product balance quantity

Call Insert product transaction

End

Process 4.5 Insert product transaction

Begin

Insert product transaction into database

End

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Process 5.0 Generate Report

Process 5.1 Verify Report Name

Begin

Read report name

Check Report Name

If found Then

Call Create report condition

End if

End

Process 5.2 Create Report Condition

Begin

Make criteria

Call Retrieve data (criteria)

End

Process 5.3 Retrieve Data (criteria)

Begin

Get Data from database

Call Compute extra column

End

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Process 5.4 Compute Extra Column

Begin

Build extra column

Call Present

End

Process 5.5 Present

Begin

Display information on screen or print to printer

End

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