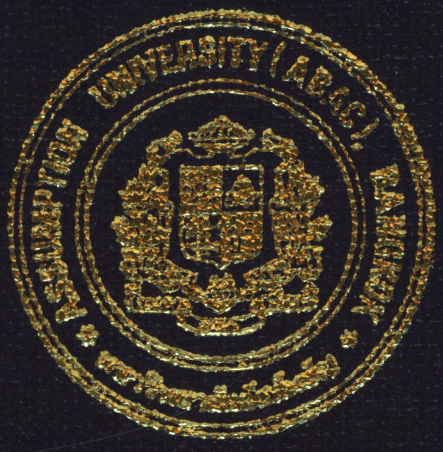

Account Receivable System For Pulp Manufacturing Business

by

Ms. Yupa Chayanopparat

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

Submitted in Partial Fulfillment
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Project Title	Account Receivable System for Pulp Manufacturing Business
Name	Ms. Yupa Chayanopparat
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Academic Year	July 21, 2002

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

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ABSTRACT

Since technology is getting enhancement, a computerized system is one of the technologies that is going to replace the manual system which will be obsolete one day in the future.

In recent years, the business of YC Company Limited has been expanding rapidly, therefore, there have been impacts on company operations. Its departments are confronting with overload work. Therefore to keep up with the workload, the computer must be introduced to assist managing organizing and control its business process.

This project is developed to improve the existing operation system at The Accounting Department of the company. The emphasis is on computerization as to provide the right information at the right time. Several reports can also be generated as output of integrated data for planner and management to be used as a tool in planning, forecasting and decision-making.

ACKNOLWEDGMENTS

A lot of efforts are put in this project with the assistance of many people involved. The writer would like to thank the following people for their helpful comments and suggestions during the project development.

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Khun Supaphan Anantachatree, Account Receivable

Air Marshal Dr. Chulit Meesajjee, Advisor

The staff at YC Company Limited for providing the opportunity to interview and giving recommendation for business view in Account Receivable System.

Her sincere of thanks go to Air Marshal Dr. Chulit Meesajjee, advisor. The writer would like to take this opportunity to express her gratitude and thanks for his valuable guidance and his kind suggestions during the period of project.

Thanks are also due to the writer's friends and family for their endurance, encouragement, and assistance throughout the project.

Finally, the writer would like to express her sincere thanks to all people involved in this project.

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I. INTRODUCTION

1.1 Background of the Project

The Accounting Receivable Department of YC Company Limited uses Excel program for data processing. The department has to work for various data and there are redundant work and errors.

The existing system is manual, so it requires paperwork to record all transactions. To handle working process manually especially in account receivable no planning and forecast on credit control of quick movement of account receivable. These problems have made the company unable to work more efficiently. Some problems that have been observed are:

(1) Customer complains about slow response on their inquiries.

(2) Accounting Receivable is not up-to-date.

(3) There is no sign warning on overdue invoice and credit limit.

(4) Redundancy of work process occurs in many departments.

(5) There is a lack of security to protect information in the system.

(6) Employees complain that they do not have enough facilities to help them in planning.

(7) It is time - consuming searching documents when specific information is needed.

Accounting Receivable Department requires new efficient accounting system to serve the business requirements. New database with single handling of data is required for any related departments.

1.2 Objectives of the Project

The object of account receivable project can be defined as:

(1) To study the existing manual system, and its.

(2) To study user's requirement.

(3) To analyze the existing system and provide an alternative solution.

(4) To analyses, design and test the new account receivable system

(5) To implement the new system.

The benefit of the new system is project development focusing on handling working process manually especially in account receivable. Account receivable system is used to protect the value of data assets, make the data resource responsive to change information needs, enable the data-processing organization and reduce the costs of improving performance. It can decrease the problem about redundancy of data, enable to recover data, and increase consistency data. It can be defined as:

(1) To solve the manual system's problems.

(2) To create reports to account receivable system.

(3) To reduce paperwork in many departments.

(4) To reduce redundancy in work process.

1.3 Scope of the Project

The account receivable system will combine all the data into one place in which Sales Department and Accounting Department share the same database. The following process will be the scope, which can be defined as follows:

(1) To analyses, design and test the new system for account receivable.

(2) To design input form and report to support the system and work process.

(3) To study and analyses the existing data collection.

(4) To analyze costs and benefits of the proposed system.

(5) To reduce paperwork in many departments.

(6) To reduce redundancy in work processes.

(7) To maintain account receivable master file.

(8) To produce user manual as a tool in training a user how to operate the system.

The accounting receivables system is created to assist the staff in each department to perform their jobs more easily, minimize any human errors and provide them back with the variety of up-to-date reports.

1.4 Deliverables

The designed system will be beneficial to the YC Company in managing its operation in account receivable. The system performs mostly to reduce time in customer information, product information, order, invoice, receipt invoice, and tax invoice. To implement this project, it is necessary to invest reasonable funds for physical equipment. It is worth investing because the new system can make profits in a short period of time. The new system requires the following:

(1) Application software which is developed by Oracle 9i.

(2) Screen layout for Graphical User Interface (GUI).

(3) Local Area Network (LAN).

(4) Various hard copy layout reports as following;

(a) Summary invoice report.

(b) Summary credit_note report.

(c) Summary receipt invoice report.

(d) Summary tax invoice report.

(e) Summary withholding tax report.

(f) Summary bank statement report.

1.5 Project Plan (Include Gantt Chart)

The project plan of account receivable system is presented in gantt chart. (See Figure 1.1. Project planning of Account Receivable System).

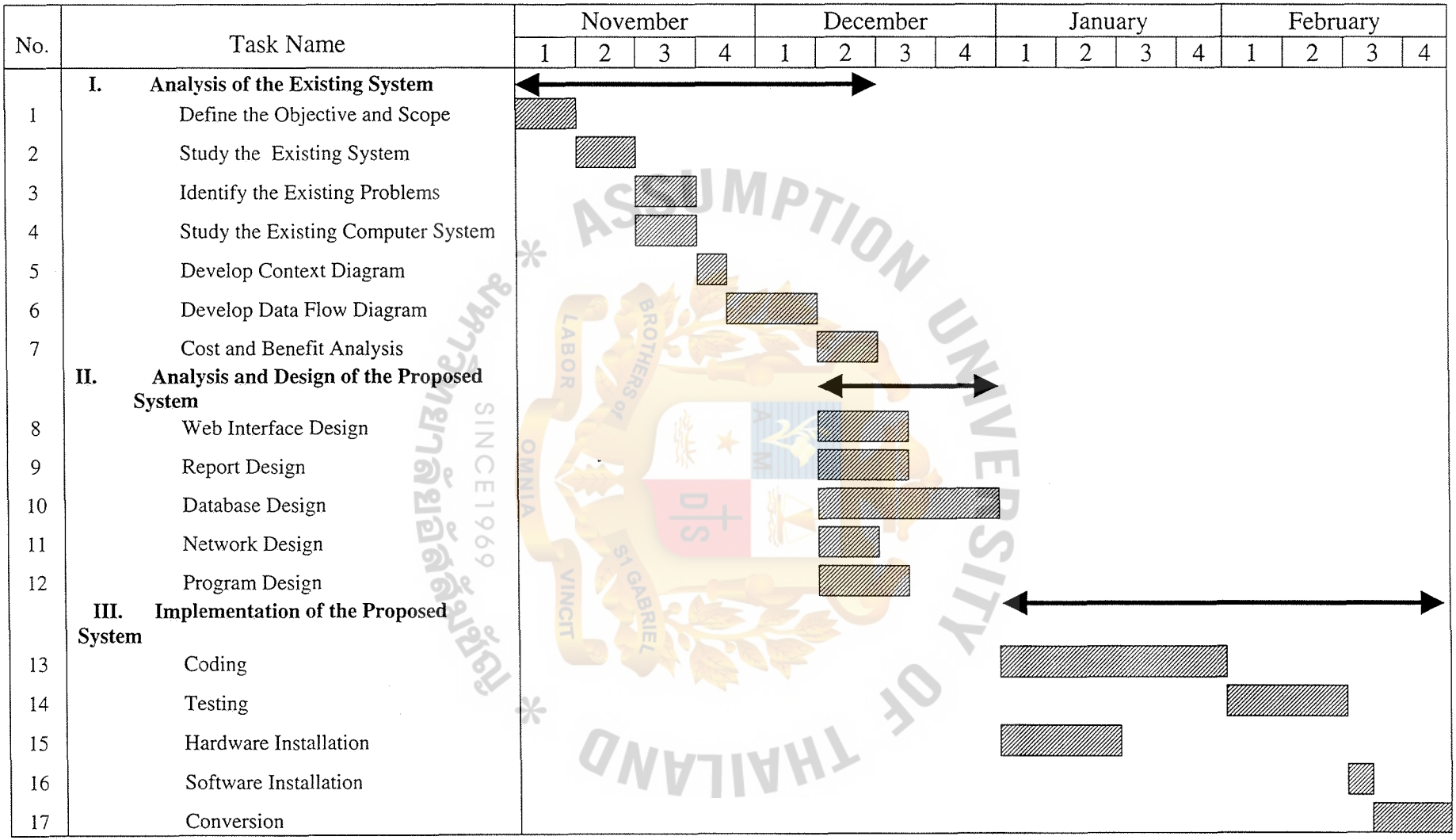


Figure 1.1. Project plan of Account Receivable System.

II. THE EXISTING SYSTEM

2.1 Background of the Company

YC Company Limited was established in 1976. The pulp that the company manufactures forms the basic raw material from which paper is produced. The kinds of pulp are processed using raw material namely bamboo, kenaf and eucalyptus. All categories of raw materials are cultivated in the Thai agricultural sector and hence cultivation of these materials help sustain this sector. Bamboo and kenaf are particularly environmentally-friendly in that they do not require the use of long living trees and are therefore preferred raw material for companies manufacturing specifically environmentally-friendly paper products.

Most of YC's customers are manufacturers of printing and writing paper to be sold domestically and internationally. Virtually the entire income of the company comes directly from selling pulp with no more than 1% of income being acquired from the sale of chemical by-products, and the derivative of the pulp processing operation.

Table 2.1. The Company's Income over the Last Three Years.

Item	2000 Million Baht	%	1999 Million Baht	%	1998 Million Baht	%
Domestic	3,084.688	61	2,175.145	57	1,578.010	46
Export	2,013.266	39	1,652.650	43	1,887.769	54
Total	5,097.954	100	3,827.795	100	3,465.779	100
Increase	1,270.159	33	362.016	10	717.676	26

The fortunes of the pulp and paper industry over the year 2000 have fluctuated considerably in comparison with 1999. The price of pulp rose during 1999, and it carried on rising continuously, until reaching saturation point in about the third quarter of 2000.

The higher prices of pulp had a direct impact on the price of paper products, but eventual oversupply in the paper industry, together with the overall economic troubles of Southeast Asia have hindered the prospects of the industry. The pulp and paper market also had to face a contraction of the US economy during 2000, and therefore the price of paper on the world market was not expected to rise significantly. As it is, the market has been oversupplied from mid-2000 onwards, and this has been having particular effects on those paper manufacturers who have not thoroughly integrated their paper mills, losing out because the difference in prices for paper and pulp do not cover the costs of production. These producers have had to reduce manufacturing capacity or manufacture other types of paper that utilize recycled paper to a higher degree.

The discouraging position as regards the world pulp price has led paper producers to conclude that pulp prices have already reached their peak and are likely to fall further in the foreseeable future. Another that pressures the pulp price is that during the rising pulp price period, most paper manufacturers have accumulated significant stock excesses. Consequently the pulp market has been slow this year, and partly due to high prices before. The warehouses are full yet the demand is shrinking, hence it has resulted in the fall in prices since the third quarter of 2000.

The economic condition of the pulp and paper industry in 2000 can be seen as a natural occurrence for this industry in that the industry is characteristically cyclical, industry professionals being well familiar with such price cycles.

YC Company Limited has followed a sales strategy emphasizing the value of regular customers, generally those who require pulp as the raw material for their own products. The company still commands 80% domestic market share in Thailand on which the company utilizes more than 50% of its production capacity and which allows for more certainty notwithstanding the slower demand in International market. Conversely, by employing the other 50% of production capacity for the export markets the company gains from safer access to a broader band of currencies.

The Organization Chart of Account Receivable System of YC Company Limited are shown in Figure 2.1.

2.2 General Information on Area under Study – Input, Process, Output

2.2.1 Input of the Existing System

Since the existing system activities are managed manually, the inputs, therefore, consist of raw data, paperwork, filing and filing forms. These inputs can be classified by each source entity and are listed below:

(1) Place order.

(2) Receive customer record.

(3) Delivery order.

(4) Return invoice from customer.

(5) Payment overdue.

(6) Confirm payment.

(7) Receive cash or cheque from customer.

(8) Withholding Tax Document.

(9) Pay-in slip.

(10) Return cheque from bank

(11) Bank Statement.

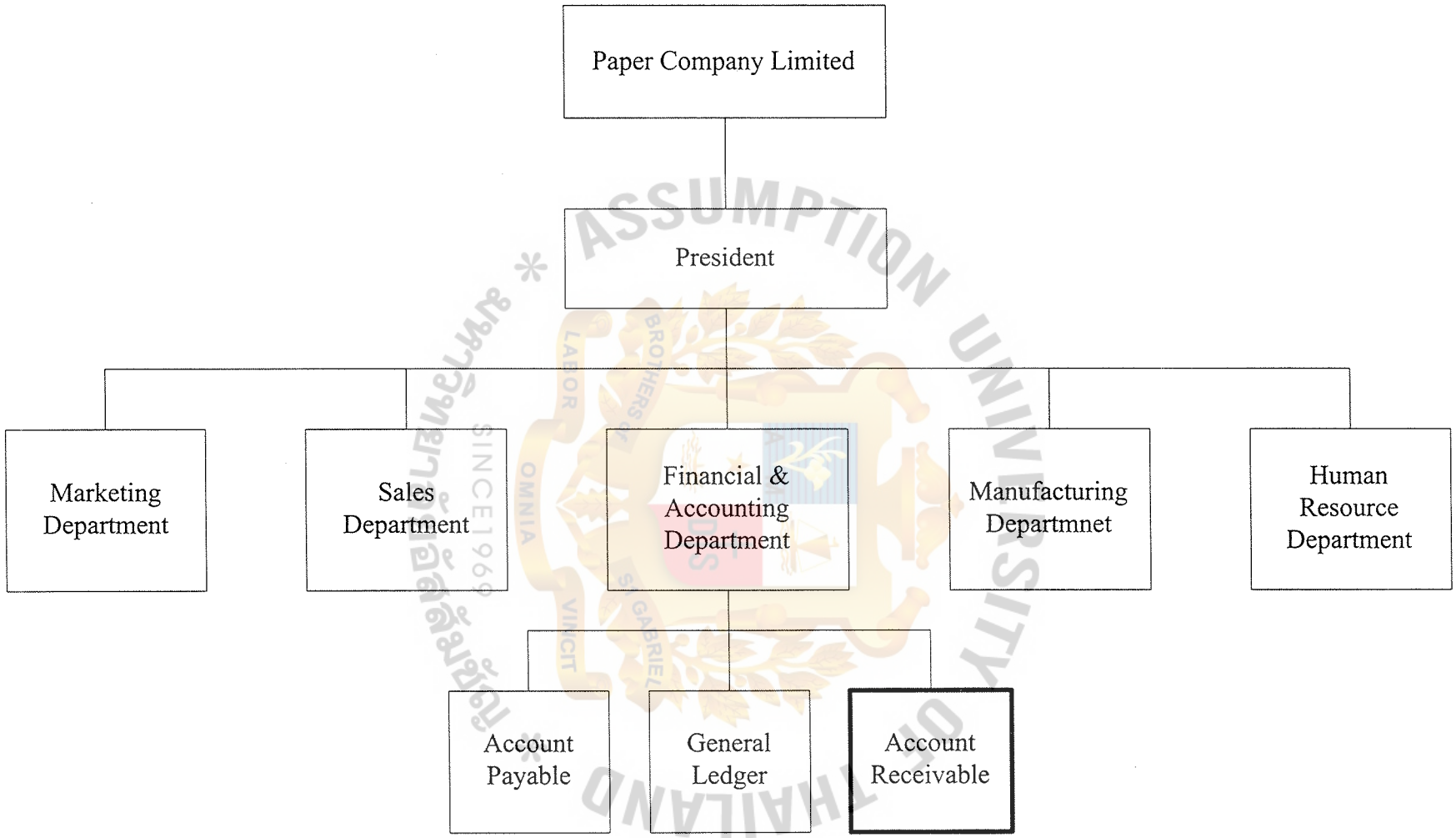


Figure 2.1. The Organization Chart of Account Receivable System.

2.2.2 Process of the Existing System

The process of the existing system starts when the company receives an order from the customer and will end the process when the payment is deposited to the bank. The Context Diagram and The Data Flow Diagram Level 1 (Existing System) of Fancy Paper Company Limited is shown in Figure 2.2. and in Figure 2.3.

Process 1.0	:	Receive an order
Step 1	:	Check customer requirement and condition on purchase order.
Step 2	:	Check unit price.
Step 3	:	Check credit limit.
Step 4	:	Approve an order.
Process 2.0	:	Shipment
Step 1	:	Confirm order detail.
Step 2	:	Create delivery order.
Step 3	:	Submit order and delivery.
Process 3.0	:	Invoice
Step 1	:	Check order and delivery detail.
Step 2	:	Check customer detail.
Step 3	:	Create invoice.
Step 4	:	Sent invoice to customer.
Step 5	:	Submit to invoice.
Step 6	:	Create credit_note invoice, if invoice have some problem
Step 7	:	Sent credit_note invoice to customer.
Step 8	:	Submit to credit_note invoice.

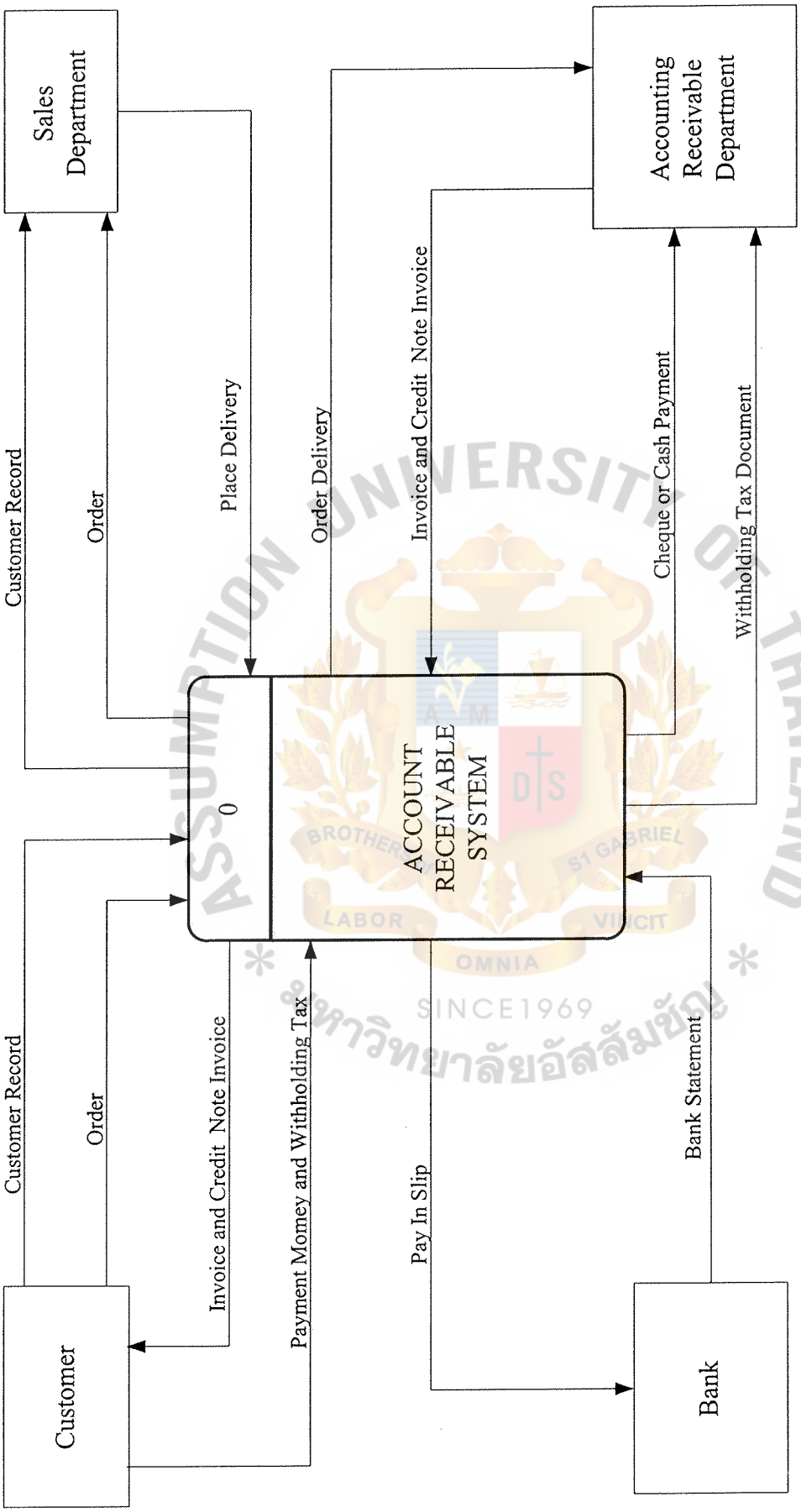


Figure 2.2. Context Diagram (Existing System).

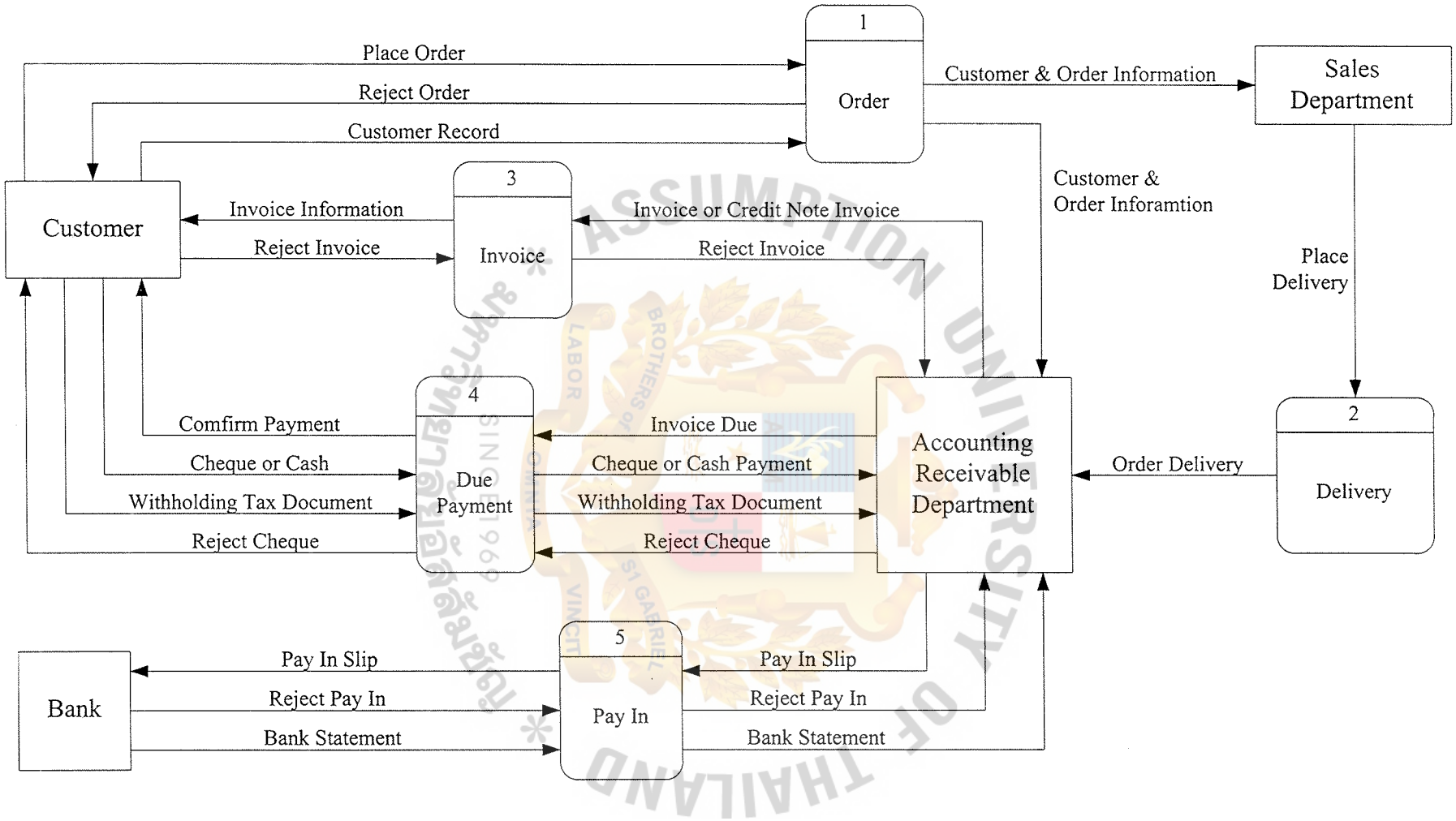


Figure 2.3. Data Flow Diagram Level 1 (Existing System).

Process 4.0	:	Due payment
Step 1	:	Check invoice due date detail.
Step 2	:	Confirm customer to payment.
Step 3	:	Receive cash or cheque from customer.
Step 4	:	Receive withholding tax document from customer.
Step 5	:	Create receipt invoice.
Step 6	:	Create tax invoice.
Step 7	:	Sent receipt invoice and tax invoice to customer.
Step 8	:	Submit customer payment.
Process 5.0	:	Pay in
Step 1	:	Check cheque date to pay in.
Step 2	:	Pay in cheque or cash to bank.
Step 3	:	Record pay in detail in to customer receive detail store.
Step 4	:	Update bank statement book.
Step 5	:	Check customer detail with bank statement.

2.2.3 Output of the Existing System

The output of the existing system consists of completing paperwork, and filling the form, etc., which are derived from the processes. All outputs are classified by specified source or entity and are listed below:

(1) Reject order.

(2) Sent invoice to customer.

(3) Output to account department.

(4) Order number.

(5) Credit_note invoice to customer.

(6) Pay-in cheque or cash to the bank.

(7) Return cheque to customer.

2.3 Resource of the Existing System

The resource of the existing system is the items that are used in up-to-date operations to convert inputs to outputs. These items are listed below:

2.3.1 Personnel

2 documentation staff

They prepare all customers' orders, check credit limit, and pay in cash or cheque payment to the bank, keep document, etc.

3 accounting staff

They prepare all information such as customer's details, order, invoice, receipt, tax invoice, bank statement, and etc.

2.3.2 Hardware

2 electronics type writers

Copier machine

Facsimile

2.4 Existing Forms

The existing form that the company is currently using compose of the following:

(1) Order form.

(2) Invoice form.

(3) Credit note invoice form.

(4) Receipt invoice form.

(5) Tax invoice form.

(6) Return cheque-listing form.

2.5 Benefits and Weaknesses of the Existing System

The study the existing account receivable system, demonstrates that this account receivable system is unable to handle the high volume of daily transactions as well as data maintenance and there are many errors in the existing system. The benefit and weakness of the existing system are listed as follows:

2.5.1 Benefits of the Existing System

(1) It is very easy to handle the manual system.

(2) No costs or efforts are required.

(3) Users are familiar with the old system.

(4) Data is kept in files, which can be carried along and can be used by other departments.

2.5.2 Weaknesses of the Existing System

(1) There are duplicates of documents.

(2) There is no systematic standard to support efficient procedure.

(3) It is time consuming to refer to the information.

(4) Account information is not up-to-date.

(5) Data is redundant and becomes inconsistent.

(6) There is redundancy of work.

(7) It cannot provide reports.

(8) The possibility of human error is high.

(9) There is a lack of security to protect information in the system.

(10) Personnel calculations are not accurate.

(11) Development costs are very high.

(12) There is a poor planning in account receivable system.

III. THE PROPOSED SYSTEM

The system analysis design in this project is carried out by using standard methods. The proposed computerized system is designed to facilitate the up-to-date operation and set up an information base for management. The proposed system will serve all user requirements, utilize the existing resources, increase efficiency and effectiveness of the operations.

3.1 User Requirements

In account receivable system, the updated information is important to the organization, as it requires accurate reliable information. The acquired information from the system must be presented in the usable form, or in the written report, which will be simply understood, used and analyzed by the management team in making decisions. The information includes order report, invoice and credit_note report, receipt invoice report and tax invoice report.

The user requirements are obtained from the users themselves and the existing system evaluation. Actually, the existing system can serve the user requirements to some extent. But users still need further development for more system function as well as improvement within the existing system operating scope. The main development and improvement includes query capability volume report, database storage, security and etc. The user requirements are concluded as follows:

(1) The staff are able to view the information of each customer from the computer any time.

(2) The staff take less time to obtain the required information details about customer, product, order, invoice and credit_note invoice, receipt invoice, and tax invoice.

(3) The proposed system can provide up-to-date and accurate information.

(4) The proposed system can reduce process of work.

(5) The proposed system is be easy to use and the familiar all users.

(6) Information can be shared among several systems at the same time.

(7) The proposed system can allow multiple users to access the database at the same time.

(8) The proposed system can show historical data for tracing back information when an error is occurred.

(9) The proposed system can identify users' access authority, and allow only authorized person to work on their authorized jobs.

3.2 System Design

System design is the evaluation of alternative solutions and the specification of a detailed computer-based solution. The new proposed system was designed with an aim to solve the current problems existing in the present system to meet all user requirements. There are many strategies or techniques for performing a systems design. They include modern structured analysis information engineering, prototyping, JAD (Joint application development), RAD (Rapid application development) and object-oriented design. These strategies are often viewed as competing alternative approaches to system design. The techniques used to analyze and design this new proposed system are the context diagram, the data flow diagram (DFD) and the structure analysis.

Modern structured design is a process-oriented technique for breaking up a large program into a hierarchy of modules that result in a computer program that is easier to implement and maintain change. It is top-down program designed and structured programming that refines the objectives represented in terms of a layered model of system requirement. The basic tools that are used to analyze and design this project are:

(1) Context Data Flow Diagram.

(2) Data Flow Diagram (DFD).

(3) Feasibility Analysis of Candidate System.

(4) Data Dictionary.

(5) System Structure Chart.

(6) Process Specification.

(7) Database Design.

(8) Process Specification.

(9) Output Design.

(10) User interface design.

3.2.1 Context Diagram

The context diagram is constructed to establish initial project scope. It shows only the system's interfaces with its environment. This context data flow diagram defines the scope and boundary for the system and project. Because the scope of any project is always subject to change, the context diagram is also subject to constant change. A synonym *is environmental model.* There are the net inputs to determine its source and net output to determine its destination. Both sources and destinations will become external agents on the context diagram and there contains only one process in the diagram.

The context diagram of YC Company Limited associated with four external entities: Customer, Sales Department, Accounting Department and Bank as shown in Figure 3.1. Context Diagram (New System).

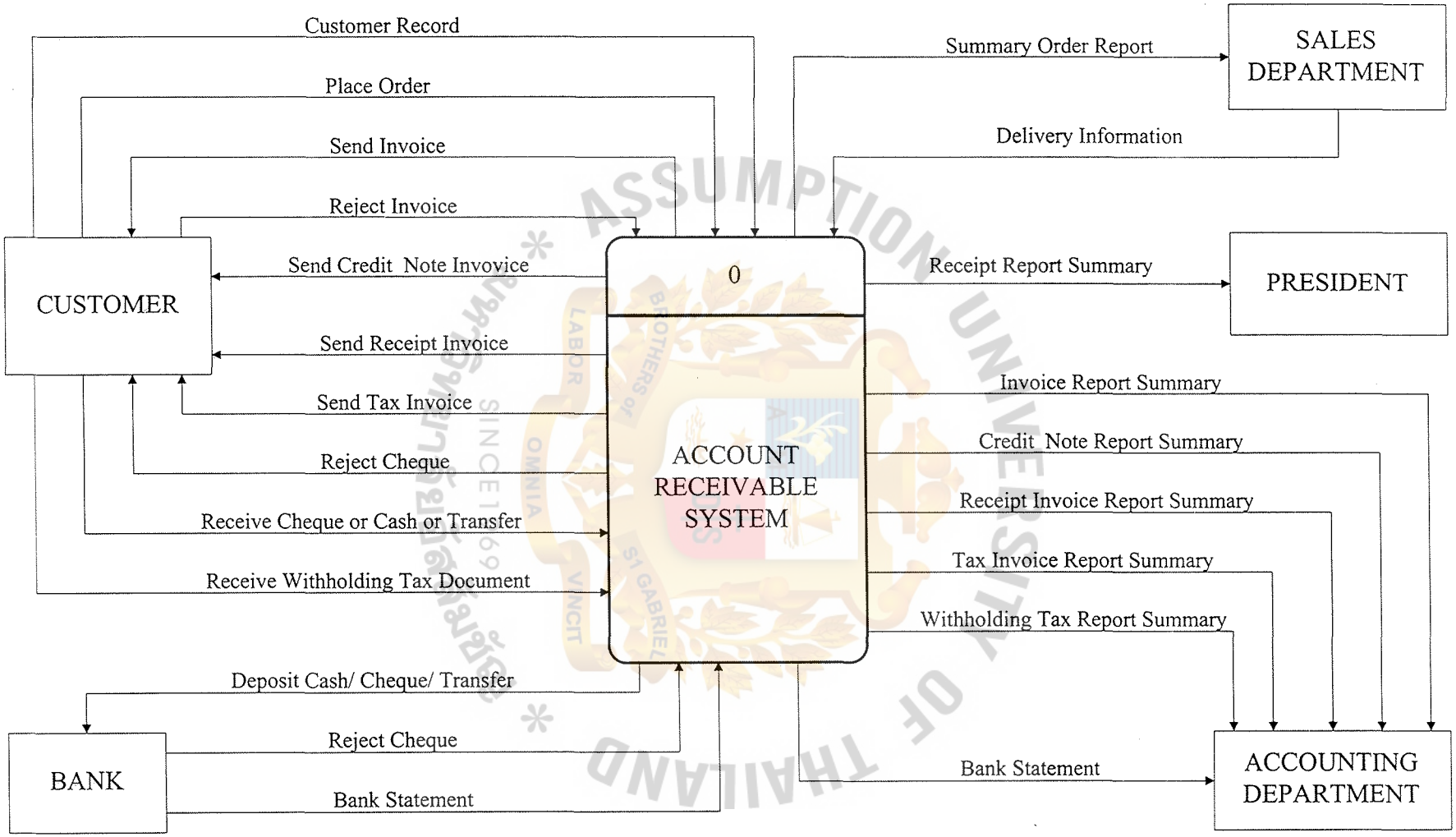


Figure 3.1. Context Diagram (New System).

Input data that flow into the system are listed below:

(1) Customer information.

(2) Delivery information.

(3) Return invoice from customer.

(4) Payment overdue.

(5) Cash or cheque information.

(6) Withholding tax document.

(7) Pay-in slip.

(8) Bank statement.

(9) Return cheque from bank.

Output from the system are listed below:

(1) Invoice to customer.

(2) Output to Accounting Department.

(3) Order number.

(4) Credit_note invoice to customer.

(5) Pay-in cheque or cash to bank.

(6) Return cheque to customer

3.2.2 Data Flow Diagram

The data flow diagram is a tool that depicts the flow of data through a system and the work or processing performed by the proposed system. There are several competing symbol sets for DFDs but the data flow diagram in this project uses the Gane and Sarson notation because of its popularity and CASE tool support. The meaning of the symbol will be clarified in Figure 3.2. The Gane and Sarson Notation.

The process of the new proposed system can be summarized as below:

Process 1: Customer Record

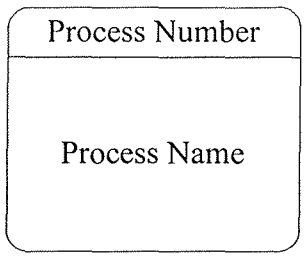
A staff records the details of all new customers to entry or old customers to modify record.

Process 2: Accept order request

Staff accepts an order from a customer and generates order information report to Sales Department to send product to customers follow in order.

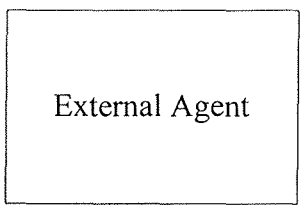
Process 3: Create invoice

After customers receive the products and sign on the delivery order and return it to Sale Department. Sales Department will send delivery information to create invoice to customers and generates invoice information report to Accounting Department. Sometimes invoice may have some problems about the price of the product. Staff creates credit_note invoice to credit all prices in the invoice for customers and generates credit_note invoice information report to Accounting Department.



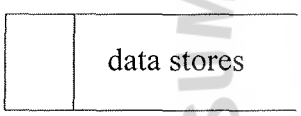
- The rounded rectangles represent process

A Process is work performed on, or in response to incoming data flows or conditions. A synonym is transformed.



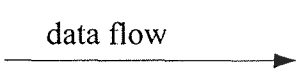
- The squares represent external agents

An External Agent defines a person, organization unit, other system, or other organization that lies outside the scope of the project but that interacts with the system begin studied. External agents provide the net inputs into a system and receive net ouputs from a system. Common synonyms include external entity.



- The open-ended boxes represent data stores

A Data Store is an "inventory" of data. Synonyms include file and database. (although those terms are too implementation-oriented for essential process modeling).



- The arows represent data flow

A Data Flow represents an input of data to a process or the output of data (or information) from a process. A data flow is also used to represent the creation, reading, deletion, or updating of data in a file or database (called a data store on the DFD).

Figure 3.2 The Gane and Sarson Notation.

Process 4: Create receipt invoice and tax invoice

On the due date for the payment on a credit invoice, staff will confirm the amount, and the type to payment (cash, cheque or transfer), and place to receive the money. After confirm detail, staff create invoice receipt and tax invoice to the customer and generates receipt invoice information report and tax invoice information report to Accounting Department and generate receipt information report to President.

Process 5: Receiving money and withholding tax document

After the staff receive money and withhold tax document from customer, they deposit the money to the bank and generate bank statement information report to Accounting Department. Concerning withholding tax document, staff will record withholding tax amount (0% embassy, 1% for government, and 3% for others) to credit invoice amount and generates withholding tax information report to Accounting Department. Sometimes the cheques cannot be deposited at the bank because there are name errors or the customer has no balance at the bank, so the bank will reject the cheque. After the staff get the rejected cheque, they will return it to the customer to solve the problem and to deposit the money again.

All processes will be shown in Figure 3.3 Data Flow Diagram Level 1 of proposed system and each process will be shown thoroughly separately in level 1 Data Flow Diagram Level 2 and 3 in Appendix A.

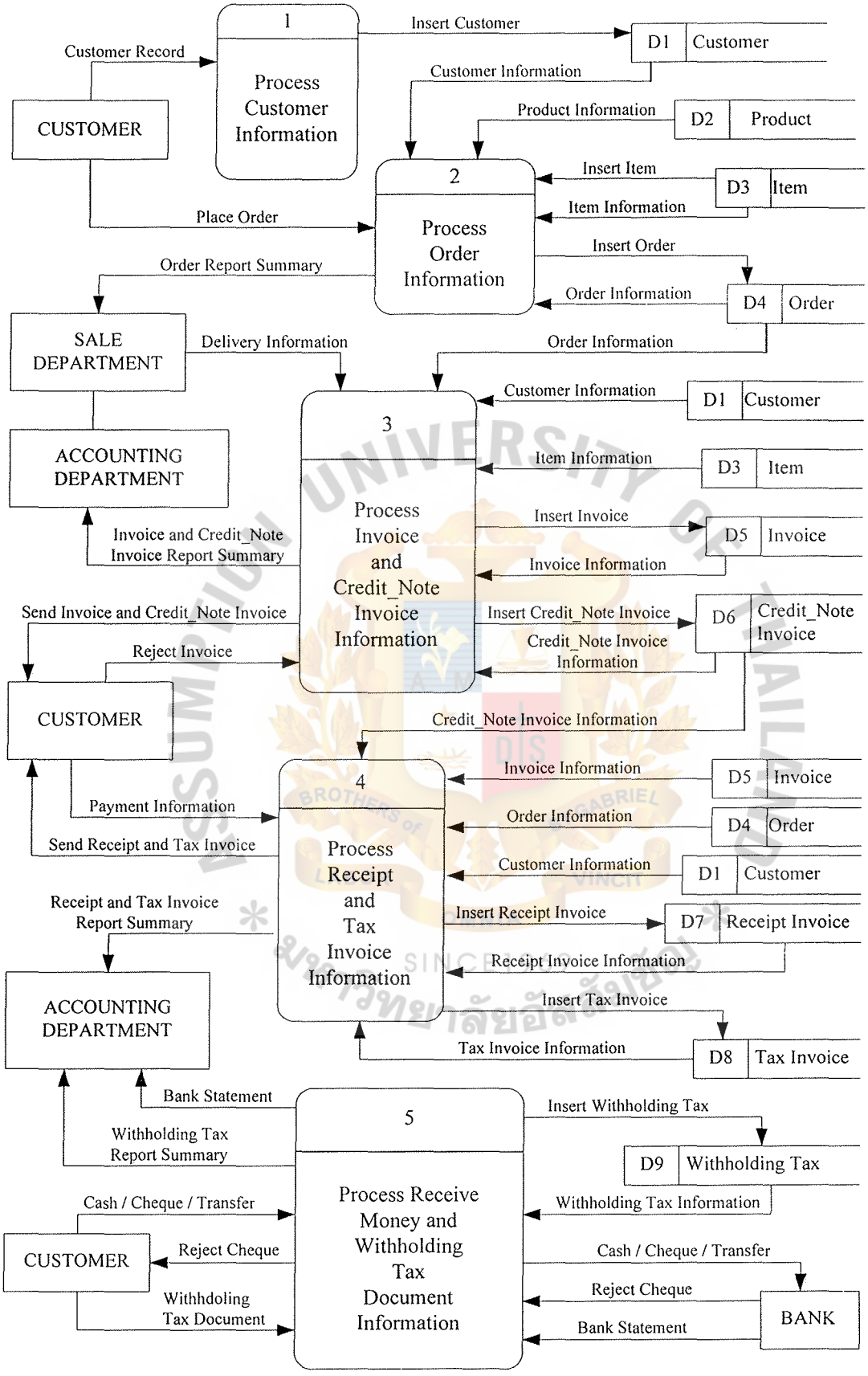


Figure 3.3. Data Flow Diagram Level 1.

3.2.3 Feasibility Analysis of Candidate System

The techniques for candidate system have 2 type

1. Candidate System Matrix
2. Feasibility Analysis Matrix

The Candidate System matrix is the matrix identifying and comparing many aspects of the candidate solution. Those aspects may be the benefit derived from the system, and software and hardware needed. The candidate system matrix documents the similarities and differences between candidate system; however, it offers no analysis.

The Feasibility analysis matrix is the second matrix, which is the complement of the candidate system matrix. The feasibility includes an analysis and ranking of the candidate systems. The columns of feasibility analysis matrix correspond to each candidate. The rows of feasibility analysis matrix correspond to the feasibility criteria, which consist of operational feasibility, Technical feasibility, Economic feasibility, schedule feasibility. Rows are added to describe the general solution and a ranking of the candidates. After ranking all candidates on each criterion, a final ranking or score is recorded in the last row. The feasibility analysis of candidate system is represented in Appendix B.

3.2.4 Data Dictionary

The date dictionary is a repository that contains descriptions of all data objects consumed or produced by software. It is used to support the data flow diagram. The data dictionary is represented in Appendix C.

3.2.5 Structure Chart

The structure chart is derived by studying the flow of data through the program. The structure charts are used to graphically depict a modular design of a program.

Specifically, they show how the program has been partitioned into more smaller manageable modules, the hierarchy and organization of those modules, and the communication interfaces between modules. Structure charts, however, do not show the internal procedures performed by the module or the internal data used by the module. The system structure chart of this project is shown in Appendix D.

3.2.6 Process Specification

The process specification can be used to specify the processing details implied by a bubble within a DFD. It describes the input to a function, the algorithm that is applied to the input and the output hat is produced. In addition, the process specification indicates restrictions and limitations imposed on the process (function), performance characteristic that are relevant to the process, and design constraints that influence the way in which the process will be implemented. A description of each function presented in the DFD is contained in a process specification. The process specification of this project is represented in Appendix E.

3.2.7 Database Design

The design of data goes far beyond the simple layout of records. Databases are a shared resource. Many programs will use them. The good designing databases must be adaptable to future requirements and expansion and also can access the data in order to improve performance of the company. The database design of this project is shown in Appendix F.

3.2.8 User Interface Design

The idea of user interface design is to build an easy to learn and easy to use dialogue for the user's new system. The purpose of this design is to prepare technical design specifications for an on-line user interface. The user interface design is represented in Appendix G.

3.2.9 Output Design

Transaction outputs will frequently be designed as preprinted forms onto which transaction details will be printed. Reports and other outputs are usually printed directly onto paper or displayed on a terminal screen. In any event, the precise format and layout of the outputs must be specified. Finally, internal controls must be specified to ensure that the outputs are not lost, misrouted, misused or incomplete. The output is represented in Appendix H.

3.3 Hardware and Software Requirement

The proposed system is still operating on the existing computer configuration and uses server-base on local area network. A server-base is designed to provide access to many files while maintaining performance and security to the user. Server-based sharing of data can be centrally administered and controlled. Security is the most primary reason for choosing a server-based approach to networking.

In a server-based environment, Window NT is used as a file server to provide users to access the application at the same time. All PCs are connected together by LAN and Windows NT operating system. The prevailing computing model is currently client/server wherein a network of clients, single-user computers, is connected to and interoperates with server, multiple user computers that share their services.

The personnel computer will be used to run this system. The entire computers will be connected together as a computer network in order to share all the resources. There will be a computer acting as file server. All the data transactions will be kept there, so that all the users will be able to get the updated data from one place.

The hardware required for the system shall follow Oracle information technology standard as follows:

Oracle Forms Develop Release 6i for Window NT

Hardware and Software Requirements

(1) For Forms Developer Itself

(a) Hardware

Forms Developer is designed to be installed and run on an IBM or 100% compatible PC with a Pentium processor or better. A CD-RPM drive functioning as a logical drive is also required for the installation process. For information on monitor, printer, and mouse requirements, see your Microsoft Windows documentation.

(b) Operation System

This version of Forms Developer requires Microsoft Windows. Specifically, one of the following versions:

(1) Windows 95 (any version)

(2) Windows 98 (any version)

(3) Windows NT (Service Pack 5 or Later)

(c) RAM for Design Time

128 MB of RAM provides adequate space for installing and using the design/compile portions of the Forms Developer product. (You might find that your project works well with less.)

(d) RAM for Runtime

The amount of RAM (128MB) required to run a completed Forms application depends on several factors: the mode in which it will be deployed (we/3-tier or client-server), and the size and complexity of the application itself.

(2) Related Software

(a) Database Server

Forms Developer is designed to be used with one of the following Oracle database servers:

(1) Oracle9 (9.0.5 or 9.0.6)

(2) Oracle9*i* (9.1.5 or 9.1.6)

The server also requires Net9 for Windows. You can use Personal Oracle for Windows or Personal Oracle Lite as your server. For the most robust support, however, Oracle9 or 9i is recommended. You can use a non-Oracle database server (through ODBC) if it provides equivalent function.

Oracle Reports Developer Release 6i for Window NT

Hardware and Software Requirements

(1) Reports Developer

(a) Hardware

Reports Developer is designed to be installed and run on an IBM or 100% compatible PC with a Pentium processor or better. A CD-ROM drive functioning as a logical drive is also required for the installation process. For information on monitor, printer, and mouse requirements.

(b) Operating System

This version of Reports Developer requires Microsoft Windows. Specifically, one of the following versions:

(1) Windows 95 (any version)

(2) Windows 98 (any version)

(3) Windows NT 4.0 (Service Pack 5 or later)

(c) RAM for Design Time

To provides adequate space for installing and using the design/compile portions of the Reports Developer product, we suggest 128 of RAM. (You might find that your project works well with less.)

(d) RAM for Runtime

The amount of RAM required to run a completed Report application depends on the following factors:

(1) The mode in which it will be deployed (web/3-tier or client-server)

(2) The size and complexity of the report itself

(2) Related Software

We may want to run the software described in this section on the same machine or off of a server running on another machine.

(a) Database Server

Reports Developer is designed to be used with one of the following Oracle database servers:

(1) Oracle9 (9.0.5 or 9.0.6)

(2) Oracle9i (9.1.5 or 9.1.6)

Using the server also requires Net8 for Windows. You can also use Personal Oracle for Windows or Personal Oracle Lite as your server. For the most robust support, however, Oracle9 or Oracle9i is recommended. You can also use a non-Oracle ODBC database server if it provides the equivalent functions.

Oracle9i Database Release 1 (9.0.1.1.1)

The Oracle9i Database top-level component consists of the following installation types:

(1) Enterprise Edition

The system requirements for Enterprise Edition, Standard Edition, and Personal Edition are described in Table 3.2. The requirements for Custom depend upon the components selected for installation below.

Table 3.2. The Requirements for Custom Depending on the Components Selected for Installation.

Requirement	Enterprise Edition
Operating System	Windows NT 4.0, Windows 2000
WindowsNT 4.0 Service Pack	Certified with 5.0 or higher
Windows NT Service Pack	Not required; certified wit 1 or higher
Minimal Processor	Pentium 166 or Pentium 200
Recommended Processor	Pentium 233 or Pentium 266
RAM	128 MB (256 MB recommended)
FAT file system: - Oracle home drive - System drive	 – 4.5 MB – 140 MB
NTFS file system: - Oracle home drive - System drive	 – 2.75 GB – 140 MB
Temp Space	400 MB
Virtual Memory	Initial Size 200 MB
Video	256 Color

All kinds of hardware and software, which are used for YC are installed for the routine operation of the company. The specification is shown below:

3.3.1 Hardware Requirements

(1) Computer server 1 set.

(a) CPU Intel Pentium III 1 GHz.

(b) Hard Disk 20 GB.

(c) Diskette Drive, 1.44MB/Boot.

(d) SD ROM 256 MB.

(e) Keyboard and mouse.

(f) Monitor 15" Super VGA Color-digital.

(2) Workstation 3 sets.

(a) CPU Intel Pentium III 733 MHz.

(b) Hard Disk 10 GB.

(c) Diskette Drive, 1.44MB/Boot.

(d) SD ROM Drive.

(e) Keyboard and mouse.

(f) Monitor 15" Super VGA Color-digital.

(3) Printer.

(a) Dot-Matriz Printer (Epson LQ2180I, 24pin)

(b) Inkjet HP1200.

(4) UPS (Uninterruptable Power Supply) 1 KVA 1 set.

(5) Network Interface.

(a) UPT Cable CAT-5.

(b) Lanbit Multi Switching (Hub) 12 ports.

(c) Ethernet LAN card 10/100 Mbps.

3.3.2 Software Requirements

The software requirement can be summarized as follows:

(1) Network operation system.

(a) Microsoft Window NT Version 4.0 server.

(2) Operation system.

(a) Microsoft Window 98.

(3) System development software.

(a) Microsoft Office 97.

(b) Oracle 9*i*.

(c) Mcafee Scan for Virus.

Figure 3.4 Show the Hardware Configuration of Accounting Receivable Department.

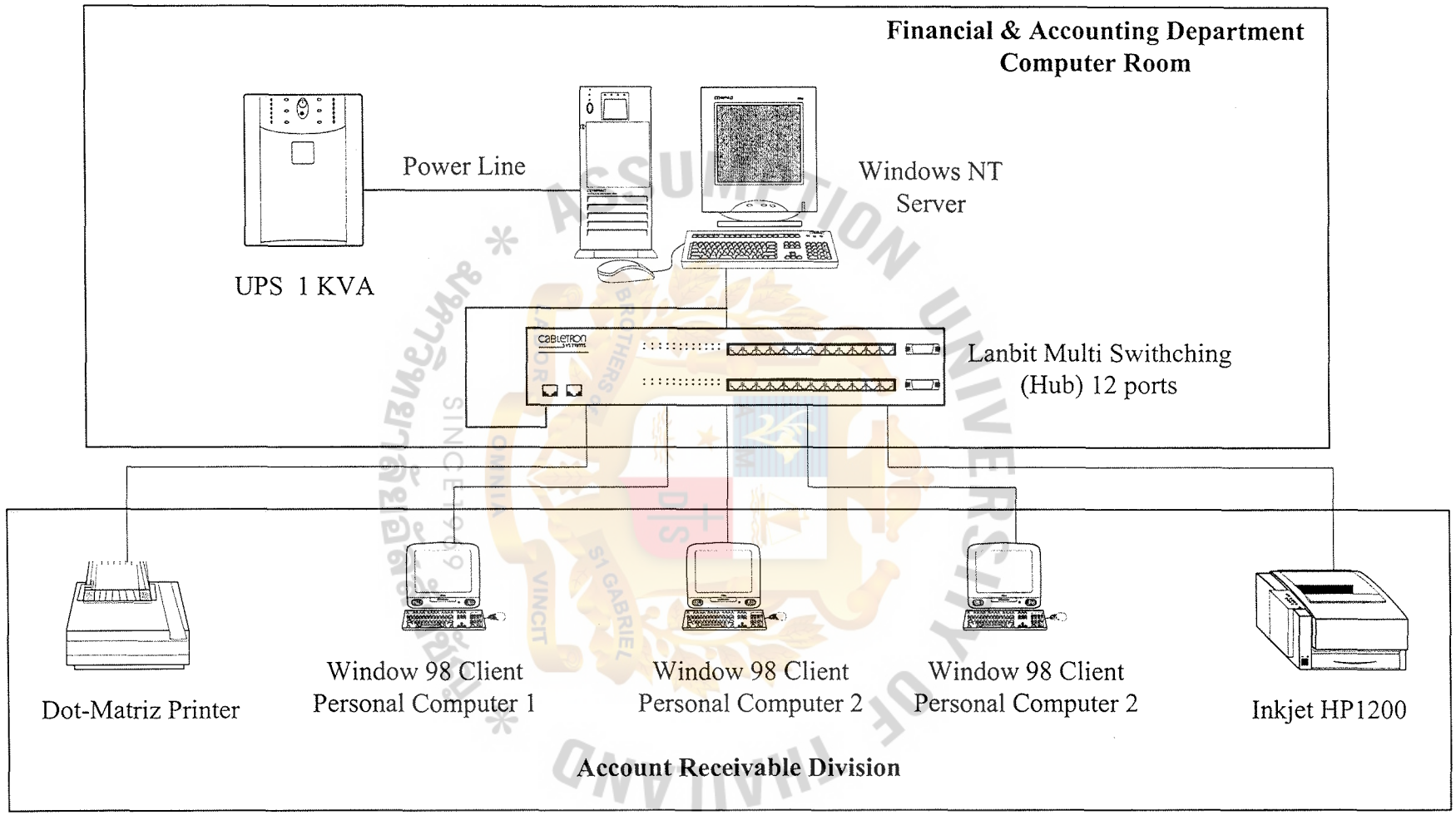


Figure 3.4. Hardware Configuration of Account Receivable System.

3.4 System Security and Control

One of the most important considerations in the development of system operation is security. Since a user-friendly program is created, anyone can access the program if needed. Therefore, to keep the accuracy of data, management team needs to be extremely careful at this point. The security strategies are listed below:

3.4.1 Backup Data Periodically

All data are backed up in diskettes at the end of a week in order to prevent the damage in the hard disk and kept the backup diskette separately in a secure place.

3.4.2 User Authentication

The user ID and passwords are assigned to authorized persons. When a user logs on, the system asks for both a user ID and a password.

3.4.3 Passwords Must Be Changed Periodically

Password must be specified by only authorized user and nobody can know the other's password. Passwords must be changed every 90 days.

3.4.4 Using UPS

The failure of the main electricity supply causes interruption to the function of the computer facility or telecommunication network. UPS (Uninterrupted Power Supply) is used to supply power in case of main electricity shut down.

3.4.5 Virus Checking

A virus-checking program will be installed for scanning virus before running any program. Service information system will update the virus-checking program every 6 months.

3.5 Cost and Benefit Analysis

3.5.1 Cost Analysis

Cost-benefit analysis is a measure of the cost-effectiveness of a project. Costs fall into two categories. There are costs associated with developing the system and there are costs associated with operating a system.

The information of The Development Cost and Operation Cost is shown in Appendix B.

3.5.2 Benefit Analysis

Benefits are classified as tangible and intangible. Tangible benefits are those that can easily be quantified. It is usually measured in terms of monthly or annual savings or of profits to the firm. Some examples of tangible benefits are fewer processing errors; increased throughput; decreased responses time; elimination of job steps; reduced expenses; and reduced credit losses. But intangible benefits are those benefits believed to be difficult or impossible to quantify. Unless these benefits are at least identified, it is entirely possible that many projects would not be feasible. Example of intangible benefits is improved customer goodwill; improved employ morale; better service to community; and better decision making.

The information of The Tangible Benefits and Intangible Benefits is shown in Appendix B.

3.5.3 Break Even Point

The principle objective of the comparison between costs and benefit is to evaluate the break-even point representing the time when the benefit is equal to the investment cost. One concept that should be applied to estimate the break-even point is the adjustment of costs and benefits to reflect the time value of money.

Time value of money concept is a baht today is worth more than a baht one year from now. Some of the costs of a system will be accrued after implementation. Additionally, all benefits of the new system will be accrued in the future before cost benefit analysis, these costs should be brought back to current baht.

For the new proposed system, the hardware and software cost will be amortized into 5 years, therefore, the cost will be equally through to year 5. The implement cost, in the first year, is numerous amounts due to installation of both the hardware and software. All costs will be increased 5% every year.

The benefit, the second candidate approximately 282,000 Baht, normally involves labor savings and operating cost saving.

The cost comparison of the existing system and the proposed system and the break even analysis chart is shown in Appendix B.

3.5.4 Payback Analysis

The payback period is determined from how much time will lapse before accrued benefits overtake accrued and continuing cost. Because systems development costs are incurred long before benefits begin to accrue, it will take some time period for the benefits to overtake the costs. After implementation, you will incur additional operating expenses that must be recovered. The payback period formula is shown below:

Number of years to pay back $=$

$$\frac{\text{Original investment}}{\text{Annual net cash inflow}}$$

or

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

Where: I = investment cost or capital expenditure

T = corporation tax rate in percent

R = average annual return on investment

to find average annual return on investment

Average annual return on investment = Total sales – Annual cost

The payback period of the second candidate system is 2.8 years. It will take about 2.8 years to pay back the initial investment. Payback period calculation will be shown in Appendix B.

3.5.5 Net Present Value (NPV)

Net present value is a sophisticated capital budgeting technique, which is calculated by subtracting the project's initial investment from the present value of cash inflows discounted at a rate to the firm's cost of capital. The formula for net present value is

Net Present Value = Present value of expected cash flows – Initial investment cost

or

$$NPV = R/(1+L)^1+\ldots+R/(1+K)^n-I$$

When NPV = Net Present Value

I = Investment

R = Annual saving realized by investment

K = Interest Rate

N = Number of years saving available

The net present value calculation will be shown in Appendix B.

If NPV is more than zero, the project should be accepted. If NPV is less than zero, the project should be rejected. After the net present value calculation, it is positively valued at 166,928.06 Baht and therefore, the second candidate system should be accepted.

IV. PROJECT IMPLEMENTATION

The implementation begins after the management has accepted the new system. It consists of the installment of the new system and the removal of the current system. It involves hardware (machine), software (computer program, procedure forms) and peopleware (personnel). Implementation plan includes all steps to convert from the existing system to the new system.

4.1 System Analysis

The system analysis period will include 3 major activities:

4.1.1 Survey and Plan the Project

This activity covers finding problems with the existing system and planning the scope of the project to solve the problems.

4.1.2 Study and Analyze the Current System

This is the activity that gives the project team a thorough understanding of the current system. It offers a closer look at the problem with the existing system.

4.1.3 Define User Requirements:

After the current system is examined thoroughly, the requirements of the proposed system will be developed.

The requirements cover 4 areas:

(1) Data

(2) Process

(3) Interface

(4) Geography of the proposed system.

4.2 System Design

Activities included in the system design period are:

4.2.1 Cost/benefit Analysis

This activity is to find out that it is worth to build the proposed system. The cost of developing and maintaining the proposed system will be found out, and this cost will be used to weigh against benefits derived from putting the proposed system into use. Possible solution can be provided to find the solution that occurs the best benefits.

4.2.2 Hardware and Software Requirements

This is to specify the hardware and software specifications required for the new system. It is the architecture of the proposed system. The hardware and software requirements will be used as the guidelines for acquiring the new hardware and software for the proposed system.

4.2.3 Process Modeling

This is to model the processes of the system. The process modeling gives a logical data flow diagram. The logical data flow diagram presents how processes are performed without technical details.

4.2.4 Data Modeling

Data Modeling is to create an Entity Relationship Diagram, which will be used to construct the database of the proposed system. It shows data that needs to be collected by the proposed system.

4.2.5 Data Dictionary

The data dictionary is developing along with Process Modeling and Data Modeling to assure that the project team members have a common understanding of the data in the system. This is because each system has its own technical team, which should be clarified for project team member's common understanding.

4.2.6 Structure Chart

This activity is to give the guidelines of the programming part of the system. It specifies each process in term of modules; each module has its own function, input and output.

4.2.7 Input and Output Design

This is to model the interface of the proposed system. It shows how the proposed system will interact with users. It also shows what output the system will produce. This activity is useful in checking whether the system suits the requirements of users.

4.2.8 Security and Control

System security and control should be developed to control access into the system and to prevent unauthorized updates of any data in the system. The control is also provided to check if the user has input the correct data into the system.

4.3 System Implementation

System implementation's activities are:

4.3.1 Construct the New System

After the system has been designed, the design blueprint will be constructed accordingly. All the system components; data, interface, process, geography will be created. All types of modeling or prototypes will be developed into the system that operates.

4.3.2 Conduct System Test

After system construction, a system test will be conducted to see if the system operates according to the requirements or not. Users will be given a chance to test the system interface and see how the system operates. Test data is put into the system to test if it is able to produce the required output.

4.3.3 Train Users

If the system has passed the system test, it will be ready to go into operation. So user will be trained to use the system. The training will be offered separately according to their different aspects of system usage.

4.3.4 System Conversion:

This activity is to convert the data in the existing system to the new system. The data available in paper format will be changed to the electronic format. The hardware and software required will be installed. This activity makes the system ready to be used in the real operation.

4.3.5 Operation System and Maintenance

The proposed system will be put into real operation during this activity. The maintenance of the production system will be started. However, a help desk should be provided in case users have problem using the system.

4.3.6 Documentation

This is the activity that will run through all the phases of the system. Documentation is started when the system analysis starts. This is to keep track of all the documents produced in all the phases for the future reference.

System implementation is the construction of the new system and the delivery of that system into production (day-to-day operation). The purpose of system implementation is:

(1) To build and test a functional system that fulfills business and design.

(2) To implement the interfaces between the new system and existing accounting receivable system.

The system implementation consists of many activities that are defined as:

(1) Net work testing

This project must install new network, LAN (Local Area Network), which must normally be implemented before building and testing databases and installing computer programs that will use this network.

The following steps are implemented to complete this activity.

(a) Review the network design requirements outlined into the technical design statement developed during systems design.

(b) Construct and test new network (Window 2000).

(c) Revise network specifications for future reference.

(2) Database testing

This task must immediately precede other programming activities. Databases are the resources shared by the computer programs to be written Oracle Version O9*i*1 is used in this project for database design.

The following steps are implemented to complete this activity.

(a) Review the technical design statement for database design requirements.

(b) Locate production database that may contain representative data for testing database tables.

(c) Build database per design specifications.

(d) Revise databases schema and store as necessary for future reference.

(3) Program testing

Program testing should be deferred until after the entire program has been written. The following steps are implemented to complete this activity.

(a) Review the design specifications.

(b) Formulate the project team and assign responsibilities.

(c) Write and document programs and perform unit testing.

(d) Review program document for quality standards.

(e) Conduct system testing to ensure all programs work properly. If the programs do not work correctly, continue testing until they operate correctly and properly.

(f) Update the project repository with revised program documentation for future referencing.

(g) Place the new programs and reusable components in the software library.

4.4 Conversion Plan

Once a successful system test has been completed, we can begin preparations to place the new system into operation. This plan will identify database to be installed, end user training and documentation that need to be developed, and a strategy for converting from the old system to the new system.

For this system, Parallel conversion is used. Under this approach, both the old and new systems are operated for some time period. This is done to ensure that all major problems in the new system have been solved before the old system is discarded. This strategy minimizes the risk of major flows in the new system causing irreparable harm to the business; however, it also means the cost of running two systems over some period must be incurred. Parallel conversion is suitable for the change from the manual system to the computerized system, although it increases the cost of running two systems over some period and consumes more time with double workload of employees. When employees can run the new system smoothly and all major problem can be solved, the double workloads will be reduced.

4.5 Training

Change may be good, but it is not always easy. Converting to a new system necessitates that system users be trained and provided with documentation that guides them through using the new system. The purpose of this training is to provide training and documentation to system users to prepare them for a smooth transition to the new system. Group training is used because it is a better use of time and it encourages group learning possibilities.

V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The study of this project is to analyze, design and implement the information system for YC Company Limited. During the analysis of the existing system, some problems are found. A large amount of transactions occur each day. The process of daily transactions seems to be busy and difficult in the manual operation.

The manual system will fail to implement the information when the company expands in the future. The volume of information will be increased. The company will want the information to be managed efficiently. The manual system will not be able to support these features. If the company still uses the manual system, the result will be a greater cost and defectives and, at last, lead to failure.

Therefore, the computerized system has been designed to solve these problems including others, which may occur in the future. It offers more efficient way by changing the paper format into the computer format. The system provides a more productive way of preparing several types of reports with less time required. The system also makes the expense tracking for each individual information request easier and more effective. Moreover, the system provides management information system reports, not available in the current system, to assist management decision-making. The proposed system is able to operate on the existing computer configuration with some additional hardware and software.

In addition, the proposed system that is Accounting Receivable System helps the users handle their work more efficiently and professionally and helps to achieve the division's goal as being the information source for the whole organization.

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

Process	Existing System	Proposed System
Input record Customer, Bank information	25 mins	10 mins
Generate Order	20 mins	10 mins
Generate Invoice, Credit_note Invoice	25 mins	10 mins
Generate Receipt Invoice, Tax Invoice, Withholding Tax Information	25 mins	10 mins
Generate Report	30 mins	5 mins

This proposed system also achieves the solution that increases revenue because it provides the effective performance. The process of input record customer, bank information, saves at least 15 minutes. Process generate order will be reduced from 20 minutes to 10 minutes and process generate invoice, credit_note invoice, generate invoice, receive payment and generate report reduced from 25 minutes to 10 minutes In addition, the process of generate report can reduce from 30 minutes to 5 minutes. The user can key input data to the proposed system, which has the computer system to generate the document for user and database to save the data. When user wants to search the data, he can query and generate report from the proposed system so the proposed system will use less time than the existing system.

5.2 Commendations

The proposed system is the first step towards computerization. The computerized system can be easily modified for further expansion or to develop further according to user's requirement.

There are still opportunities to further develop the Accounting Receivable System to increase its efficiency and to fully support the work of organization. The scope of the system can be expanded in 2 major areas:

(1) Reporting Process:

With Internet technology, the scope of the system on the information reporting can be expanded to offer clients direct contact to the system by accessing the Accounting Receivable System via the Internet to retrieve the report and to search for information that they are interested in. However, this expansion should be developed with full system security.

(2) Storing other useful information:

The proposed system can be applied to store other useful information in order to make the system more comprehensive in providing every kind of information for every kind of work. However, the network and database server are suggested to expand to handle the work properly.

APPENDIX A

DATA FLOW DIAGRAM LEVEL 2 AND 3

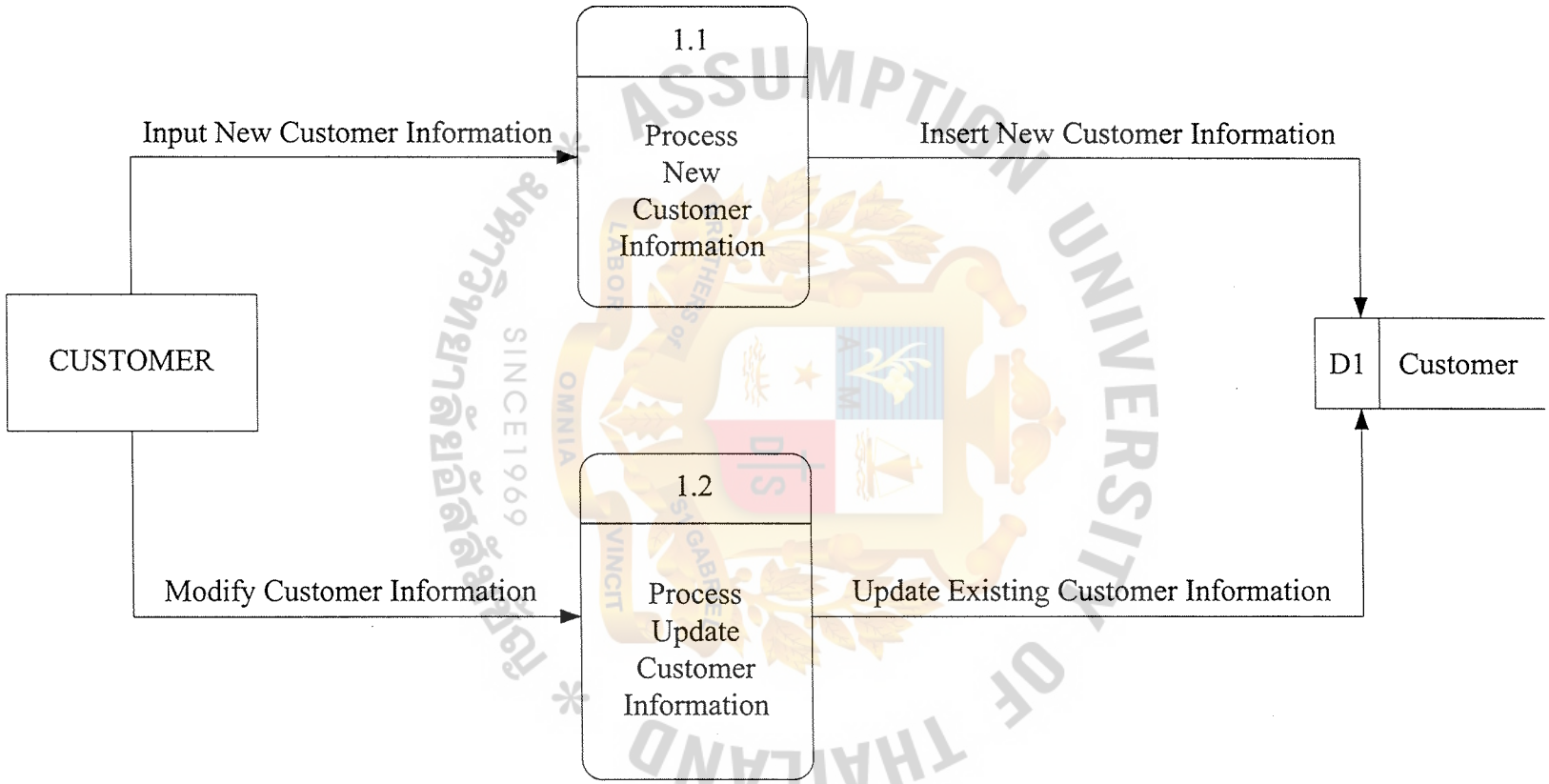


Figure A.1. The Data Flow Diagram Level 2 (1. Customer).

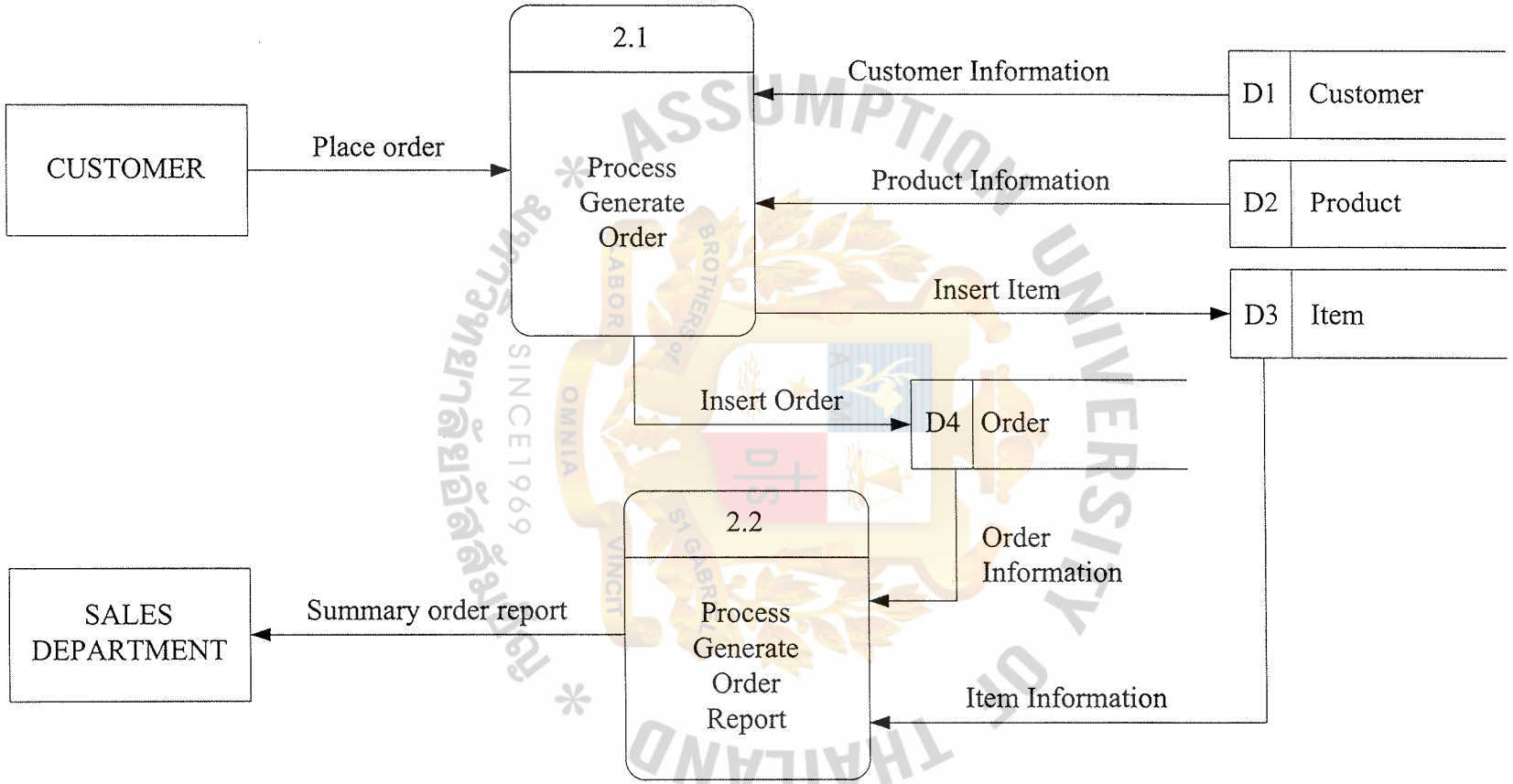


Figure A.2. The Data Flow Diagram Level 2 (2. Order).

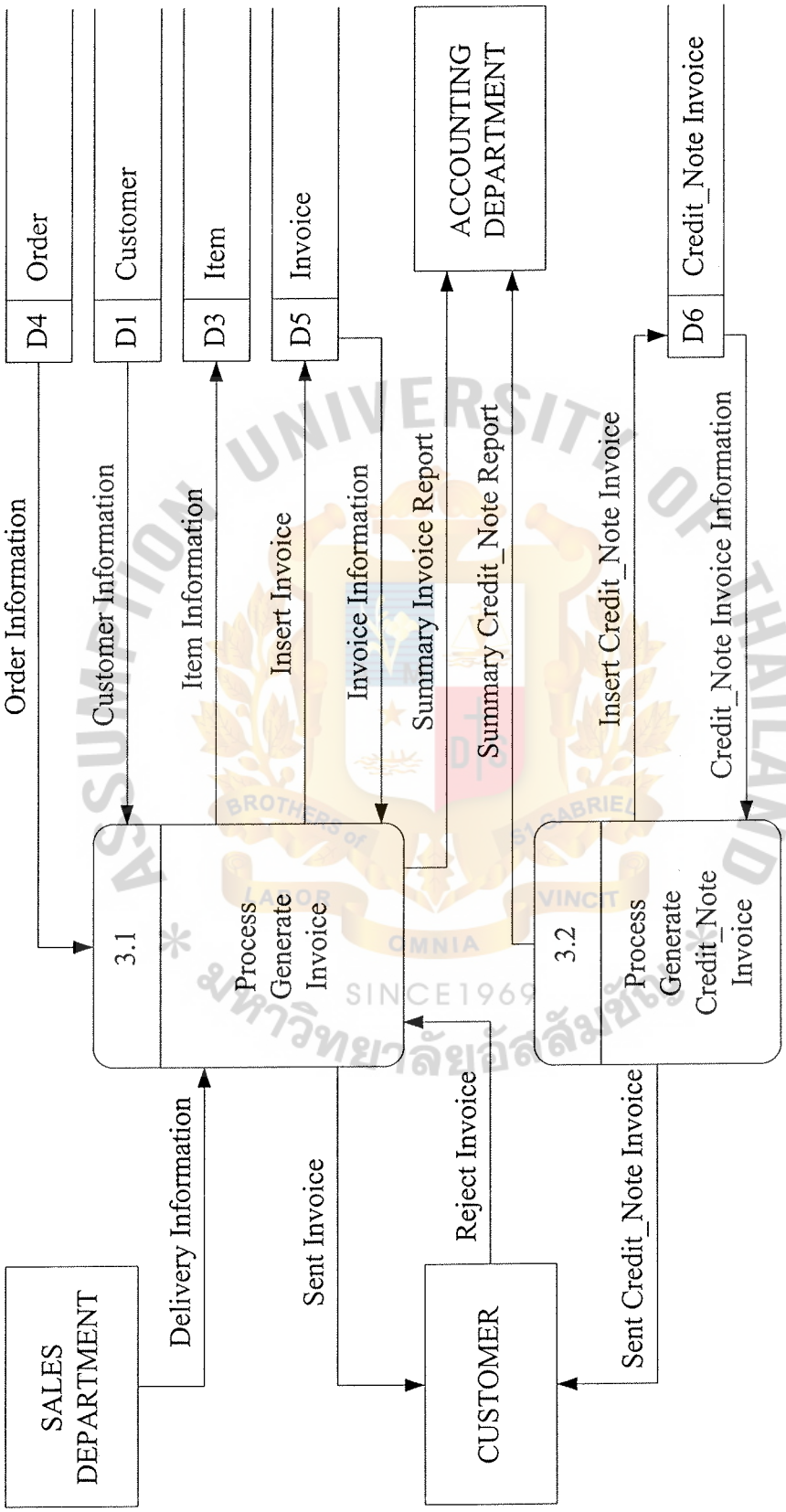


Figure A.3. The Data Flow Diagram Level 2 (3. Invoice and Credit_Note Invoice).

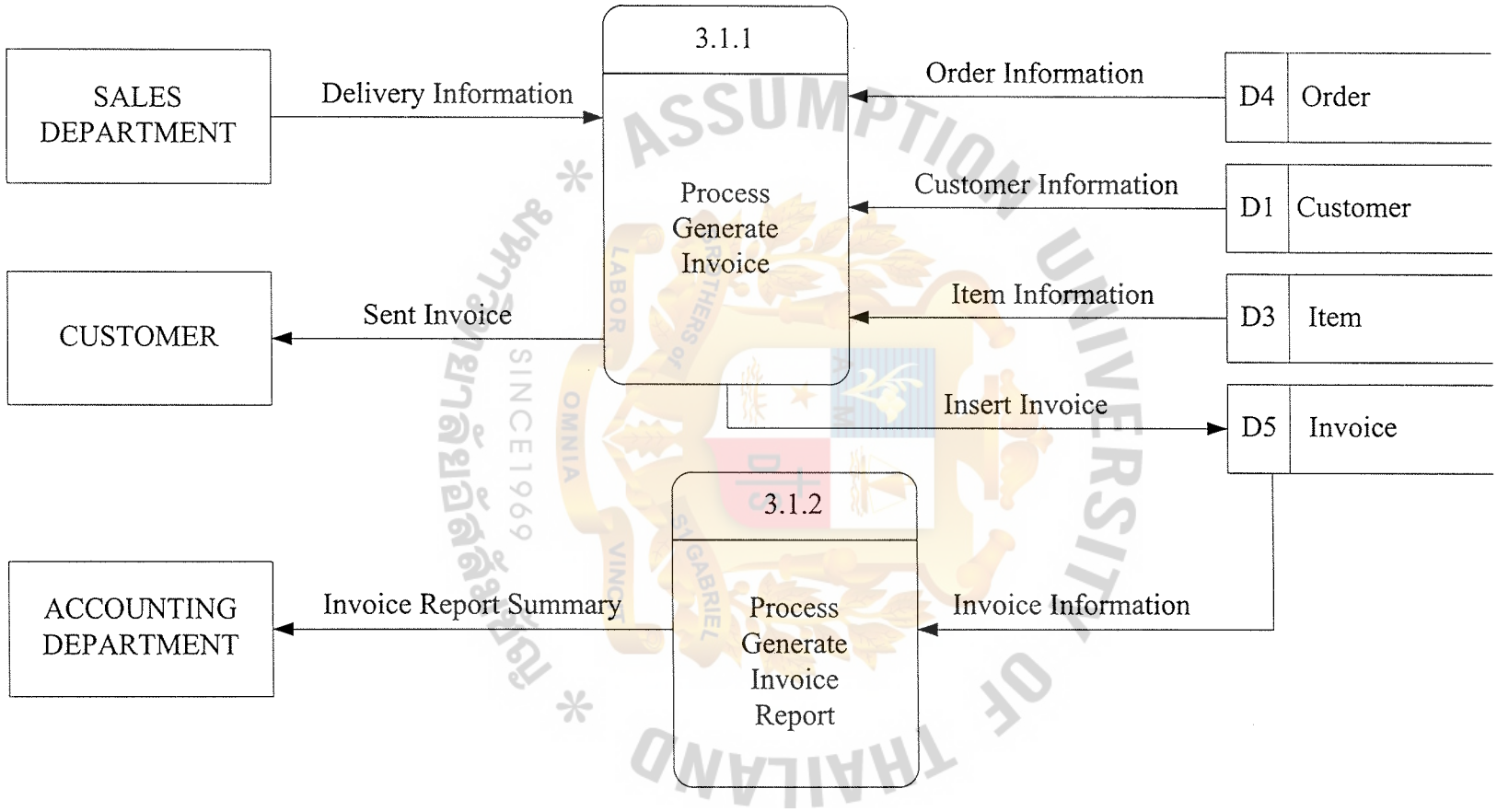


Figure A.4. The Data Flow Diagram Level 3 (3.1. Invoice).

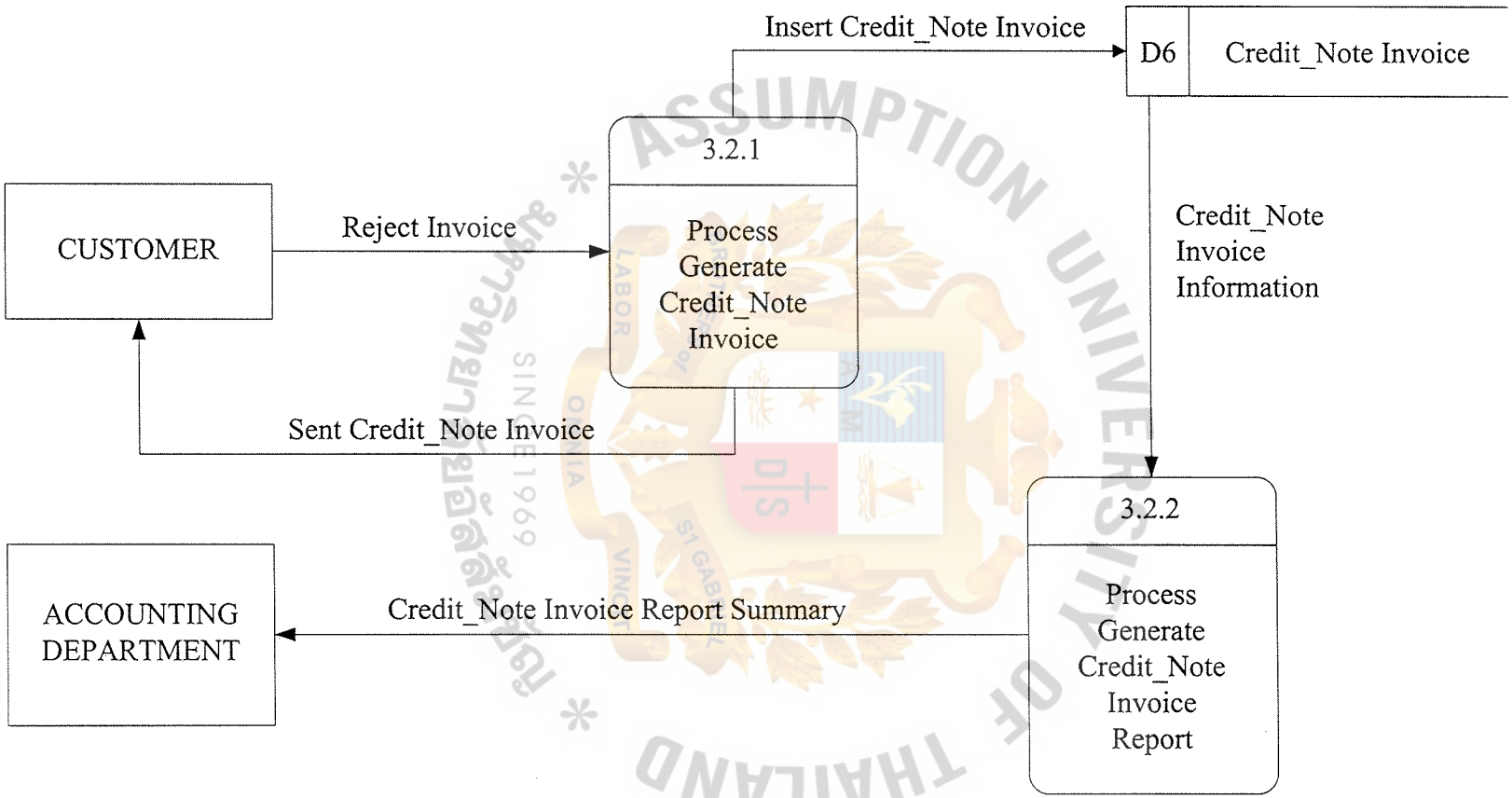


Figure A.5. The Data Flow Diagram Level 3 (3.2. Credit_Note Invoice).

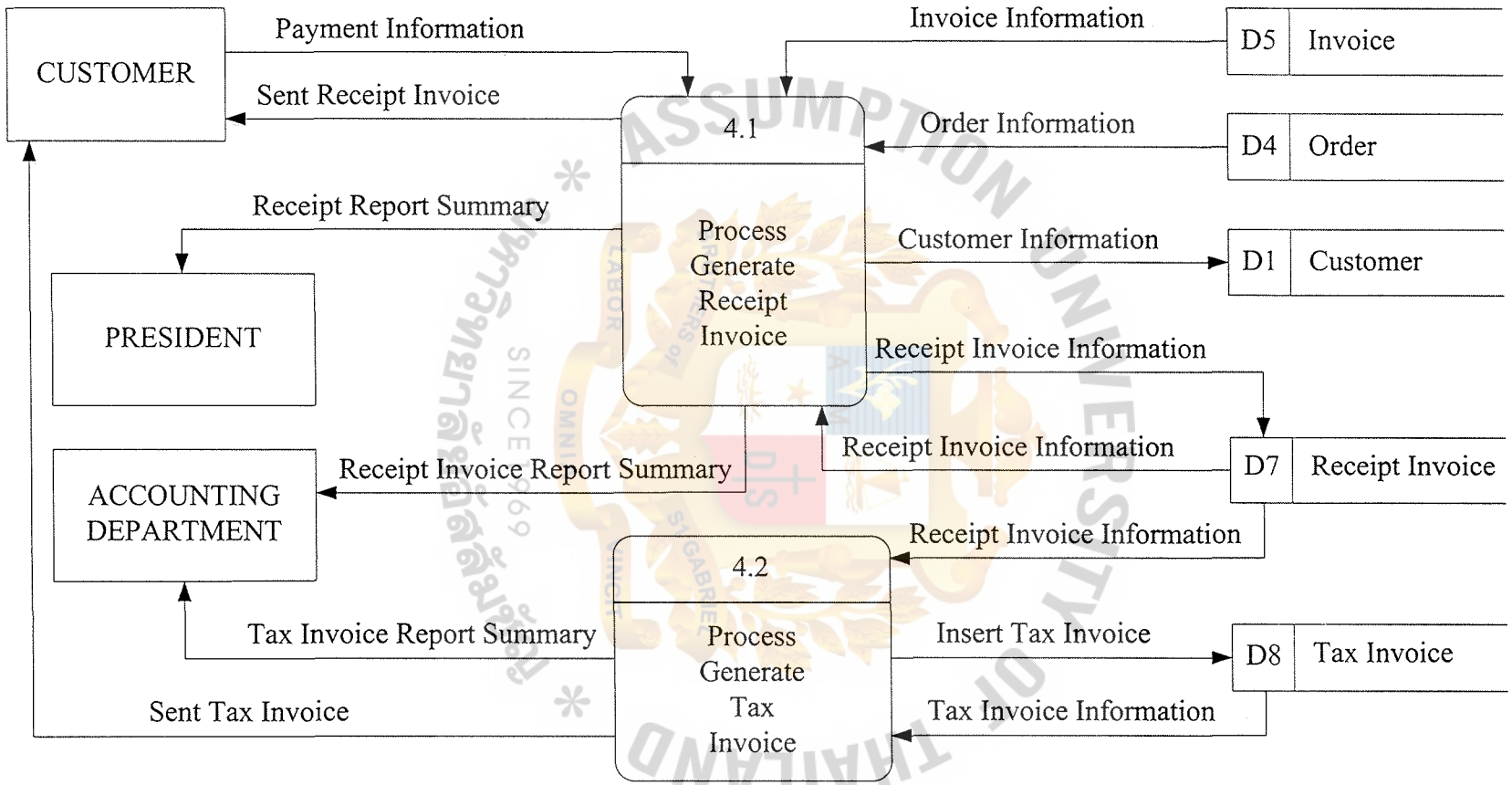


Figure A.6. The Data Flow Diagram Level 2 (4. Receipt and Tax Invoice).

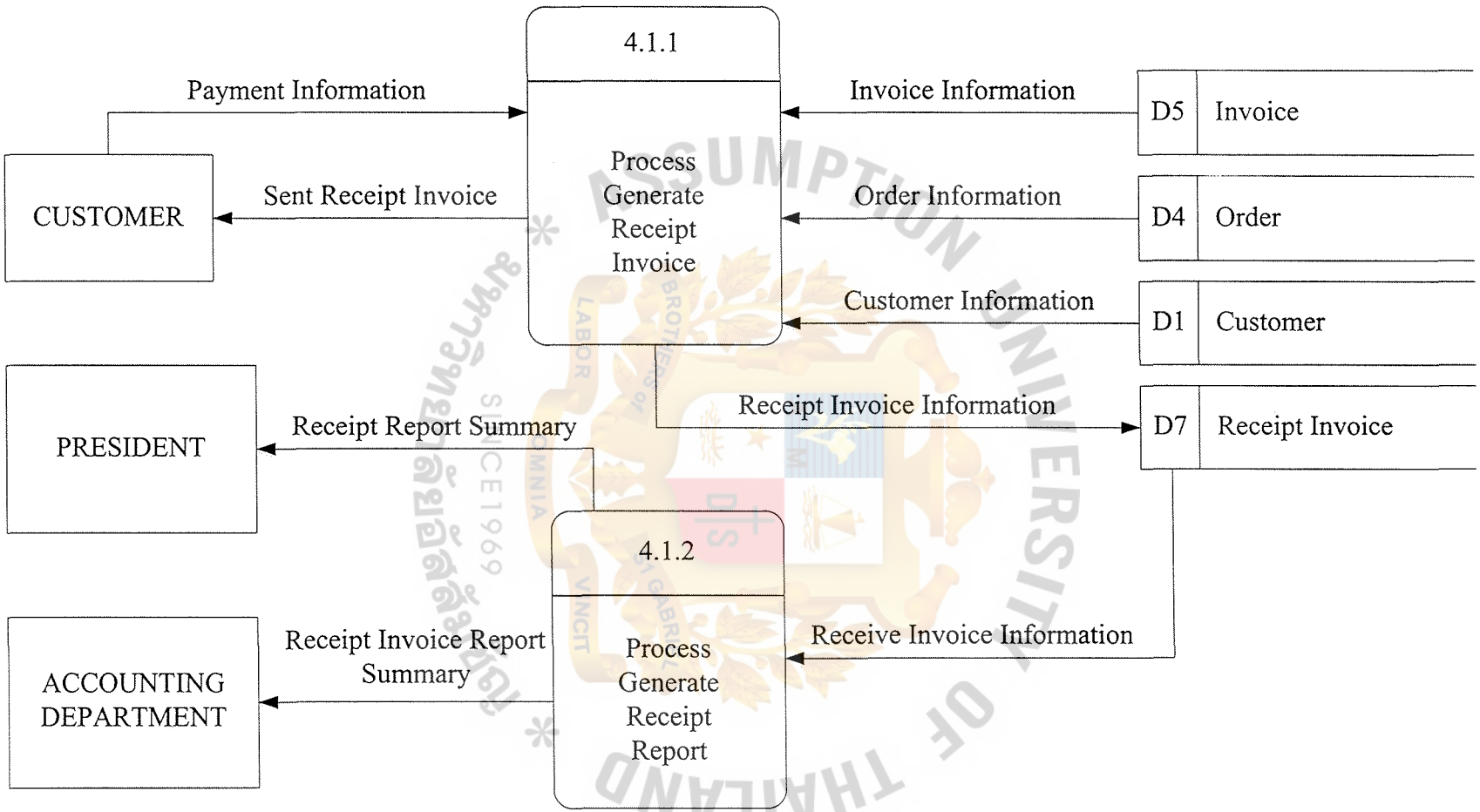


Figure A.7. The Data Flow Diagram Level 3 (4.1. Receipt Invoice).

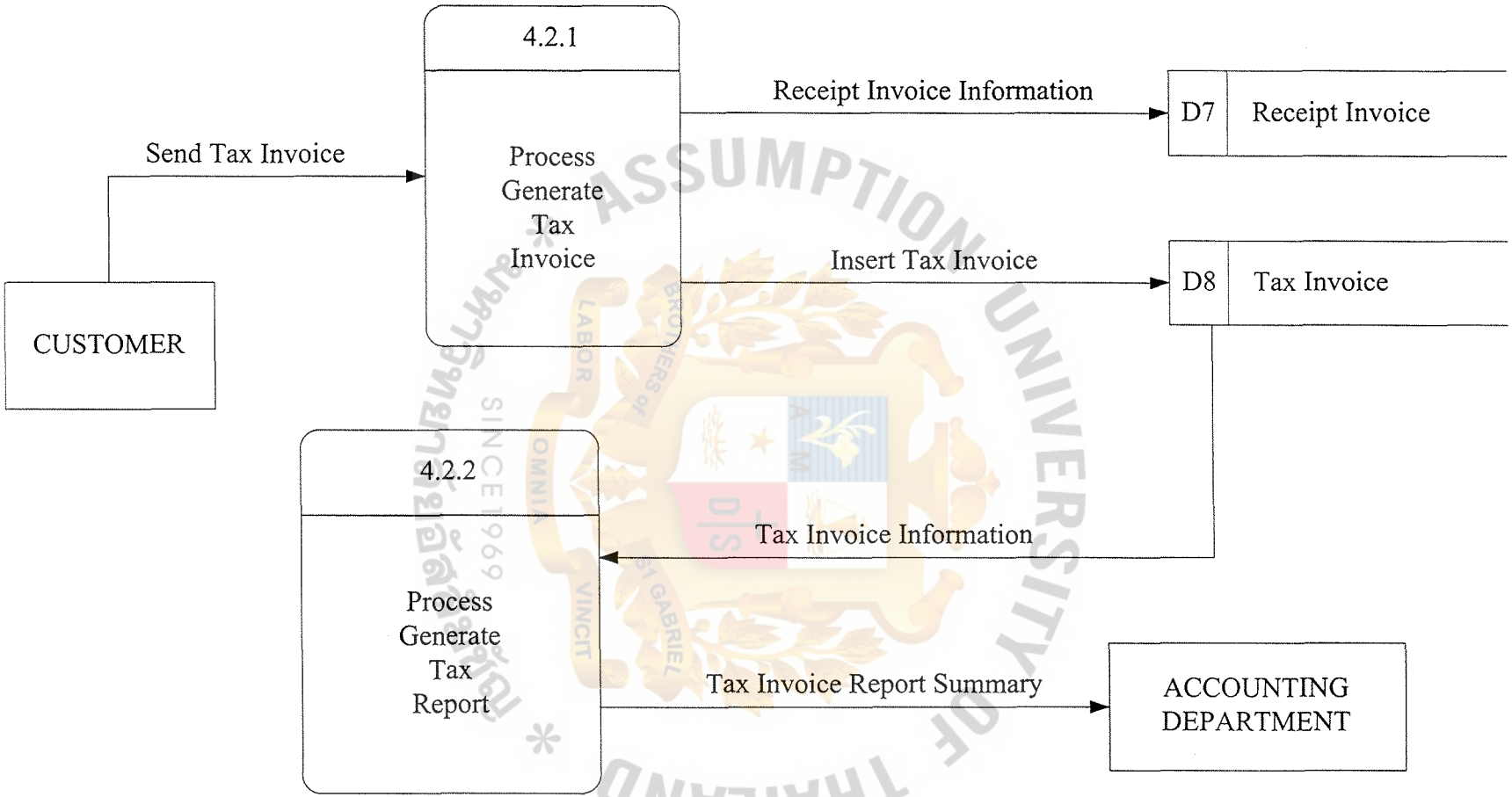


Figure A.8. The Data Flow Diagram Level 3 (4.2. Tax Invoice).

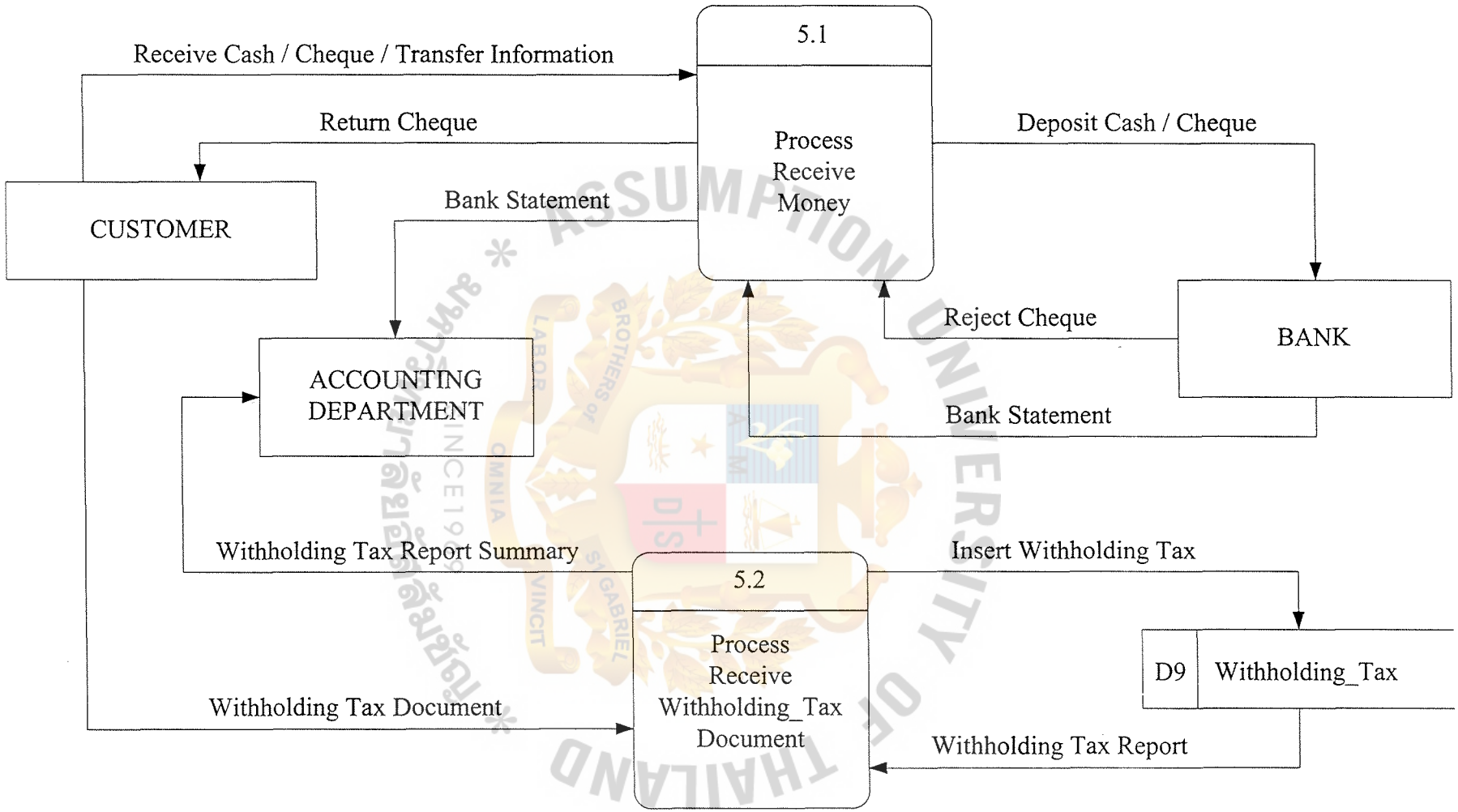


Figure A.9. The Data Flow Diagram Level 2 (5. Receive Money and Withholding Tax).

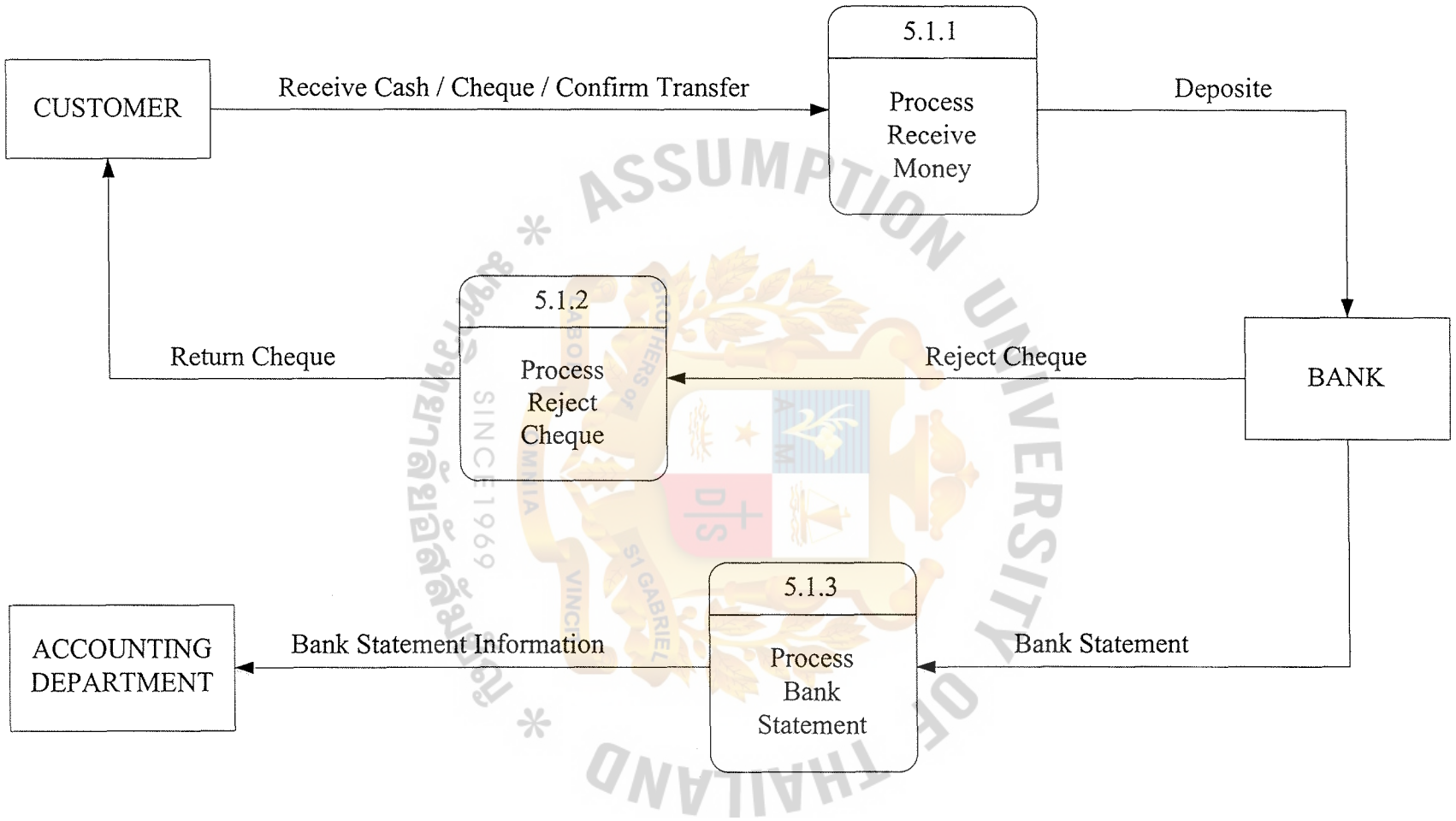


Figure A.10. The Data Flow Diagram Level 3 (5.1. Receive Money).

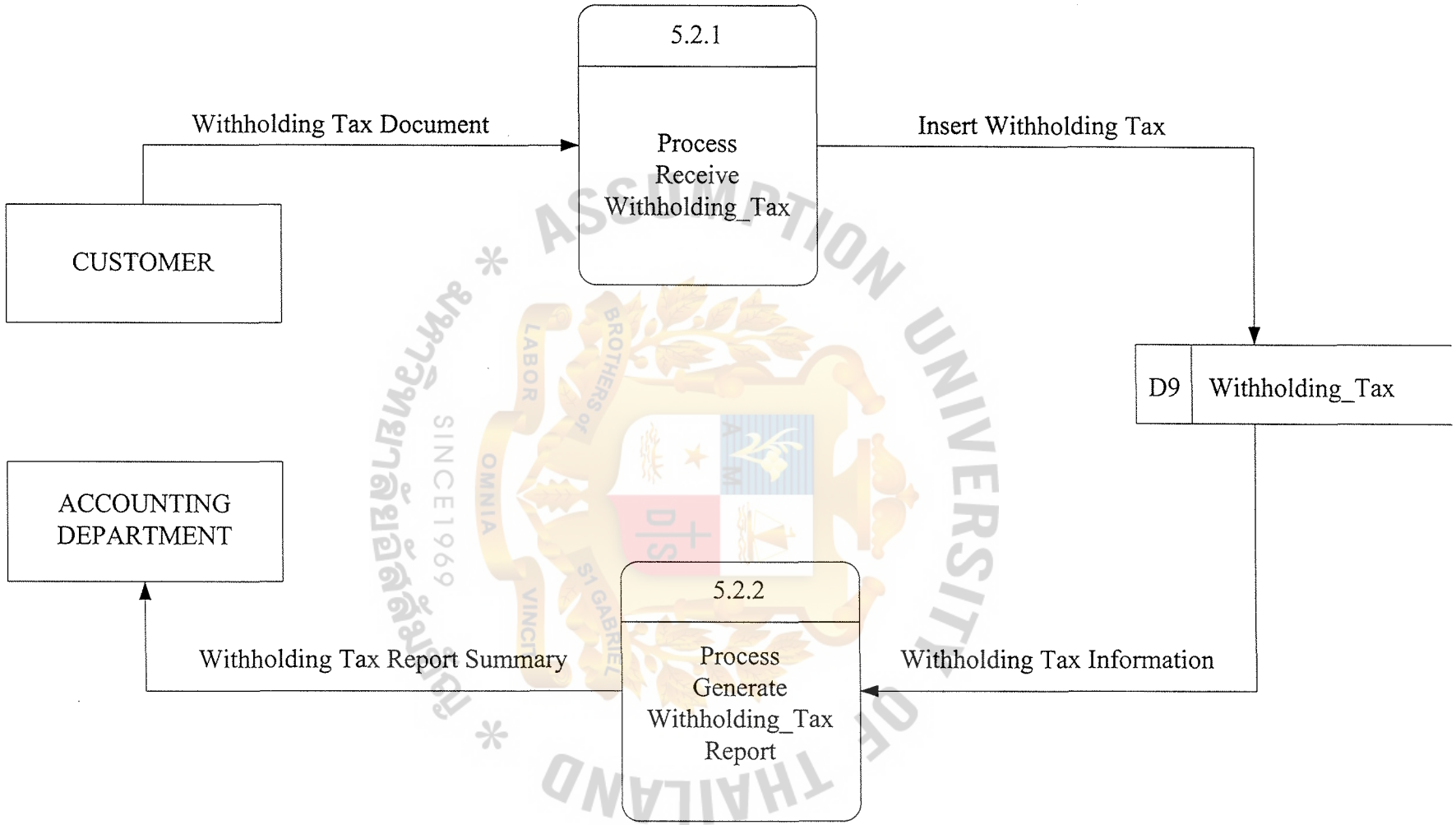


Figure A.11. The Data Flow Diagram Level 3 (5.2. Receive Withholding Tax).

APPENDIX B

THE CANDIDATE OF THE NEW SYSTEM

Table B.1. Candidate System Matrix

Characteristic	Candidate 1	Candidate 2	Candidate 3
Portion of System Computerized Brief description of that portion of the system that world be computerized in this candidate.	COTS package will be purchased and customized to meet business requirement.	Application Programs will be developed by our own developers.	Same as Candidate 1.
Benefits This system will give overall improvement to our manufacture's activities.	This solution can be easily implemented by may not fully support our operation.	This solution can completely fulfill our requirements less risk, easier and better maintenance.	This solution can completely fulfill our requirements but more difficult to maintenance.
Servers & Workstation Servers and workstation are needed to support all these candidates.	Technically Architecture Pentium III Ms Window NT server.	Same as Candidate 1.	Same as Candidate 2.
Software Tools Needed Software tools need to design and create all these system	Ms Visual Basic 6.0 System Architecture 2000 Ms SQL server	Oracle Developer 2000 (form and report) Oracle 9*i* Server	SAP DB2
Application Software Software will be purchased, created, accessed or same combination of these.	Package solution.	Customer Solution.	Same as Candidate 2.
Method of Data Processing This data will be processed in different way such as on-line, batch and real-time.	Peer to Peer.	Client / Server.	Same as Candidate 2.
Output Devices and Implication Output devices will be used different technologies (e.g. network, preprinted form etc.).	- Dot Matrix Printer (NEC Pinwriter P9300). - Samsung ML-1450 Inkjet.	- Dot Matrix Printer (Epson LQ2180I, 24pin) - Inkjet HP1200	Same as Candidate 2.
Input Devices and Implication Input method is used to input the data.	Keyboard Mouse Internal Modem.	Same as Candidate 1.	Same as Candidate 2.
Storage Devices and Implications For stored data, which storage media world e used stored data, and how data would be organized.	- Ms SQL Server - DBMS with 20 GB arrayed capability	- Oracle Application Server (Oracle AS) with 20 GB arrayed capability	- SAP 4.6 C with 20 GB arrayed capability

Table B.2. Feasibility Analysis Matrix

Feasibility	WT	Candidate 1	Candidate 2	Candidate 3
Operational Feasibility Functionality: It describes the degree of benefit to the organizations as well as the system. Political: This will be the description of efficient performance to user management, users and organization.	35%	It may not be fully support the business requirement and the system has to be resigned. SCORE : 65	Fully supports users requirement and its functionality and potentiality. SCORE : 90	Same as Candidate 2. SCORE : 90
Technical Feasibility Technology: It needs to access the maturity, availability and desirability of computer technology. Expert: This system needs technical experts to develop, operate, assist, and maintain the system.	30%	Current application program must be upgraded frequently to higher version. Required training Ms Visual Basic 6.0 in order to enhance user's expertise SCORE : 70	Oracle 9*i* Server is better to support and manage the operational information and manage the operational information and massive data than Ms SQL is. SCORE : 95	SAP is good in Logistic and can easy to insert configuration technology. Use to automate and extend in any business process. SCORE : 90
Economical Feasibility Cost to develop: Payback period (discount): Net present value:	25%	Approximate 582,500 B. Approximately 3.1 years 29,018.56 B. SCORE : 95	Approximate 800,500 B. Approximately 3.1 years 166,928.06 B. SCORE : 90	Approximate 933,500 B. Approximately 4.5 years 257,554.31 B. SCORE : 85
Schedule Feasibility How long it will take to design and implement the system	10%	3 months SCORE : 95	4 months SCORE : 85	6-7 months SCORE : 75
Ranking	100%	77	91	87.25

Table B.3. The Development Cost and Operation Cost for the First Candidate, Baht.

Items	Development Cost	Price
1	Hardware Cost	
	Window NT 4.0 Server (1 @ 60,000)	60,000.00
	Personal Computer (4 @ 30,000)	120,000.00
	Inkjet Samsung ML-1450 (1 @ 15,000)	15,000.00
	Dot-Matrix Printer NEC Pinwriter P9300 (1 @ 40,000)	40,000.00
	Ethernet LAN Card	10,000.00
	Switching Hub	11,000.00
	UTP Cable (100 meters @ 15)	1,500.00
	UPS 30 minutes (1 @ 6,000)	6,000.00
2	Software Cost	
	Microsoft Window NT Version 4.0	20,000.00
	Microsoft Window 98 Operating System	7,000.00
	Microsoft Office 98	19,000.00
	Software Visual Basic, Architecture, Ms SQL server	150,000.00
	Mcafee Scan for Virus	10,000.00
3	Personnel	
	System Analyst (20 hours @ 500 Baht)	10,000.00
	Programmer (40 hours @ 400 Baht)	16,000.00
4	Expense	
	Training Cost	25,000.00
Total Development Costs		530,500.00

Items	Development Cost	Price
1	Personnel	
	Programmer (35 hours @ 400 Baht)	14,000.00
2	Expenses	
	Maintenance Cost	2,000.00
	Preprinted Form (8,000 @ 1.50 Baht)	12,000.00
	Utility Cost (12 Months @ 2,000 Baht)	24,000.00
Total Operating Costs		52,000.00
Total Projected Costs		582,500.00

Table B.4. The Development Cost and Operation Cost for the Second Candidate, Baht.

Items	Development Cost	Price
1	Hardware Cost	
	Window NT 4.0 Server (1 @ 60,000)	60,000.00
	Personal Computer (4 @ 50,000)	200,000.00
	Inkjet HP 1200 (1 @ 20,000)	20,000.00
	Dot-Matrix Printer Epson LQ 2180I (1 @ 30,000)	30,000.00
	Ethernet LAN Card	10,000.00
	Switching Hub	11,000.00
	UTP Cable (100 meters @ 15)	1,500.00
	UPS 30 minutes (1 @ 6,000)	6,000.00
2	Software Cost	
	Microsoft Window NT Version 4.0	20,000.00
	Microsoft Window 98 Operating System	7,000.00
	Microsoft Office 98	19,000.00
	Software Oracle	200,000.00
	Mcafee Scan for Virus	10,000.00
3	Personnel	
	System Analyst (30 hours @ 500 Baht)	15,000.00
	Programmer (90 hours @ 400 Baht)	36,000.00
4	Expense	
	Training Cost	50,000.00
Total Development Costs		695,500.00

Items	Development Cost	Price
1	Personnel	
	Programmer (50 hours @ 400 Baht)	20,000.00
2	Expenses	
	Maintenance Cost	5,000.00
	Preprinted Form (8,000 @ 2.50 Baht)	20,000.00
	Utility Cost (12 Months @ 5,000 Baht)	60,000.00
Total Operating Costs		105,000.00
Total Projected Costs		800,500.00

Table B.5. The Development Cost and Operation Cost for the Third Candidate, Baht.

Items	Development Cost	Price
1	Hardware Cost	
	Window NT 4.0 Server (1 @ 60,000)	60,000.00
	Personal Computer (5 @ 35,000)	175,000.00
	Inkjet HP 1200 (1 @ 20,000)	20,000.00
	Dot-Matrix Printer Epson LQ 2180I (1 @ 30,000)	30,000.00
	Ethernet LAN Card	10,000.00
	Switching Hub	11,000.00
	UTP Cable (100 meters @ 15)	1,500.00
	UPS 30 minutes (1 @ 6,000)	6,000.00
2	Software Cost	
	Microsoft Window NT Version 4.0	20,000.00
	Microsoft Window 98 Operating System	7,000.00
	Microsoft Office 98	19,000.00
	Software DB 2, SAP	300,000.00
	Mcafee Scan for Virus	10,000.00
3	Personnel	
	System Analyst (30 hours @ 600 Baht)	18,000.00
	Programmer (120 hours @ 500 Baht)	60,000.00
4	Expense	
	Training Cost	60,000.00
Total Development Costs		807,500.00

Items	Development Cost	Price
1	Personnel	
	Programmer (50 hours @ 600 Baht)	30,000.00
2	Expenses	
	Maintenance Cost	6,000.00
	Preprinted Form (8,000 @ 3.00 Baht)	24,000.00
	Utility Cost (12 Months @ 5,500 Baht)	66,000.00
Total Operating Costs		126,000.00
Total Projected Costs		933,500.00

Table B.6. Tangible Benefits and Intangible Benefits for the First Candidate, Baht.

Items	Tangible Benefits	Price
1	Reduction of stationary and paper usage (12 @ 2,000 baht/month)	24,000.00
2	Reduction of human labor (1 @ 110,000 baht/month)	110,000.00
3	Reduction of overtime (12 @ 5,000 baht/month)	60,000.00
Total Annual Tangible Benefits		194,000.00

Items	Intangible Benefits
1	Improve customer goodwill by providing efficient service services and fast delivery.
2	Users can work easily and increase speed of finishing daily job.
3	Reduce human errors.
4	The new system operates some tasks instead of using human labor, or Employees can save time to do other tasks and do not work overtime.

Table B.7. Tangible Benefits and Intangible Benefits for the Second Candidate, Baht.

Items	Tangible Benefits	Price
1	Reduction of stationary and paper usage (12 @ 5,000 baht/month)	60,000.00
2	Reduction of human labor (1 @ 138,000 baht/month)	138,000.00
3	Reduction of overtime (12 @ 7,000 baht/month)	84,000.00
Total Annual Tangible Benefits		282,000.00

Items	Intangible Benefits
1	Improve customer goodwill by providing efficient service services and fast delivery.
2	Provide timely, up-to-date and accurate information or decision-making for management team.
3	Reduce redundant process and data. Users can work easily and increase speed of finishing daily job.
4	Reduce human errors.
5	Improve employee morale. The new system operates some tasks instead of using human labor, or Employees can save time to do other tasks and do not work overtime.

Table B.8. Tangible Benefits and Intangible Benefits for the Third Candidate, Baht.

Items	Tangible Benefits	Price
1	Reduction of stationary and paper usage (12 @ 6,500 baht/month)	78,000.00
2	Reduction of human labor (1 @ 140,000 baht/month)	140,000.00
3	Reduction of overtime (12 @ 9,000 baht/month)	108,000.00
Total Annual Tangible Benefits		326,000.00

Items	Intangible Benefits
1	Improve customer goodwill by providing efficient service services and fast delivery.
2	Provide timely, up-to-date and accurate information or decision-making for management team.
3	Reduce redundant process and data. Users can work easily and increase speed of finishing daily job.
4	Reduce human errors.
5	Improve employee morale. The new system operates some tasks instead of using human labor, or Employees can save time to do other tasks and do not work overtime.

Table B.9. Cost Comparison between the Existing System and the First Candidate, Baht.

Items	Years				
	1	2	3	4	5
Existing System Cost					
Staff (increase 5% per year)	900,000.00	945,000.00	992,250.00	1,041,862.50	1,093,955.63
Operating Cost (increase 5% per year)	60,000.00	63,000.00	66,150.00	69,457.50	72,930.38
Utility Cost (increase 5% per year)	50,000.00	52,500.00	55,125.00	57,881.25	60,755.31
Total Cost	1,010,000.00	1,060,500.00	1,113,525.00	1,169,201.25	1,227,661.31
Cumulative Cost	1,010,000.00	2,070,500.00	3,184,025.00	4,353,226.25	5,580,887.56
The First Candidate Cost					
Hardware Cost	52,700.00	52,700.00	52,700.00	52,700.00	52,700.00
Software Cost	41,200.00	41,200.00	41,200.00	41,200.00	41,200.00
Implement Cost	51,000.00	0.00	0.00	0.00	0.00
Staff (increase 5% per year)	820,000.00	861,000.00	904,050.00	949,252.50	996,715.13
Operating Cost (increase 5% per year)	52,000.00	54,600.00	57,330.00	60,196.50	63,206.33
Utility Cost (increase 5% per year)	24,000.00	25,200.00	26,460.00	27,783.00	29,172.15
Total Cost	1,040,900.00	1,034,700.00	1,081,740.00	1,131,132.00	1,182,993.60
Cumulative Cost	1,040,900.00	2,075,600.00	3,157,340.00	4,288,472.00	5,471,465.60

Table B.10. Cost Comparison between the Existing System and the Second Candidate, Baht.

Items	Years				
	1	2	3	4	5
Existing System Cost					
Staff (increase 5% per year)	900,000.00	945,000.00	992,250.00	1,041,862.50	1,093,955.63
Operating Cost (increase 5% per year)	60,000.00	63,000.00	66,150.00	69,457.50	72,930.38
Utility Cost (increase 5% per year)	50,000.00	52,500.00	55,125.00	57,881.25	60,755.31
Total Cost	1,010,000.00	1,060,500.00	1,113,525.00	1,169,201.25	1,227,661.31
Cumulative Cost	1,010,000.00	2,070,500.00	3,184,025.00	4,353,226.25	5,580,887.56
The Second Candidate Cost					
Hardware Cost	67,700.00	67,700.00	67,700.00	67,700.00	67,700.00
Software Cost	51,200.00	51,200.00	51,200.00	51,200.00	51,200.00
Implement Cost	101,000.00	0.00	0.00	0.00	0.00
Staff (increase 5% per year)	695,000.00	729,750.00	766,237.50	804,549.38	844,776.84
Operating Cost (increase 5% per year)	105,000.00	110,250.00	115,762.50	121,550.63	127,628.16
Utility Cost (increase 5% per year)	60,000.00	63,000.00	66,150.00	69,457.50	72,930.38
Total Cost	1,022,280.00	1,065,250.00	1,111,817.50	1,160,713.38	1,212,054.04
Cumulative Cost	1,022,280.00	2,087,530.00	3,199,347.50	4,360,060.88	5,572,114.92

Table B.11. Cost Comparison between the Existing System and the Third Candidate, Baht.

Items	Years				
	1	2	3	4	5
Existing System Cost					
Staff (increase 5% per year)	900,000.00	945,000.00	992,250.00	1,041,862.50	1,093,955.63
Operating Cost (increase 5% per year)	60,000.00	63,000.00	66,150.00	69,457.50	72,930.38
Utility Cost (increase 5% per year)	50,000.00	52,500.00	55,125.00	57,881.25	60,755.31
Total Cost	1,010,000.00	1,060,500.00	1,113,525.00	1,169,201.25	1,227,661.31
Cumulative Cost	1,010,000.00	2,070,500.00	3,184,025.00	4,353,226.25	5,580,887.56
The Third Candidate Cost					
Hardware Cost	62,700.00	62,700.00	62,700.00	62,700.00	62,700.00
Software Cost	71,200.00	71,200.00	71,200.00	71,200.00	71,200.00
Implement Cost	1,380.00	0.00	0.00	0.00	0.00
Staff (increase 5% per year)	700,000.00	735,000.00	771,750.00	810,337.50	850,854.38
Operating Cost (increase 5% per year)	126,000.00	132,300.00	138,915.00	145,860.75	153,153.79
Utility Cost (increase 5% per year)	66,000.00	69,300.00	72,762.00	76,403.25	80,223.41
Total Cost	1,027,280.00	1,070,500.00	1,117,330.00	1,166,501.50	1,218,131.58
Cumulative Cost	1,027,280.00	2,097,780.00	3,215,110.00	4,381,611.50	5,599,743.08

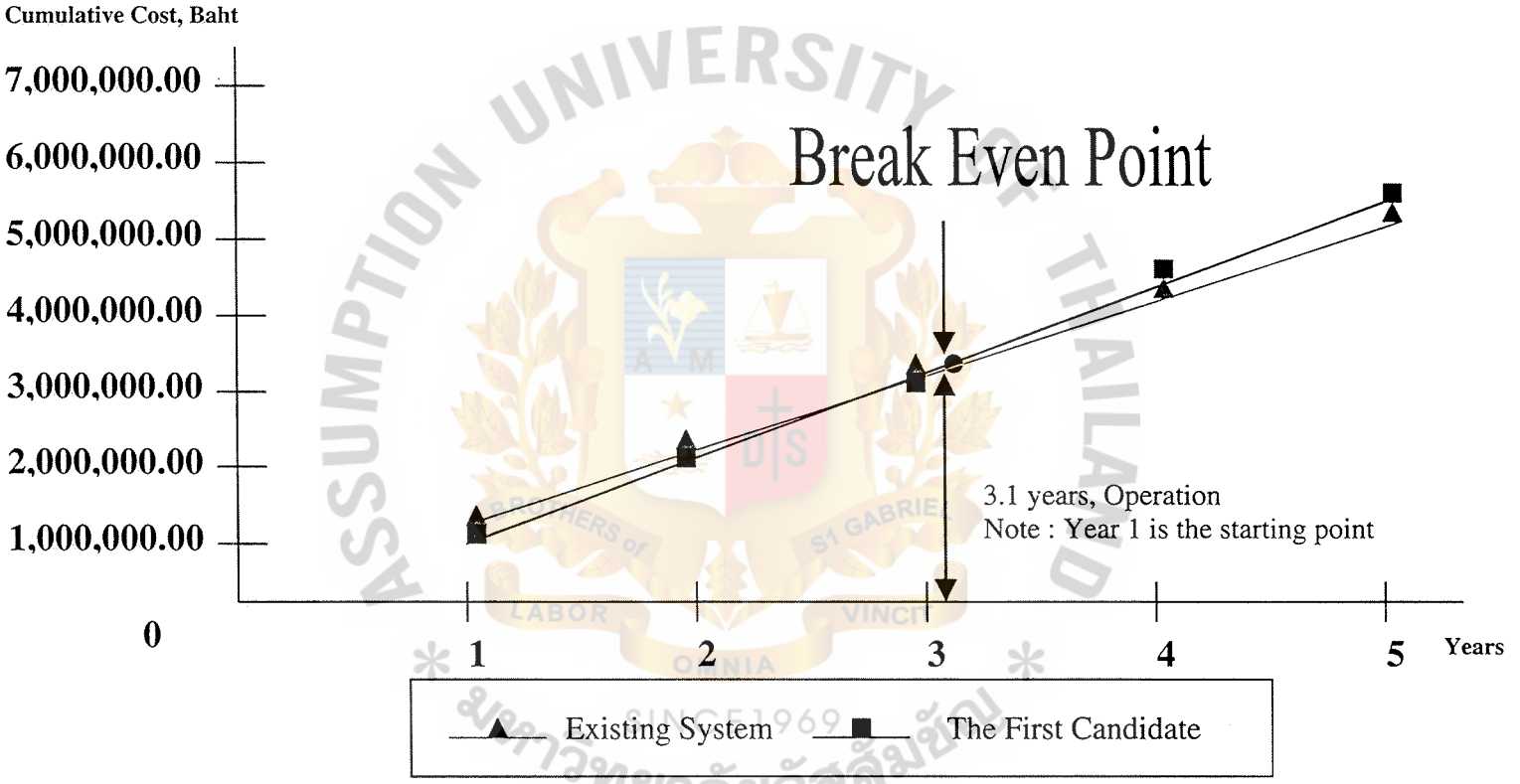


Figure B.1. The Break-even Analysis Chart for the First Candidate.

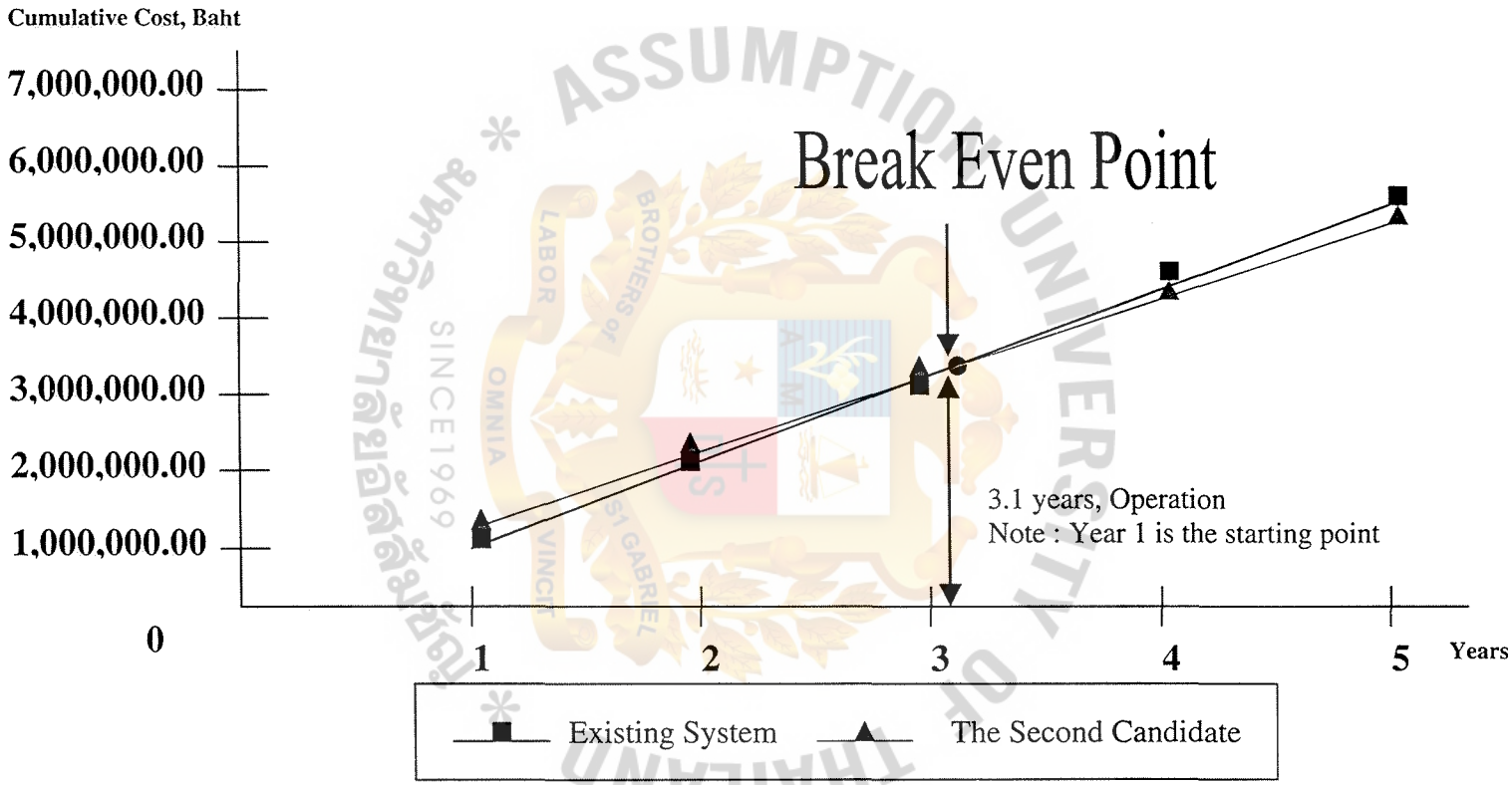


Figure B.2. The Break-even Analysis Chart the Second Candidate.

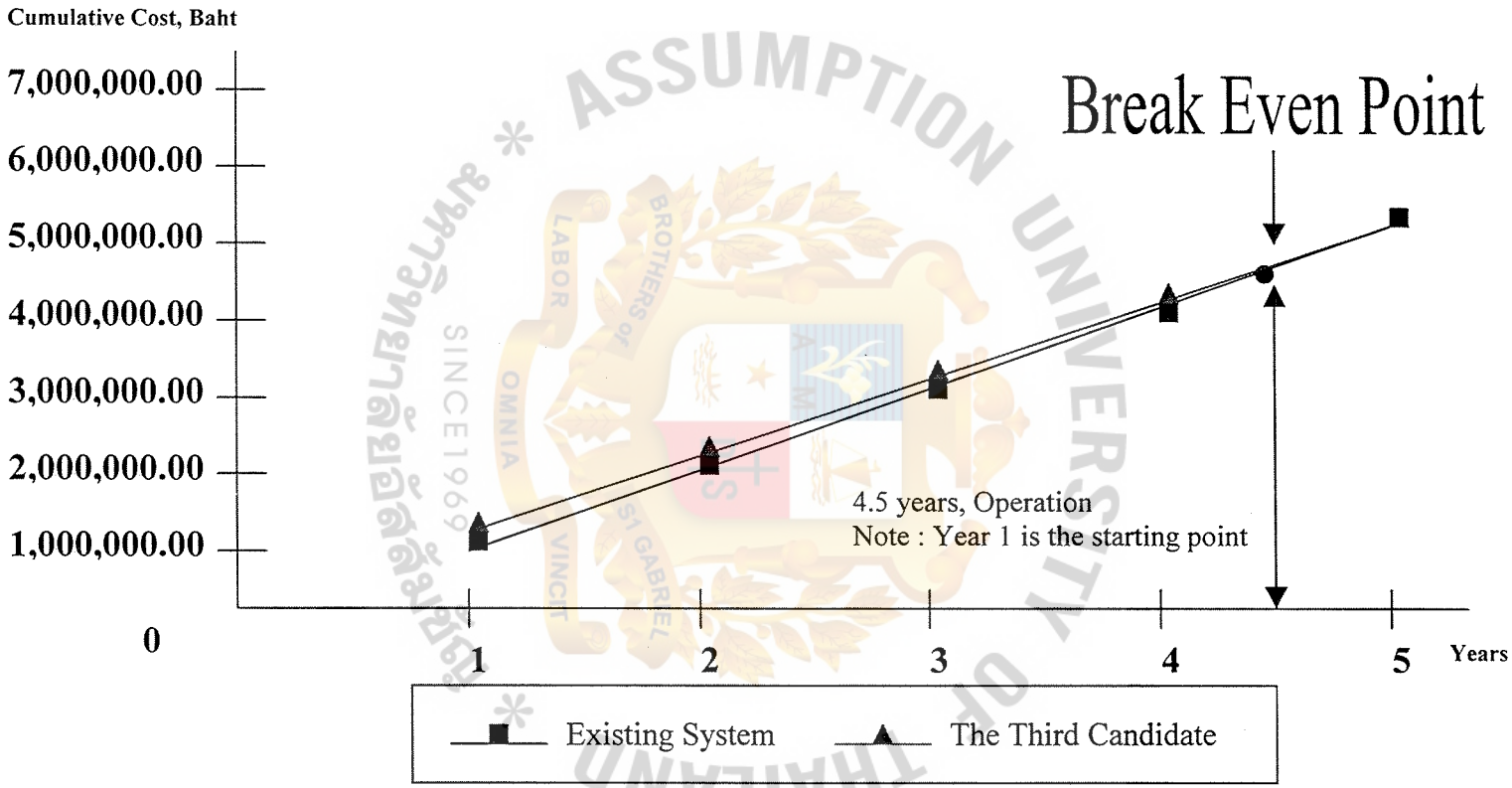


Figure B.3. The Break-even Analysis Chart the Third Candidate.

Table B.12. Payback Period for the First Candidate, Baht.

Cost Items	Years					
	0	1	2	3	4	5
Development cost	-530,500.00					
Operation & maintenance cost		-52,000.00	-54,600.00	-57,330.00	-60,196.50	-63,206.33
Discount factors for 12%	1.000	0.893	0.797	0.712	0.636	0.567
Time adjusted costs (adjusted to present value)	-530,500.00	-46,436.00	-43,516.20	-40,818.96	-38,284.97	-35,837.99
Cumulative time-adjusted costs over lifetime	-530,500.00	-576,936.00	-620,452.20	-661,271.16	-699,556.13	-735,394.12
Benefits derived from operation of new system	0.00	194,000.00	203,700.00	213,885.00	224,579.25	235,808.21
Discount factors for 12%	1.000	0.893	0.797	0.712	0.636	0.567
Time adjusted benefits (adjusted to present value)	0.00	173,242.00	162,348.90	152,286.12	142,832.40	133,703.26
Cumulative time-adjusted benefits over lifetime	0.00	173,242.00	335,590.90	487,877.02	630,709.42	764,412.68
Cumulative life time-adjust Cost + benefits	-530,500.00	-403,694.00	-284,861.30	-173,394.14	-68,846.71	29,018.56

Table B.13. Payback Period for the Second Candidate, Baht.

Cost Items	Years					
	0	1	2	3	4	5
Development cost	-530,000.00					
Operation & maintenance cost		-105,000.00	-110,250.00	-115,762.50	-121,550.63	-127,628.16
Discount factors for 12%	1.000	0.893	0.797	0.712	0.636	0.567
Time adjusted costs (adjusted to present value)	-530,500.00	-93,765.00	-87,869.25	-82,422.90	-77,306.20	-72,365.16
Cumulative time-adjusted costs over lifetime	-530,500.00	-624,265.00	-712,134.25	-794,557.15	-871,863.35	-944,228.51
Benefits derived from operation of new system	0.00	282,000.00	296,100.00	310,905.00	326,450.25	342,772.76
Discount factors for 12%	1.000	0.893	0.797	0.712	0.636	0.567
Time adjusted benefits (adjusted to present value)	0.00	251,826.00	235,991.70	221,364.36	207,622.36	194,352.16
Cumulative time-adjusted benefits over lifetime	0.00	251,826.00	487,817.70	709,182.06	916,804.42	1,111,156.58
Cumulative life time-adjust Cost + benefits	-530,500.00	-372,439.00	-224,316.55	-85,375.09	44,941.07	166,928.06

Table B.14. Payback Period for the Third Candidate, Baht.

Cost Items	Years					
	0	1	2	3	4	5
Development cost	-530,500.00					
Operation & maintenance cost		-126,000.00	-132,300.00	-138,915.00	-145,860.75	-153,153.79
Discount factors for 12%	1.000	0.893	0.797	0.712	0.636	0.567
Time adjusted costs (adjusted to present value)	-530,500.00	-112,518.00	-105,443.10	-98,907.48	-92,767.44	-86,838.20
Cumulative time-adjusted costs over lifetime	-530,500.00	-643,018.00	-748,461.10	-847,368.58	-940,136.02	-1,026,974.21
Benefits derived from operation of new system	0.00	326,000.00	342,300.00	359,415.00	377,385.75	396,255.04
Discount factors for 12%	1.000	0.893	0.797	0.712	0.636	0.567
Time adjusted benefits (adjusted to present value)	0.00	291,118.00	272,813.10	255,903.48	240,017.34	224,676.61
Cumulative time-adjusted benefits over lifetime	0.00	291,118.00	563,931.10	819,834.58	1,059,851.92	1,284,528.52
Cumulative life time-adjust Cost + benefits	-530,500.00	-351,900.00	-184,530.00	-27,534.00	119,715.90	257,554.31

Table B.15. Net Present Value for the First Candidate, Baht.

Cost Item	Years						Total
	0	1	2	3	4	5	
Development cost	-530,500.00						
Operation & maintenance cost		-52,000.00	-54,600.00	-57,330.00	-60,196.50	-63,206.33	
Discount factors for 12%	1.000	0.893	0.797	0.712	0.636	0.567	
Present Value of annual Costs over lifetime	-530,500.00	-46,436.00	-43,516.20	-40,818.96	-38,284.97	-35,837.99	
Total present value of Lifetime costs							-735,394.12
Benefits derived from Operation of new system	0.00	194,000.00	203,700.00	213,885.00	224,579.25	235,808.21	
Discount factors for 12%	1.000	0.893	0.797	0.712	0.636	0.567	
Present Value of annual Costs over lifetime	0.00	173,242.00	162,348.90	152,286.12	142,832.40	133,703.26	
Total present value of Lifetime costs							764,412.68
Net Present Value							29,018.56

Table B.16. Net Present Value the Second Candidate, Baht.

Cost Item	Years						Total
	0	1	2	3	4	5	
Development cost	-530,000.00						
Operation & maintenance cost		-105,000.00	-110,250.00	-115,762.50	-121,550.63	-127,628.16	
Discount factors for 12%	1.000	0.893	0.797	0.712	0.636	0.567	
Present Value of annual Costs over lifetime	-530,500.00	-93,765.00	-87,869.25	-82,422.90	-77,306.20	-72,365.16	
Total present value of Lifetime costs							-944,228.51
Benefits derived from Operation of new system	0.00	282,000.00	296,100.00	310,905.00	326,450.25	342,772.76	
Discount factors for 12%	1.000	0.893	0.797	0.712	0.636	0.567	
Present Value of annual Costs over lifetime	0.00	251,826.00	235,991.70	221,364.36	207,622.36	194,352.16	
Total present value of Lifetime costs							1,111,156.58
Net Present Value							166,928.06

Table B.17. Net Present Value the Third Candidate, Baht.

Cost Item	Years						Total
	0	1	2	3	4	5	
Development cost	-530,500.00						
Operation & maintenance cost		-126,000.00	-132,300.00	-138,915.00	-145,860.75	-153,153.79	
Discount factors for 12%	1.000	0.893	0.797	0.712	0.636	0.567	
Present Value of annual Costs over lifetime	-530,500.00	-112,518.00	-105,443.10	-98,907.48	-92,767.44	-86,838.20	
Total present value of Lifetime costs							-1,026,974.21
Benefits derived from Operation of new system	0.00	326,000.00	342,300.00	359,415.00	377,385.75	396,255.04	
Discount factors for 12%	1.000	0.893	0.797	0.712	0.636	0.567	
Present Value of annual Costs over lifetime	0.00	291,118.00	272,813.10	255,903.48	240,017.34	224,676.61	
Total present value of Lifetime costs							1,284,528.52
Net Present Value							257,554.31

APPENDIX C

DATA DICTIONARY

Table C.1. Structure of Bank.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	Bank_No	Number (5)	Y	Y		Receipt Invoice		Primary Key
2	Bank_Code	Varchar2 (10)						Attribute
3	Bank_Name	Varchar2 (20)						Attribute
4	Bank_Branch	Varchar2 (20)						Attribute
5	Bank_Address	Varchar2 (40)						Attribute
6	Bank_Telephone	Varchar2 (10)						Attribute
7	Bank_Fax	Varchar2 (10)			Y			Attribute

Table C.2. Structure of Credit_Note Invoice.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	Credit_Note_No	Number (5)	Y	Y				Primary Key
2	Invoice_No	Number (5)						Foreign Key
3	Credit_Note_Date	Date						Attribute
4	Credit_Note_Sub_total	Number (20,2)						Attribute
5	Credit_Note_Vat_Rate	Number (5)						Attribute
6	Credit_Note_Vat_Amount	Number (20,2)						Attribute
7	Credit_Total	Number (20,2)						Attribute

Table C.3. Structure of Customer.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	Customer_No	Number (5)	Y	Y		Order, Invoice		Primary Key
2	Customer_Name	Varchar2 (40)						Attribute
3	Customer_Address	Varchar2 (20)						Attribute
4	Customer_City	Varchar2 (20)						Attribute
5	Customer_Country	Varchar2 (20)						Attribute
6	Customer_Zipcode	Varchar2 (5)						Attribute
7	Customer_Telephone	Varchar2 (20)						Attribute
8	Customer_Fax	Varchar2 (20)			Y			Attribute

Table C.4. Structure of Invoice.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	Invoice_No	Number (5)	Y	Y		Receipt Invoice, Credit_Note Invoice		Primary Key
2	Customer_No	Number (5)						Foreign Key
3	Order_No	Number (5)						Foreign Key
4	Invoice_Date	Date						Attribute
5	Term_Payment	Number (3)			Y			Attribute
6	Due_Date	Date						Attribute
7	Sub_Total	Number (20,2)						Attribute
8	Vat_Rate	Number (5)						Attribute
9	Vat_Amount	Number (20,2)						Attribute
10	Invoice_Total	Number (10)						Attribute

Table C.5. Structure of Item.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	Item_No	Number (5)	Y	Y		Order		Primary Key
2	Order_No	Number (5)	Y	Y				Primary Key
3	Product_No	Number (5)						Foreign Key
4	Item_Quantity	Number (10)						Attribute
5	Item_Price_Unite	Number (10,2)						Attribute
6	Item_Price	Number (20,2)						Attribute

Table C.6. Structure of Order.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	Orders_No	Number (5)	Y	Y		Item, Invoice		Primary Key
2	Customer_No	Number (5)						Foreign Key
3	Orders_Date	Date						Attribute
4	Delivery_Date	Date						Attribute
5	Orders_Total_Price	Number (20,2)						Attribute

Table C.7. Structure of Product.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	Product_No	Number (5)	Y	Y		Item		Primary Key
2	Product_Name	Varchar2 (20)						Attribute
3	Product_Colour	Varchar2 (10)						Attribute
4	Product_Price	Number (10,2)						Attribute

Table C.8. Structure of Invoice Receipt.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	Receipt_No	Number (5)	Y	Y				Primary Key
2	Invoice_No	Number (5)						Foreign Key
3	Bank_No	Number (5)						Foreign Key
4	Tax_Invoice_No	Number (5)						Foreign Key
5	Withholding_Tax_No	Number (5)						Foreign Key
6	Receipt_Date	Date						Attribute
7	Receipt_Amount	Number (20,2)						Attribute
8	Deposite_Date	Date						Attribute

Table C.9. Structure of Tax Invoice.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	Tax_Invoice_No	Number (5)	Y	Y		Invoice Receipt		Primary Key
2	Tax_Invoice_Date	Date						Attribute
3	Tax_Invoice_Amount	Number (20,2)						Attribute

Table C.10. Structure of Withholding Tax.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	Withholding_Tax_No	Number (5)	Y	Y		Invoice Receipt		Primary Key
2	Withholding_Tax_Code	Number (10)						Attribute
3	Withholding_Tax_Date	Date						Attribute
4	Withholding_Tax_Amount	Number (20,2)						Attribute

APPENDIX D

STRUCTURE CHART

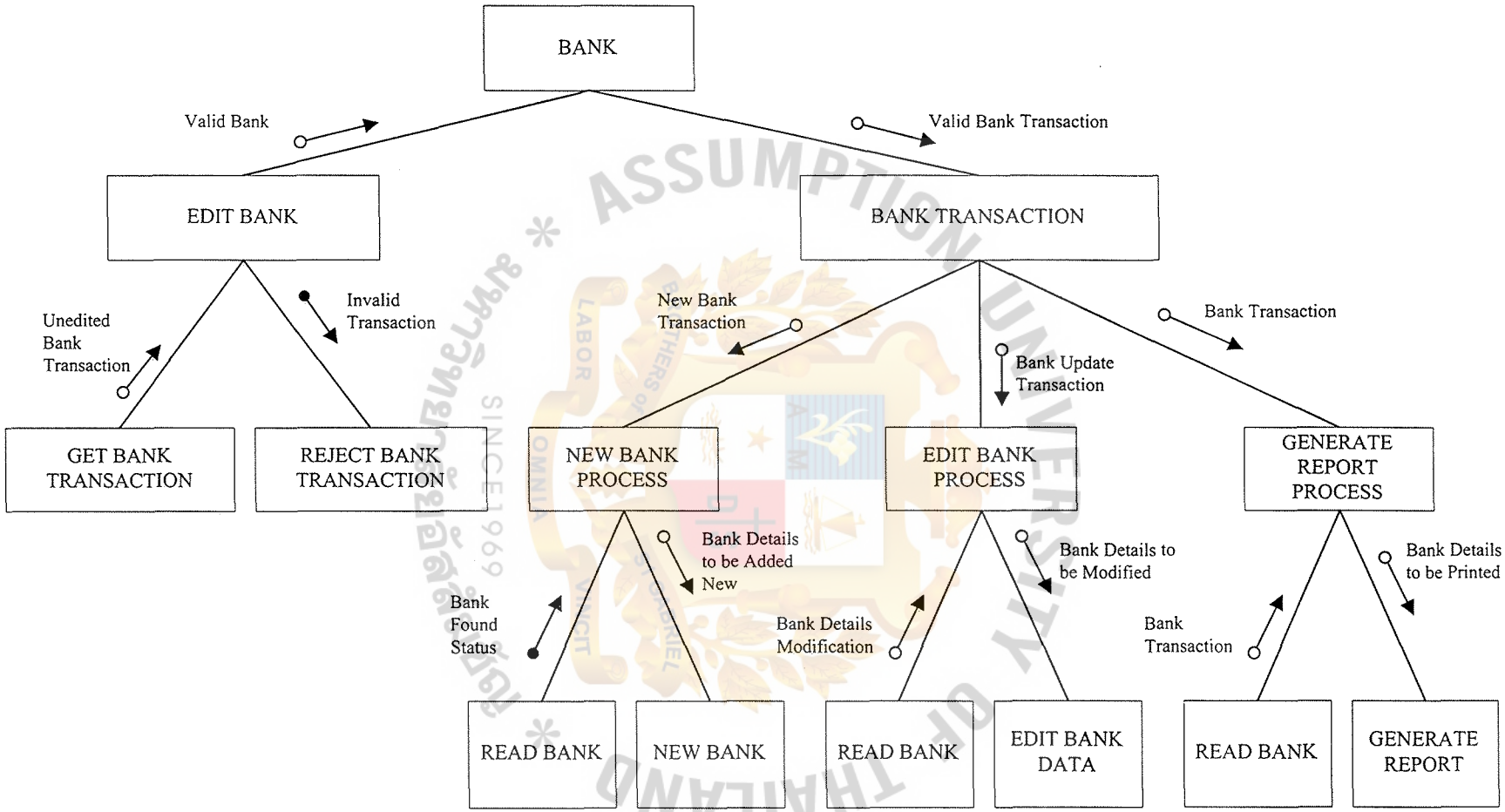


Figure D.1. The Structure Chart of the Bank.

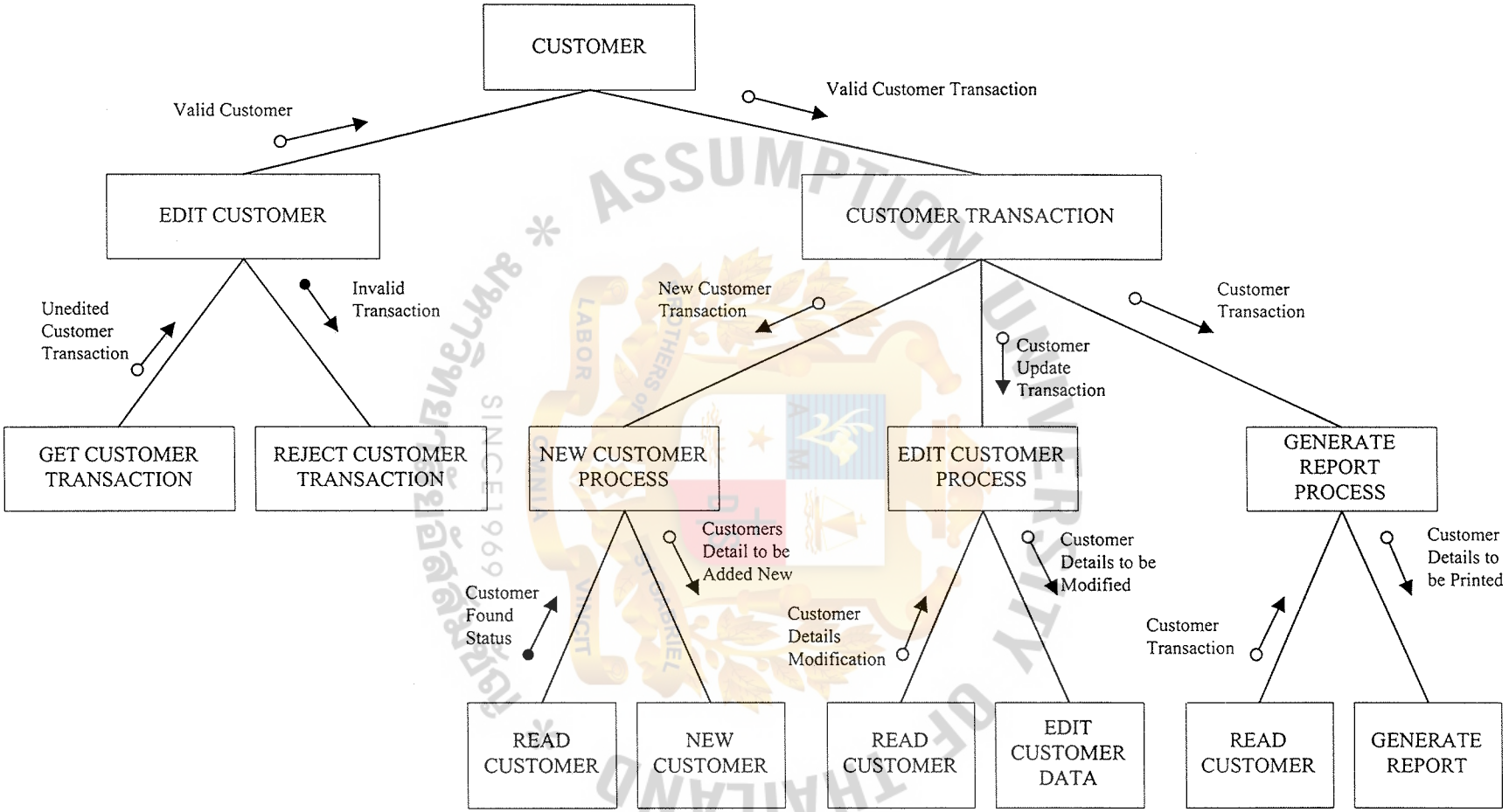


Figure D.2. The Structure Chart of the Customer.

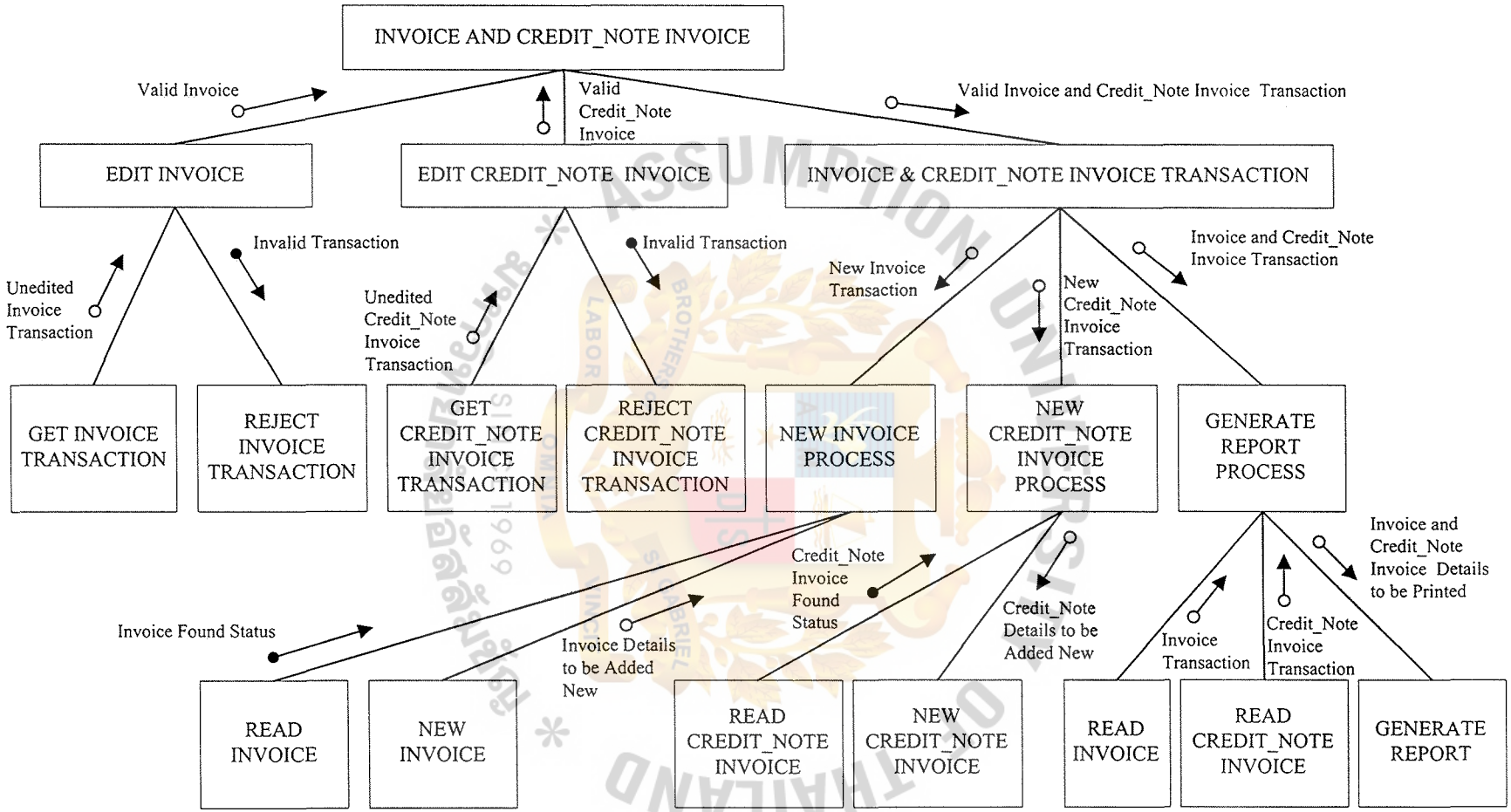


Figure D.3. The Structure Chart of the Invoice and Credit_Note Invoice.

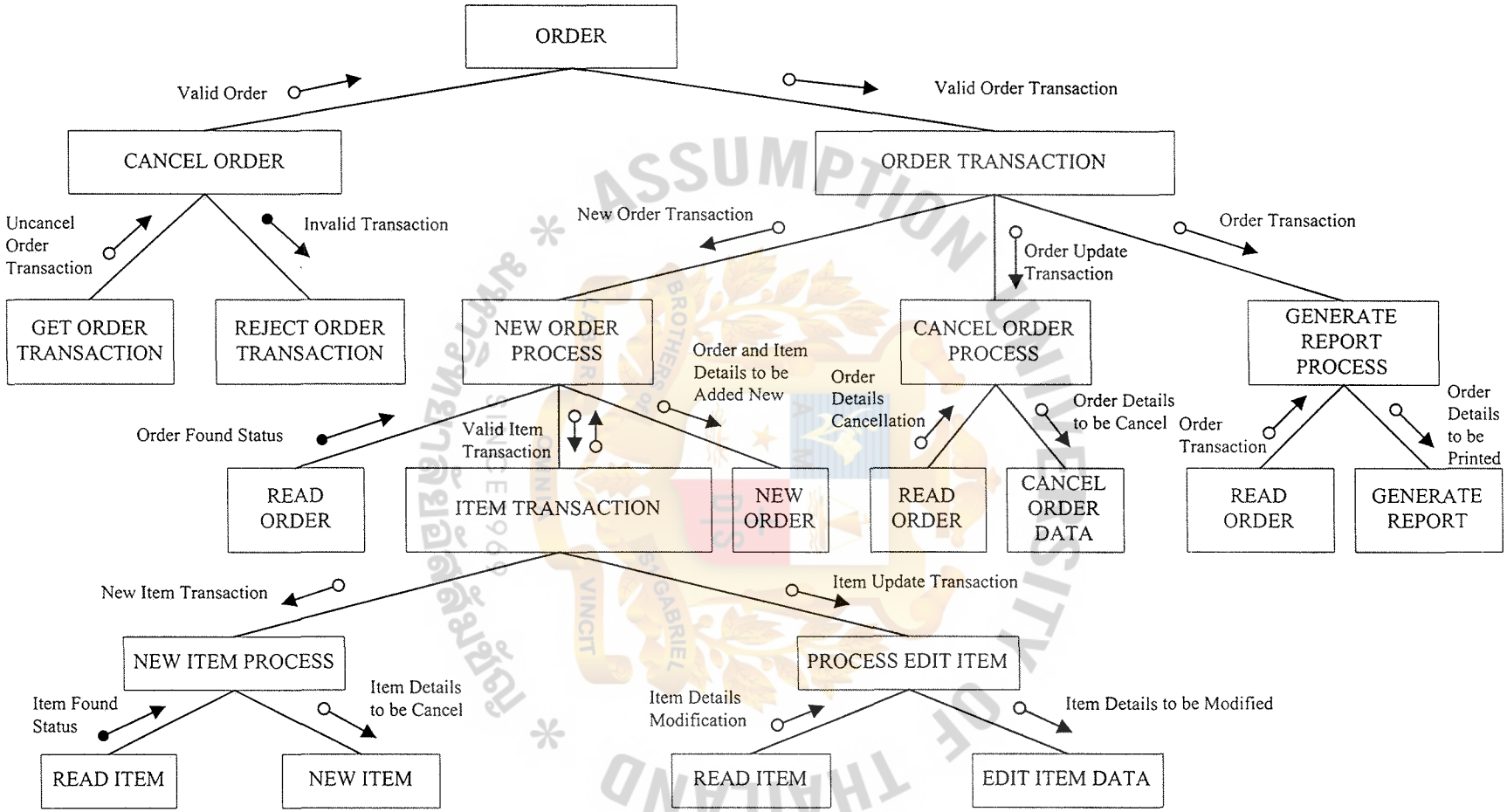


Figure D.4. The Structure Chart of the Order.

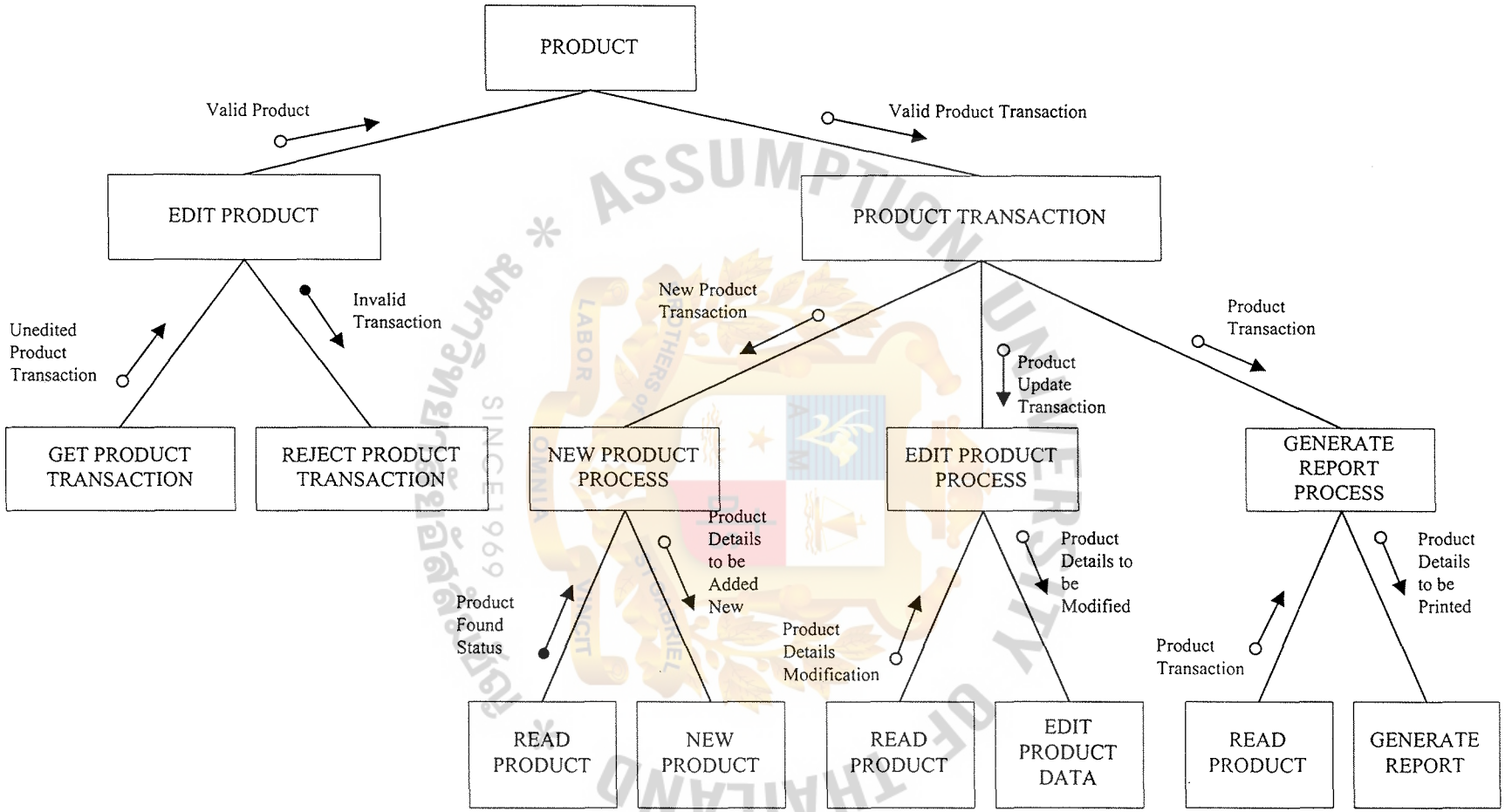


Figure D.5. The Structure Chart of the Product.

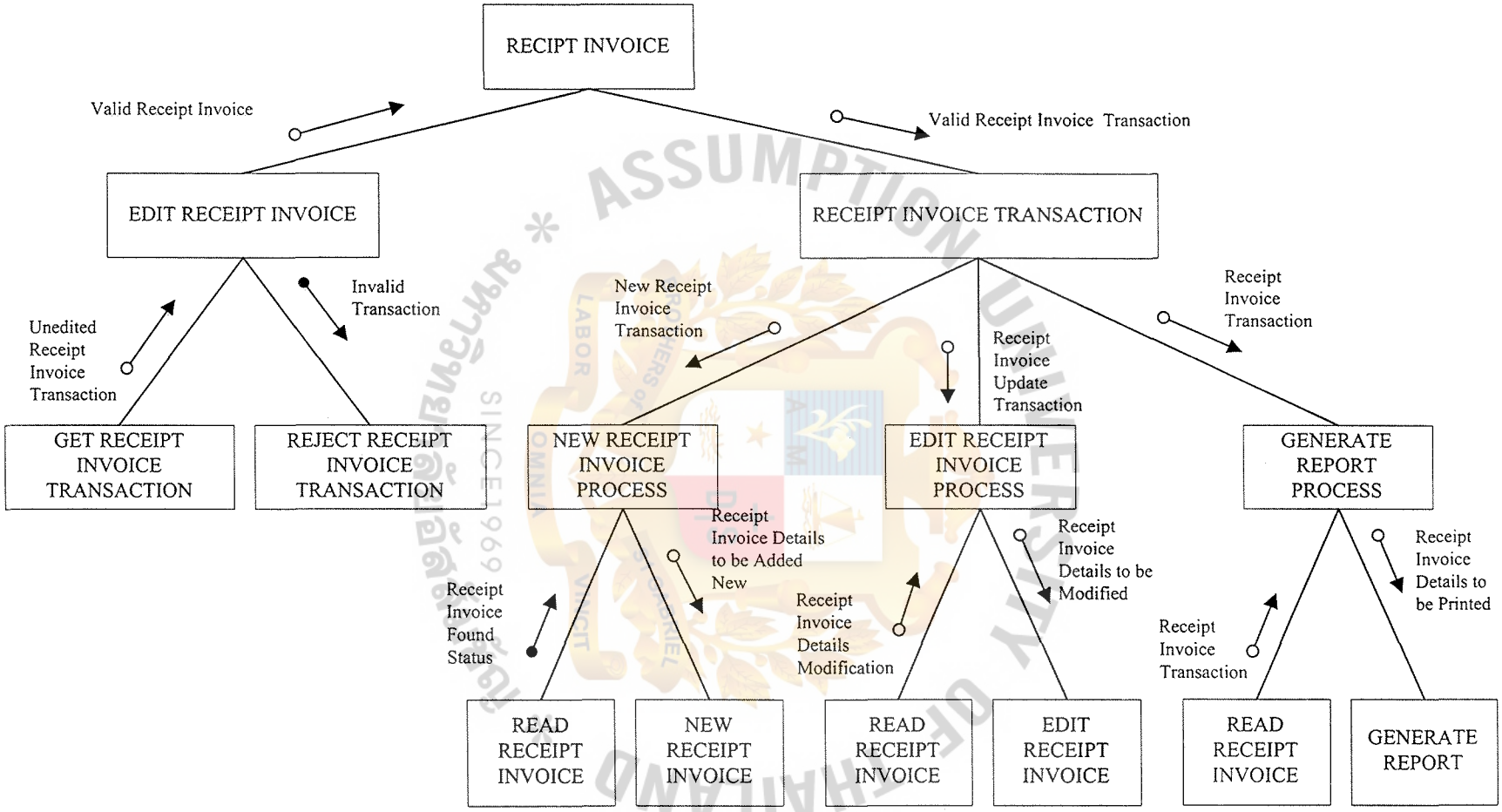


Figure D.6. The Structure Chart of the Receipt Invoice.

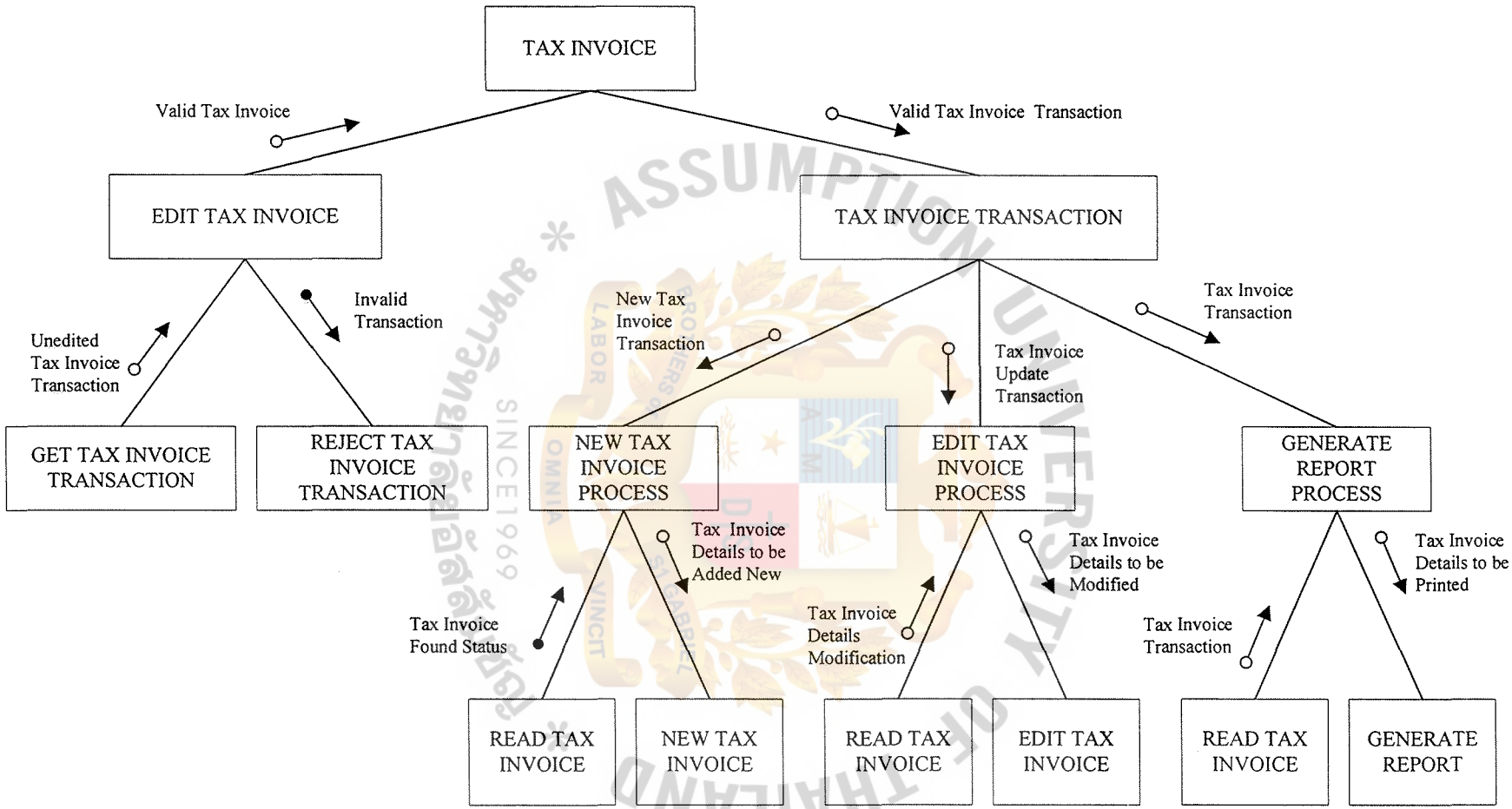


Figure D.7. The Structure Chart of the Tax Invoice.

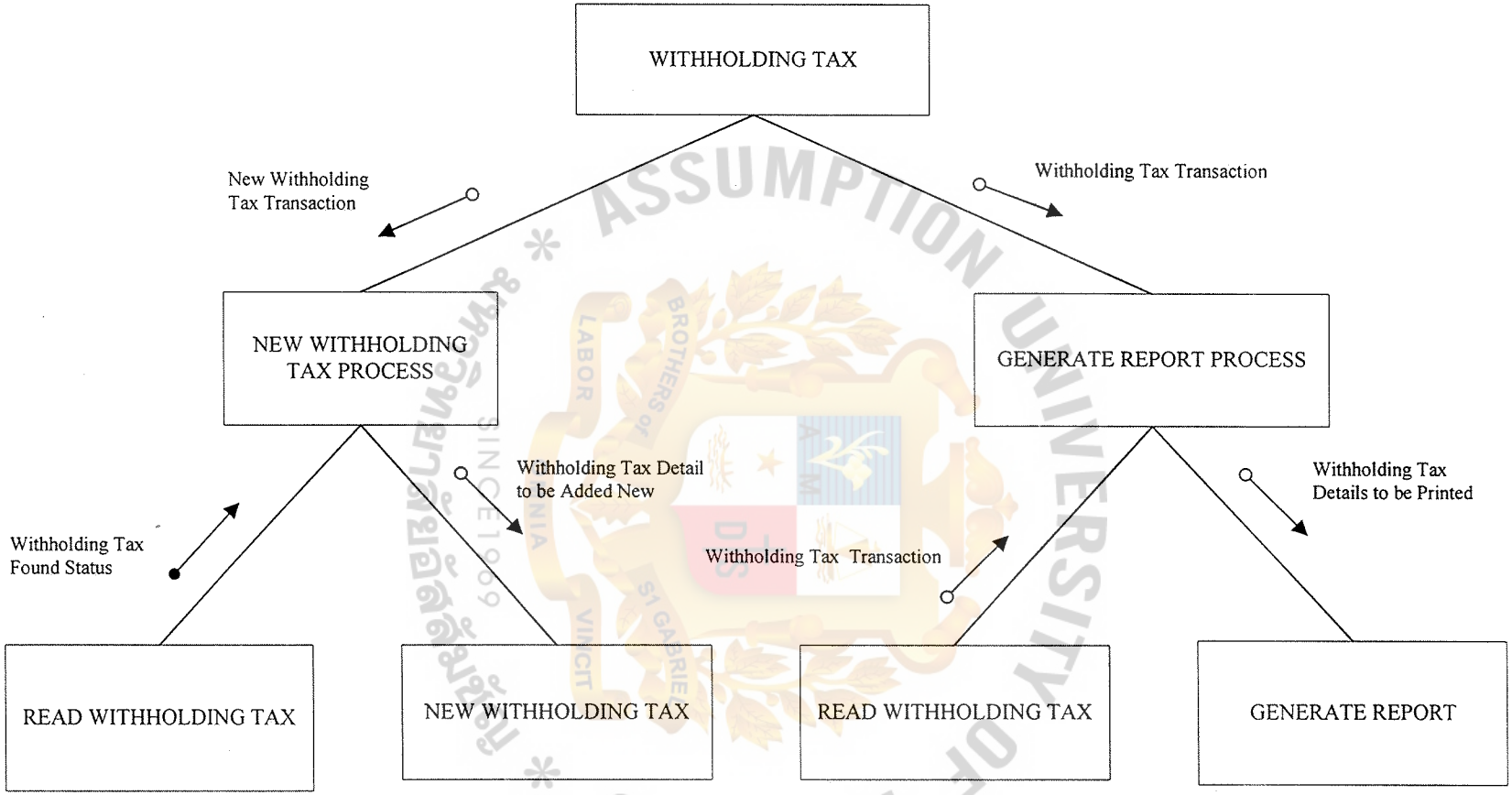


Figure D.8. The Structure Chart of the Withholding Tax.

APPENDIX E

PROCESS SPECIFICATION

PROCESS SPECIFICATION

Process 1.1: New Customer Information Process

Precondition:

Receive input new customer information from customer

Postcondition:

Update customer information into customer file

BEGIN

Read new customer

Record customer

END

Process 1.2: Update Customer Information Process

Precondition:

Receive modified customer information from customer

Postcondition:

Update customer information into customer file

BEGIN

Read new customer

Record customer

END

Process 2.1: Generate Order Process

Precondition:

Receive place order from customer

Receive customer and product information

Postcondition:

Update order information to order file

Update item information to item file

BEGIN

Read place order

Read customer file

Read product file

Record order

END

Process 2.2: Generate Order Report Process

Precondition:

Receive order and item information

Postcondition:

Send orders report summary to sales department.

BEGIN

Read order and item

Generate order report summary

END

Process 3.1.1: Generate Invoice Process

Precondition:

Receive delivery information from sales department

Receive order and item information

Receive customer information

Postcondition:

Send invoice to customer

Update invoice information into invoice file

BEGIN

Read delivery

Read order and item

Read customer

Generate invoice

Record invoice

END

Process 3.1.2: Generate Invoice Report Process

Precondition:

Receive invoice information

Postcondition:

Send summary of invoice report to Accounting Department

BEGIN

Read invoice

Generate invoice report summary

END

Process 3.2.1: Generate Credit_Note Invoice Process

Precondition:

Receive reject of invoice information from customer

Postcondition:

Send credit_note invoice to customer

Update credit_note invoice information into credit_note invoice file

BEGIN

Read reject invoice

Generate credit_note invoice

Record insert credit note invoice

END

Process 3.2.2: Generate Credit_Note Invoice Report Process

Precondition:

Receive credit_note invoice information

Postcondition:

Send credit_note invoice report summary to Accounting Department

BEGIN

Read credit_note invoice

Generate credit_note invoice report summary

END

Process 4.1.1: Generate Receipt Invoice Process

Precondition:

Receive payment information from customer

Receive invoice information

Receive order information

Receive customer information

Postcondition:

Send receive invoice to customer

Update receipt invoice information into receipt invoice file

BEGIN

Read payment

Read invoice

Read order

Read customer

Generate receipt invoice

Record receipt invoice

END

Process 4.1.2: Generate Receipt Report Process

Precondition:

Receive receipt invoice information

Postcondition:

Send receipt invoice report summary to Accounting Department

BEGIN

Read receipt invoice

Generate receipt invoice report

END

Process 4.2.1: Generate Tax Invoice Process

Precondition:

Receive receipt invoice information

Postcondition:

Send tax invoice to customer

Update tax invoice into tax invoice file

BEGIN

Read receipt invoice

Generate tax invoice

Record tax invoice

END

Process 4.2.2: Generate Tax Report Process

Precondition:

Receive tax invoice information

Postcondition:

Send tax invoice report summary to accounting department

BEGIN

Read tax invoice

Generate summary tax invoice report

END

Process 5.1.1: Receive Money Process

Precondition:

Receive cash or cheque or confirm transfer from customer

Postcondition:

Deposit cash or cheque to bank

Confirm transfer with bank

BEGIN

Read cash or cheque or transfer

If receive = cheque then

Read cheque_date

If cheque_date > today then

Deposit cheque on cheque date

Endif

Endif

Deposit cash or cheque

END

Process 5.1.2: Reject Cheque Process

Precondition:

Receive rejected cheque from bank

Postcondition:

Send rejected cheque return to customer

BEGIN

Read reject cheque

END

Process 5.1.3: Bank Statement Process

Precondition:

Receive bank statement from bank

Postcondition:

Send bank statement to Accounting Department

BEGIN

Read bank statement

END

Process 5.2.1: Receive Withholding Tax Process

Precondition:

Receive withholding tax document from customer

Postcondition:

Update withholding tax information to withholding tax file

BEGIN

Read withholding tax

Record withholding tax

END

Process 5.2.2: Generate Withholding Tax Report Process

Precondition:

Receive withholding tax information

Postcondition:

Send withholding tax report summary to Accounting Department

BEGIN

Read withholding tax

Generate summary withholding tax report

END

APPENDIX F

DATABASE DESIGN

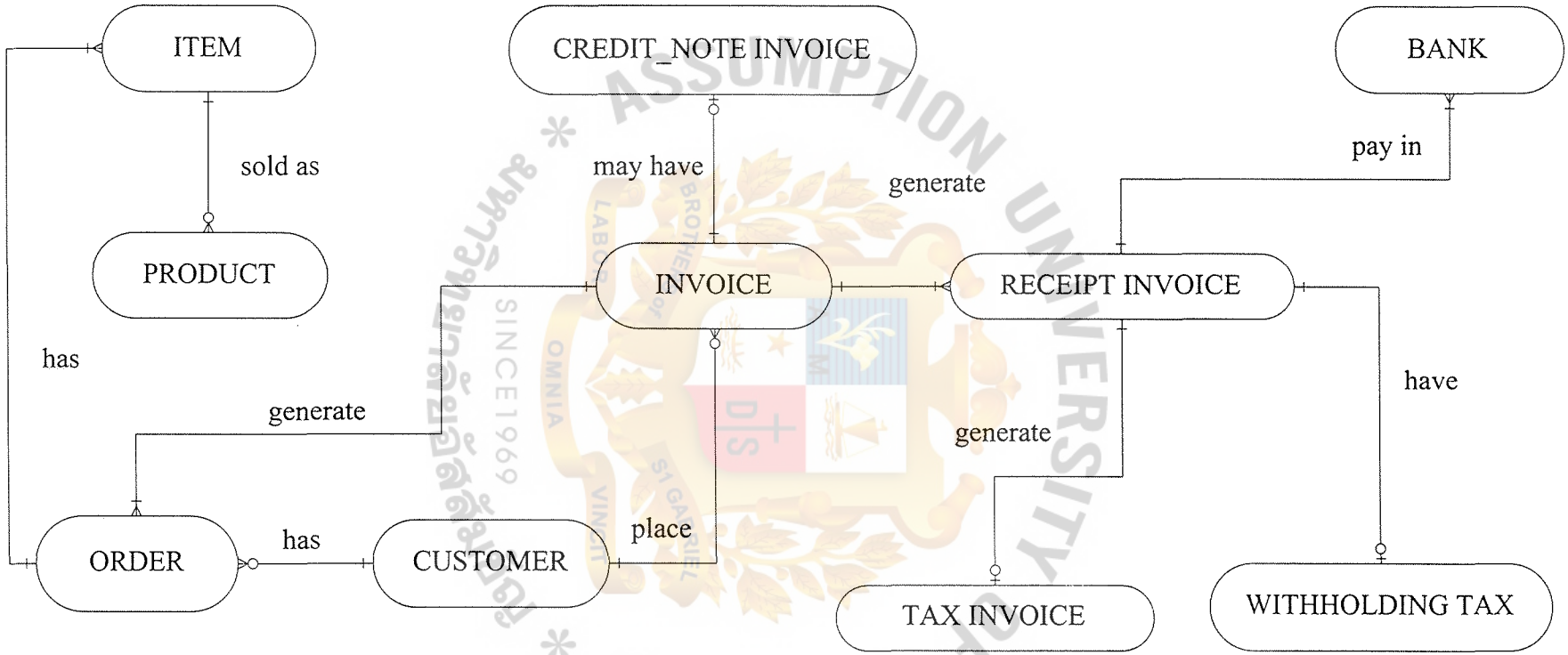


Figure F.1. Entity Relationship Diagram (ERD) [Context Diagram].

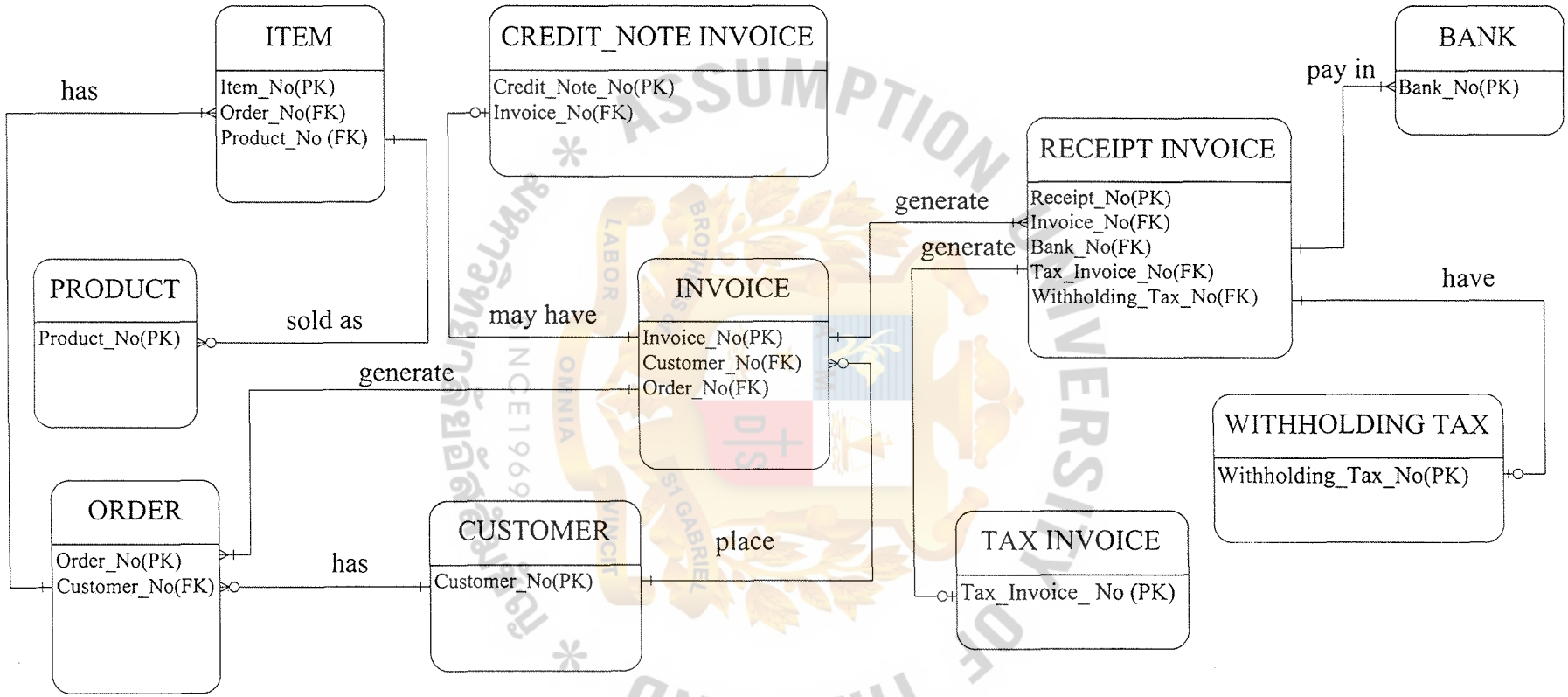


Figure F.2. Entity Relationship Diagram (ERD) [Key].

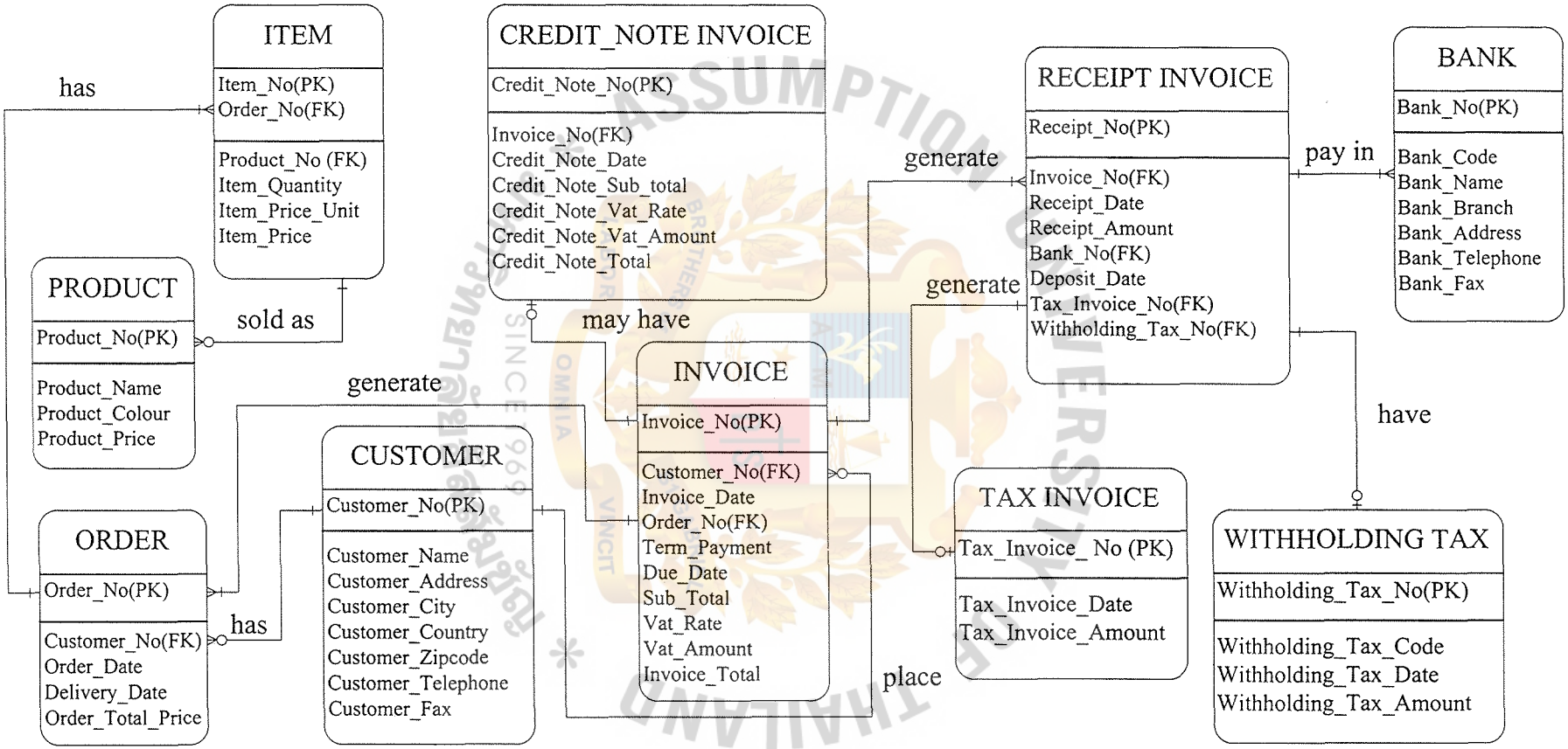


Figure F.3. Entity Relationship Diagram (ERD) [Fully].

DATABASE

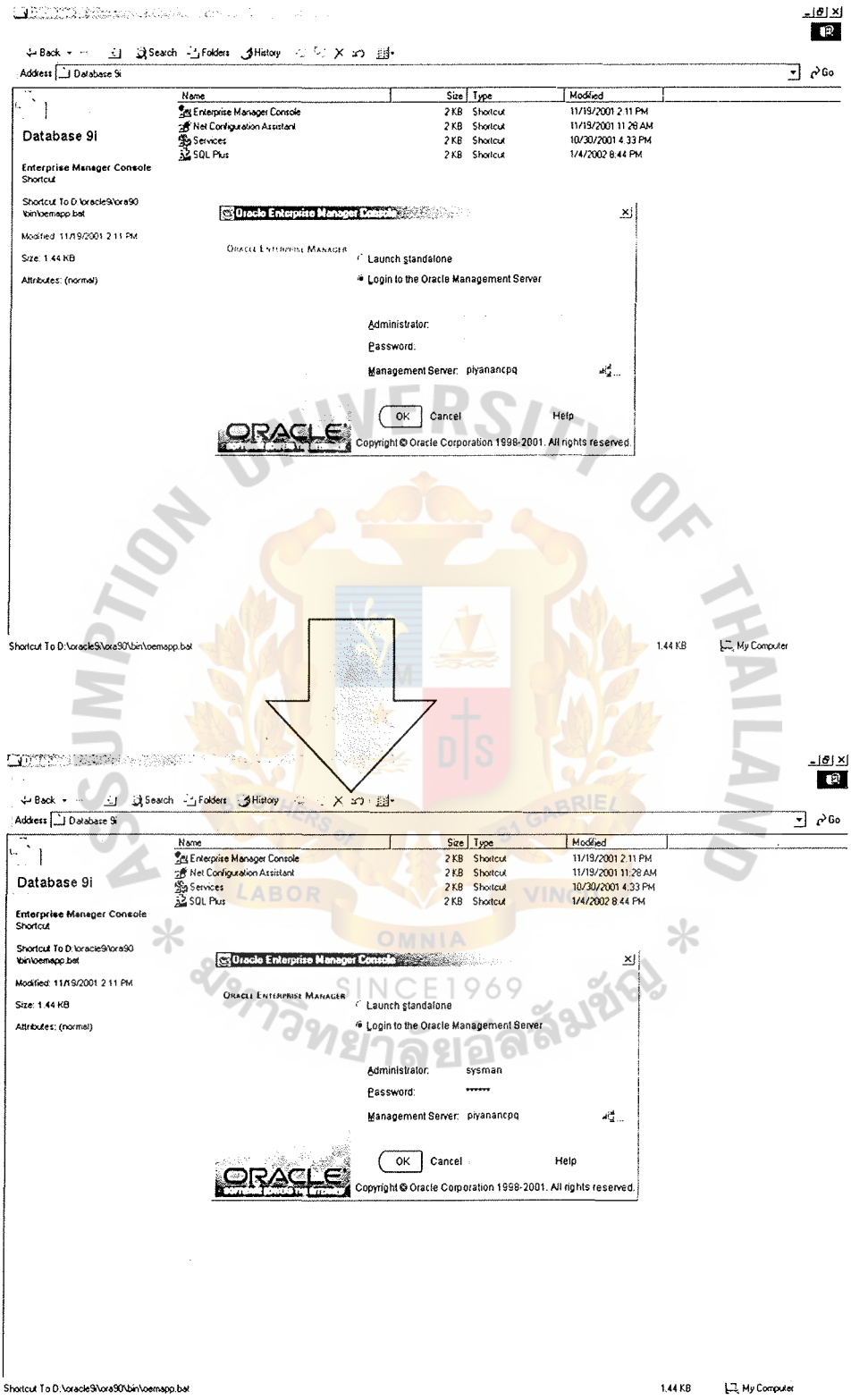


Figure F.4. Key Login and Password to Entry in the Database.

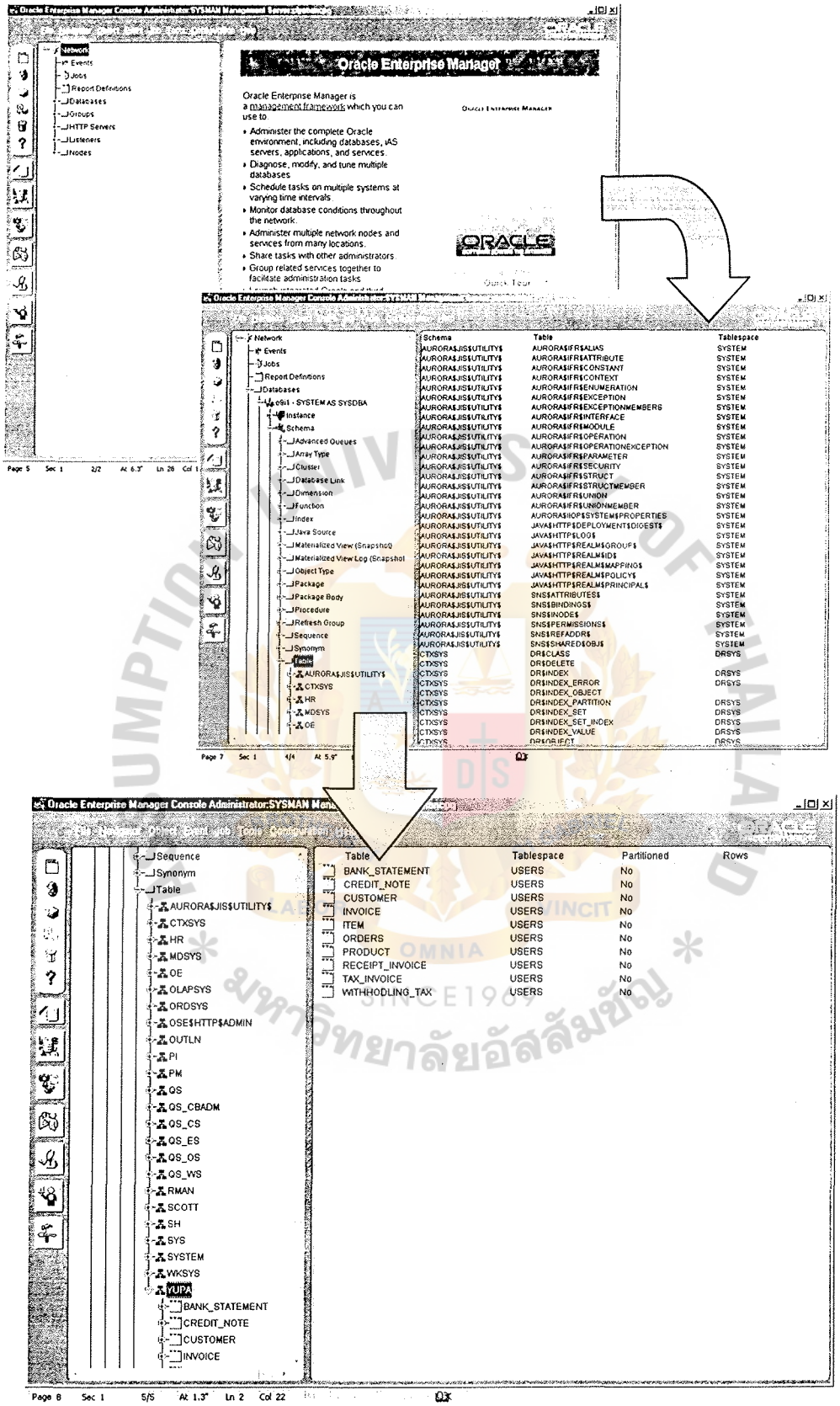


Figure F.5. Entry to Database Step by Step.

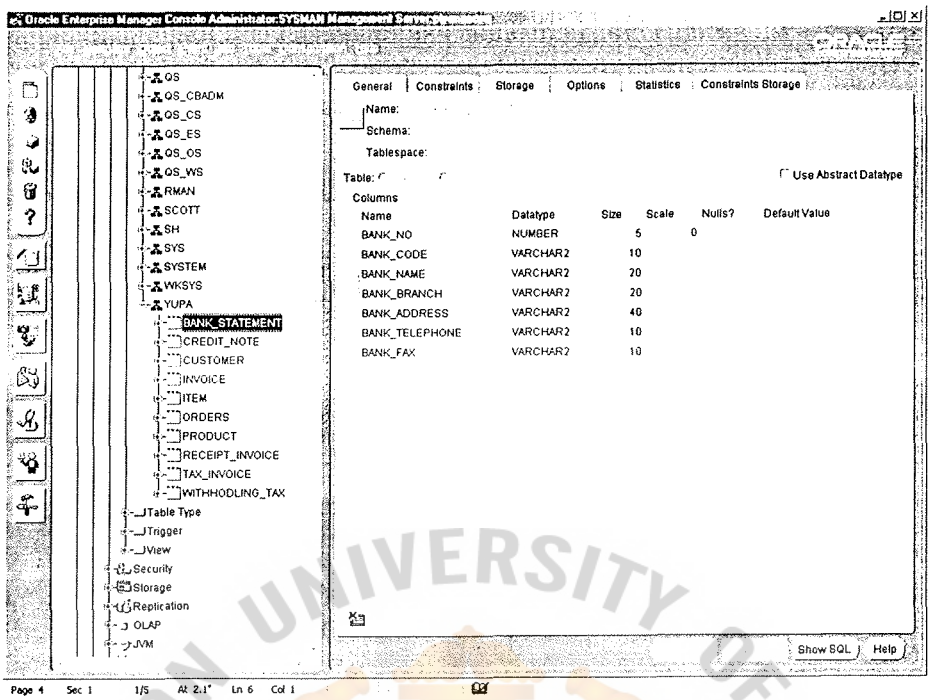


Figure F.6. General Table Record for Bank Statement Database.

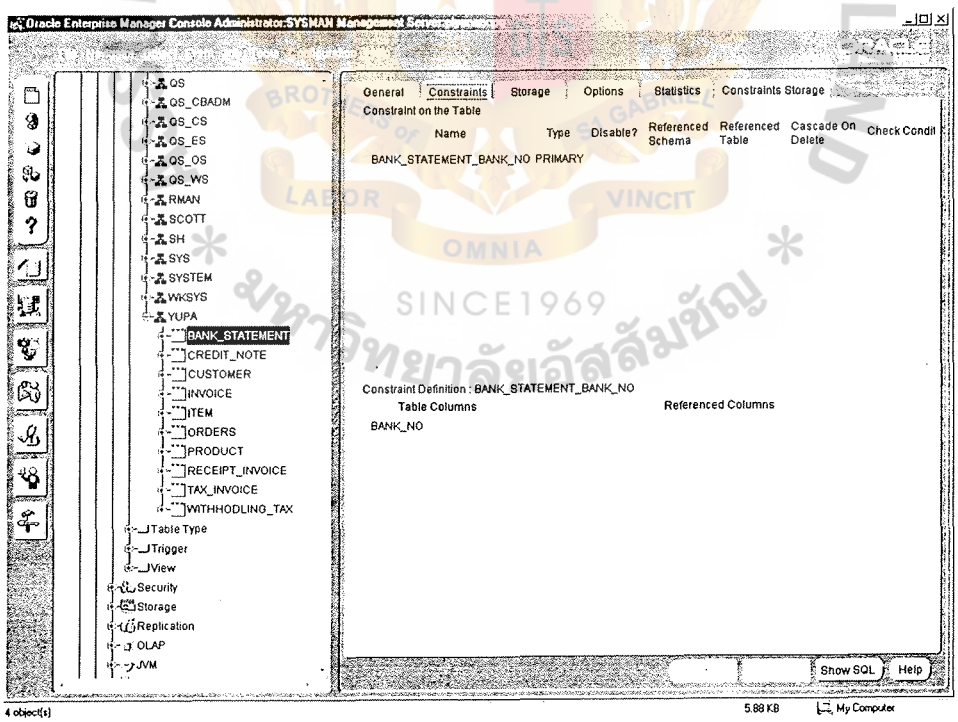


Figure F.7. Constraints for Bank Statement Database.

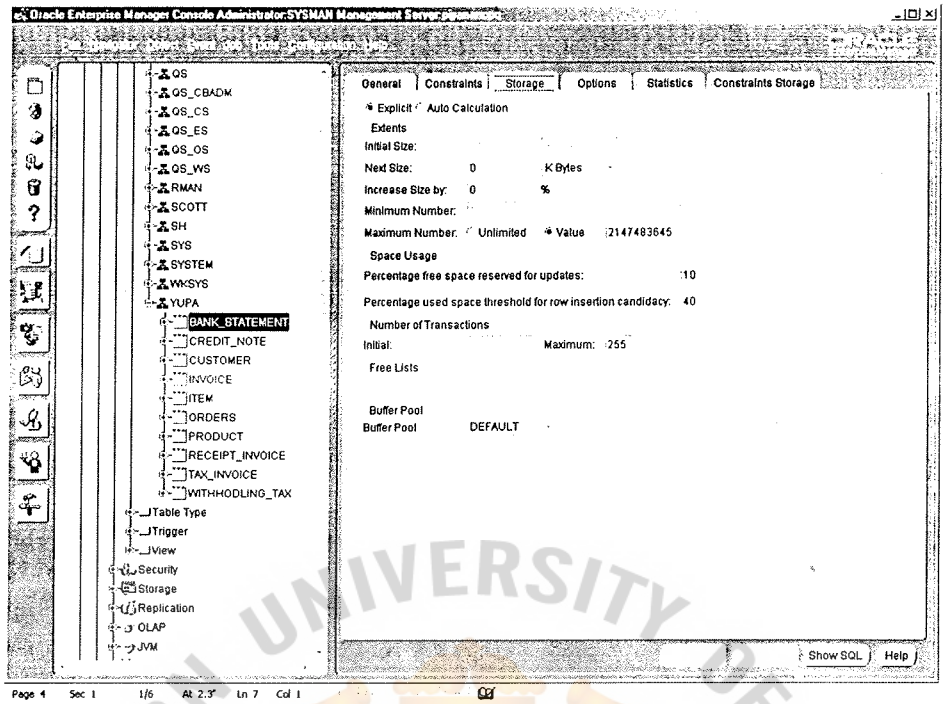


Figure F.8. Storage for Bank Statement Database.

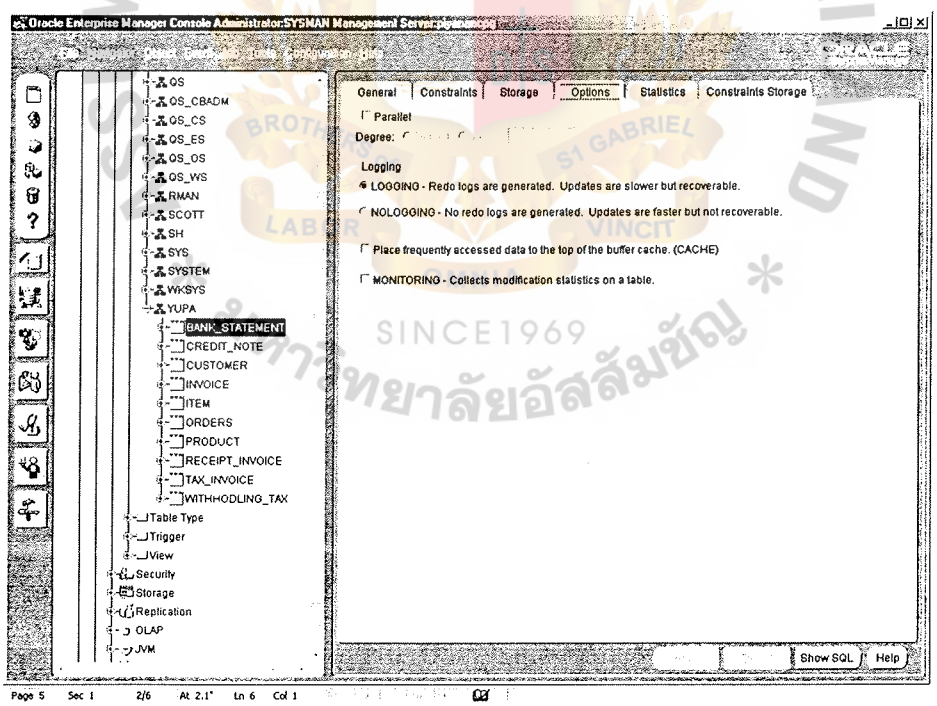


Figure F.9. Options for Bank Statement Database.

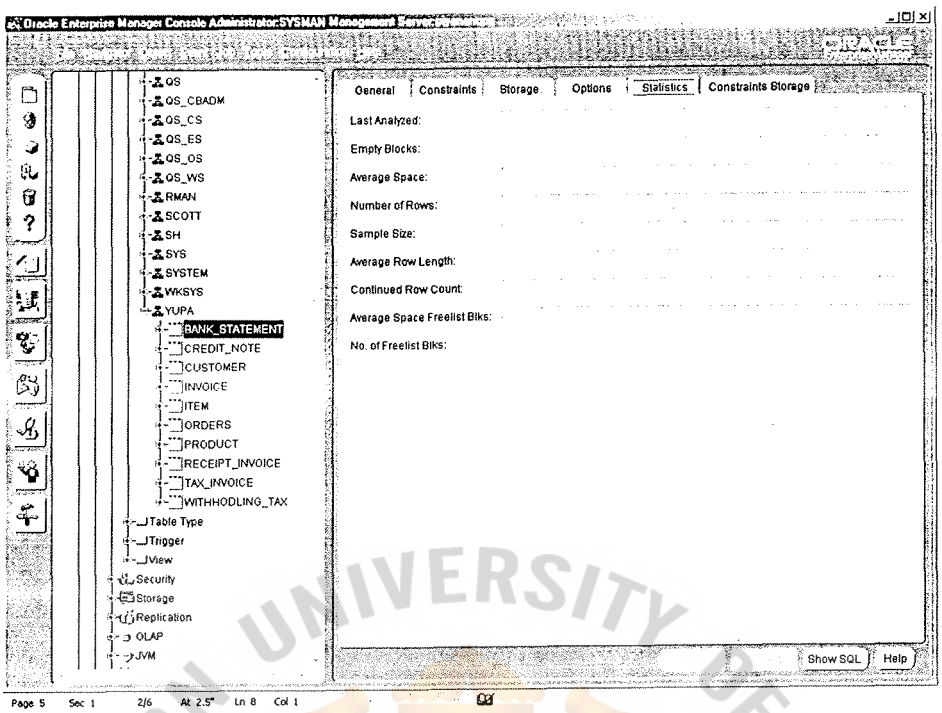


Figure F.10. Statistics for Bank Statement Database.

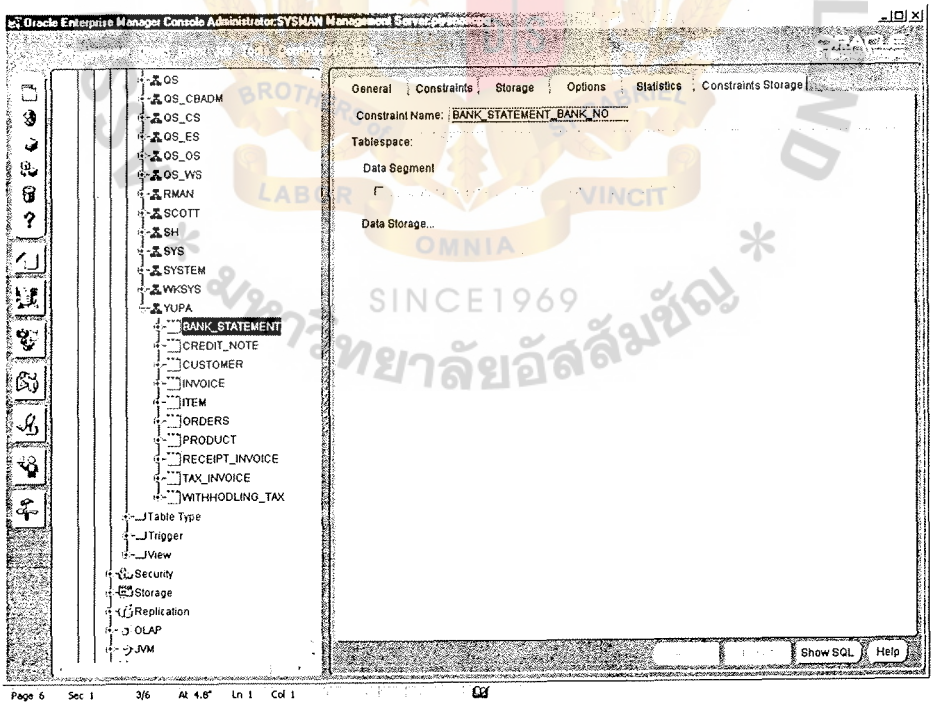


Figure F.11. Constraints Storage for Bank Statement Database.

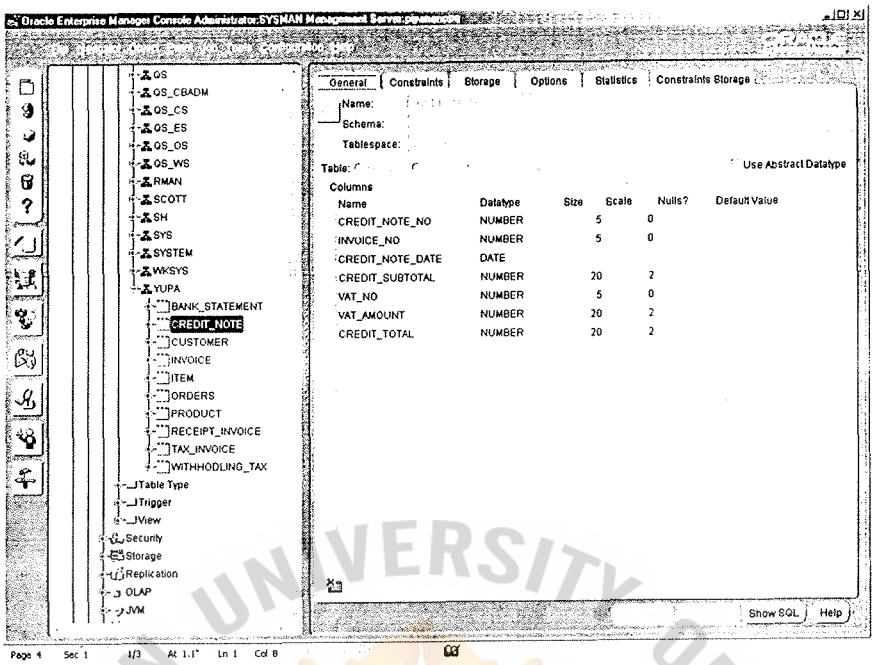


Figure F.12. General Table Record for Credit_Note Invoice.

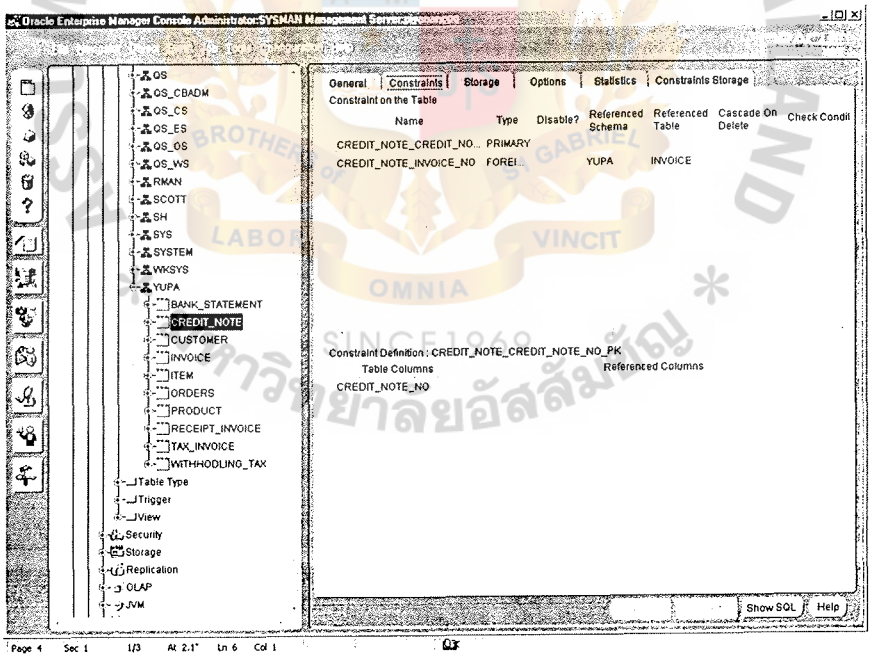


Figure F.13. Constraints for Credit_Note Invoice.

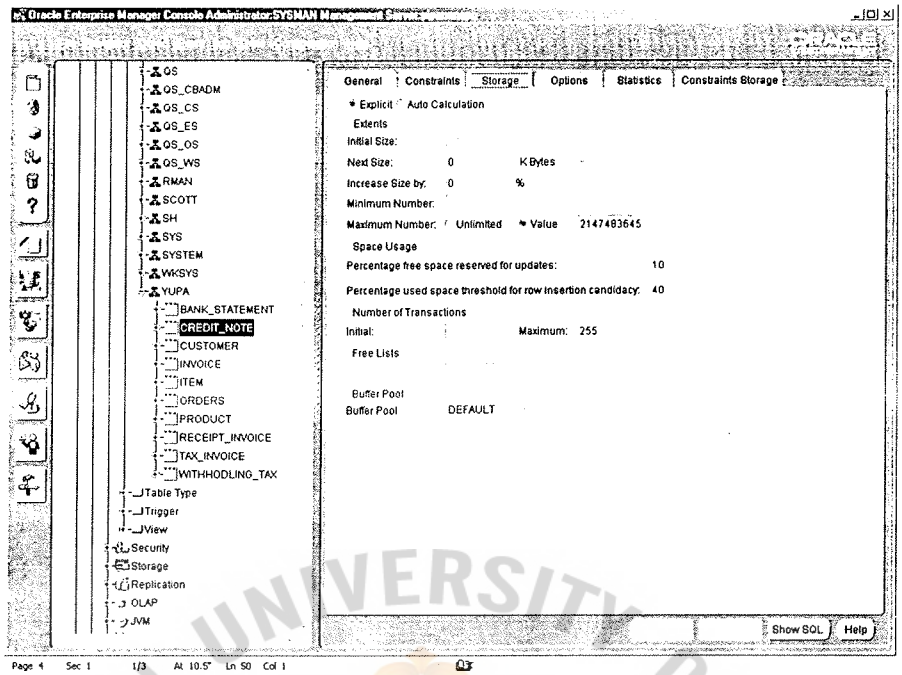


Figure F.14. Storage for Credit_Note Invoice.

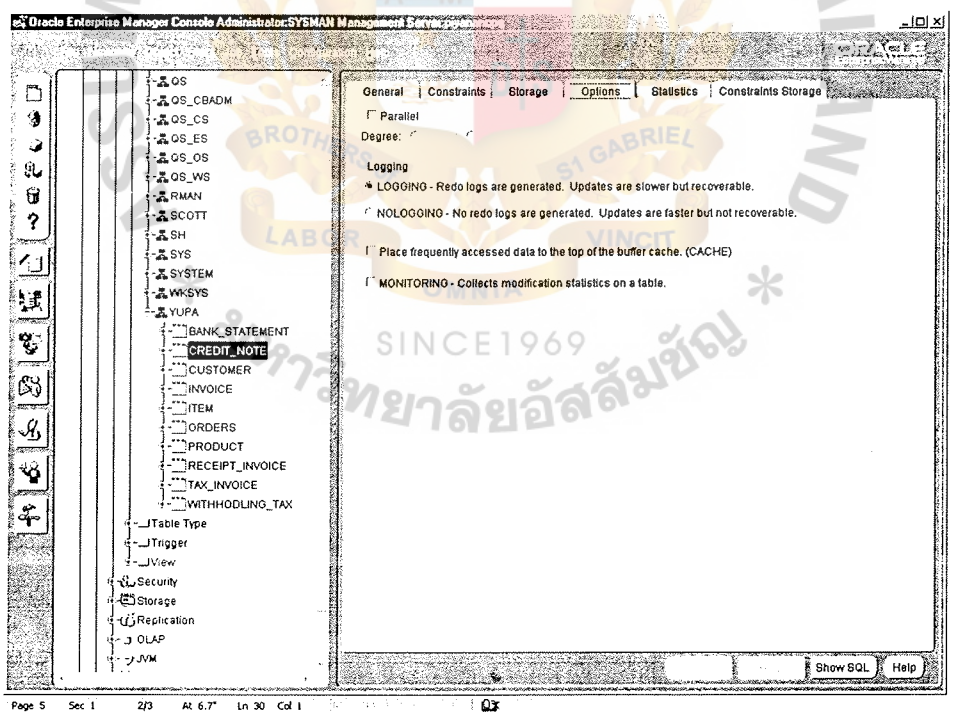


Figure F.15. Options for Credit_Note Invoice.

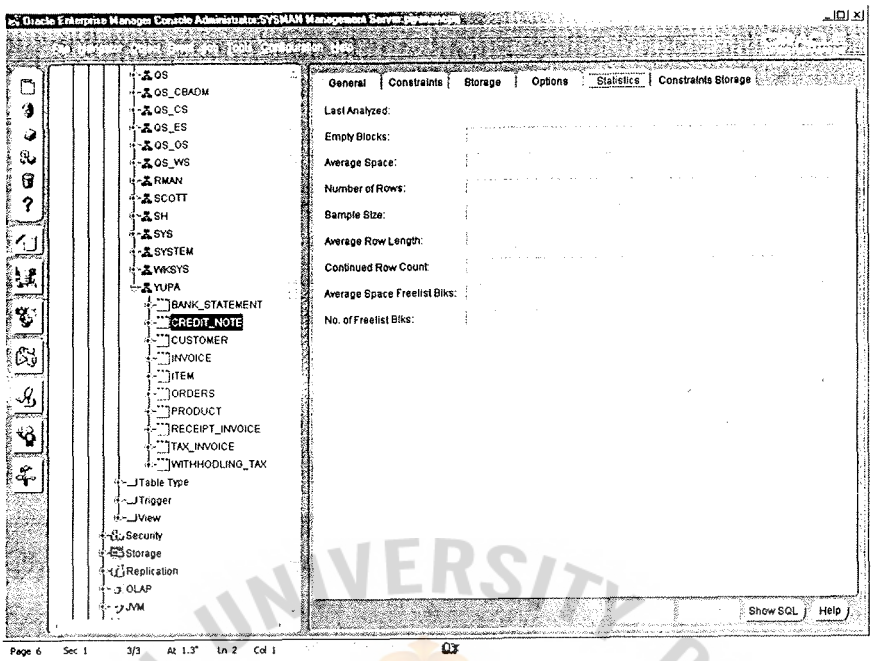


Figure F.16. Statistics for Credit_Note Invoice.

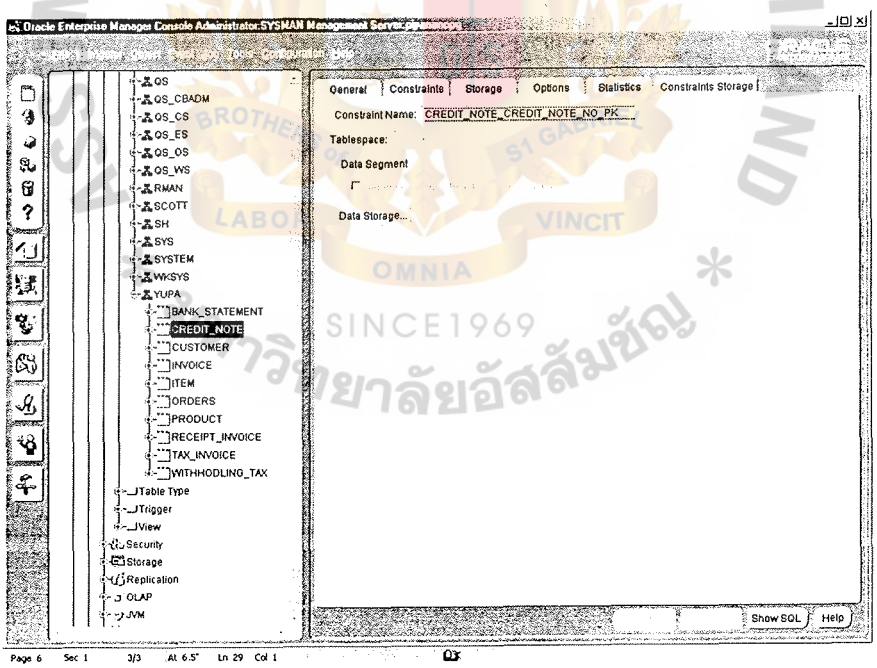


Figure F.17. Constraints Storage for Credit_Note Invoice.

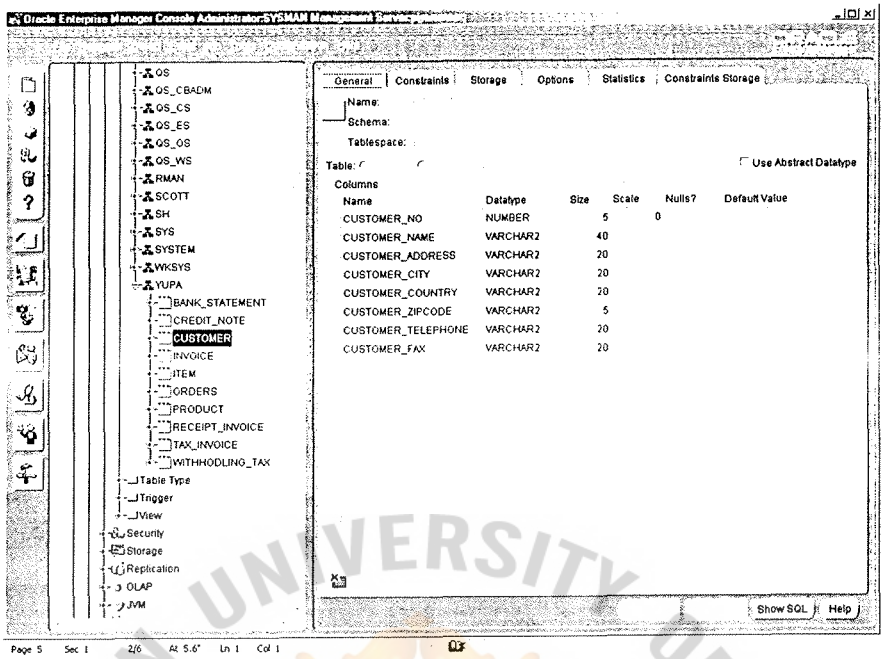


Figure F.18. General Table Record for Customer.

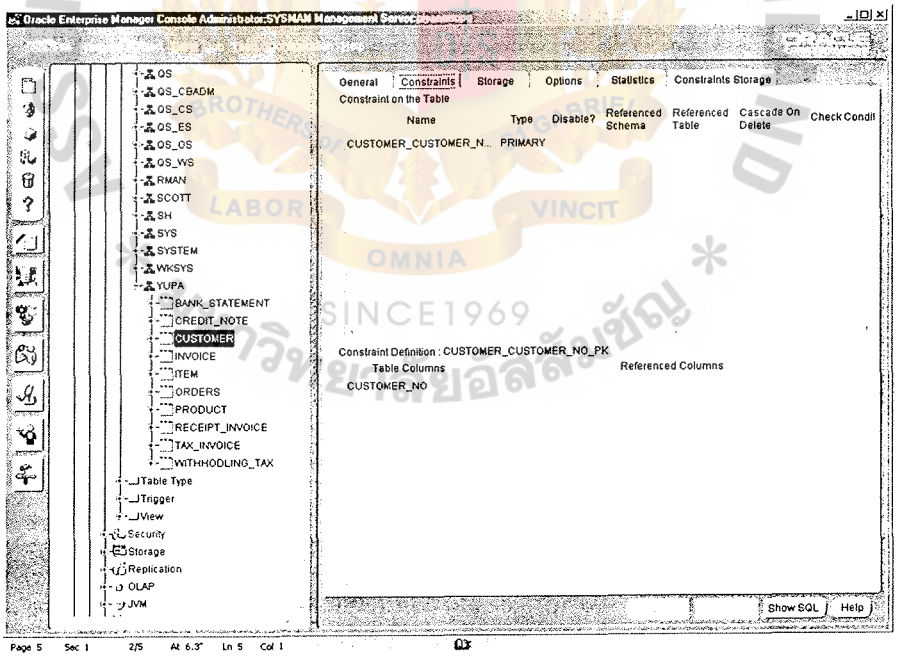


Figure F.19. Constraints for Customer.

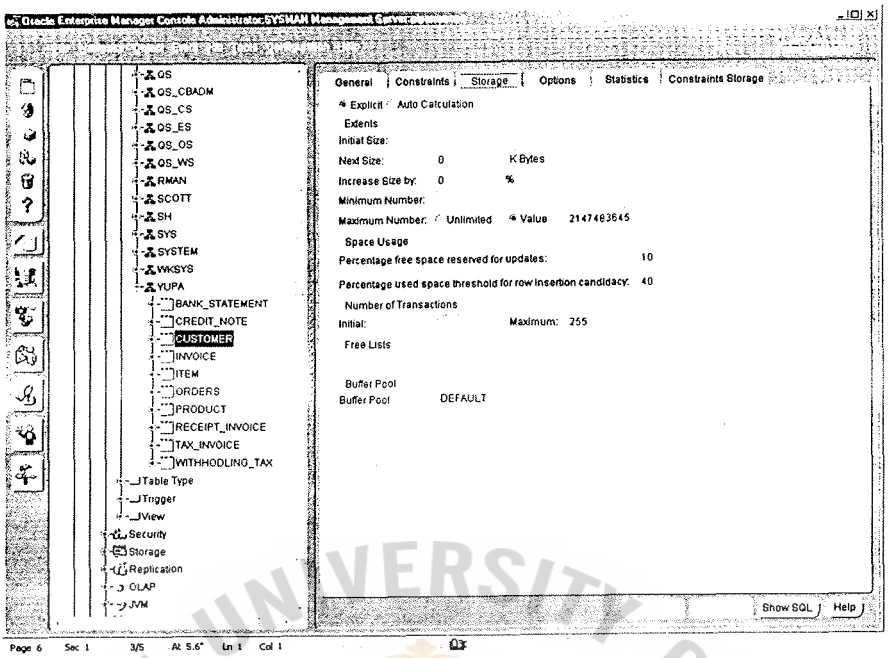


Figure F.20. Storage for Customer.

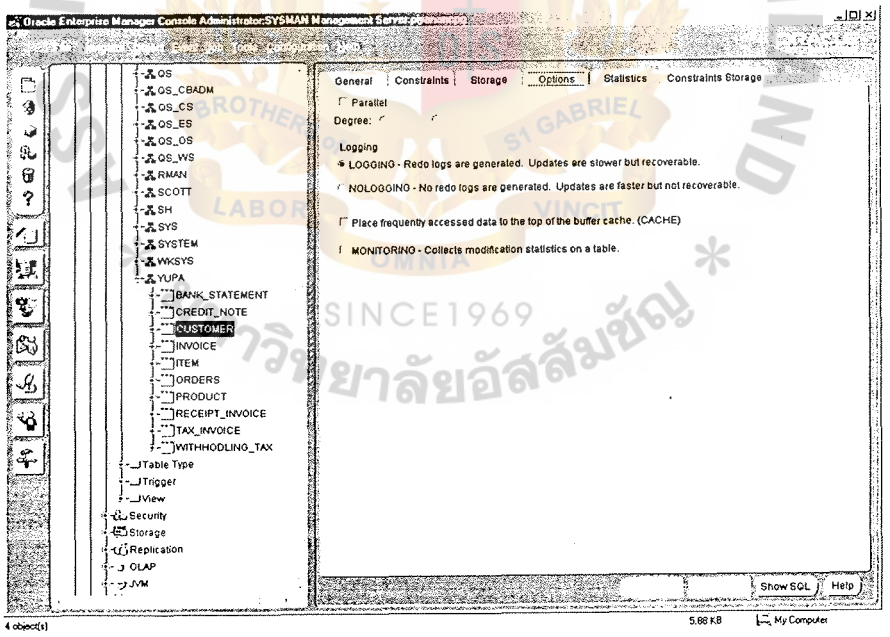


Figure F.21. Options for Customer.

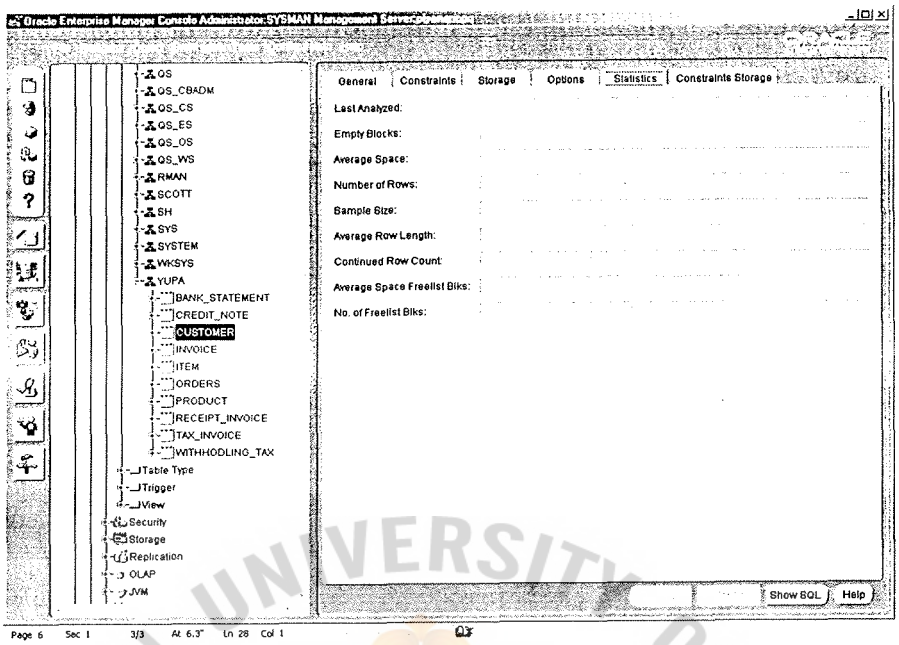


Figure F.22. Statistics for Customer.

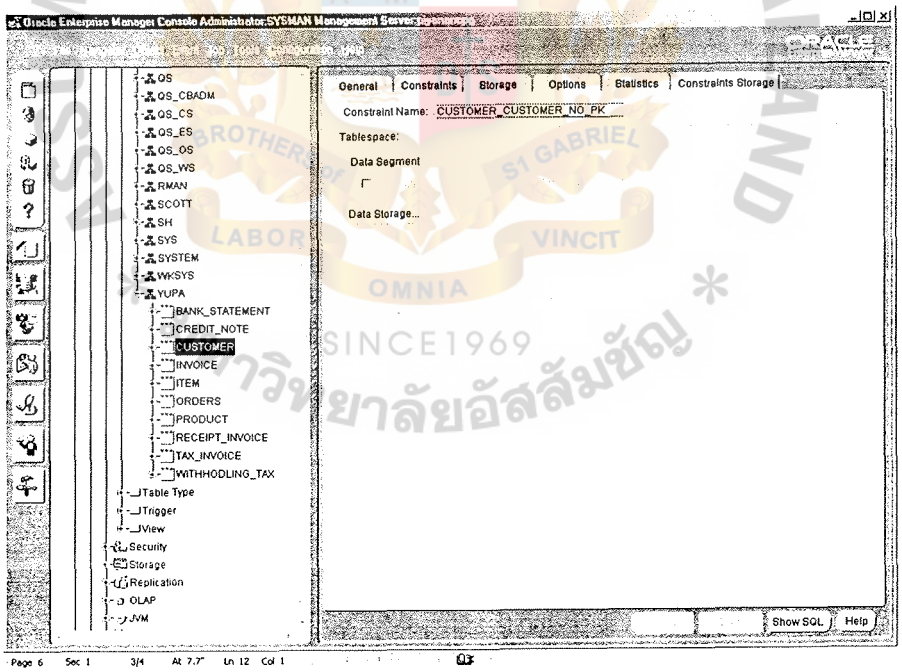


Figure F.23. Constraints Storage for Customer.

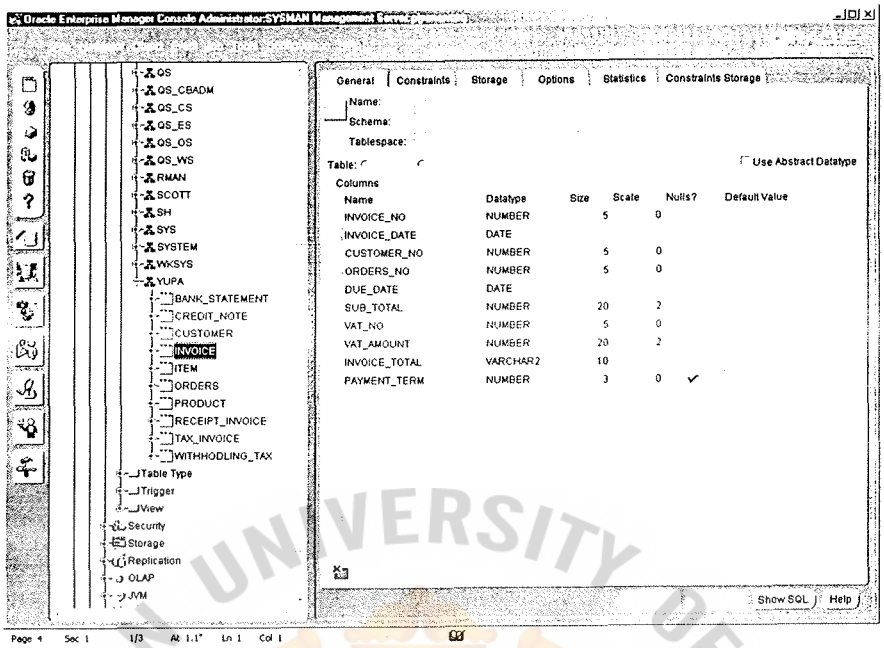


Figure F.24. General Table Record for Invoice.

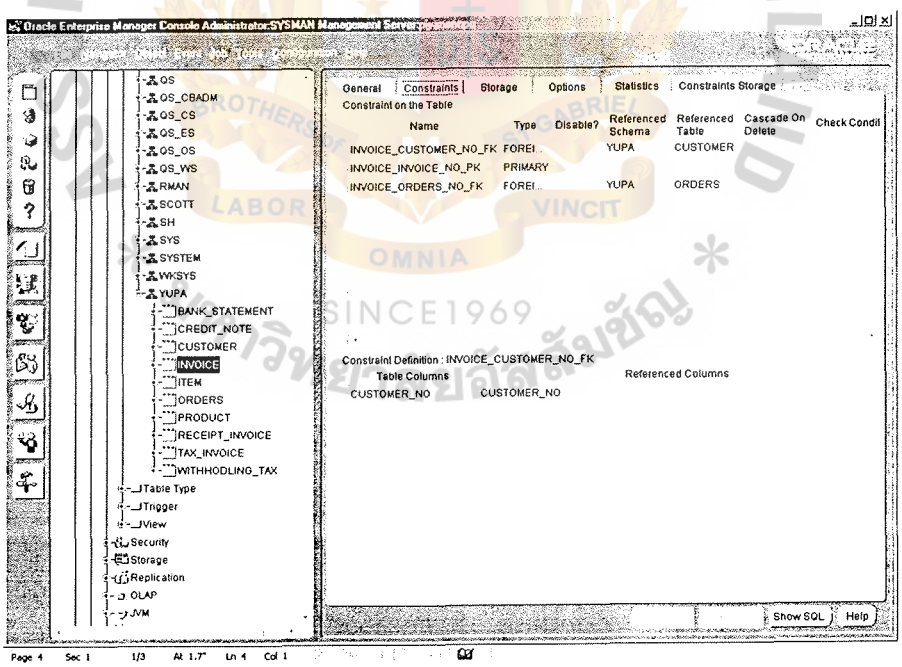


Figure F.25. Constraints for Invoice.

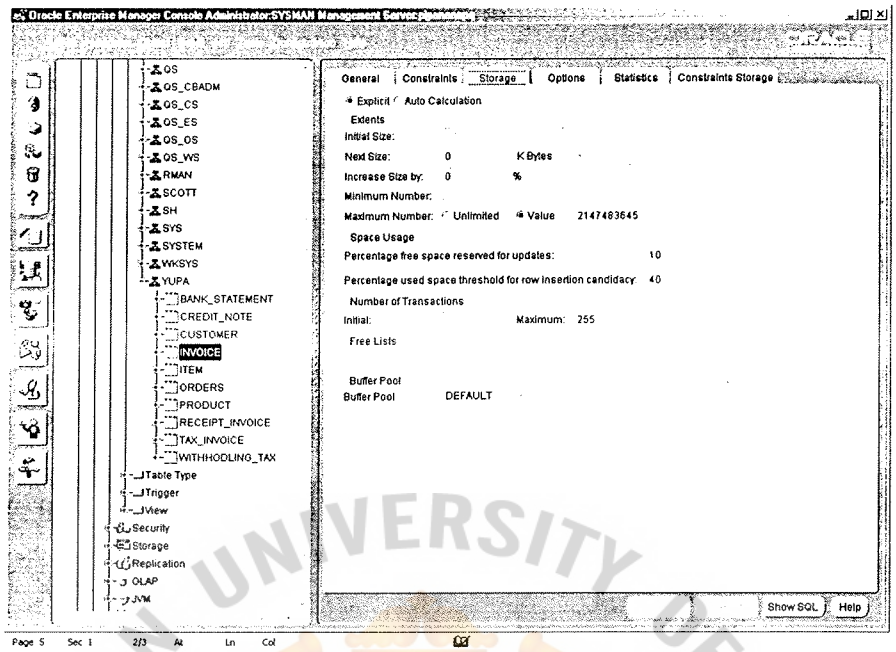


Figure F.26. Storage for Invoice.

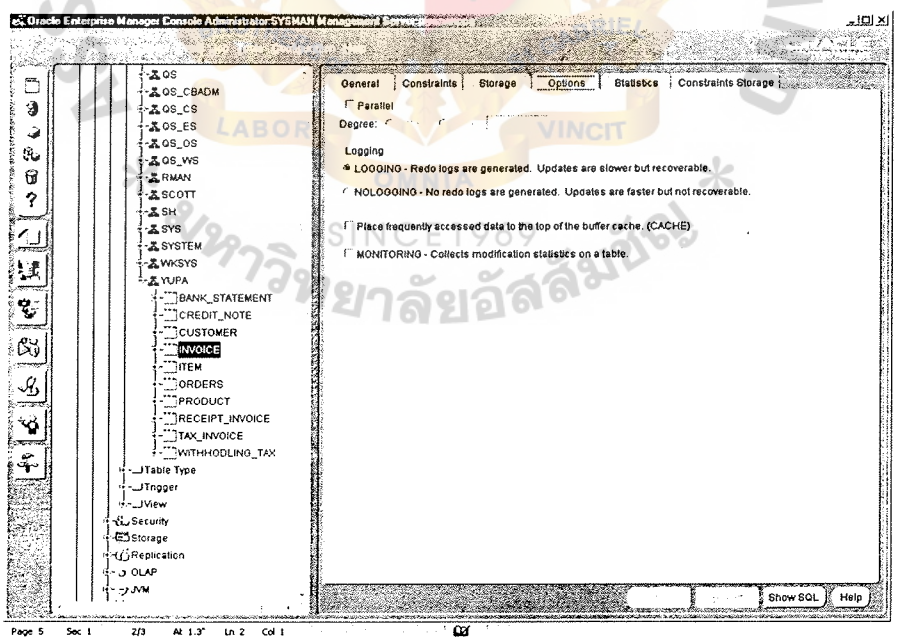


Figure F.27. Options for Invoice.

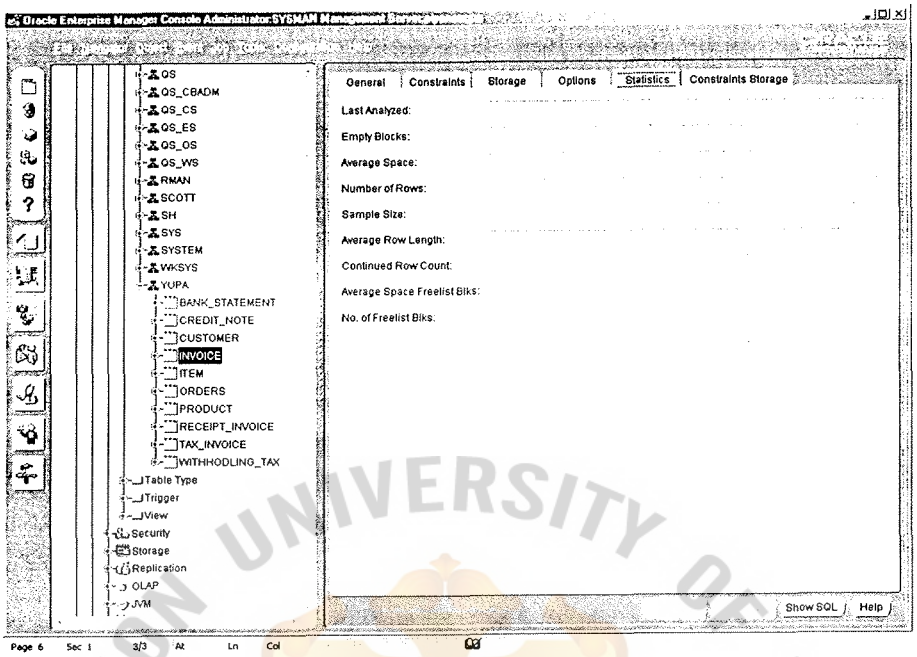


Figure F.28. Statistics for Invoice.

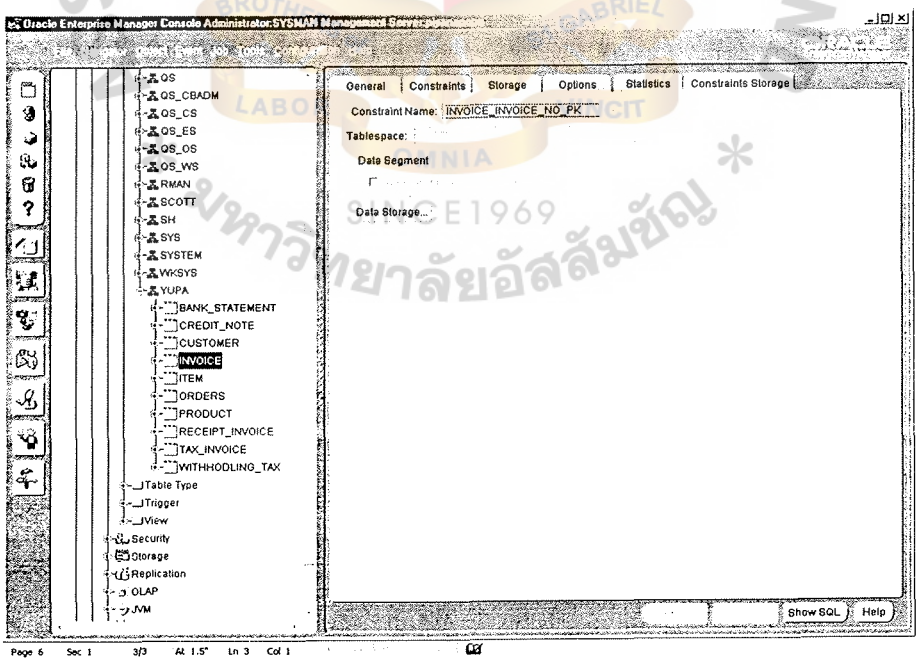


Figure F.29. Constraints Storage for Invoice.

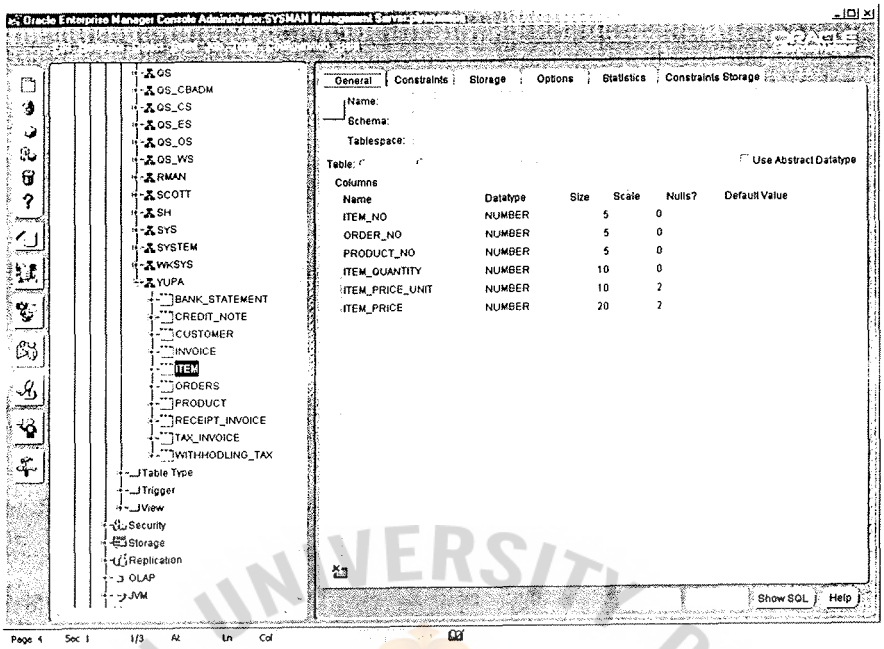


Figure F.30. General Table Record for Item.

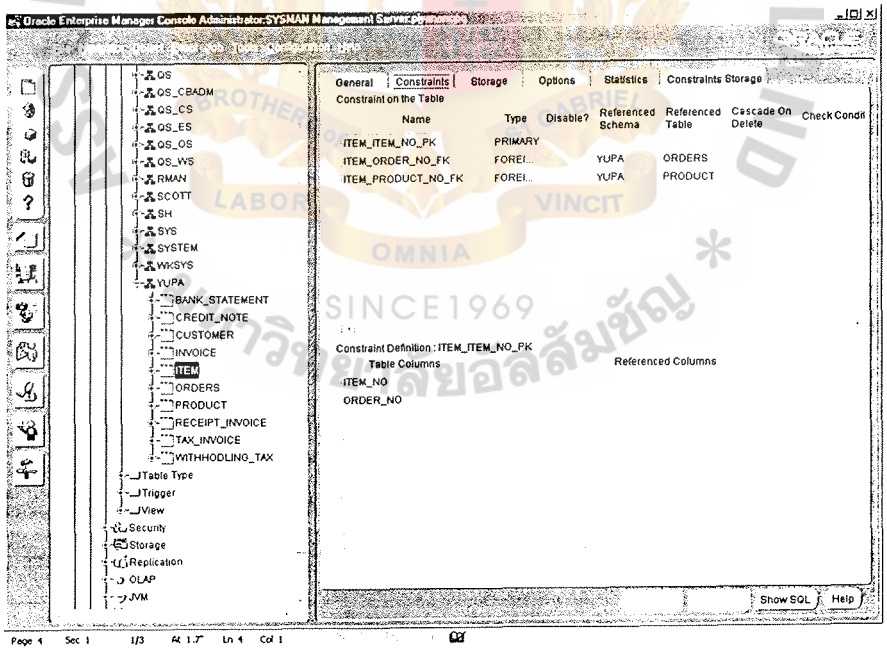


Figure F.31. Constraints for Item.

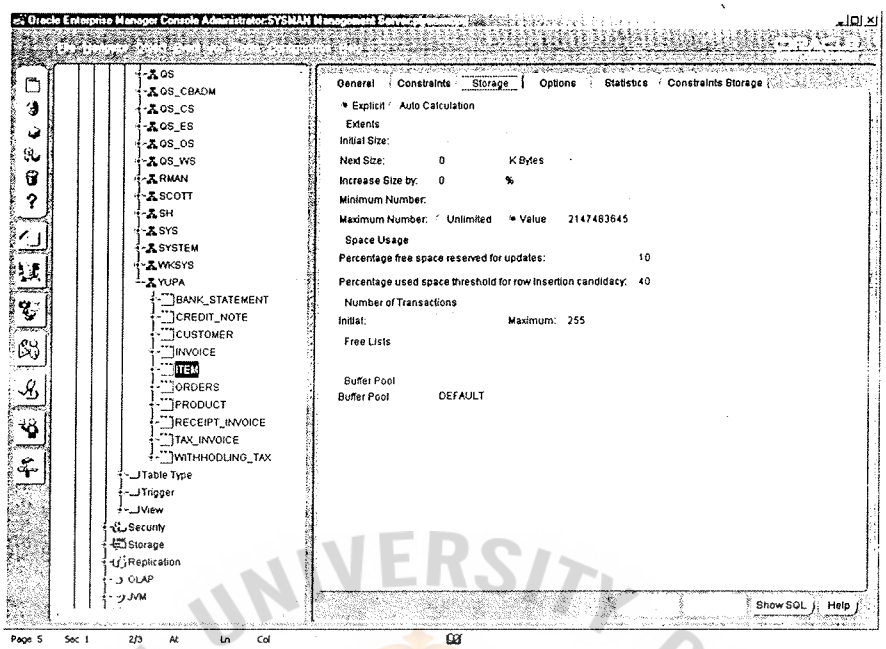


Figure F.32. Storage for Item.

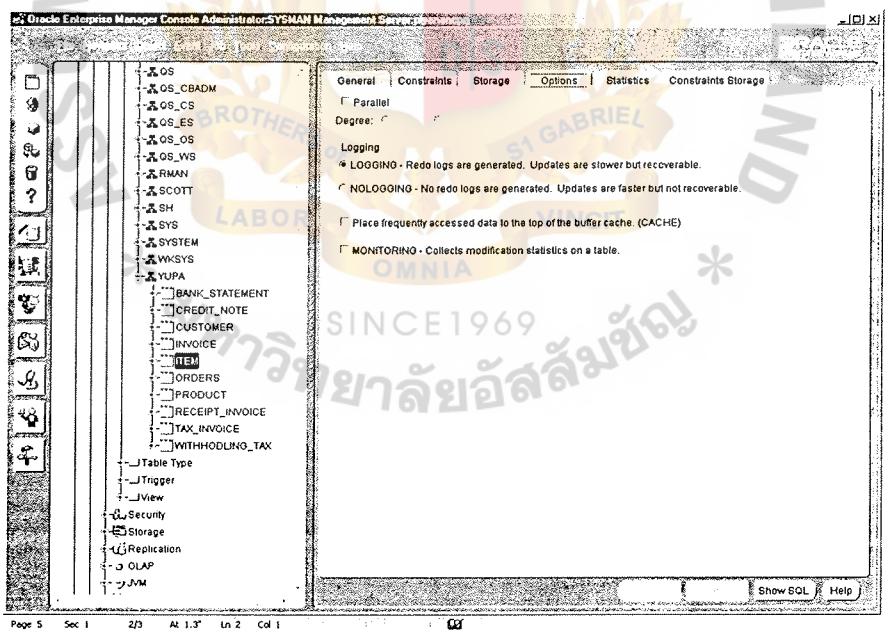


Figure F.33. Options for Item.

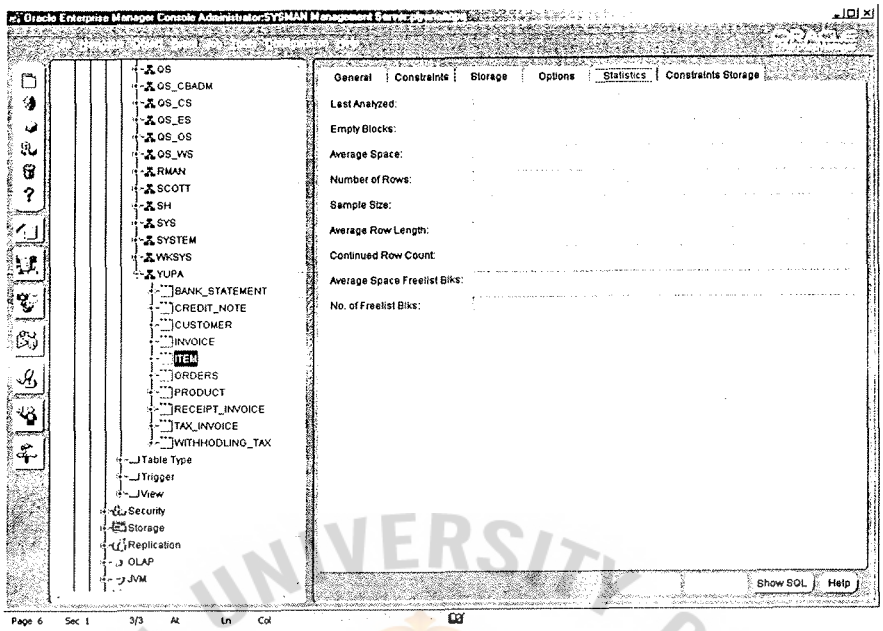


Figure F.34. Statistics for Item.

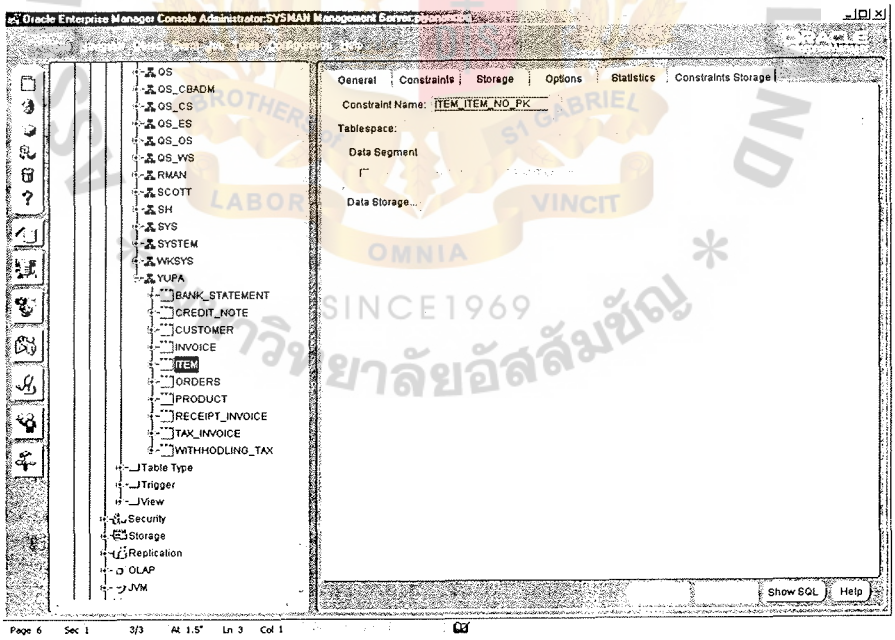


Figure F.35. Constraints Storage for Item.

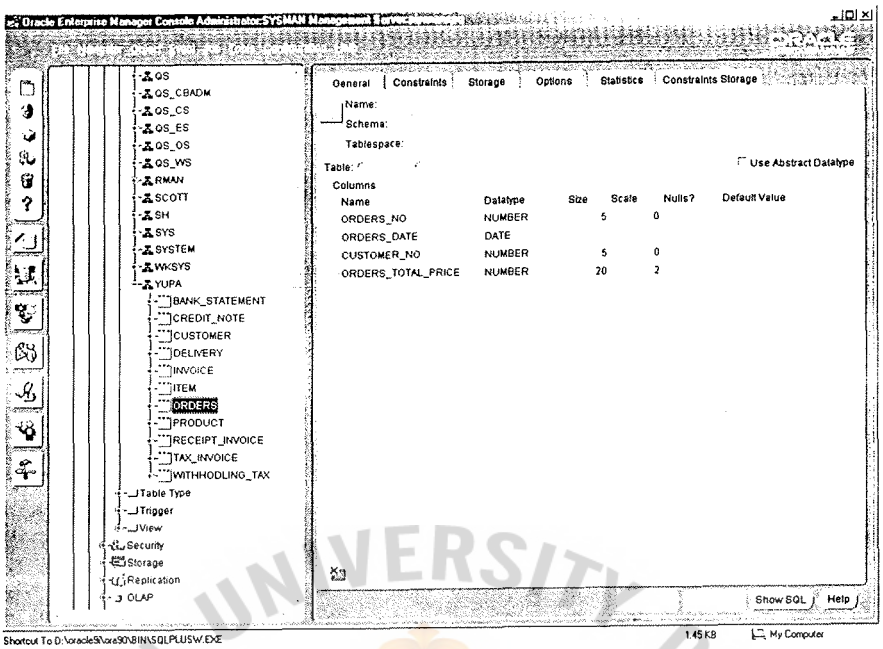


Figure F.36. General Table Record for Order.

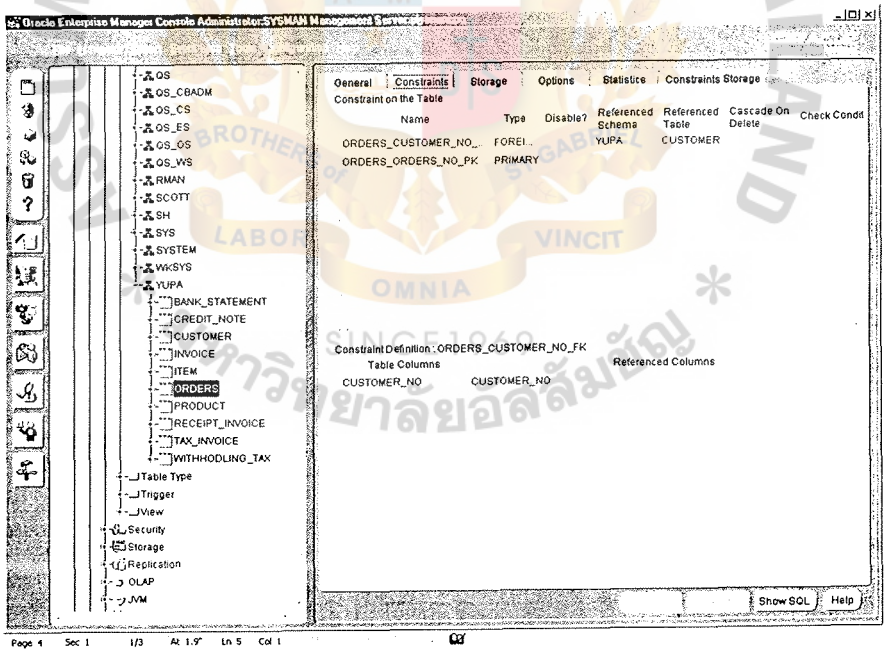


Figure F.37. Constraints for Order.

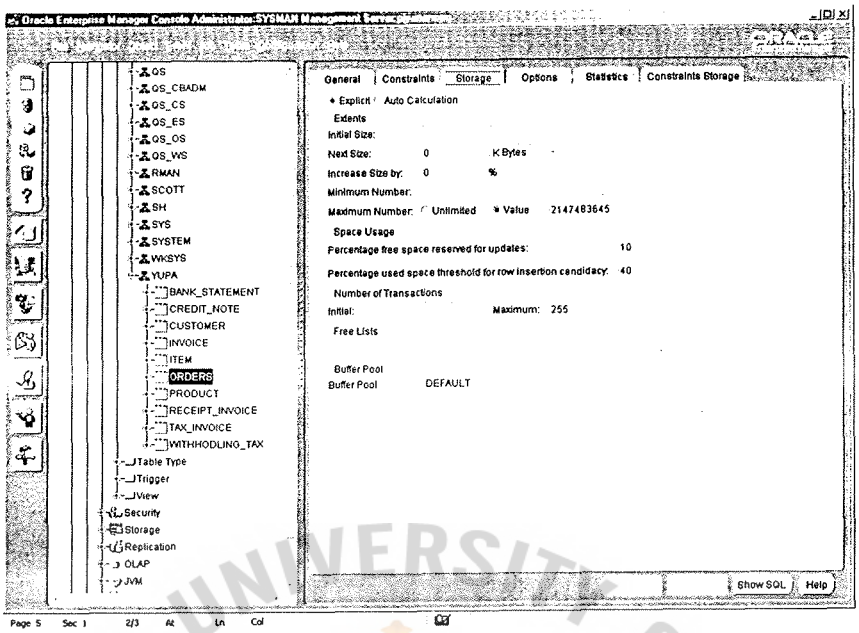


Figure F.38. Storage for Order.

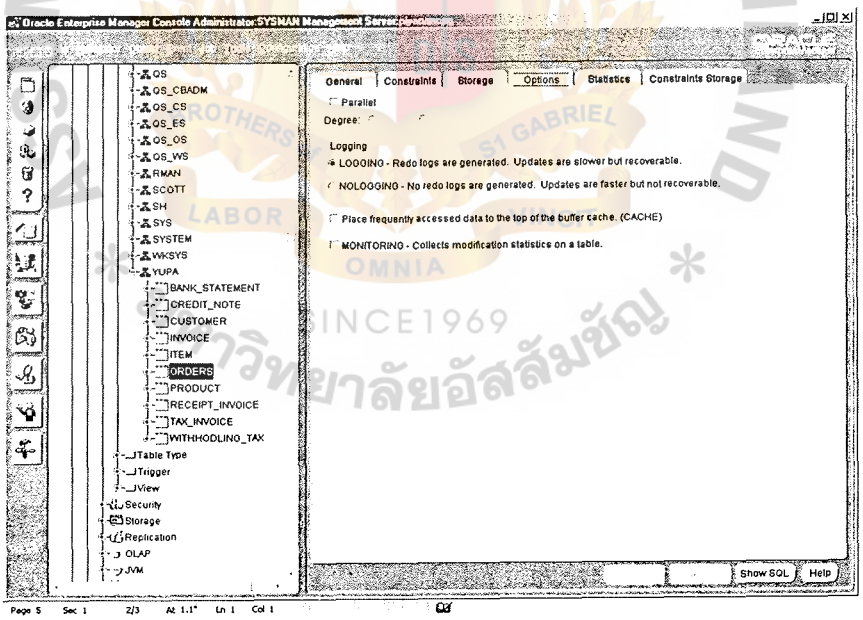


Figure F.39. Options for Order.

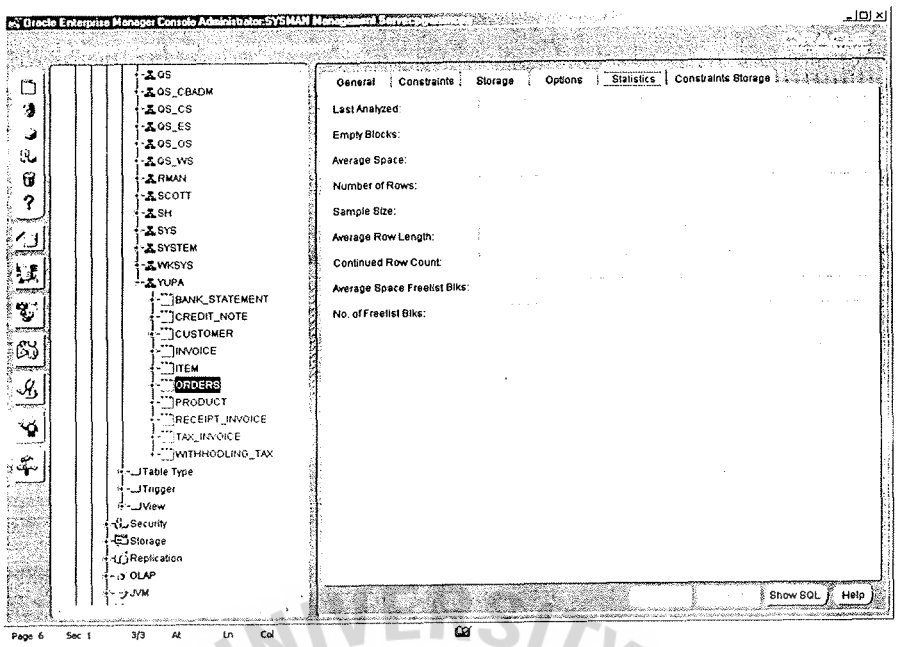


Figure F.40. Statistics for Order.

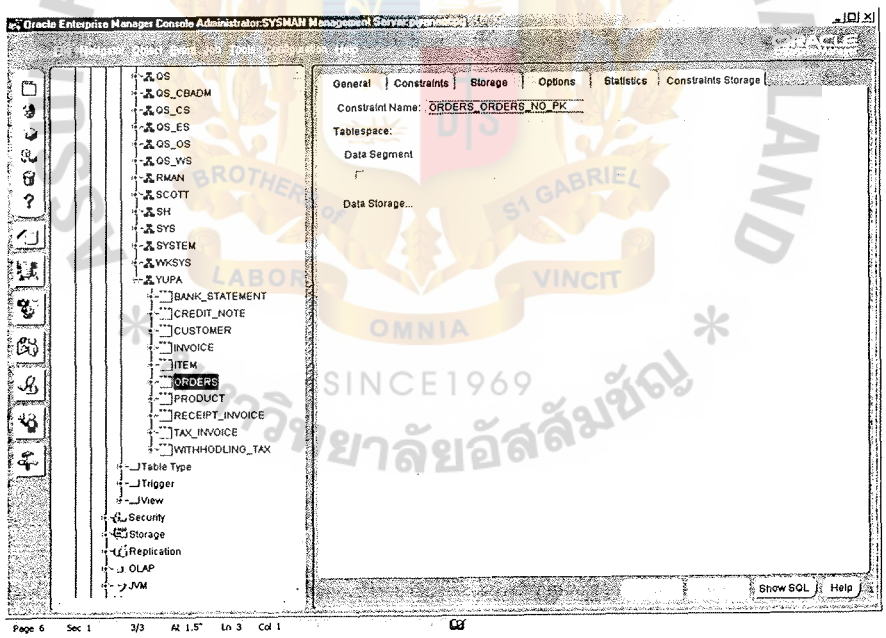


Figure F.41. Constraints Storage for Order.

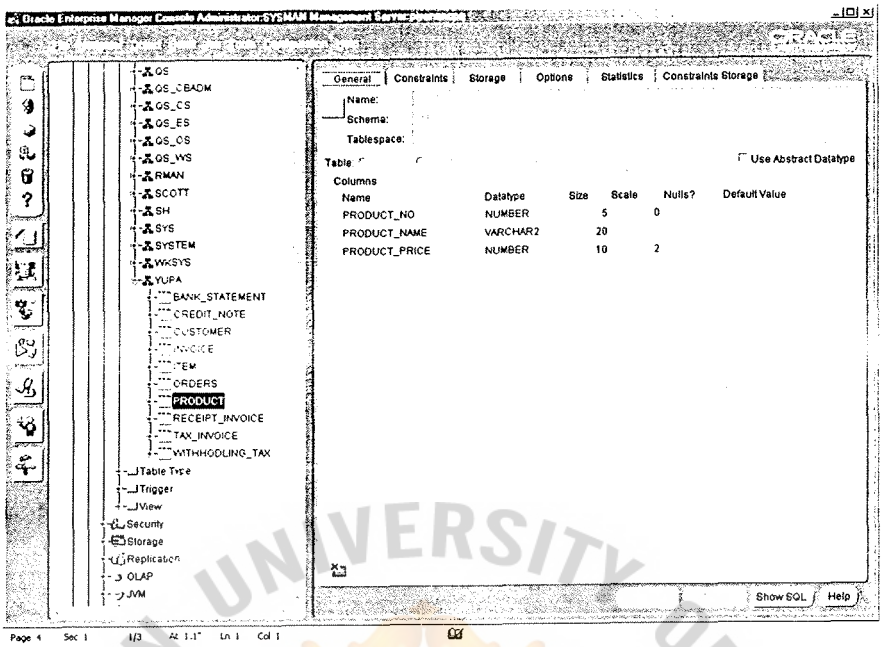


Figure F.42. General Table Record for Product.

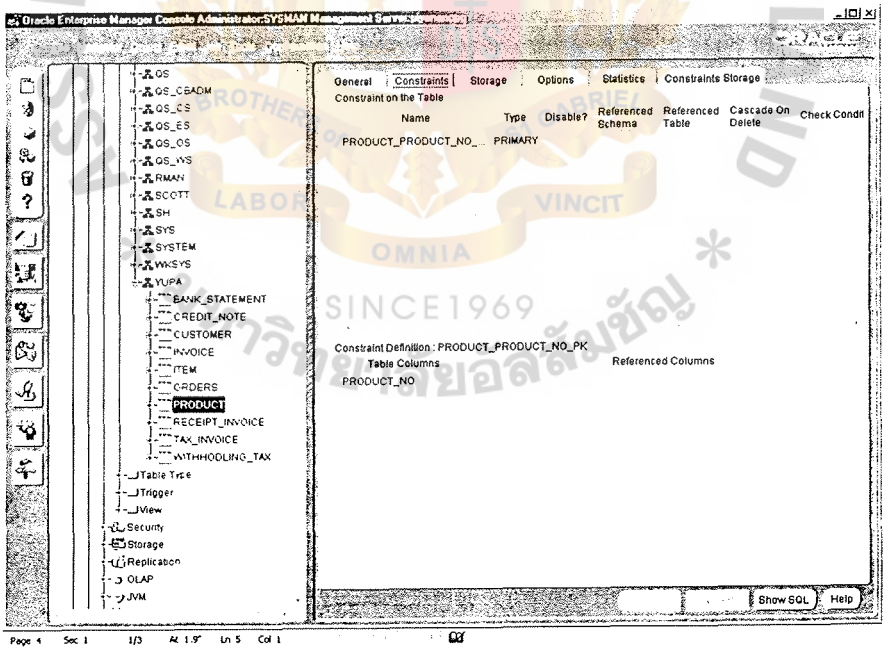


Figure F.43. Constraints for Product.

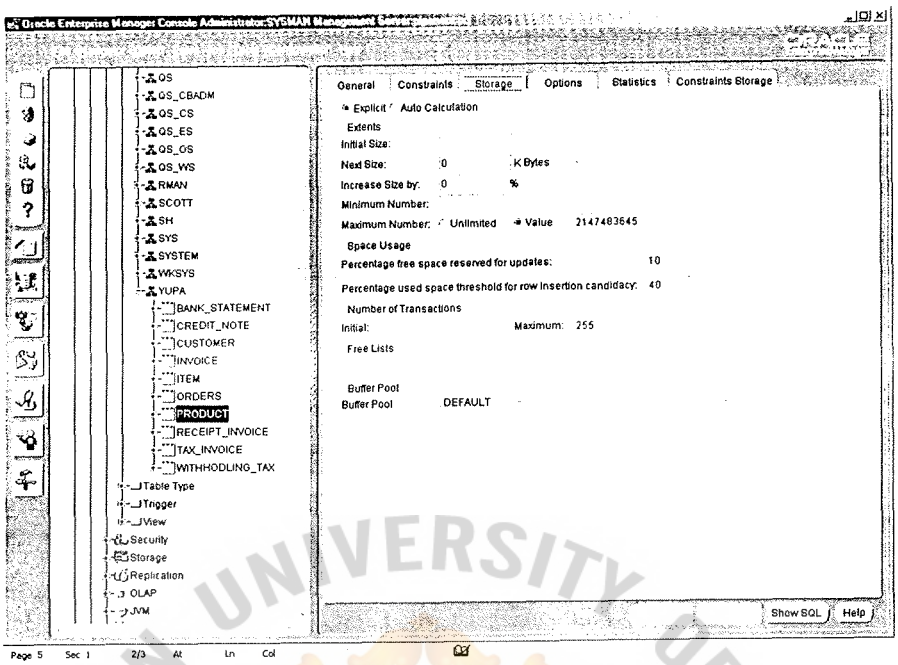


Figure F.44. Storage for Product.

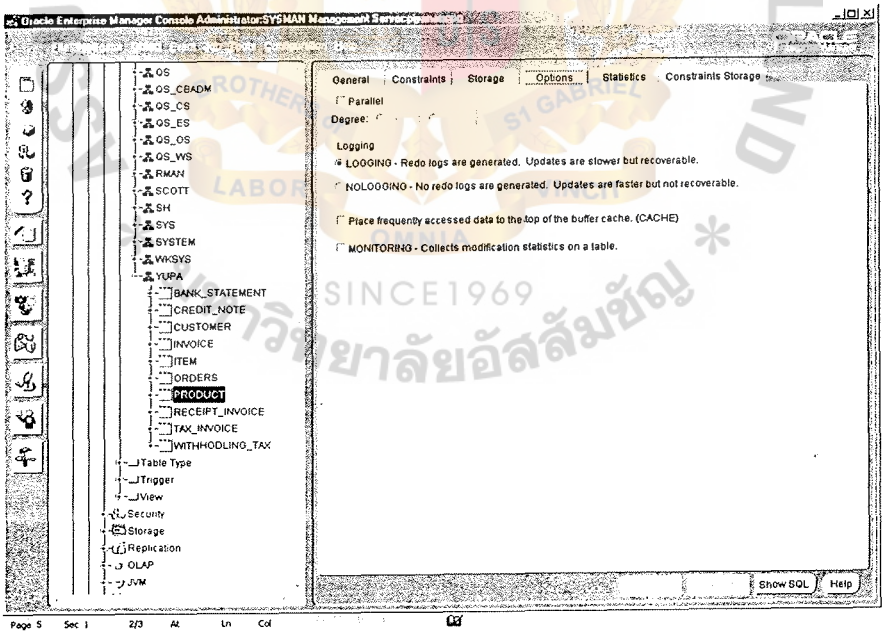


Figure F.45. Options for Product.

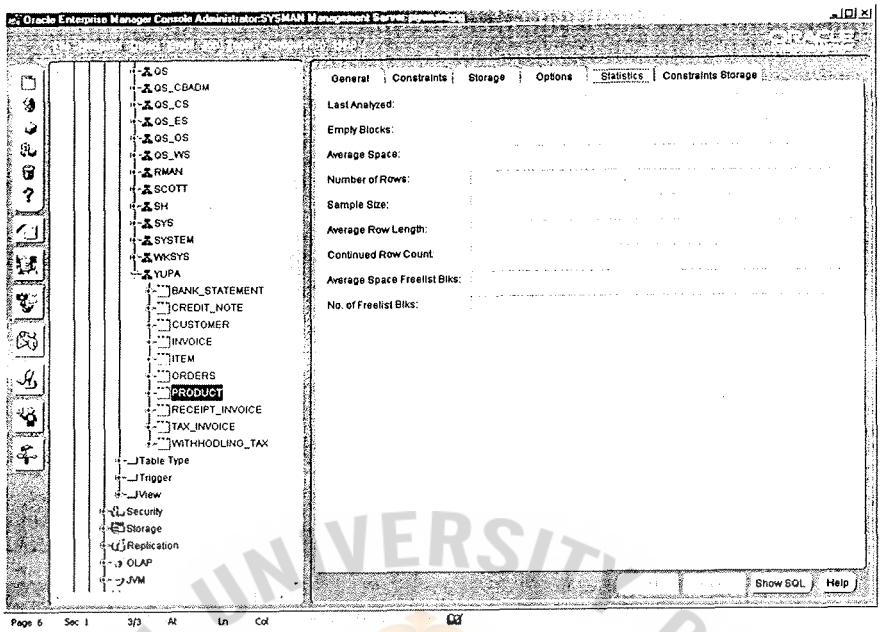


Figure F.46. Statistics for Product.

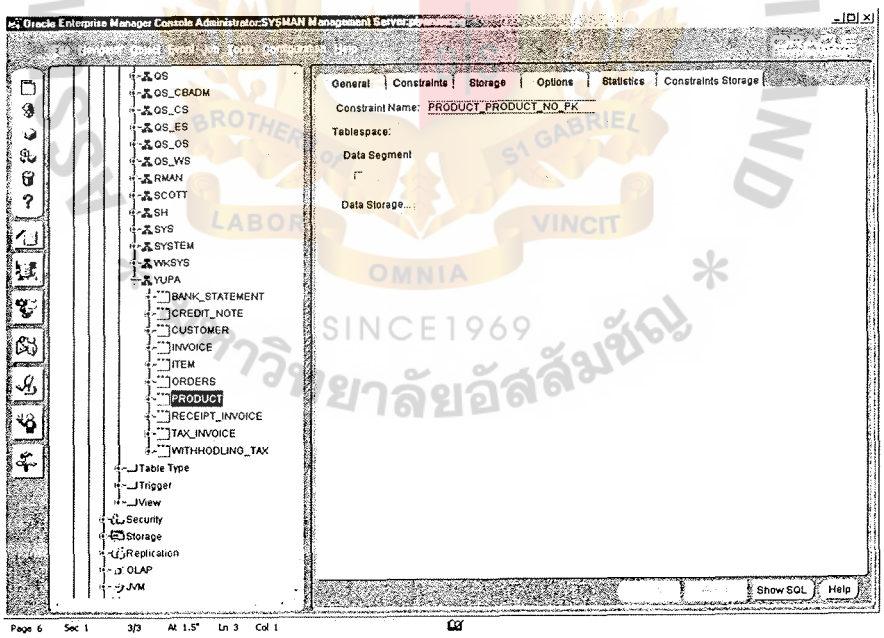


Figure F.47. Constraints Storage for Product.

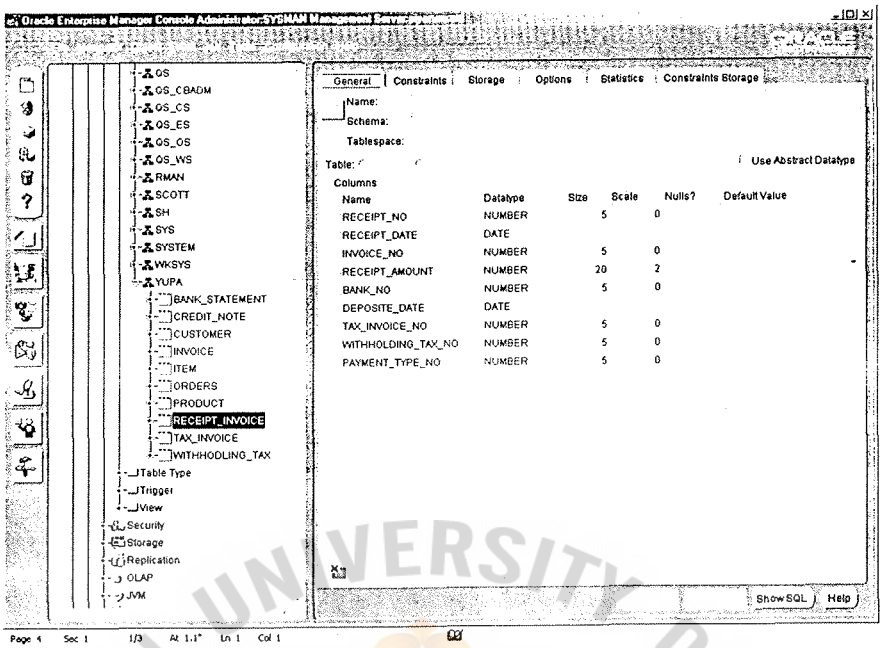


Figure F.48. General Table Record for Invoice Receipt.

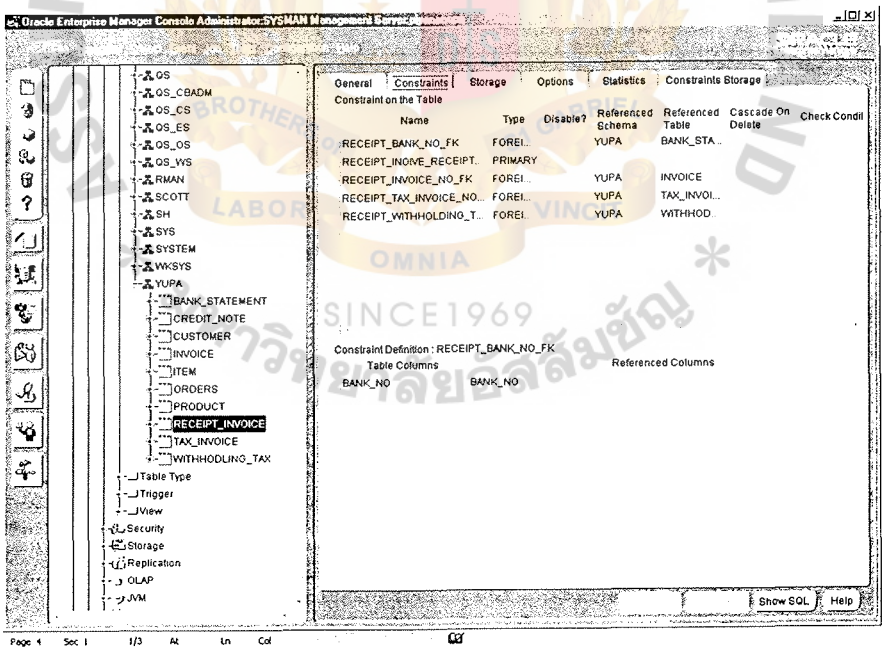


Figure F.49. Constraints for Invoice Receipt.

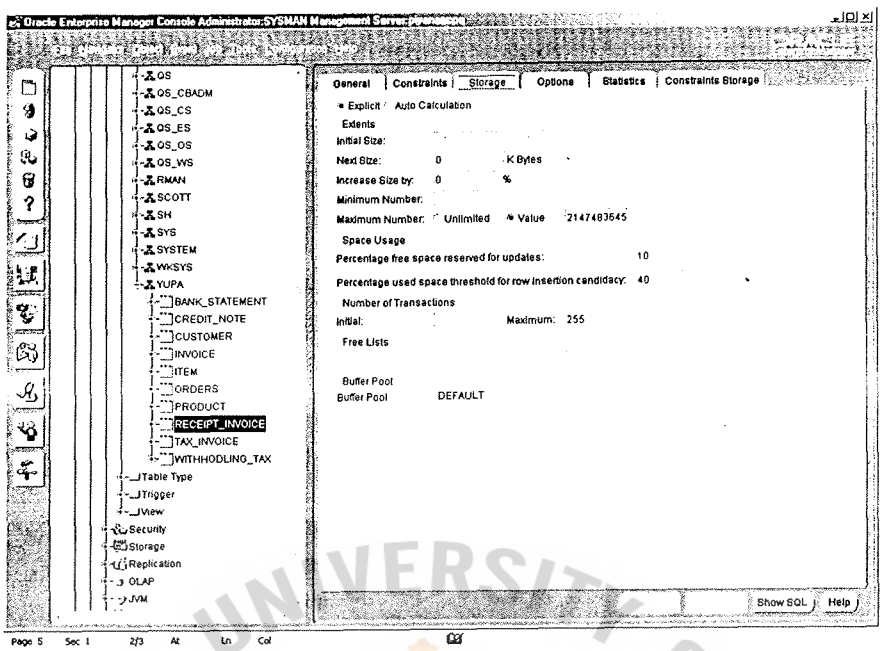


Figure F.50. Storage for Invoice Receipt.

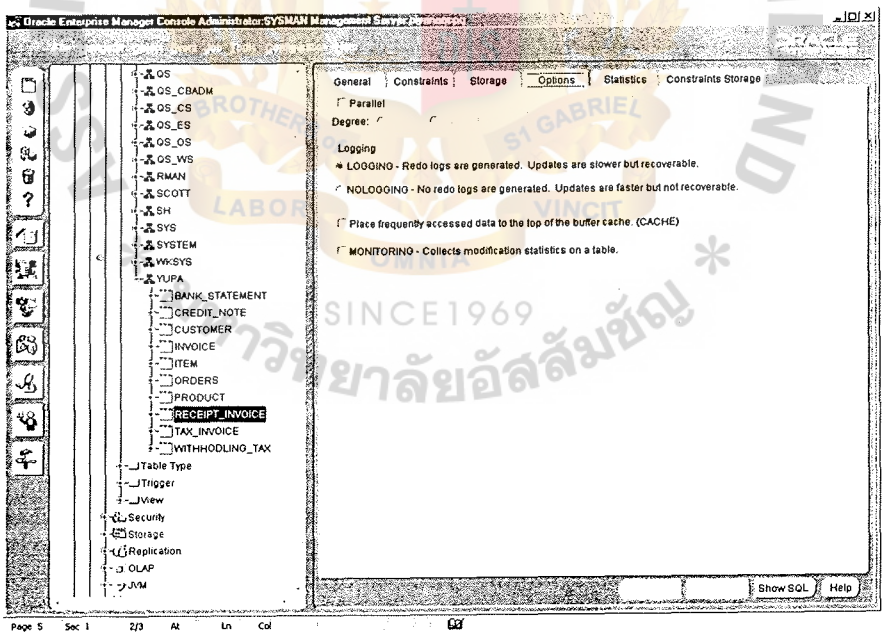


Figure F.51. Options for Invoice Receipt.

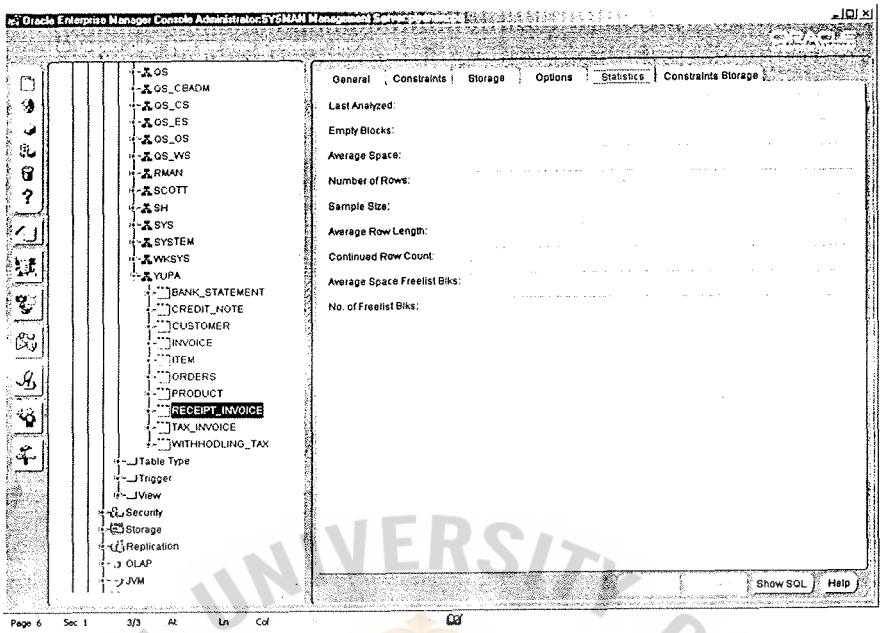


Figure F.52. Statistics for Invoice Receipt.

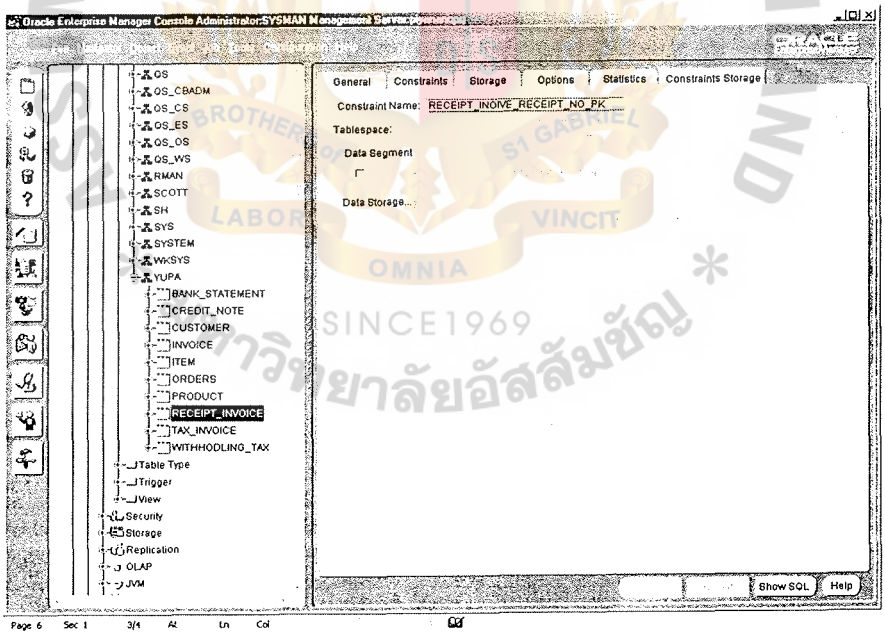


Figure F.53. Constraints Storage for Invoice Receipt.

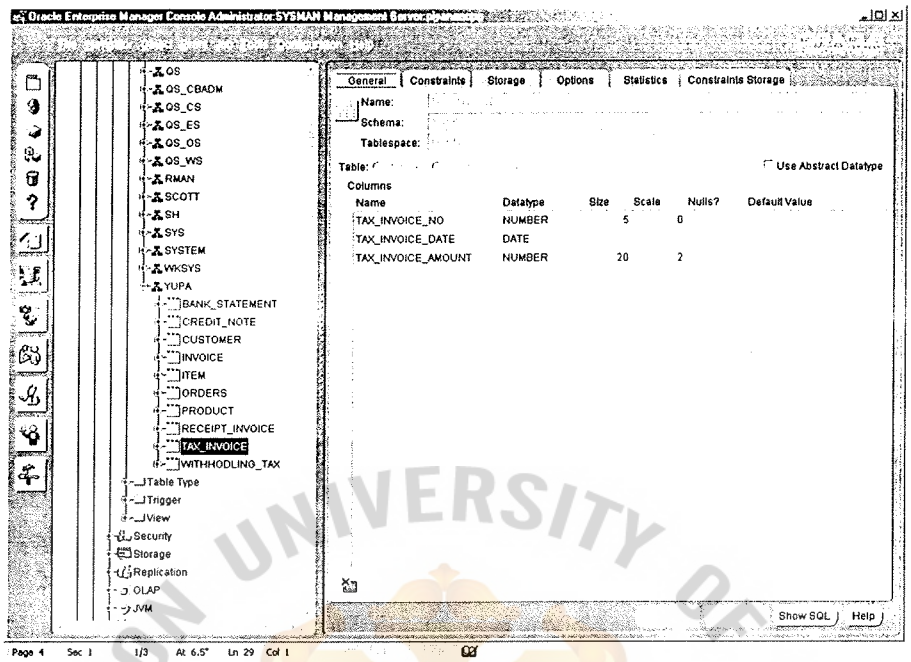


Figure F.54. General Table Record for Tax Invoice.

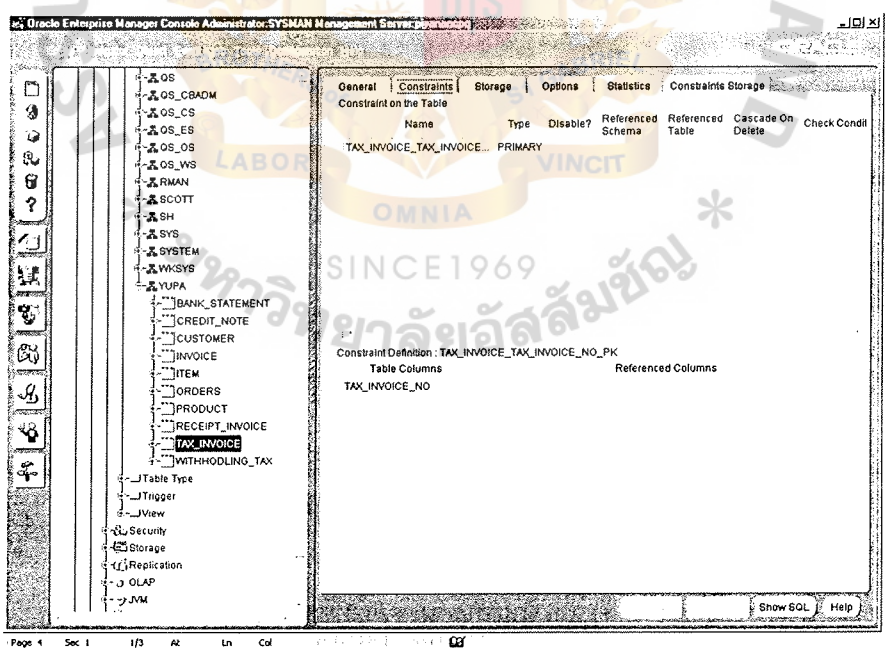


Figure F.55. Constraints for Tax Invoice.

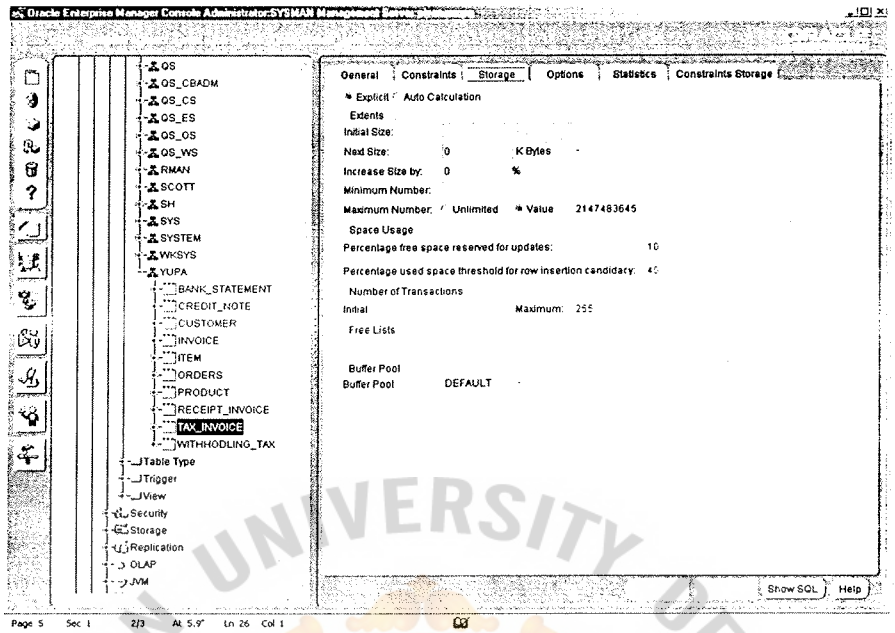


Figure F.56. Storage for Tax Invoice.

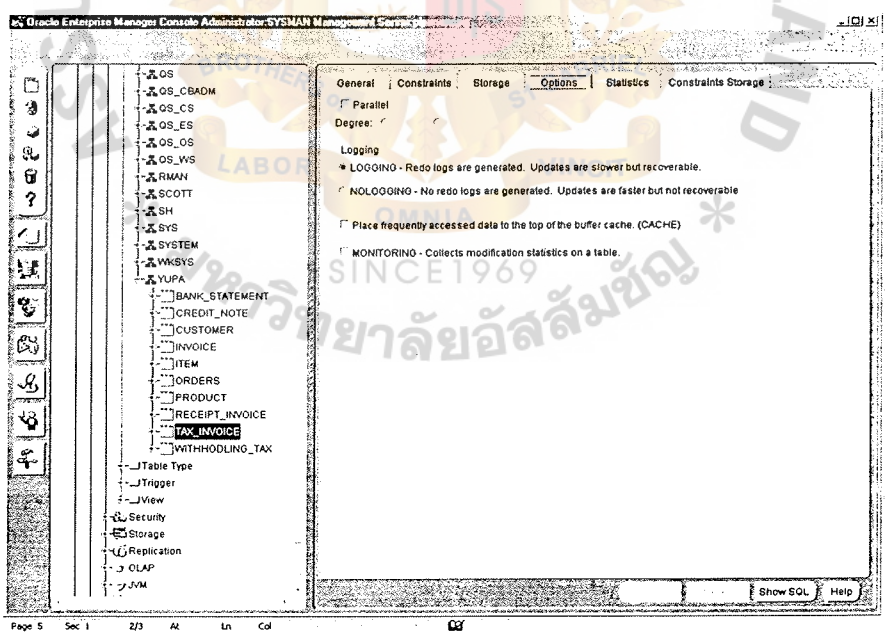


Figure F.57. Options for Tax Invoice.

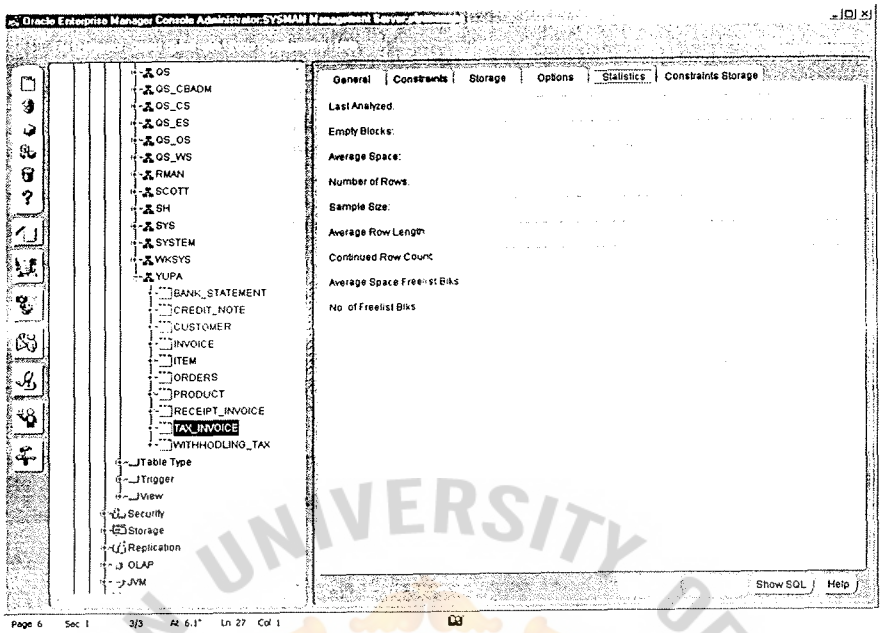


Figure F.58. Statistics for Tax Invoice.

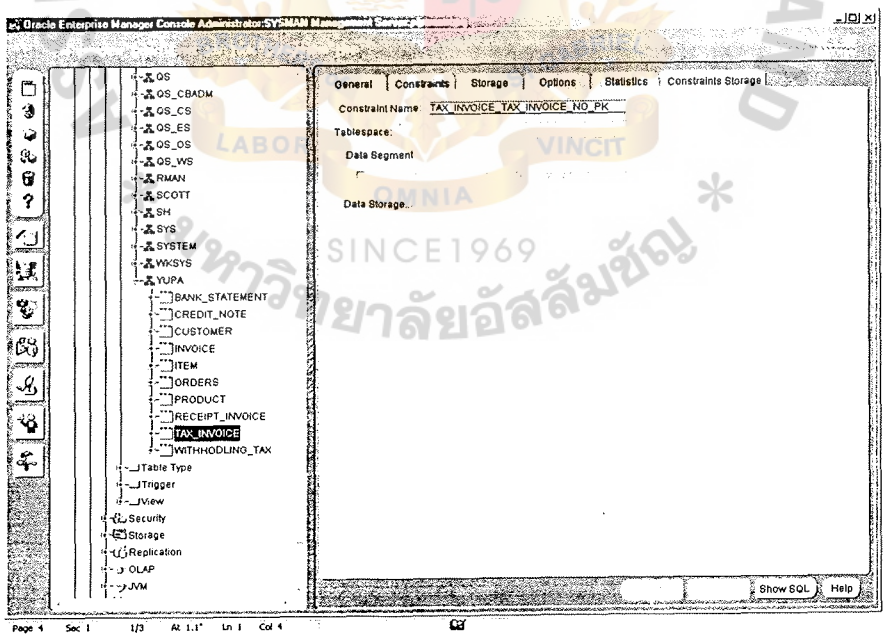


Figure F.59. Constraints Storage for Tax Invoice.

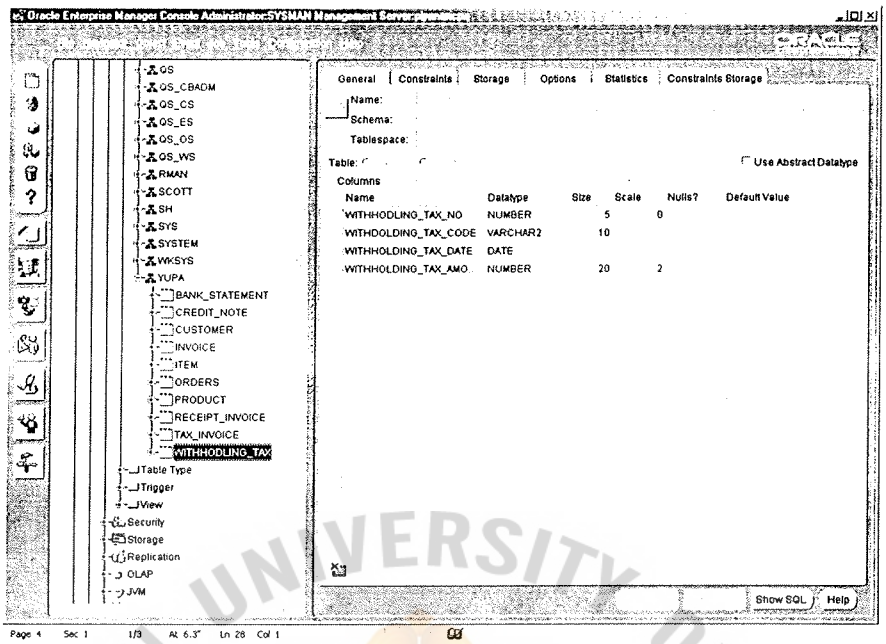


Figure F.60. General Table Record for Withholding Tax.

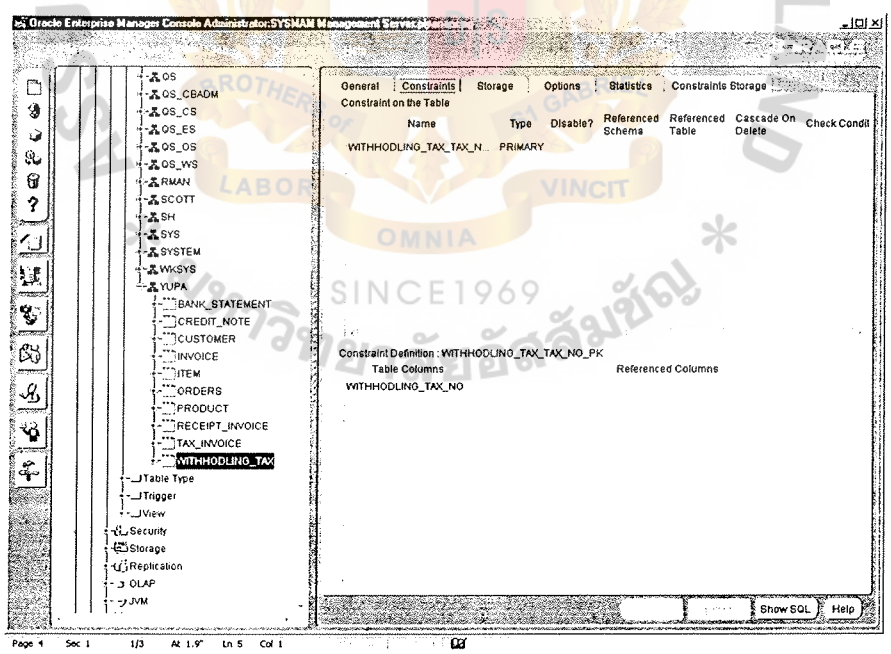


Figure F.61. General for Withholding Tax.

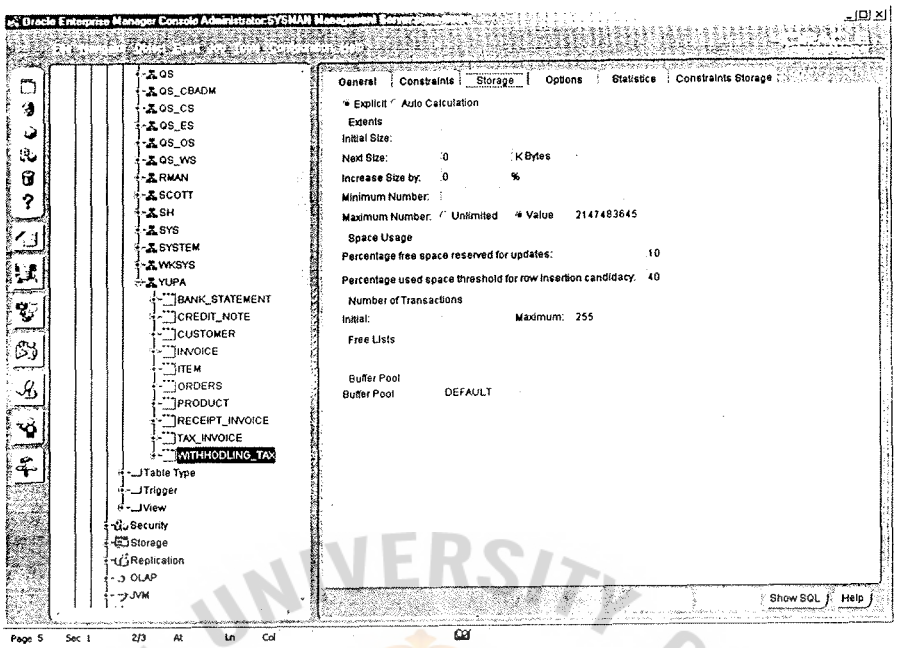


Figure F.62. Storage for Withholding Tax.

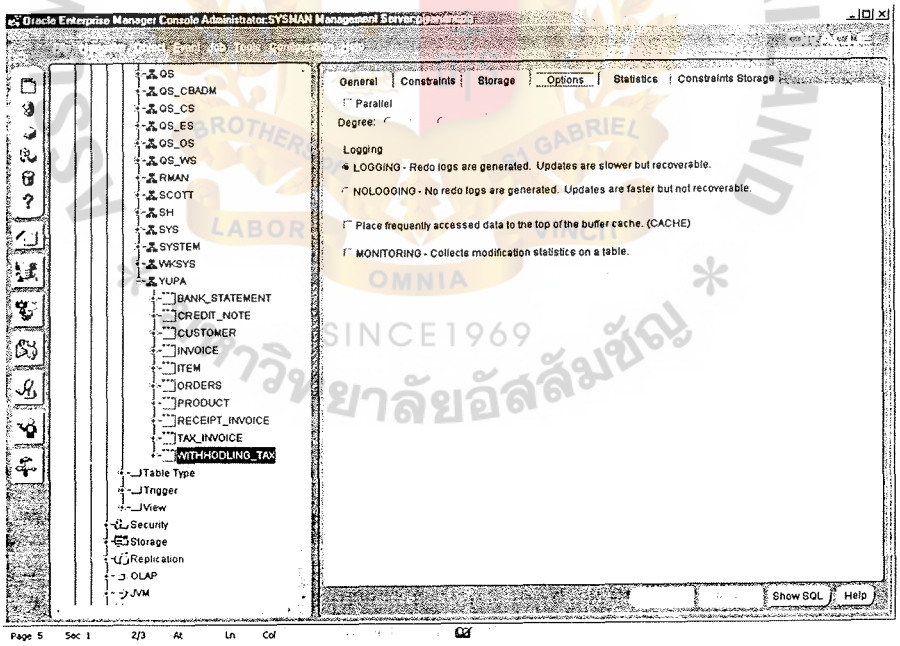


Figure F.63. Options for Withholding Tax.

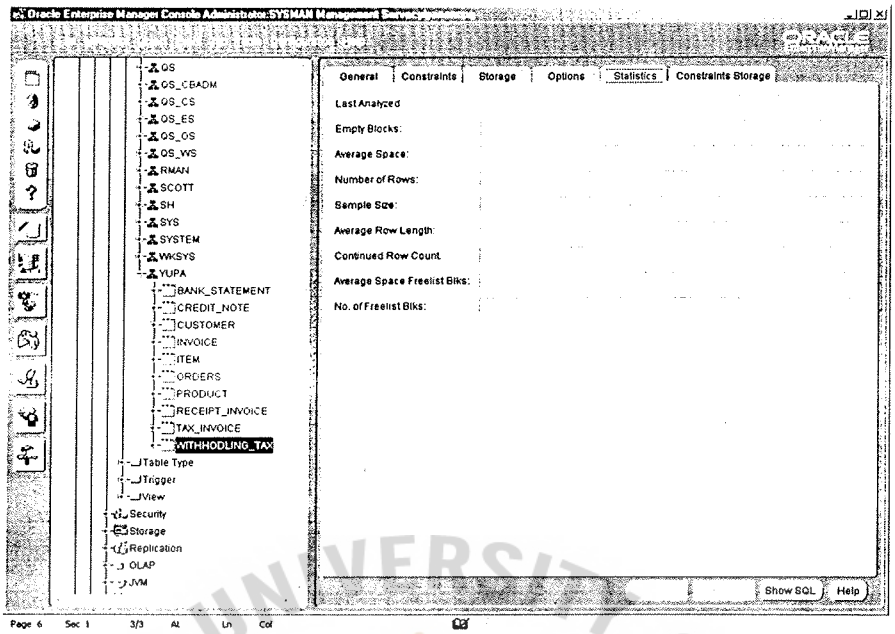


Figure F.64. Statistics for Withholding Tax.

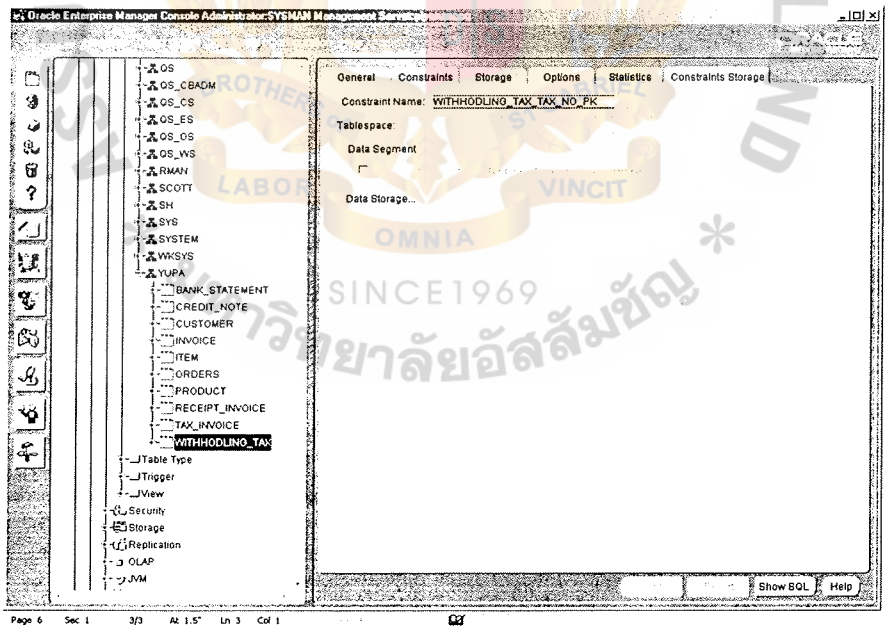


Figure F.65. Constraints Storage for Withholding Tax.

APPENDIX G

USER INTERFACE

USER INTERFACE

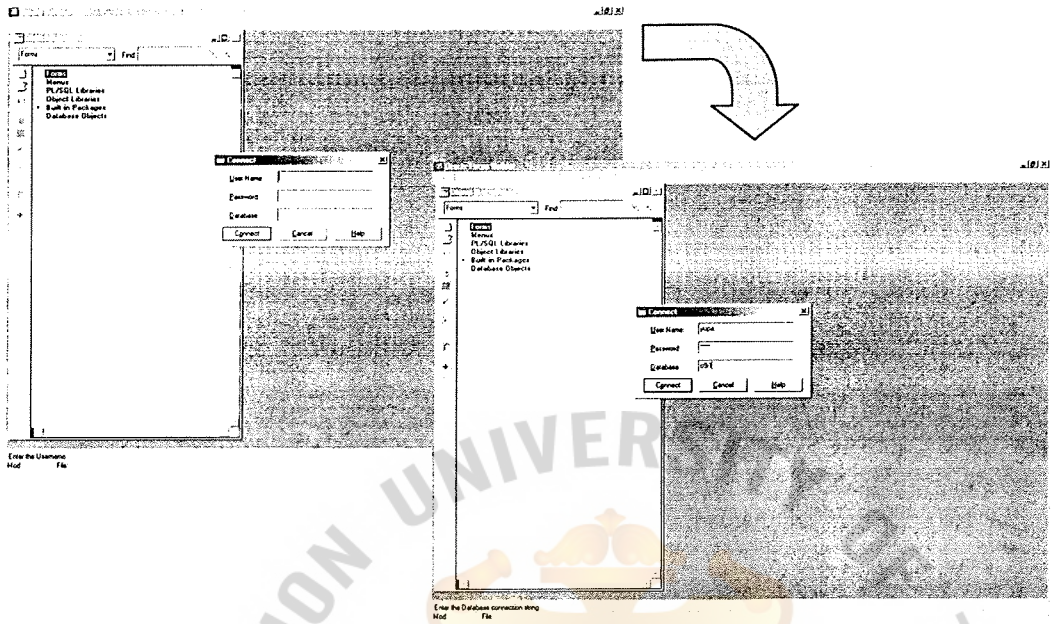


Figure G.1. Login and Password.

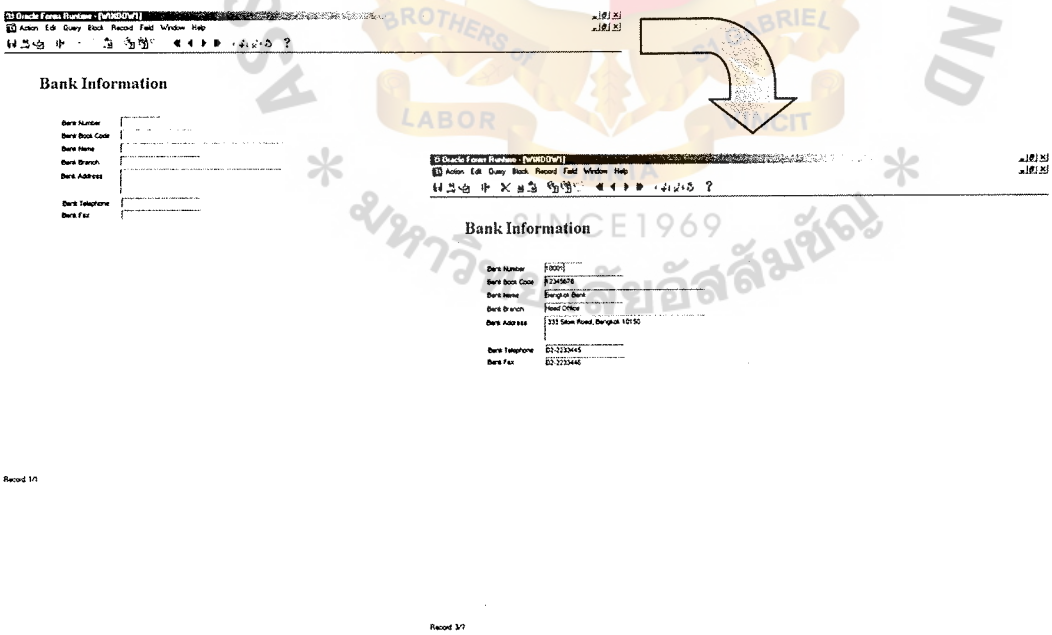


Figure G.2. User Interface of Bank Information.

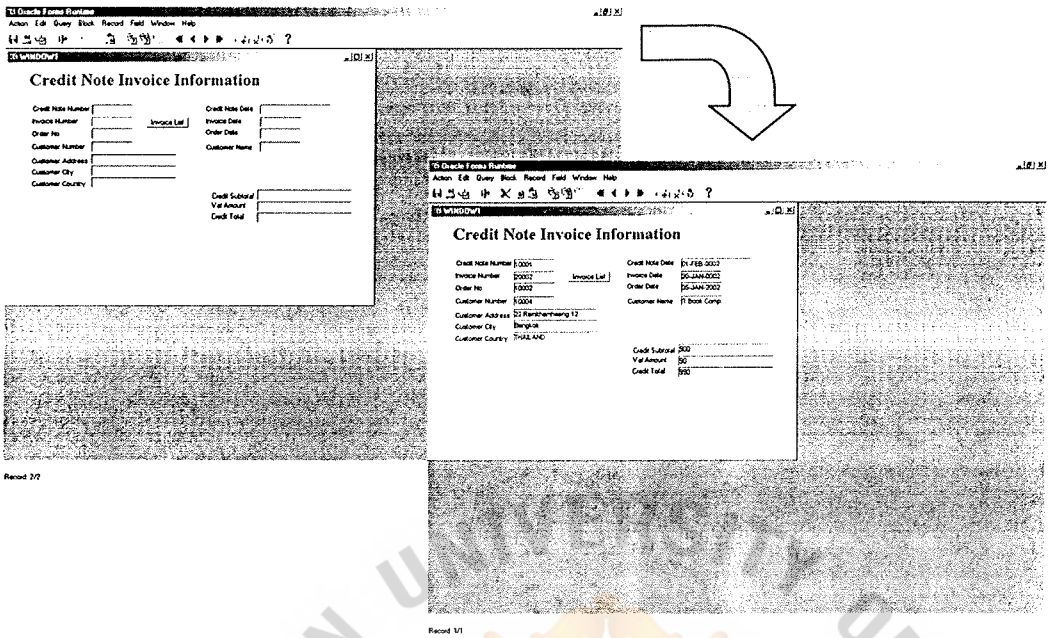


Figure G.3. User Interface of Credit_Note Invoice Information.

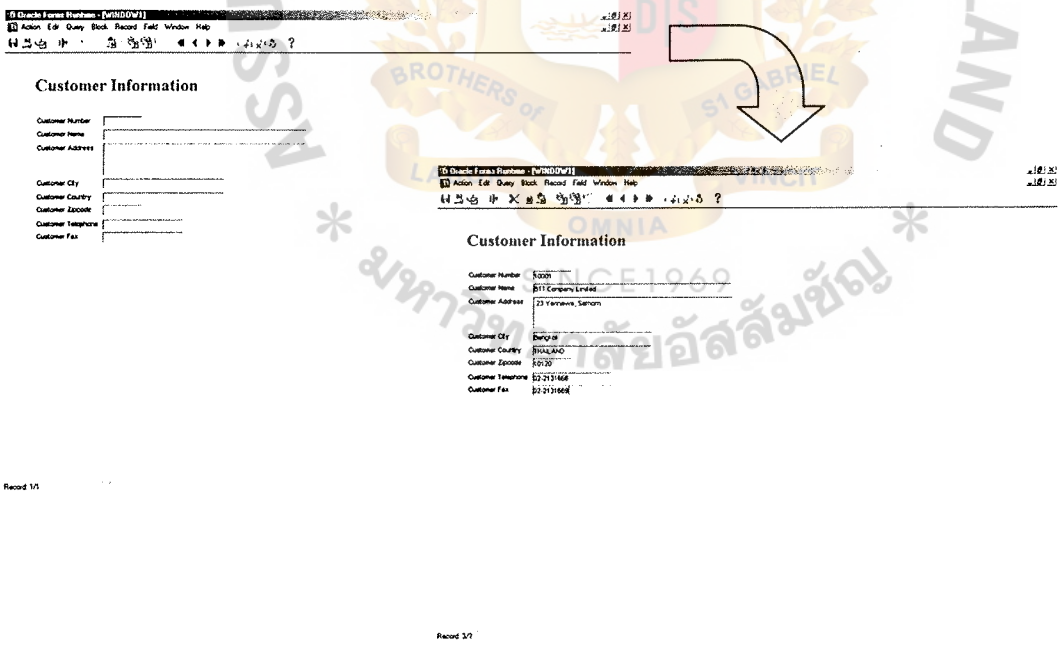


Figure G.4. User Interface of Customer Information.

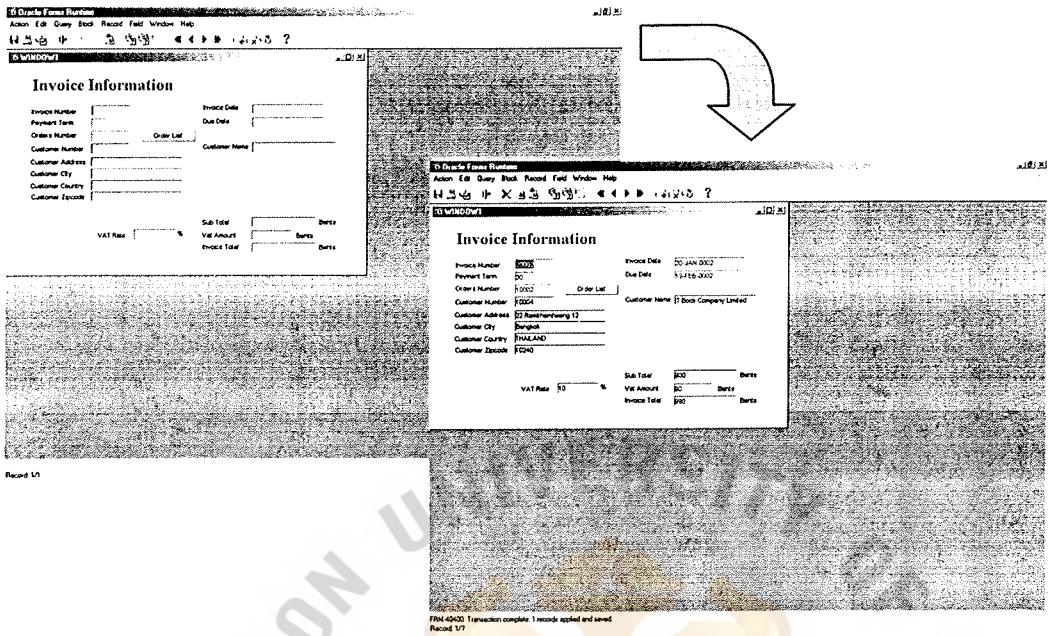


Figure G.5. User Interface of Invoice Information.

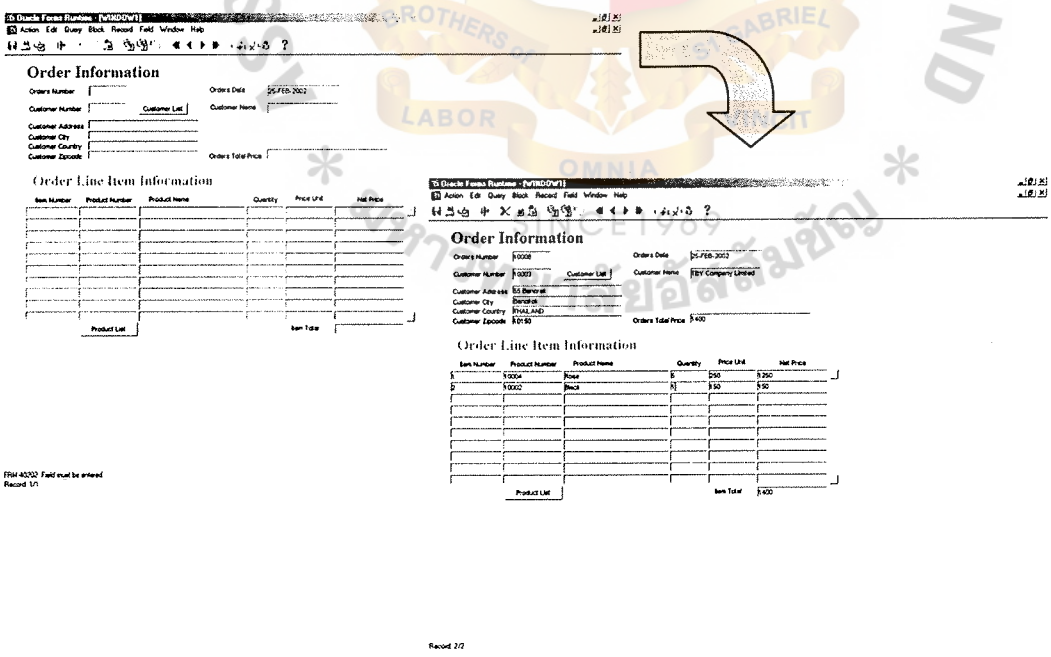


Figure G.6. User Interface of Order Information.

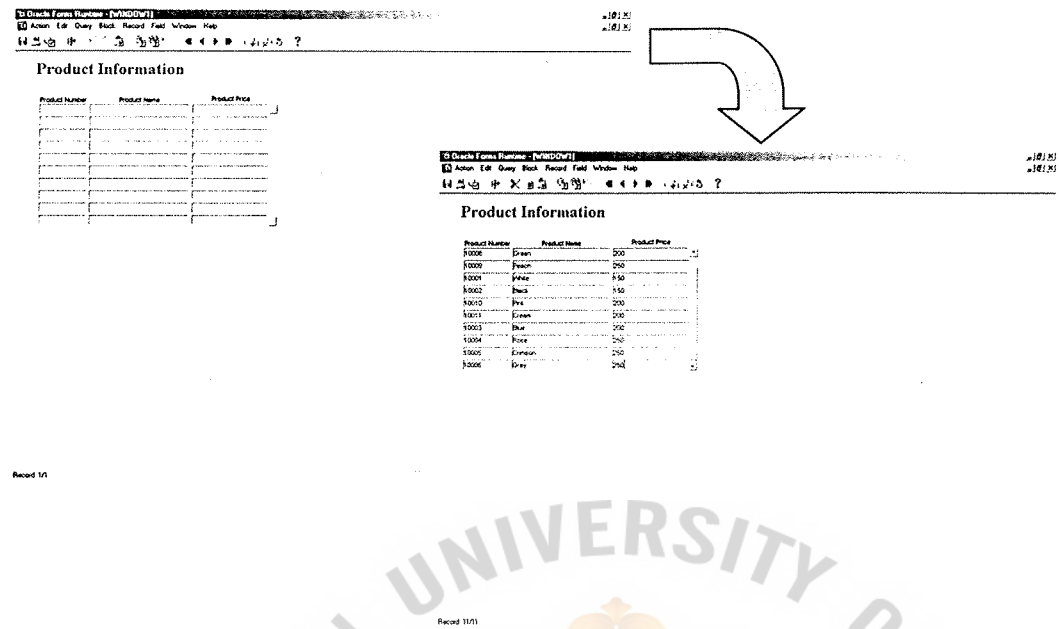


Figure G.7. User Interface of Product Information.

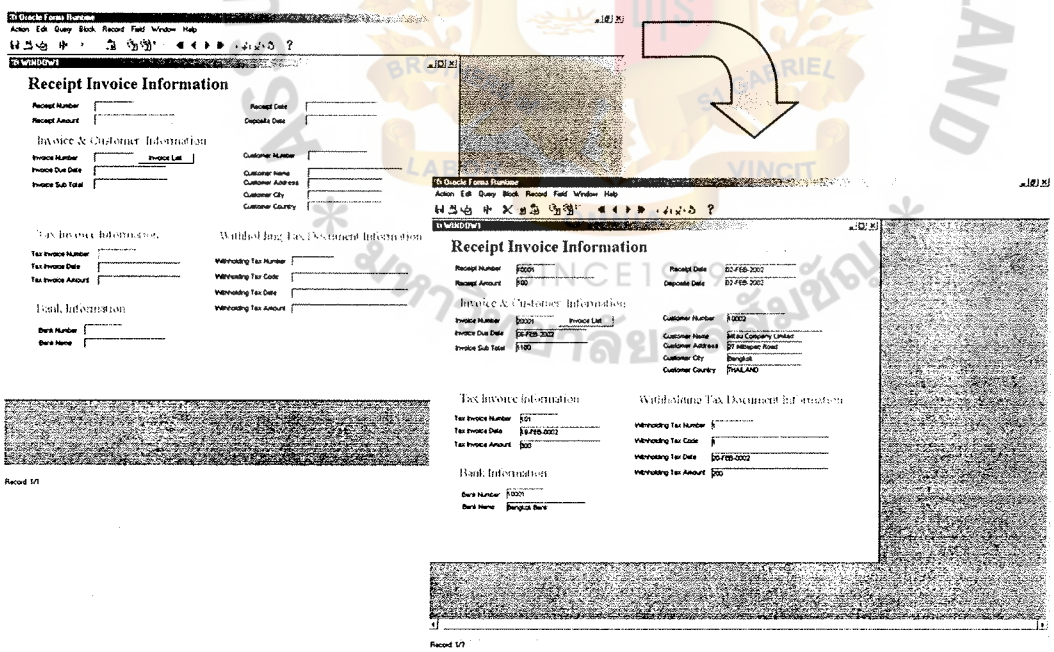


Figure G.8. User Interface of Receipt Invoice Information.

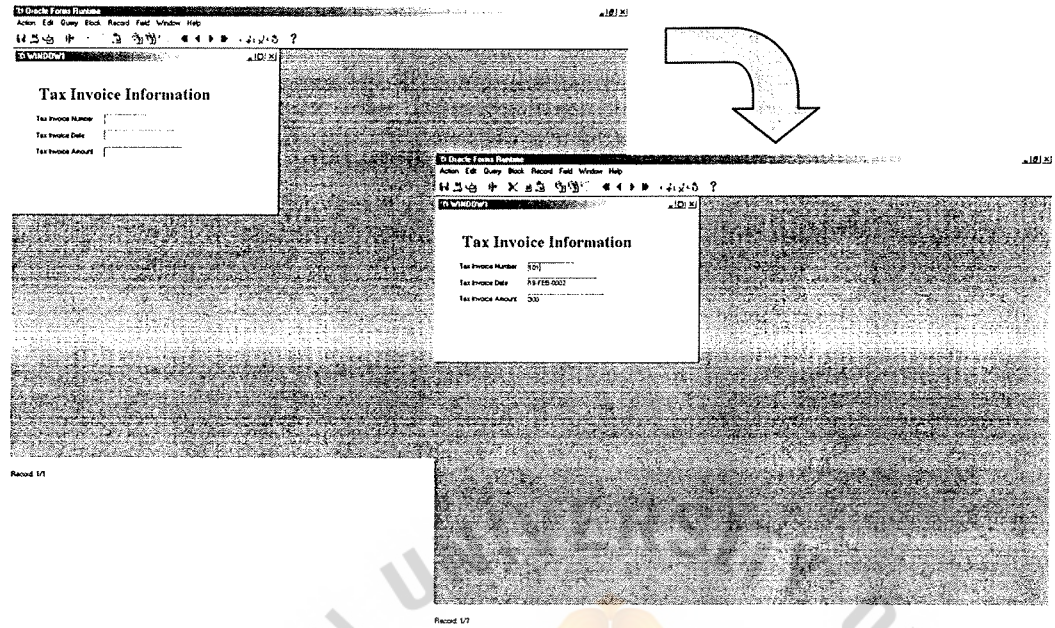


Figure G.9. User Interface of Tax Invoice Information.

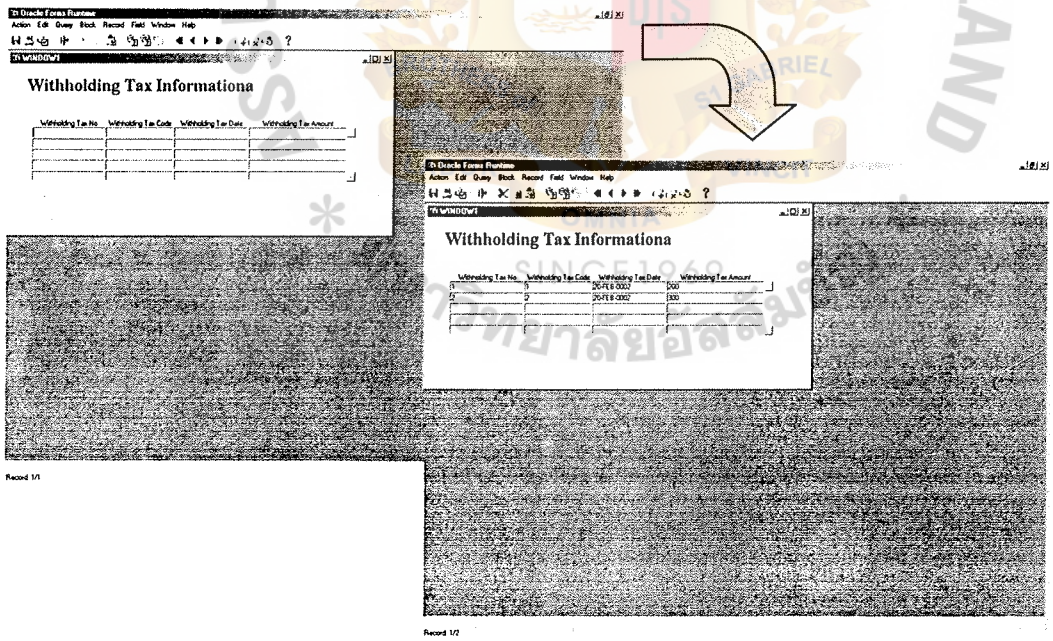
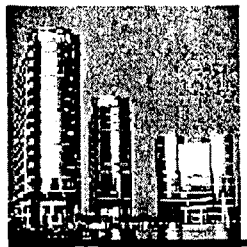


Figure G.10. User Interface of Withholding Tax Information.

APPENDIX H

OUTPUT DESIGN

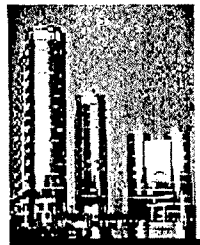


Bank Information Report

Report run on: June 18, 2002 2:49 PM

Name	Number	Code	Branch	Address	Telephone	Fax
Bangkok Bank	10001	12345678	Head Office	333 Silom Road, Bangkok 10150	02-2233445	02-2233446
Bank of Asia	10002	55577789	Silom Complex	22 Silom Road, Bangkok 10150	02-4856457	02-4856459
Bank of Ayutthaya	10005	22778899	Phyathai Road	97 Phyathai Road, Bangkok 10400	02-2869400	02-2869449
Citibank	10003	66448822	Sathorn Road	98 Sathorn Road, Bangkok 10120	02-2329400	02-2329405
Thai Farmers Bank	10004	2277567	Chan Road	35 Chan Road, Yannawa, Bangkok 10120	02-8874545	02-8874550
Amount	**5**					

Figure H.1. Bangkok Bank Record Information Report.

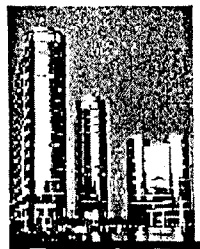


Bangkok Bank Record Information

Report run on: June 18, 2002 2:53 PM

Deposite Date	Name	Invoice Noumber	Receipt Number	Amount
02-FEB-02	Mitsu Company Limited	20001	10001	100.00
		Count:	**1**	
			Total:	**100.00**

Figure H.2. Bank Record Information Report.

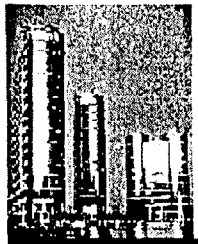


Bank of Asia Record Information

Report run on: June 18, 2002 2:54 PM

Deposite Date	Name	Invoice No	Receipt Number	Amount
02-FEB-02	Paradise Company Limited	20003	10002	1,000.00
		Count:	**1**	
			Total:	**1,000.00**

Figure H.3. Bank of Asia Record Information Report.

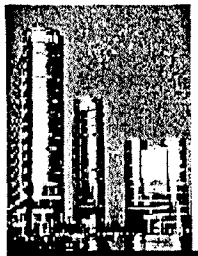


Citibank Record Information

Report run on: June 18, 2002 2:54 PM

Deposite Date	Name	Invoice Number	Receipt Number	Amount
		Count:	0	
			Total:	

Figure H.4. Citibank Record Information Report.

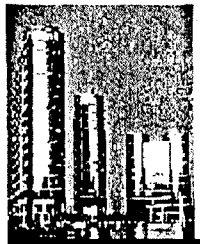


Credit_Note Invoice Report

Report run on: June 18, 2002 2:56 PM

Credit Note Number	Credit Note Date	Orders Number	Invoice Number	Customer Name	Credit Subtotal	Credit Total
10001	01-FEB-02	10002	20002	IT Book Company Limited	900.00	990.00
1				**Total**	**900.00**	

Figure H.5. Credit_Note Invoice Record Information Report.



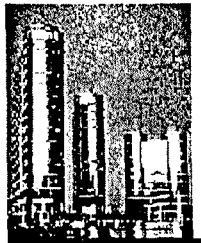
Customer Information Report

Report run on: June 18, 2002 2:57 PM

Name	Number	Address	City	Country	Zipcode	Telephone	Fax
BTT Company Limited	10001	23 Yannawa, Sathorn	Bangkok	THAILAND	10120	02-2131668	02-2131669
IT Book Company Limited	10004	22 Ramkhamhaeng 12	Bangkok	THAILAND	10240	02-7199000	02-7199004
Mitsu Company Limited	10002	27 Mittapab Road	Bangkok	THAILAND	10150	02-7712525	02-7712526
Paradise Company Limited	10006	55 Tambol Muaklek	Saraburi	THAILAND	18180	036-330193	036-330195
Puppy Company Limited	10005	55 Tan da Street	Ho Chi Minh	VIETNAM	25948	84-8552550	84-8552424
TBY Company Limited	10003	55 Bangrak	Bangkok	THAILAND	10150	02-2146643	02-2146644

Amount **6**

Figure H.6. Customer Record Information Report.



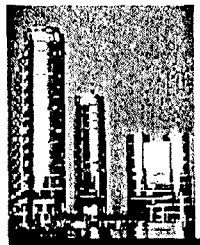
Delivery Information

Report run on: June 18, 2002 2:58 PM

Delivery Number	Delivery Date	Orders Number	Orders Date	Customer Number	Customer Name
10001	05-JAN-02	10001	25-DEC-01	10002	Mitsu Company Limited
10002	15-JAN-02	10002	05-JAN-02	10004	IT Book Company Limited
10003	15-JAN-02	10003	05-JAN-02	10006	Paradise Company Limited
10004	30-JAN-02	10004	20-JAN-02	10003	TBY Company Limited
10005	15-FEB-02	10005	05-FEB-02	10004	IT Book Company Limited
10006	22-FEB-02	10006	12-FEB-02	10001	BTT Company Limited

6

Figure H.7. Delivery Record Information Report.



Invoice Information Report

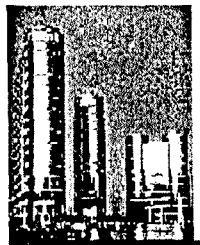
Report run on: June 18, 2002 2:59 PM

Invoice Number	Date	Name	Orders Number	Orders Date	Sub Total	Vat	Total
20001	10-JAN-02	Mitsu Company Limited	10001	25-DEC-01	1,100.00	110.00	1100
20002	20-JAN-02	IT Book Company Limited	10002	05-JAN-02	900.00	90.00	990
20003	20-JAN-02	Paradise Company Limited	10003	05-JAN-02	1,250.00	125.00	1375
20004	05-FEB-02	TBY Company Limited	10004	20-JAN-02	1,500.00	125.00	1375
20005	20-FEB-02	IT Book Company Limited	10005	05-FEB-02	1,250.00	125.00	1375

5

Total of Sub Total **6,000.00**

Figure H.8. Invoice Record Information Report.

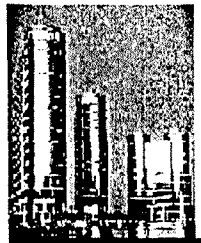


OrderReport

Report run on: June 18, 2002 3:04 PM

Orders Numbe	Date	Name	Total Price
10001	25-DEC-01	Mitsu Company Limited	1,100.00
10002	05-JAN-02	IT Book Company Limited	900.00
10003	05-JAN-02	Paradise Company Limited	1,250.00
10004	20-JAN-02	TBY Company Limited	1,500.00
10005	05-FEB-02	IT Book Company Limited	1,250.00
10006	12-FEB-02	BTT Company Limited	1,900.00
10007	22-FEB-02	Mitsu Company Limited	500.00
10008	25-FEB-02	TBY Company Limited	1,400.00
20001	25-FEB-02	IT Book Company Limited	800.00
		Total:	**10,600.00**

Figure H.9. Order Record Information Report.



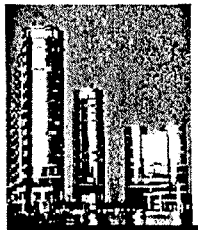
Receipt Informaion Report

Report run on: June 18, 2002 3:04 PM

Receipt Number	Date	Due Date	Deposite Date	Tax Invoice Number	Invoice Number	Name	Receipt Amount
10001	02-FEB-02	09-FEB-02	02-FEB-02	101	20001	Mitsu Company Limited	100.00
10002	02-FEB-02	19-FEB-02	02-FEB-02	102	20003	Paradise Company Limited	1,000.00
						Receipt Total	**1,100.00**

2

Figure H.10. Invoice Receipt Record Information Report.

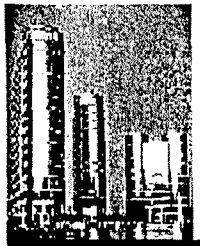


Tax Information Report

Report run on: June 18, 2002 3:05 PM

Tax Invoice Number	Date	Invoice Number	Receipt Number	Name	Tax Invoice Amount
101	19-FEB-02	20001	10001	Mitsu Company Limited	300.00
102	21-FEB-02	20003	10002	Paradise Company Limited	300.00
2				**Total of Tax**	**600.00**

Figure H.11. Tax Invoice Record Information Report.



Thai Farmers Bank Record Information

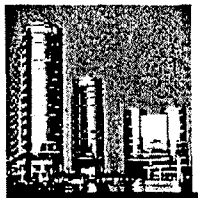
Report run on: June 18, 2002 2:55 PM

Deposite Date	Name	Invoice Noumber	Receipt Number	Amount

Count: 0

Total:

Figure H.12. Thai Farmers Bank Information Record Report.



Withholding Tax Information

Report run on: June 18, 2002 3:06 PM

Withholding Tax Number	Withholding Tax Code	Withholding Tax Date	Invoice Number	Receipt No	Name	Withholding Tax Amount
1	1	20-FEB-02	20001	10001	Mitsu Company Limited	200.00
2	2	20-FEB-02	20003	10002	Paradise Company Limited	300.00
					Total	**500.00**
2						

Figure H.13. Withholding Tax Information Record Report.

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