SALES ORDER PROCESSING SYSTEM

by

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

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

May 1996
Sales Order Processing System

by

Amporn Kamolchalwanich ID# 363-9201

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May 18, 1996
Project Title: Sales Order Processing System
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Project Advisor: Dr. Vichit Avatchanakorn

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

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May 18, 1996
Abstracts

The system development project is about analyzing current system, structuring & organizing data in aspect of designing and implementing computer software & hardware of Sales Order Processing System.

There are many computers and printers have been used in company's sales department but the effectiveness and efficiency are quite low. After investigation the current information system and user's requirement, the new system is developed by modeling tools as Dataflow Diagrams, Structure Charts, Database & Data File Design, Network Configuration and Input & Output Design. This project is designed in order to connect the existing automated system with new proposed sales order processing system and also to utilize the existing resources.

This project will be useful for company and can help them work more efficiency, effective and accuracy.
Acknowledgments

Too many people have contributed to the development of this project which the author very much appreciated their kind cooperation and their advice.

The author would like to thank the staff and management team of Engineering & Science Associates Co., Ltd. for providing information and cooperation in this project.

The author would like to thank too her colleagues at ABAC that help her and provide her their experience in development of their project.

The author would also like to thank specially to her advisor, Dr. Vichit Avatchanakorn who has given her the time to consult on her project and advise her in all aspects of this project.

Finally, the author would like to thank all of the committees who have taken time to read this project and attend in the oral examination which she has really appreciated their kind constructive criticisms.
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1. Introduction

1.1 Introduction

The System Development Design is for Engineering & Science Associates Co., Ltd. (ESA), the distributor/agent company for industrial products in order to facilitate the day-to-day operation in the area of Sales Order Processing as well as the related Database File System of company.

ESA is a distributor/agent of environmental instruments, Scientific Instrument, Automotive Inspection Equipment and Testing Instruments. ESA is a group of engineers and scientists who have long experience in supplying, servicing & consulting to the universities, industries, governmental institutes and Research & Development institutes. ESA has many represented principals in many countries around the world. According to represented agreement, if the represented products are sold in our area (Thailand) directly from principal company in foreign country, ESA will get the commission or compensation as agreed. The main products for sales will be imported from foreign countries by airfreight & seafreight (order by order basis). However, ESA will have stock for consumable parts, spare parts and some main products (wide range of products). The company has a lot of computers and printers and all of them have been used but the effectiveness and efficiency is quite low.

After my investigation the existing system of ESA and discussion with management, the following problems are issued:

1. Take long time for getting the information
2. Different format of reports of each department
3. The information cannot be shared between department
4. Redundancy of data, e.g. Sales Dept. keeps customer record and Accounting & Financial Dept. also keeps customer record.
5. The resources cannot be shared between each function.
1.2 Objectives

The objectives of this system-development project are as follow:

1) To study the existing system

2) To design Sales Order Processing System

3) -Provide the management an effective customer order and sales information system.

4) -Provide periodic reporting system

5) -Provide Sales Performance Analysis System

6) -To automate central customers, principals, orders and inventory file system

7) -To update and maintain central customer records and order records.

8) -To minimize error & time for document processing e.g. Sales Order, Commission Memorandum, Invoice, and etc.

9) -To utilize the existing facility

10) To develop computerized system to meet the requirement of Sales Order processing system.

1.3 Scope

Scope of the project includes computerization of the following functions:

1. Customer Order Processing
   -Customers File
   -Principals File
   -Salespersons File
   -Orders File
   -Order Confirmations File
- Sales Orders File

- Commission Memorandums File

- Invoices File

- Generate Sales Order

- Generate Commission Memorandum

- Generate Invoice

- Customer order & Sales Analysis

2. Inventory System

- Check inventory file

- Generate back ordered item record
2. Current System & Problem Definition

2.1 Organization Overview

Engineering & Science Associated Co., Ltd. (ESA) has been established since 1983 and located at 755/79 Soi Watpakineenart Bangplad, Bangkok 10700 Thailand. ESA represents many principals in many countries for Scientific Instruments, Automotive Inspection Equipment, Environmental Monitoring Instrument and etc. In the early stage, ESA just imported the products in order by order basis according to customer orders so all data processing in organization have been done manually but when the business grow, the company will have to keep stock for main products, consumable parts and spare parts in order to provide better service to their customers. The main problem is that the company has too many product lines and high cost for each item so it is difficult to know how many units per item should be kept in stock and all of items have to be imported from foreign countries which it take time to fulfill the customer's need. The management therefore needs information to forecast and plan stock items to manage inventory most efficiently.

Due to the rapid expansion, the number of customer and principal are increased so the problem of filing system make the management trouble and also slow data processing. Each department has his own filing system and they can't share the same data resources. The principal also wants to review the performance of company every period and also the company has to send them the sales forecast every period. The current need of management for update information within specific of time calls for an improvement in efficiency and ease of use.

2.1.1 Organization Chart

ESA is a small company and has a simple organization chart. Mostly ESA uses informal communication. Each department has its own management style and information flow and report format within its department but all of department will have the same outcomes according to the corporate policy.

CEO is a group of Department's Heads and shareholders have been selected to be CEO team which will be changed each year. The Organization Chart is shown in figure 2.1.

2.1.2 Information Flow Chart

The corporate policy of organization will be flowed TOP-DOWN to each head department and then flow within department according to the method of each department. The lost of information will be responsible by head of department.
The information (planning, budgeting, performance report and etc.) from each department will be BOTTOM-UP to CEO through head of department.

2.2 Existing Business Function

The existing system has been summarized by Context Diagram as shown in Figure 2.2 and Dataflow Diagram Level 0 as shown in figure 2.3.

The following functions are performed manually by many officers manually of different department;

2.2.1 Each Sales Division will prepare the quotation and send to their customers and each division will have his own database design both manual and computerized by stand alone PC.

2.2.2 Verify price of goods, all terms and customer of customer order against quotation which is offered to customer and keep customers and orders record.

2.2.3 When we get an Purchase Order from customer, Sales Dept. will issue the Sales Order and send to Stock Controller for checking goods as per customer order in warehouse.

2.2.4 If the goods as per Sales Order is in stock the Stock Controller will signed the Sales Order and send to Financial Dept. to process the invoice.

2.2.5 If the goods as per Sales Order is out of stock, the Stock Controller will issue the Purchase Request to Administration Dept.

2.2.6 Purchasing will order the goods as per Purchase Request from Stock Controller. After they receives the goods from supplier, they will do the stock addition to Stock Controller. Stock Controller will update stock when they receive the stock addition document from Purchasing and then signed document to Financial for invoice processing.

2.2.7 Invoice will be issued by Financial & Accounting Dept. and send to the WAREHOUSE for request of goods.

2.2.8 In case of direct order which customer will open L/C directly to principal in foreign country, Sales Order will be sent to Administration Department for next processing without any record at sales department.

2.2.9 Sales Department will evaluate sales performance from their Sales Order File and also calculate sales commission from Sales Order.
2.2.10 Sales Commission paid to salesperson will be calculated by invoice file of Financial & Accounting Dept.

2.2.11 Sales Department has to prepare monthly report to management.

2.2.12 Administrative Department has to prepare monthly report on principal to management.
Figure 2.1 Organization Chart
Figure 2.2 Context Diagram for Sales Order Processing System
Figure 2.3 DFD Level 0 for Existing System of Sales Order Processing
2.3 Current Problem & Area of Improvement

2.3.1 Overview of existing system under study (Sales Order Processing)

Customer:

There are two kinds of customer who have different sales conditions;

1. Direct Customer consists of;
   1.1 L/C customer:

   Customer who wants to purchase the represented products (through ESA) directly from the principal company in foreign country.

   -ESA will not responsible for damage & loss of products, warranty of parts. In case of loss or any claim occur. ESA will just convey customer’s message to the principal and wait for principal’s decision making. ESA has to do installation & commissioning for this customer. ESA is responsible for the necessary local item for installation & commissioning and warranty only local parts such as Gas, Computer, Wiring. ESA will get commission from principal company based on ESA's mark-up (the different between net CIF Bangkok cost from principal company and the selling price to customer).

   1.2 Area Customer:

   -Customer who acquires the represented products directly from the principal company in foreign country or through any contractor. ESA will not responsible for anything, just keep information of this customer and any performance will be done according to the request of principal company. If this customer requests ESA to do installation & commissioning, ESA will charge for registered fee to be ESA’s customer and quoted for installation & commissioning separately. ESA will get commission from principal company based on export price to customer which will be lower than L/C customer.

2. Indirect Order: Imported goods are sold for two groups;

2.1 Public Customer:

   -Customer is governmental institute or State Enterprises who buys the (imported & local) products from ESA. ESA will responsible for complete system (including imported or
local products, installation, commission and etc.) and provide maintenance and parts warranty for specific period of time. ESA has to sign the official contract and provide bank guarantee for this customer. Any deviation from the condition of contract, ESA must pay penalty fee so ESA will threat this customer carefully. The payment term & sales condition based on each customer such as payment term may be divided into three parts:

- 10% Advance Payment
- 80% Payment for complete project
- 10% Payment after expired warranty period

2.2 Private Customer:

Customer is private company who buys the (imported & local ) products from ESA. ESA will responsible for complete system (including imported or local products, installation, commission and etc.) and provide maintenance and parts warranty for specific period of time. ESA receives the Purchase Order from customer. Any deviation can be negotiated. The payment term & sales condition based on each ESA's standard, such as 30 days for Payment Term, 60 days for delivery time.

Sales Department

Sales Department consists of 4 divisions;

- Scientific Instrument & Equipment (SI)
- Automotive Inspection Equipment (AI)
- Environmental Instrument (EI)
- Measuring & Testing Instrument (MI)

- Each division will have his own customer database & customer order.

- Sale Order Document are generated by each division in the same format and will be kept separately and are used for Sales Performance Analysis.

- Sales Commission will be paid after ESA can collect money from customer. In case of L/C customer, Sales Rep will get commission based on the actual commission from principal.
company after completion of installation. After Sales Division classified the order type, the Sales Order will be generated and processed as following step.

L/C customer: Sales Order will be sent to Admin. Dept. for issuing the order confirmation to the principal company and processing for local purchasing.

Indirect order: Sales Order will be sent to Stock controller for checking inventory file.

If the ordered product is available in stock, the invoice will be generated and sent to Warehouse for receipt of goods and then delivery to customer. If the ordered product is unavailable in stock, the booking item is recorded and back-ordered item will be processes and sent to Administration Dept. for Purchasing Process. (Purchase Request is generated by Stock Controller)

**Accounting & Financial Department**

- Sales Order Information will be used for generating invoices and collect money as term & condition specified in Sales Order.

- Calculate Commission for Sales Department.

- Provide updated inventory file and booking record.

**Administrative Department**

- Generate Order Confirmation to Principal Company for L/C customer and provide status of order to Sales Department.

- Process order to principal for unavailable items.

**2.3.2 Current Problem**

The problem areas of the existing system can be summarized as follows:

2.3.2.1 Order processing and invoice processing is slow and inaccurate because complicated part number of different brand name and different information from many files and it takes time to wait for checking and keep record at every step such as process customer order, process sales order, check inventory, process invoice and etc.

2.3.2.2 No sufficient information for management to plan, forecast and determine market trend for each year.
2.3.2.3 Report generating is slow and unreliable. When the management needs any information, it takes approximate a week to get information. Every data item has to be listed out and rearranged in order to get the required information.

2.3.2.4 Order and Sales records are not updated regularly. There is no back ordered record for follow-up the order. Therefore, they cannot deliver the goods to customers on time.

2.3.2.5 The information cannot be shared between department since each department has his own filing system of the same record e.g. customer record

2.3.2.6. The resources cannot be shared between each function.

2.3.2.7. Loss of information due to changing of employees.

2.4 Existing Computing System

All PCs are stand alone PCs. Every Dept. has designed his own database design and format of report according to the need of management and they use different software programs.

e.g. Sales Department

Scientific Instrument Division produces Quotation by using AmiPro

Automotive Inspection Division produces Quotation by using EXCEL

2.4.1 HARDWARE

1) 2 sets MITAC DM4033A VESA Local Bus

   Central Processor Intel i80486DX-33

   Architecture ISA with VESA Local Bus

   Main Memory 4096 Kb. (4 Mb.)

   8 Kb Integrated Cache

   256 Kb External Cache Memory

   1.44 Mb 3.5" High - Density Floppy Disk Drive

   210 Mb Hard Disk Drive IDE interface

   Super VGA VESA Local Bus 1024 x 768 (1 Mb)
14" Ultra VGA Color Monitor, 1024 x 768 Pixels

I/O Port: 1 Parallels (Db25), 2 serial (Db9)

Expansion Slots: 6 x ISA Bus, 2 x VESA Local Bus

101 Keys - Enhanced Keyboard

200 Watt Switching Power Supply

"GENIUS" GK-T320 Geni Trac

2) 8 sets ACERMATE 486SX/25D

32 bit Intel 80486SX-25 running 25 MHz.

4 MB RAM on board expandable to 40 MB on board

1 X 1.44 mb 3.5" Floopy Disk Drive

Built-in VGA with 512 KB RAM expandable to 1 MB RAM

Four 16 bit ISA expansion slots

2-Serials, 1 Parallel & 1 PS/2 Type Mouse Port

AcerView 33D SVGA Color Monitor

Acer 101 keys audible click (Thai/English)

Acer Mouse

3) 1 set HP LASERJet 4 Printer "Hewlett Packard"

4) 1 set HP LASERJet IIIP Printer "Hewlett Packard"

5) 2 sets EPSON LQ-1170 Printer

6) 1 set NEC P5300 Printer

7) 1 set NEC P6300 Printer
2.4.2 SOFTWARE

- MS DOS 6.0 THAI EDITION
- MS WINDOWS 3.1 THAI EDITION
- AMIPRO 2.5/Thai
- MS OFFICE
- LOTUS
- DBASE III PLUS
3. Proposed System

The proposed computerized system will facilitate the day-to-day operation and set up information base for management instead of manual system. The proposed system will serve all user requirements, utilize existing resources and increase effectiveness in administrative and Sales Department. Moreover, the proposed system can avoid an increase in administrative staff.

3.1 User Requirement

Users would like to have central database for information that can be shared by different department and if possible, they would like to utilize the existing hardware for new system and they would like to automate the order processing system in order to minimize the administrative staff and all data can be recorded for further use..

3.1.1 Output requirements Report Forms

1. Sales Order
2. Commission Memorandum
3. Invoice
4. Sales Order Report
5. Commission Memorandum Report
6. Invoice Report
7. Order Report
8. Products on Order Report
9. Indirect Sales by Sales Amount Report
10. Salesperson by Indirect Sales Amount Report
11. Sales Order 's Commission Report
12. Invoice's Commission Report
13. Back Ordered Item Report
14. Order Subform Report
15. Sales Amount by Principal Report
16. Products by Indirect Sales Amount Report
17. Direct Sales Report
18. Salesperson Sales Report

3.1.2 Input requirements

The following document are required as input of the new system;

1. Order Forms
2. Credit Customer Application
3. Add new customer
4. Add new principal
5. Inquiry for inventory item

3.2 System Design

3.2.1 Dataflow Diagram(2)

The operational requirement for proposed system are depicted in Dataflow Diagram Level 0 as shown in figure 3.1 (detail of proposed DFD in Appendix A1, Data Dictionary in A2 and also Process Specification in A3).

3.2.2 Structured Chart (17)
3.2.3 Input & Output Design

The design of effective input and output for a computer system is often overlooked because it seem so simple but in fact this is the attractive point that human can interface with computer. From our system development for Sales Order Processing System, I have careful investigated the necessary information for form design so we try to design the input & output to meet the user's requirements and also can satisfied the following objectives;

1. Accuracy
2. Effectiveness
3. Consistency
4. Ease of use
5. Simplicity

but they may have some parts those are not completely correct because we need to know the detailed information of existing system that interact with external entity.
Figure 3.1 DFD Level 0 for Sales Order Processing System
3.2.3.1 Input forms (Source Document)

Preprinted documents that request user to fill out in response in standard way and then used for data entry to the system.

-Order Form (see Appendix C3-1)

-Credit Customer Application Form (see Appendix C3-2)

The application for credit customer has to sent to get the approval from Sales Manager and then to be passed to accounting department for credit customer registration so the application needs more document for credit consideration such as; copy of certificate of company registration, reference name and etc.

The information of credit have to kept in database file as credit customer so this data file must be shared by sales dept. and accounting dept.

3.2.3.2 Input Screen

The following screens design are shown in Appendix C1;

S001 LOGIN-MENU
S002 MAIN-MENU
S003 SOP-MENU
S004 CUSTOMERS
S005 PRINCIPALS
S006 INVENTORY
S007 ORDER ENTRY
3.2.3.3 Output forms

-Printed documents that are requested to print out from the system after entered the validate and complete data then used for output to customer, user or executive management as hard copy.

The design effective output (proper hard copy) should meet (14):

1) System objective
2) User's preference and requirement
3) Various cost of implementation
4) Law & regulation

The following report forms are shown in Appendix D1

1. Sales Order
2. Commission Memorandum
3. Invoice
4. Sales Order Report
5. Commission Memorandum Report
6. Invoice Report
7. Order Report

8. Products on Order Report

9. Indirect Sales by Sales Amount Report

10. Salesperson by Indirect Sales Amount Report

11. Sales Order's Commission Report

12. Invoice's Commission Report

13. Back Ordered Item Report

14. Order Subform Report

15. Sales Amount by Principal Report

16. Products by Indirect Sales Amount Report

17. Direct Sales Report

18. Salesperson Sales Report

3.2.4 Database & Data File Design

3.2.4.1 Data File

Two types of data file

1) **Master File**: Information systems are ongoing and are used as long as they are meaningful to the organization such as(8);

   - Sales history master file for customer: containing a record of each sales made to a customer over a specified period as shown in figure 3.2.
- Account Payable master file: shows the balance owned to every vendor or supplier from whom the organization purchases supplies or service. The balance owned to each supplier reflects the current status of all accounts (the result of all purchases, payments, and credits made between the organization and suppliers). This example shows one type of master file—the used to reflect the current status of entities (such as vendor payable accounts). (see figure 3.2).

- Account receivable master file: shows balance owned by every credit customer, the owned reflect the current status of each credit customer for next order.

2) Transaction File: a temporary file with two purposes: accumulating data about events as they occur and updating master file to reflect the result of current situation.

Sales History Report

<table>
<thead>
<tr>
<th>Master File</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer ID</td>
</tr>
<tr>
<td>XXXXXXX</td>
</tr>
</tbody>
</table>

| Transaction File | Order amount | 10,000.00 |
| Order amount | 20,000.00 |

| Customer ID | Customer Name | Current Balance | Month to date purchase |
| XXXXXXX | XXX... | 100,000.00 | 500,000.00 |

| Current status | Historical summary in month |

Figure 3.2 History Master File
3.2.4.2 Database Design

The following database design are shown in Appendix E1

- Customer
- Principal
- Inventory
- Salesperson
- Orders
- Order Confirmations
- Sales Orders
- Commission Memorandum
- Invoices

3.3 Data Communication & Network

The company has two floors, 9th and 10th floor of a building at Boromratchonnee Road. I would like to propose the LAN System for the company as their requirement by utilize the existing hardware and acquired additional necessary hardware & software(4).

According to the policy of management, they would like the server to be located in the Accounting & Financial Department for security problem and also A&F Manager who graduated from MS (CIS) will responsible for overall computer system.

The Managing Director, Secretary and Manager of each department will use the HP LASERJet 4 PLUS, the other officer will use EPSON LQ-1170i.
<table>
<thead>
<tr>
<th>Department</th>
<th>no. of terminals</th>
<th>no. of printers</th>
</tr>
</thead>
<tbody>
<tr>
<td>9th Floor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Managing Director</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Accounting &amp; Financial Department</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>A&amp;F Manager</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Administrative Department</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Admin. Manager</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>10th Floor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sales Department</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Sales Manager</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Technical Support</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Technical Support Manager</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>22</strong></td>
<td><strong>11</strong></td>
</tr>
</tbody>
</table>

The space drawing and wiring layout for 9th floor is shown in Figure 3.3 and 10th floor is shown in Figure 3.4.

For wiring job, TIEX Adaptive Wiring System will be used through the method of Star Wired Topology by UTP cable and we also provide more RJ45 Wall Plate Point than the requirement in each floor for future expansion (15).
Figure 3.3: Space Diagram & Wiring Layout of 9th Floor
Figure 3.4: Space Diagram & Wiring Layout of 10th Floor
3.3.1 Specifications (10,16)

1. SERVER (ONE UNIT)

- HP NET SERVER LF4/100 M1050
- CPU 486DX2-100MHz
- 16 MB RAM, 1.05GB HARD DISK
- FAST SCSI-2 HARD DISK CONTROLLER
- 1.44MB 3.5" DISK DRIVE
- HP CD-ROM DRIVE
- 512 KB VIDEO MEMORY
- 7 EISA SLOTS, 2 PCI SLOT
- 6 ACCESSIBLE STORAGE
- 1 PARALLEL, 2 SERIAL, MOUSE PORT
- HP KEYBOARD 101 KEYS & MOUSE
- 1.05 GB 3.5" FAST SCSI-2 DISK DRIVE
- HP SVGA DISPLAY 14" (28 DOT PITCH)

LAN CARD: HP10/100VG SELECTABLE EISA ADAPTER

2. CLIENT TERMINAL (12 UNITS)

- HP VECTRA VL2 4/66 PC 270 MB
- CPU 486DX2-66 MHz
- 8MB RAM, 270 MB QUANTUM HARD DISK
- FAST IDE HARD DISK CONTROLLER
- 1.44 MB 3.5" DISK DRIVE
- HP 14" SVGA COLOR DISPLAY
- 1 MB VIDEO MEMORY
- 4 ISA SLOTS
- 1 PARALLEL, 2 SERIAL, MOUSE PORT
- HP KEYBOARD 101 KEYS & MOUSE
- PREINSTALLS MS-DOS 6.2 & WINDOW FOR WORKGROUPS THAI 3.11

LAN CARD: HP PC LAN ADAPTER NC16/TP

3. NETWORK OPERATING SYSTEM (NOS)
   NETWARE 3.12 - 25 USERS

4. PRINTER (11 UNITS)
   - HP LASERJET 4 PLUS (4 UNITS)
   - EPSON PRINTER LQ 1170i (1 UNIT)
   - HP JET DIRECT CARD ETHERNET (10B-T) FOR HP LASERJET 4 PLUS
   - HP JET DIRECTCARD (10B-T FOR LQ 1170i)
5. "VICTRON" UNINTERUPTIBLE POWER SUPPLY (ONE UNIT)
   - RATING 800 VA
   - INPUT/OUTPUT 220V 1 PHASE 50Hz.
   - BACK-UP TIME 8 MINUTES AT FULL LOAD

6. WIRING JOB
   - UTP CABLE (LEVEL 5)
   - HP ADVANCESTACK ET HUB-48 (1 UNIT)
   - RJ45 WALL PLATE 2 I/O
   - RJ45 MODULAR JACK (FEMALE)
   - RJ45 MODULAR PLUG (MALE)
   - 110 BLANK INSERT
   - PATCH PANEL 48 PORTS
   - CLOSET RACK 19"
   - ELECTRICAL & ACCESSORIES

3.3.2 System Configuration (4)

Server: HP NET SERVER LF4/100 M1050
   (includes HP 10/100 VG SELECTIBLE EISA ADAPTER)

Workstations no. 1 - 22: HP VECTRA VL2 4/66
Printer no. 1, 2, 3, 5, 8, 11 (6 units) : HP LASERJET 4 PLUS

-Printer no. 1, 2, 3, 5 connects to its workstation no. 1, 2, 3, 5 by RS 232.

-Printer no. 8, 11 are network printers including HP JET Direct Card Ethernet (10B-T)

Printer no. 4, 6, 7, 9, 10 (5 units) : EPSON LQ 1170i. All of them are network printers include HP JET DIRECT (10B-T).

The configuration sheets (1,3,4) in shown in Figure 3.5
Figure 3.5 System Configuration

HP ADVANCE STACK
HUB-48
PATCH PANEL 48
PORTS
### 3.3.3 Cost Estimation of additional hardware & software for proposed system

<table>
<thead>
<tr>
<th>Description</th>
<th>Qty</th>
<th>@Baht</th>
<th>Amount</th>
</tr>
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<tbody>
<tr>
<td>1. HP NET SERVER LF4/100 M1050 HP10/100VG SELECTABLE EISA ADAPTER</td>
<td>1</td>
<td>125,038.89</td>
<td>125,038.89</td>
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<tr>
<td>2. HP VECTRA VL2 4/66 PC:WORKSTATION HP PC LAN ADAPTER NC16/TP</td>
<td>12</td>
<td>44500.00</td>
<td>534,000.00</td>
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<td>3. NETWARE 3.12-25 USERS</td>
<td>1</td>
<td>76000.00</td>
<td>76,000.00</td>
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<td>4. HP LASERJET 4 PLUS</td>
<td>4</td>
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<td>176,000.00</td>
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<td>5. EPSON LQ 1170i</td>
<td>1</td>
<td>19,000.00</td>
<td>19,000.00</td>
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<td>6. HP JETDIRECT CARD ETHERNET (10B-T)</td>
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<td>9800.00</td>
<td>49,000.00</td>
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<tr>
<td>7. HP JET DIRECT (10B-T) FOR LQ1170i</td>
<td>5</td>
<td>9800.00</td>
<td>49,000.00</td>
</tr>
<tr>
<td>8. WIRING JOB</td>
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<td></td>
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<td>UTP CABLE (LEVEL 5)700 M</td>
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<td>PATCH PANEL 48 PORTS</td>
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<td>RJ 45 WALL PLATE 2 I/O</td>
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<tr>
<td>RJ 45 MODULAR JACK (FEMALE)</td>
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<td>8,700.00</td>
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<td>RJ 45 MODULAR PLUG (MALE)</td>
<td>100</td>
<td>30.00</td>
<td>3,000.00</td>
</tr>
<tr>
<td>110 BLANK INSERT</td>
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<td>18.00</td>
<td>540.00</td>
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<td>ELECTRICAL &amp; ACCESSORIES</td>
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<td>INSTALLATION CHARGES</td>
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<td>9 APPLICATION SOFTWARE</td>
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<tr>
<td><strong>TOTAL COST IN BAHT</strong></td>
<td></td>
<td></td>
<td><strong>1,472,714.89</strong></td>
</tr>
</tbody>
</table>
3.4 Security and Control

The good system should have security on the overall system to ensure data validity and correctness. The following security techniques are recommended to the proposed computerized system;

1. User Identification

The use of Password is applied to ensure user authentication. When the user starts the request, the password identification is performed. If it is the wrong password, the screen alerts the user to reenter password. If there are more than 3 incorrect, then the process is terminated.

Every user has his own password and enter his user ID and password before access to the system (please see input screen S001). Each user can set the password by themselves. Password will automatically outdated if user does not change it for three months. However, they can change it any time before three months if they want.

Passwords keyed in the system use encryption technique so that no one will understand when retrieve password from the system or when somebody look at the screen while the user enter password.

2. Automatic Switch on Machine

The system will not be allowed to be used after 22.00 o'clock until 8:00 o'clock in the morning. This can prevent unauthorized person to access data. However, if it is necessary to work during the switch off time, the F&A Manager is the person who can switch on the machine for special case.
3. **Program Security** (1)

Programs may be changed intentionally or unintentionally so there should be some protection. Configuration Management is another aspect of software engineering that offers advantages in security. When configuration management is practiced, a person or system controls records all changes to a program or documentation.

Program security can be performed at the operating system as well. Access log is a listing of who accessed which computer objects, when, and for what amount of time. It is an after-the-fact means of tracking down what has been done.

4. **Protection of access to general objects**

As ESA’s sales order processing depend a lot on data from general files which are used by many people, there should be some standards to ensure that each person does not distort the files or get too much access on file. The Least Privilege Principle stated that a subject should have access to the smallest number of objects necessary to perform some task. There is one access control list for each object and the list shows all subjects who should have access to the object and what their access is (e.g. read, write, execute).

There are three-bit access code for each user and each bit represents read-only bit, write-only bit and access-bit. If bit is set to one, means “can do” while zero mean “can’t do”.

The person outside Sales Department are able to read some report of Sales Order Processing System but cannot wrote or access the data.

However, each person in Sales Department has different access level.
5. Database Security

Two phase update is done to ensure the complete update because the system may fail at any time (e.g. electronic problem)(8).

6. Personal Computer Security

Computer is an object vulnerable to water, heat or even a scratch. Certain rules should be set for users e.g.

1. Do not smoke or drink in computer room
2. Perform periodic backup
3. Do not leave computer open

To avoid natural disaster (e.g. fire, flood), computers should be placed on table and use Uninterruptible Power Supply (U.P.S.) and the room should have fire alarm system.
3.5 Cost Benefit Analysis for Proposed System (13)

System Start-up Cost

Development

System analysis and requirement determination

2 weeks (80 hours) Baht 40,000.00

System Design

4 weeks (160 hours) Baht 80,000.00

Development and Implementation

6 weeks (240 hours) Baht 120,000.00

Indirect cost for staff Baht 50,000.00

Total Baht 290,000.00

Equipment Purchase (Cost Estimation in Chapter 3.3.3)

Total cost of addition equipment Baht 1,472,714.89

Installation

Site Preparation Baht 50,000.00

Training Baht 80,000.00

System Generation Baht 20,000.00

Total Baht 150,000.00
Systems Operating Costs

Supplies

Existing and new equipment maintenance

Program maintenance

Total operating costs (first year) Baht 50,000.00

Benefits

System Benefits

Savings on additional personnel not needed Baht 480,000.00

Savings

Elimination of pricing errors (minimum) Baht 300,000.00

Reduced accounts receivable balances (minimum) 300,000.00

Intangible benefits

Better planning information

Better customer relations

More satisfied employees

Necessary to grow

Ability to add communication and avoid courier costs (if expansion occurs)

Total tangible systems benefit (first year) Baht 1,080,000.00
## COST / BENEFIT ANALYSIS

### 5-YEARS SYSTEM LIFE

<table>
<thead>
<tr>
<th>Year</th>
<th>System Cost in Baht</th>
<th>System Benefit in Baht</th>
<th>Net Cumulative Different in Baht</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>1,912,714.89</td>
<td>1,080,000.00</td>
<td>(832,714.89)</td>
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<td>2</td>
<td>50,000.00</td>
<td>780,000.00</td>
<td>(102,718.89)</td>
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<td>3</td>
<td>60,000.00</td>
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<td><strong>2,322,714.89</strong></td>
<td><strong>4,980,000.00</strong></td>
<td><strong>2,657,285.11</strong></td>
</tr>
</tbody>
</table>

Payback occurs between 24 and 25 months after start of project.
4. Project Implementation

4.1 Project Implementation

1. Feasibility Study

The feasibility study is to study about current system, current hardware capacity and the overall operation of the related system and human resources. The investigation of existing problem and user requirement should be done in this phase(2).

2 System Analysis and Design

The system analysis and design involved the study in detail about the current system and doing the problem definition which will take time for interviewing the related function and discussion with management. After that the summary of existing system, problem and draft proposed system will be presented to user for acceptance. The next step detail of system design can be continued(2).

3 System Implementation

3.1 SITE PREPARATION

3.2 TEST AND ACCEPTANCE

3.3 TRAINING & SUPPORT

3.4 SYSTEM CONVERSION

3.1 Site Preparation

Firstly the company should consider several categories of preparation activities: space, electric needs, communications, climate control and etc(5).
Space

Providing space for new computer and output devices is a major consideration in space planning. The company prepare space for new personal computers at sales department.

Electricity needs

Computer or terminal requires the standard electric capability. Before installation begins, the company should determine if sufficient power is available to support the system by having an electrical engineer complete a power requirement survey.

3.2 Test and Acceptance

Before company accepts the items as being operational, they should conduct the own test called test and Acceptance.

Test and Acceptance requirement should be developed in conjunction with the design of the system.

Deriving Test Data from Black-Box Testing Methods (17)

-Boundary Analysis testing: concentrates on data input to or output from a module as either a range or an ordered set of values. The value can be identified:

-Value at the lower boundary of the range
-Value at the upper boundary of the range
-Value that is less than lower boundary.
-Value that is greater than the upper boundary
Example, consider a module to calculate the Total VAT amount for each cash sales order. Ranges would be set for expected value of the lowest number total goods value for each customer order. The expected number of goods value might be between 10-10000 which feasible range for a positive 5 integer numeric between 9,999-99,999,999.99 Thus boundary analysis test cases for a range of expected value of GOODS VALUE might be 1,100, 1000, 10000 , assuming minimal order of Baht 1,000.-.

The following values would be needed in test case to provide input boundary analysis for MODULE A to calculate VAT amount

<table>
<thead>
<tr>
<th>GOODS_VALUE</th>
<th>VAT RATE</th>
<th>VAT AMOUNT</th>
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<tbody>
<tr>
<td>100</td>
<td>7%</td>
<td>&quot;under&quot;</td>
</tr>
<tr>
<td>900</td>
<td>7%</td>
<td>&quot;under&quot;</td>
</tr>
<tr>
<td>1,000</td>
<td>7%</td>
<td>70.00</td>
</tr>
<tr>
<td>100,000</td>
<td>7%</td>
<td>7,000.00</td>
</tr>
</tbody>
</table>

3.3 Training & Support

- Customer on-site training for direct user, system operator and management, the training program will be conducted to each group according to their related work and authorization of each group. After on-site training, all operation manual will be provided.

- Quarterly technology update seminar for customer

- Provided hot line service for HP server and application problem solving

- Remote service for immediate problem diagnostic and solves from Supplier’s office by MODEM

- Periodically system tuning for maximum performance
-Provide demo system for customer to test or develop the application during shipping period

- The training schedules are available all the year, user can be trained repeatedly.

3.4 System Conversion

The installation phase (of system development life cycle) comprises two activities;

- Data Conversion

- System Installation

The methods used in converting files will depend at least in upon the alternative selected for installation of the new system.

The existing file (customer file, account receivable file, inventory file are prepared for conversion. But we have to consider the cost and possibility of conversion the existing file to match the new system because the actual conversion process require run time essentially preventing the company from process business.

The accounting and inventory system has been already used software package for one years ago, it mean that some master file need to support both existing and new sales order processing system so there is likely to be some delay. Such problem can be avoided if the system is done "ABRUPT CONVERSION". such as change in the accounting and inventory system are made at the end of period. The new system start up with all current balance at zero.

For customer master file which we do not have the database for computer system before so we gather the data from the existing system as much as possible (it may come form the hard copy) and then using PARALLEL OPERATION WITH A SINGLE CUTOVER POINT strategy for Sales Order Processing System (5)
Both existing system and new computerized system are operated concurrently for some period of time. Often this parallel operation period coincides with business processing cycles such as week or month. During the interim period, all input transactions are used to update the database that support both old and the new systems. A balancing between results of the two systems is performed regularly but the cost of operating both system is concurrent.
4.2 Project Time Requirement

The development of this project will take time for six month, please see figure 4.1 Project Time Requirement Schedule.
### Activity

1. **R&D**
   - Evaluation Period
   - Executive Overview
   - Problem definition

2. **System Analysis & Design**
   - Understand existing system
   - Define new system requirement
   - Design new system
   - Cost Benefit Analysis
   - Programming
   - Testing

3. **Adjustment**

4. **Final Project**

---

**Project Time Requirement for Sales Order Processing System**

<table>
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<tr>
<th>Activity</th>
<th>1st month</th>
<th>2nd month</th>
<th>3rd month</th>
<th>4th month</th>
<th>5th month</th>
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<td>1. R&amp;D</td>
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<td>- Evaluation Period</td>
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<tr>
<td>- Executive Overview</td>
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<td>- Problem definition</td>
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<td>2. System Analysis &amp; Design</td>
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<td></td>
<td></td>
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<tr>
<td>- Understand existing system</td>
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<tr>
<td>- Define new system</td>
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<tr>
<td>requirement</td>
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<td></td>
</tr>
<tr>
<td>- Design new system</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>- Cost Benefit Analysis</td>
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</tr>
<tr>
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</tr>
<tr>
<td>- Testing</td>
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<tr>
<td>3. Adjustment</td>
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<tr>
<td>4. Final Project</td>
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</tr>
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</table>

**Figure 4.1 Project Time Requirement Schedule**
5. Conclusions & Recommendations

5.1 Conclusions

There are main problems in the company as follow;

- Information and documentation are scattered among individual staff of each department and the same information can't be shared by different department.

- The communication between department is poor.

- The computing resources cannot be shared between each function.

- Workload for administrative staff for filing and preparing the report to management.

- Take long time to get information from system.

- Inconvenient for customer when they want to know the status of their orders.

- Management does not receive reliable and high quality information needed for planning and decision making.

The important thing is that ESA doesn't have computer system for customer & sales record and also the inventory report cannot on-line to the Sales Department. All documents from Sales Department are prepared in manually which cause mistake and duplicated work and the delay in communication both forward & backward between sales department, inventory and accounting department.

To solve this problem, the company need to be improved by:

- to automate Sales Order Processing System

- DBMS for customer file, credit customer record, principal file, inventory file, sales
slip/cash receipt record and invoice for credit customer record.

-Central Database

-Reducing work redundancy.

-Data Communication Network to communicate between department and MODEM connected to the computer's supplier company for hotline problem solving service.

However the way to be successful system is training, training the staff how to use new system, teach basic concepts of automation and explain how automation can help them work more efficiency, effective and accuracy.

5.2 Recommendations

-There should have a study on structure of existing database of all departments for the feasibility of doing data conversion, if so, the data conversion is needed as much as possible.

-To connect existing computer system to the new computer system of Sales Department.

-The company should assign some suitable group of staff to handle the new central database or they should recruit new computer staffs to handle new system and central database.

-The company should let the staff of sales department to get involved in new system team so that they would be willing to cooperate in this project.
Appendix A:

A1 Dataflow Diagram of Proposed System

A2 Data Dictionary of DFD

A3 Process Specification
Figure A1.1 DFD Level 1 Verify Orders
Figure A1.2 DFD Level 3 Process Sales Order
Figure A1.3 DFD Level 4 Process Direct Order
Figure A1.4 DFD Level 5 Check Inventory
Figure A1.5 DFD Level 6 Generate Invoice
Appendix A2

The Data Dictionary

Back-Ordered Record = "The detailed of required items which are out_stock items and these items will be recorded as back-ordered items for next process of purchasing requisition"

bill-address = "bill_to" address: where we show in invoice (tax invoice)

city = "a province in an address"

Commission Memorandums = \{commission memorandum\}

commission memorandum = "information contain ed in commission memorandum"

@cm_number+customer_name+customer_address+direct order detail+prin_ID+prin_name
commission memorandum detail = "detailed information about direct order"

commission report = "sales commission report"

\{(salesperson_ID+invoice number+sales order number+commission amount)+total commission\}

company-name = "the name of a company or organization"

country = "the country in an address"

Credit Customers = \{credit customer\}

credit customer = "credit customers file which keep documents of credit customer eg. registered document, bank statement, authorized signature of company, reference, etc."
credit inquiry = *a request for authorization to credit sales for purchase of goods*

credit-limit = *a amount of credit that will be extended to a customer for orders that are not prepaid*  
"unit: baht; range 1-1,000,000"  

Customers = {customer}  
customer = "ESA customer"  
@&customer_ID+(company name) customer_name+customer_address+contact+title+credit_limit+term+bill_address+ship_address+note  

customer-address = "the location of customer's office where we contact them"  
address number+street name+kweng+district+city+zip-code+region+phone+fax  

customer-name = courtesy-title+first name+last name  
customer_ID = "identification of ESA customer"  
{[numeric-digit]}  
debit limit = "the amount of credit that principal extends to ESA for order that are not prepaid"  
despatch goods = "the ordered goods has been shipped to customer"  
direct order = "the order that customer will place order and make payment directly to ESA principals in foreign country and ESA will get commission from principal"
direct order detail = *detailed of direct order*
customer_name+customer_address+prin_ID+
prin_name+item_ID+item_name+mftg_ID+unit
type+unit on order

first-name = *a person's first name*
goods = *products are sold by ESA*
in_stock items = *message to inquiry or order inquiry indicate that item is in stock at warehouse*
in_stock items detail = *detailed information about required item which is in stock at warehouse*
@item_ID+item_name+unit on hand+unit type

indirect order = *the order that customer places to ESA and goods will be delivered from ESA's warehouse*

indirect order detail = *detailed of indirect order*
customer_name+customer_address+item_ID+
item_name+unit type +unit on order

Inventory = {inventory}
inventory = *ESA's inventory file contained the information about goods available for sales*
@item_ID+item_name+unit_type+unit on hand+unit price+(mftg_ID)

Invoices = {invoice}
invoice = *information contained in an ESA invoice*
@invoice number + customer_name + bill_address+ship_address+order detail

item inquiry = *request for availability of goods in ESA's
warehouse*

item_ID = *identification number of goods*

item_name = *the name call for goods*

* (eg. Gas Detector Tube, Side Slip Tester)*

last-name = *a person's last name*

low-inventory message = *a message send to management when the*

system discovers that the total inventory of

goods in stock has dropped below a

prescribed threshold*

item_ID+total in stock+*time to reprint

mftg_ID = *identification number of principal's goods; note

that this mftg_ID may be different from item_ID

but it is unique for each principal*

Order Confirmations = *direct order file: customer order which is

classified as direct order of ESA*

*customer order placed order in the name of

principal and paid to principal invoice*

*currency:foreign (eg. USD, YEN, DEM, CHF)*

Orders = *indirect order file: customer order which is

classified as indirect order of ESA*

*customer order placed order in the name of

ESA and paid to ESA invoice*

*currency:baht*

order detail = *the raw data from which a valid order will be

classified as direct or indirect order and be
order response = *response to customer when customer places an order to ESA*

out_stock item = *message to inquiry of order detail indication that item is out of stock at the warehouse* 

out_stock item detail = *detail information of item that is out of stock at warehouse* 

payment = *payment made for goods on order or to pay invoice*

Principals = {principal}

principal = *the vendor company in foreign country which ESA represented in Thailand to sell their products* 

prin_address = *the address of principal*

prin_ID = *identification number of principal*
prin_name = "the name of principal"
purchase request = "the document to be sent to Admin Dept after the out_stock item has been in back ordered record and low inventory message is shown"
purchase request detail = "detail information of required items which are in back ordered record and low inventory item"
quantity = "the number of goods that has been ordered"

Quotations = "quotation file that keep the detail of goods, price and condition that quoted to each customer"
quotation detail = "detail of goods, price and condition that salesperson offers to each customer"
required shipment date = "the latest date that customer requests ESA to deliver the goods to them"
sales amount = "the amount of money received from sales of goods included VAT"

Sales Orders = {sales order}
sales order = "document to show sales transaction and is used to keep record of Sales Department and Accounting Department"

@sales order number+customer_ID+customer name+customer_address+bill_address+
ship_address+order type+term+salesperson+
currency+required shipment date+order

65
| Sales Order for Direct Sales | \( = \) *sales order which order type = "direct"*
| Sales Order for Indirect Sales | \( = \) *sales order which order type = "indirect"*
| Sales Reports | \( = \) *report file of sales department*
| Salespersons | \( = \) \{salesperson\}
| Salesperson | \( = \) \@salesperson\_ID+salesperson\_name
| Salesperson Detail | \( = \) *detail of ESA salesperson*
| Customer ID | \( = \) tentative customer\_ID
| Ship Address | \( = \) "ship_to" address: where we have to deliver goods to customer and we show in invoice*
| Term | \( = \) *the period of time that allows for credit customer*
| Total Commission | \( = \) *total commission paid to salesperson during a one month period based on all of goods he sold. Calculated in process 4.3*
total commission report = "the report show the commission paid to salesperson"
salesperson_ID+salesperson_name+total commission+period

total direct sales amount = "the total direct sales amount that customer placed order directly to principal in foreign country. currency:(eg. USD, DEM, CHF, etc)"

total sales amount = "the total indirect sales amount that customer placed order to ESA, currency: baht"

unit on hand = "number of units which are held in stock"

unit price = "the price for a single unit of goods"
*units: baht*

unit_type = "measure unit of goods"
*units: (set, pack, piece, dozen, etc.)*

valid credit customer = "the raw data from which a valid credit customer will be constructed and put into Credit Customers store"

valid direct order = "the raw data from which a valid direct order will be constructed and put into Order Confirmations store"

valid direct order detail = "detail of valid direct order"

valid indirect order = "the raw data from which a valid indirect order will be constructed and put into Orders store"

valid indirect order detail = "detail of valid indirect order"
**

vat amount = "Value Added Tax amount, currency: baht"

\[ VAT = \text{total extension} \times \text{vat rate} \]
Appendix A3

THE PROCESS SPECIFICATIONS

PROCESS 1.1 VERIFY ORDER

BEGIN
IF customer in CUSTOMERS with customer_ID = customer_ID in order details
READ customer record
IF record cannot be found
THEN order-response = "No such customer"
ELSE customer_ID = "NEW" APPEND new customer record to CUSTOMER
DO WHILE there are more order-items in order details
   FIND order item in QUOTATION with item_ID = item_ID in order detail
   IF record cannot be found
      order response = "No such item"
      EXIT
   ENDIF
ENDDO
valid-order-detail = customer_ID + {order item} + order type + currency + term
DISPLAY (to process 1.2) valid order detail
END

PROCESS 1.2 CLASSIFY ORDERS

BEGIN
IF order type = "Direct"
   APPEND order detail record to ORDER CONFIRMATIONS
   DISPLAY (to process 1.3) valid direct order detail
IF order type = "Indirect"
APPEND order detail to ORDERS

DISPLAY (to process 1.3) valid indirect order detail

ENDIF

ELSE

DISPLAY order type error

ENDIF

END

PROCESS 1.3  CREATE SALES ORDERS

Precondition 1
valid order detail and valid direct detail are determined

Postcondition 1
direct order is acceptable
sales order for direct order is produced and direct order detail is transferred to next process (Process 4.1 CREATE COMMISSION MEMORANDUM)

Precondition 2
valid order detail and valid indirect order detail are determined

Postcondition 2
indirect order is acceptable
sales order for indirect order is produced and indirect order detail is transferred to next process (Process 6.1 CHECK GOODS IN STOCK)

PROCESS 2  VERIFY CREDIT CUSTOMER

Precondition 1
valid order detail occurs with customer_ID in ORDERS matching customer_ID in CREDIT CUSTOMER

total sales amount in ORDERS is less than or equal credit limit in CUSTOMERS
Postcondition 1
credit sales is allowed

Precondition 2
valid order detail occurs with customer_ID in ORDERS is “NEW”

Postcondition 2
credit customer documents are requested for credit authorization

Precondition 3
valid order detail occurs with customer_ID in ORDERS is not matching customer_ID in CREDIT CUSTOMER and customer_ID is not “NEW”

Postcondition 3
ERROR-MESSAGE is generated

PROCESS 3.1 CREATE SALES ORDERS
(Please see Process 1.3)

PROCESS 3.2 COMPUTE VAT AND SALES AMOUNT

Precondition 1
sales order occurs with item_ID matching an item-category in TAX-CATEGORIES

Postcondition 1
VAT amount is set to total extension * tax rate
sales amount is set to total extension + VAT amount

Precondition 2
sales order occurs with item_ID that doesn’t match an item-category in TAX-CATEGORIES

Postcondition 2
ERROR-MESSAGE is generated
PROCESS 3.3 ACCUMULATE TOTAL SALES AMOUNT

Precondition 1

there is sales amount occurs from each sales order

Postcondition 1

accumulate sale amount of each sales order to TOTAL SALES AMOUNT

PROCESS 3.4 PRODUCE SALES REPORT

BEGIN

REPEAT UNTIL there are no more sales orders in SALES ORDERS

READ next sales order record

sales order total = 0

REPEAT UNTIL there are no more sales amount in SALES ORDERS with order date within specified range

ADD sales amount to total sales amount

ADD order_ID , sales order number, customer name, order date to next line of sales report

END REPEAT

ADD total sales amount to next line of sales report

END REPEAT

END

PROCESS 3.5 COMPUTE SALES COMMISSION

Precondition 1

sales order occurs with salesperson name matching a salesperson name in SALES ORDERS

Postconditon 1

sales commission is set to total extension * commission rate of a specified
salesperson name

total sales commission is added for all items

Precondition 2

sales order occurs with salesperson name that does not match a salesperson name in

SALESPERSONS

Postcondition 2

ERROR-MESSAGE is generated

**PROCESS 3.6 ACCUMULATE SALES COMMISSION**

Precondition

there is sales commission occurs from each sales order

Postcondition

accumulate amount of sales commission for each sales order to COMMISSIONS

**PROCESS 3.7 PRODUCE SALES COMMISSION REPORT**

BEGIN

DO WHILE there are more salesperson in SALESPERSONS

READ next salesperson record

salesperson-commission = 0

DO WHILE there are more sales orders in SALES ORDERS with salesperson_ID matching salesperson_ID in SALESPERSONS and with order date within this month

READ next such sales order record

commission = commission rate * total extension

ADD commission to salesperson commission

END DO

APPEND salesperson_ID, sales order number, commission to next line of commission report
PROCESS 4.1 CREATE COMMISSION MEMORANDUM

Precondition

sales order occurs with direct order type is determined

Postcondition

commission memorandum is produced

PROCESS 4.2 COMPUTE DIRECT SALES AMOUNT AND COMMISSION

Precondition 1

commission memorandum occurs with prin_name matching a prin_name in PRINCIPALS

Postcondition 1

commission is set to total extension * commission rate
direct sales amount is added for all items

Precondition 2

commission memorandum occurs with prin_name that does not match prin_name in PRINCIPALS

Postcondition 2

ERROR-MESSAGE is generated

PROCESS 4.3 ACCUMULATE TOTAL DIRECT SALES AMOUNT

Precondition 1

there is direct sales amount occurs for each commission memorandum

Postcondition 1
accumulate direct sales amount for each commission memorandum to total direct sales amount
accumulate direct sales amount for each commission memorandum to each principal

PROCESS 4.4 PRODUCE TOTAL DIRECT SALES AMOUNT REPORT

BEGIN
DO WHILE there are more principals in PRINCIPALS
   READ next principal record
   direct sales amount = 0
   DO WHILE there are more commission memorandum in COMMISSION MEMORANDUMS with prin_ID matching prin_ID in PRINCIPALS and order date within this month
      READ next such commission memorandum record
      commission = commission rate * total direct sales
      ADD commission to principal-commission
      APPEND commission memorandum number, prin_ID, sales order number, direct sales amount and principal-commission to next line of total direct sales report
   END DO
END DO
END

PROCESS 4.5 COMPUTE SALES COMMISSION

BEGIN
DO WHILE there are more salespersons in SALESPERSONS
   READ next salesperson record
   sales-commission = 0

75
DO WHILE there are more commission memorandum in COMMISSION MEMORANDUM with salesperson_ID matching salesperson_ID in SALESPERSON and with order date within this month
  READ next such commission memorandum record
  sales commission = sales commission rate * total extension
  ADD sales commission to salesperson-commisison
END DO

PROCESS 4.6 ACCUMULATE SALES COMMISSION

Precondition
  there is sales commission occurs from each commission memorandum

Postcondition
  accumulate amount of sales commission for each commission memorandum to COMMISSIONS

PROCESS 4.7 PRODUCE SALES COMMISSION REPORT

BEGIN
DO WHILE there are more salesperson in SALESPERSONS
  READ next salesperson record
  salesperson-commission = 0
  DO WHILE there are more commission memorandum in COMMISSION MEMORANDUMs with salesperson_ID matching salesperson_ID in SALESPERSONS and with order date within this month
    READ next such sales order record
    commission = commission rate * total extension
ADD commission to salesperson commission

END DO

APPEND salesperson_ID, commission memorandum number, commission to next line of commission report

END DO

END

PROCESS 5.1 CHECK GOODS IN STOCK

BEGIN

DO WHILE there are more order detail in ORDERS

FIND item detail in INVENTORY with item_ID = item_ID in ORDERS provide as input to this process

READ item name record

IF item_ID is matched item_ID in INVENTORY

WRITE available item record and keep record of order

IF out of stock occurs

WRITE unavailable item to next process and keep record of order

ELSE

WRITE not supplied item to customer

ENDIF

END DO

END

PROCESS 5.2 ENTER AVAILABLE ITEM

Precondition

item_ID in order detail is matched item_ID in inventory

in_stock item is determined
Postcondition

enter order detail to next process

PROCESS 5.3 CHECK INVENTORY FOR REPRINT

BEGIN

DO WHILE there are more order items in valid order details

    FIND inventory item in INVENTORY with item_ID = item_ID in order item and mftg_ID in INVENTORY matching mftg_ID in PRINCIPALS provided as input to this process

READ inventory item record

    SUBTRACT quantity ordered from inventory-quantity

    *Note: this could result in a negative inventory; it simply means that the warehouse won’t be able to fill the order until a reprint arrives*

WRITE inventory item record

    FIND item name in INVENTORY with item_ID = item_ID in order item

READ item record

    SUBTRACT quantity ordered from total in stock

WRITE item record

    IF total in stock < reorder threshold

        low inventory message = item_ID+total in stock+"time to reprint"

        DISPLAY low inventory message

    ENDIF

END DO

END

PROCESS 5.4 PROCESS PURCHASE REQUEST

Precondition

    There is out_stock item detail in BACK_ORDERED RECORD which item_ID is
matched item_ID in INVENTORY

Postcondition

Purchase Request is produced to next process

**PROCESS 5.5 UPDATE INVENTORY**

**Precondition 1**

there is in_stock item detail which item_ID in INVENTORY matching item_ID in INVOICES

**Postcondition 1**

the quantity ordered in invoice is subtracted from unit on hand in inventory

**Precondition 2**

there is stock addition occurs as issuing purchase request

**Postcondition 2**

inventory item is added

**PROCESS 5.6 PRODUCE INVENTORY REPORT**

**BEGIN**

**REPEAT UNTIL** there are no more products in PRODUCTS

READ next product in PRODUCTS

inventory-total = 0

**REPEAT UNTIL** there are no more inventory items in INVENTORY with item_ID that match item_ID in PRODUCTS

ADD inventory-quantity to inventory total

ADD item_ID, mftg_ID, inventory-quantity to next line of inventory report

**END REPEAT**

ADD inventory-total to next line of inventory report

**END REPEAT**
PROCESS 6.1 CREATE INVOICES

Precondition

in_stock item detail and ready for ship is determined

Postcondition

invoice is produced

PROCESS 6.2 COMPUTE VAT AND TOTAL SALES AMOUNT

Precondition 1

invoice occurs with item_ID matching an item-category in TAX-CATEGORIES

Postcondition 1

VAT amount is set to total extension * tax rate

total sales amount is set to total extension + VAT amount

Precondition 2

invoice occurs with item_ID that doesn’t match an item-category in TAX-CATEGORIES

Postcondition 2

ERROR-MESSAGE is generated

PROCESS 6.3 ACCUMULATE TOTAL SALES AMOUNT

Precondition

there is sales amount occurs from each invoice

Postcondition

accumulate sales amount for each invoice to total sales amount
PROCESS 6.4 PRODUCE SALES COMMISSION REPORT

BEGIN

DO WHILE there are more salesperson in SALESPERSONS

    READ next salesperson record
    salesperson-commission = 0

    DO WHILE there are more invoice in INVOICE with salesperson_ID matching salesperson_ID in SALESPERSONS and with order date within this month

        READ next such sales order record
        commission = commission rate * total extension
        ADD commission to salesperson commission

    END DO

    APPEND salesperson_ID, invoice number, commission to next line of commission report

END DO

END

PROCESS 6.5 COMPUTE SALES COMMISSION

Precondition 1

invoice occurs with salesperson name matching a salesperson name in SALES ORDERS

Postcondition 1

sales commission is set to total extension * commission rate of a specified salesperson name

total sales commission is added for all items

Precondition 2

sales order occurs with salesperson name that does not match a salesperson name in
SALESPERSONS

Postcondition 2

ERROR-MESSAGE is generated
Appendix B:  

B1  Structured Chart

B2  Module Specification
TRANSACTION ANALYSIS

Figure B1.1
Figure B1.2 VALIDATE LOGIN NAME
Figure B1.3 VALIDATE ORDER DETAIL
PROCESS CUSTOMER ORDER

VALID ORDER DETAIL

READ CUSTOMER ORDER

FORMAT SALES ORDER

CLASSIFY ORDER TYPE

FORMAT COMMISSION MEMORANDUM

READ INVENTORY FILE

FORMAT PURCHAS E REQUEST

INQUIRY FOR CREDIT SALES

FORMAT INVOICE

VALID CREDIT CUSTOMER

READY FOR SHIP ITEM

IN_STOCK ITEM

OUT_STOCK ITEM

CREDIT INQUIRY

IN_STOCK ITEM

OUT_STOCK ITEM

INSUFFICIENT ITEM

OUT_STOCK ITEM

INSUFFICIENT ITEM

PURCHASE ORDER

ORDER DETAIL

GET ORDER FILE

GET BACK ORDERED RECORD

ADD BACK ORDERED ITEM

GET NEXT BACK ORDERED ITEM

WRITE PURCHASE ORDER

GET PRINCIPAL RECORD

ORDER STATUS

SALES ORDER

VALID ORDER DETAIL

DIRECT ORDER DETAIL

ORDER TYPE

OUT_STOCK ITEM

IN_STOCK ITEM

ITEM ID

RECORD BACK ORDERED ITEM

DISPLAY MESSAGE

RELEASE ORDER TO PRINCIPAL

WRITE PRINCIPAL RECORD

ITEM ID

END OF ITEM

PURCHASE ORDER

ITEM ID

PRINCIPAL DETAIL

Figure B1.4 PROCESS CUSTOMER ORDER
Figure B1.5 FORMAT SALES ORDER
Figure B1.6 FORMAT COMMISSION MEMORANDUM
Module Specification

Module: Validate login name

Purpose: To validate login name, password

Uses: login name, password

Returns: valid login name

BEGIN

REPEAT until user quit

CLEAR S001-screen

PUT screen S001

ENTER login name

ENTER password

REPEAT until no change made

FIND login name in login file by entered login name

IF FOUND valid login name = "true"

FIND password in login file by entered password

IF FOUND valid password = "true"

WRITE valid login name, valid password to login file

ELSE DISPLAY "invalid password"

ELSE DISPLAY "invalid login name"

ENDREPEAT

IF change made = "true"

READ new login name, new password

WRITE new login name to login file

WRITE new password to password file

ENDIF

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Module: Validate order detail

Purpose: To validate the customer order detail accepted from S006 screen

Uses: Order detail

Returns: Valid order detail, (valid) order detail

BEGIN

Repeat until user quit

Clear S006-screen

Display S006-screen

Read S006 screen

Repeat until no change made

Find customer record using customer_ID

IF found valid customer = true

ENDIF

Check presence of item_ID on customer order data

IF yes then Find INVENTORY using item_ID

IF found valid inventory = true

ENDIF

ELSE Find PRINCIPAL.MFTG_ID using item_name

IF found then find INVENTORY where item_ID = MFTG_ID

IF found valid inventory = true

ENDIF

ENDIF

ENDIF

ENDIF

ENDREPEAT

IF valid customer = true and valid inventory = true
THEN valid order detail = true and write customer order data to customer order record

ELSE valid order detail = false

ENDIF

CALL display message (valid order detail)

ENDREPEAT

Module: Display Message

Purpose: To display message of order detail validation

Uses: valid order detail

Return: -

BEGIN

IF valid order detail = true
    THEN display "valid order"
ELSE display "invalid order-please check the error"

ENDIF

END

Module: Process Customer Order

Purpose: To enter customer order

Uses: Valid customer order

Returns: Customer order record

BEGIN

CALL validate order detail (valid order detail; customer order data)

IF valid order detail = not true
    THEN quit

ENDIF

GET order detail from customer order record
CALL Format Sales Order (valid order detail; sales order)
CALL Classify Order Type (Sales Order; Order-Type)
IF Order Type = Direct Order THEN
CALL Format Commission Memorandum (direct_order_detail)
ENDIF
IF Order Type = Indirect Order THEN
GET item_ID status from INVENTORY FILE
IF unit_on_hand = 0 THEN order_item = out_stock item
ELSE IF unit_on hand < unit_on_order
THEN order_item + insufficient_qty_item
ELSE order_item = in_stock item
ENDIF
ENDIF
IF order_item = out_stock item or insufficient item
CALL FORMAT MESSAGE (out_stock item, insufficient_qty item)
CALL FORMAT PURCHASE REQUEST (out_stock item)
ELSE CALL inquiry_for_credit_sales(credit_inquiry; valid credit customer)
CALL FORMAT INVOICE (in_stock item, ready for ship item)
ENDIF
ENDIF
END

Module: Classify Order Type
Purpose: to classify sales order into indirect or direct order.
Uses: Sales Order
Returns: Order Type
BEGIN
Foreach Sales Order
IF order is made to ESA THEN Order Type = INDIRECT ORDER
ELSE Order Type = DIRECT ORDER
ENDIF

Module: Format Message
Purpose: To format the message for out stock item and insufficient quantity item
Uses: out_stock_item, insufficient_qty_item
Returns: -
BEGIN
CALL Record back ordered item (out_stock_item, insufficient_qty_item;)
CALL Display Message (out_stock_item, insufficient_qty_item;)
END

Module: Record Back Ordered Item
Purpose: to record back order for out_stock_item and insufficient quantity item.
Uses: out_stock_item, insufficient_qty_item
Returns: -
BEGIN
GET order detail of out_stock_item or insufficient_qty_item
FIND back ordered item using item_ID
IF FOUND THEN
ADD back_ordered_record.unit_order with order detail.unit_on_order
ELSE
CREATE new back_order_item
ENDIF
END
Module: Display Message

Purpose: To display message for out stock item or insufficient quantity item

Uses: out_stock_item, insufficient_item

Returns: -

BEGIN
    IF order_item = "out_stock_item"
        THEN display "OUT STOCK ITEM"
    ENDIF
    IF order_item = "insufficient_qty_item"
        then display "INSUFFICIENT QTY ITEM"
    ENDIF
END

Module: Format Purchase Request

Purpose: To format purchase request for out stock item and insufficient quantity item.

Uses: out_stock_item, insufficient_qty_item

Returns: -

BEGIN
    Repeat until EOF()
    Get back ordered item
    IF back_order_status = PO.MADE
        THEN skip
    ELSE
        CREATE Purchase Order Record by PO_item = back_order_item
        WRITE Purchase Order
        SKIP
    ENDIF

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ENDREPEAT

CALL Release Order To Principal (Purchase Order;)

END

Module: Release Order To Principal
Purpose: to release purchase order to principal
Uses: Purchase Order
Returns: -

BEGIN

Foreach PURCHASE ORDER

Find Principal.prin-address using prin-ID

IF FOUND

THEN release purchase order to principal using prin_address

ELSE display message "invalid prin-id please check the errors"

ENDIF

END

END

Module: Format Sales Order
Purpose: To format sales order for valid order detail
Uses: valid order detail
Return: Sales Order

BEGIN

CALL validate order detail

CALL display screen S006

GET customer order record from customer order file

GET inventory record from inventory file

GET principal detail from principal file

CALL get total extension
IF validate order detail = SO.made
    THEN skip
    ELSE create sales order
    WRITE sales order
ENDIF
END

Module: Get total extension
Purpose: to get total extension, total VAT amount, total sales amount from valid order detail
Uses: valid indirect order detail
Returns: total extension, total VAT amount, total sales amount
BEGIN
    CALL valid order detail (unit_price;order_qty)
    total extension = 0
    REPEAT until EOF
        GET unit_price, order_qty from valid order detail
        extension = unit_price * order_qty
        total extension = total extension + extension
    ENDREPEAT
    GET VAT rate
    CALL calculate VAT amount
    CALL calculate total sales amount
END

Module: Calculate VAT amount
Purpose: to get VAT amount
Uses: total extension
Returns: VAT amount
BEGIN
GET total extension
GET VAT rate
VAT amount = total extension * VAT rate
END

Module: Calculate total sales amount
Purpose: to get total sales amount
Uses: total extension, total vat amount
Return: total sales amount
BEGIN
CALL get total extension
CALL calculate VAT amount
total sales amount = total extension + total VAT amount
END

Module: Calculate sales commission
Purpose: to get sales commission
Uses: total extension, commission rate
Return: total sales commission
BEGIN
CALL total extension
GET salesperson record, commission rate from sales person record
REPEAT UNTIL EOF
IF sales order.salesperson_ID = salesperson record.sales person_ID
THEN GET sales person.commission rate
sales commission = total extension * commission rate
ELSE DISPLAY " invalid salesperson_ID"
ENDIF
END
Module: Accumulate total sales amount
Purpose: to get monthly sales amount
Uses: total sales amount
Returns: total monthly sales amount
BEGIN
    total monthly sales amount
    REPEAT UNTIL EOF
        total monthly sales amount = total monthly sales amount + total sales amount
    END REPEAT
END

Module: Format report
Purpose: to generate report
Uses: sales order record, sales commission record
Return: Reports
BEGIN
    CALL sales order record, sales commission record
    CALL format report
END

Module: Format Invoices
Purpose: to generate invoice for in_stock item and ready to ship item
Uses: in_stock item, ready for ship item
Returns: Invoice
BEGIN

IF order type = "indirect order"
    in_stock item = "YES" and
    ready for ship = "YES"
THEN
CALL sales order record from sales order file
CALL inventory record from inventory file
CALL customer record from customer file
    IF in_stock item = inv.made
        THEN skip
        ELSE create invoice
    ENDIF
WRITE invoice
ELSE DISPLAY "error"
END

Module: Get total extension
Purpose: to get total extension, total VAT amount, total sales amount from valid order detail
Uses: valid indirect order detail
Returns: total extension, total VAT amount, total sales amount
BEGIN

CALL valid order detail (unit_price;order_qty)
    total extension = 0
    REPEAT until EOF
        GET unit_price, order_qty from valid order detail
        extension = unit_price * order_qty
        total extension = total extension + extension
ENDREPEAT

GET VAT rate

CALL calculate VAT amount

CALL calculate total sales amount

END

Module: Calculate VAT amount

Purpose: to get VAT amount

Uses: total extension

Returns: VAT amount

BEGIN

GET total extension

GET VAT rate

VAT amount = total extension * VAT rate

END

Module: Calculate total sales amount

Purpose: to get total sales amount

Uses: total extension, total vat amount

Return: total sales amount

BEGIN

CALL get total extension

CALL calculate VAT amount

total sales amount = total extension + VAT amount

END

Module: Calculate sales commission

Purpose: to get sales commission

Uses: total extension, commission rate

Return: total sales commission
BEGIN

CALL total extension

GET salesperson record, commission rate from sales person record

REPEAT UNTIL EOF

IF sales order.salesperson_ID = salesperson record.sales person_ID

THEN GET sales person.indirect commission rate

sales commission = total extension * indirect commission rate

ELSE DISPLAY " invalid salesperson_ID"

ENDIF

ENDREPEAT

CALL format report (indirect sales commission record)

CALL commission report

WRITE report

END

Module: Accumulate total sales amount
Purpose: to get monthly sales amount
Uses: total sales amount
Returns: total monthly sales amount

BEGIN

total monthly sales amount

REPEAT UNTIL EOF

total monthly sales amount = total monthly sales amount + total sales amount

END REPEAT

END

Module: Format report
Purpose: to generate report
Uses: invoice record, indirect sales commission record

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Return: Reports

BEGIN

CALL invoice record, indirect sales commission record

CALL format report

END

Module: Format Commission Memorandum
Purpose: to generate commission memorandum for direct order
Uses: direct order detail
Returns: commission order memorandum

BEGIN

IF order type = "direct order"
THEN CALL sales order record from sales order file
CALL principal record from principal file
CALL get total extension
CALL CIF charge record from CIF charge file
WRITE commission memorandum
ELSE DISPLAY "error"
ENDIF

END

Module: Get total extension
Purpose: to get total extension, total commission, total sales amount
Uses: valid direct order detail
Returns: total extension

BEGIN

CALL valid order detail (unit_price, order_qty)

    total extension = 0

REPEAT UNTIL EOF

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GET unit_price, order_qty from valid direct order detail

extension = unit_price * order_qty

total extension = total extension + extension

ENDREPEAT

GET commission rate

CALL calculate commission amount

CALL calculate total sales amount

END

Module: Calculate commission amount
Purpose: to calculate commission amount
Uses: total extension
Returns: commission amount

BEGIN

GET total extension

GET commission rate

commission amount = total extension * commission rate

END

Module: Calculate total sales amount
Purpose: to get total sales amount
Uses: total extension, commission amount
Returns: total sales amount

BEGIN

CALL get total extension

CALL calculate commission amount

total sales amount = total extension + commission amount

END

Module: Calculate sales commission
Purpose: to get sales commission
Uses: total extension, commission rate
Return: total sales commission

BEGIN
CALL total extension
GET salesperson record, commission rate from sales person record
REPEAT UNTIL EOF
IF sales order.salesperson_ID = salesperson record.sales person_ID
THEN GET sales person.direct commission rate
    direct sales commission = total extension * commission rate
ELSE DISPLAY " invalid salesperson_ID"
ENDIF
ENDREPEAT
CALL format report (direct sales commission record)
CALL direct sales commission record
WRITE report
END

Module: Accumulate total sales amount
Purpose: to get monthly sales amount
Uses: total sales amount
Returns: total monthly sales amount

BEGIN
    total monthly sales amount
    REPEAT UNTIL EOF
    total monthly sales amount = total monthly sales amount + total sales amount
    END REPEAT
END
Module: Format report
Purpose: to generate report
Uses: commission memorandum record, direct sales commission record
Return: Reports

BEGIN

CALL commission memorandum record, direct sales commission record

CALL format report

END
Appendix C:  

C1  Screen  

C2  Data Dictionary for Screen  

C3  Input form  

C3-1  Order Form  

C3-2  Credit Customer Application Form
Appendix C  C1  Screen

S001  LOGIN MENU
S002  MAIN MENU
S003  SOP MENU
S004  CUSTOMERS
S005  PRINCIPALS
S006  INVENTORY
S007  ORDER ENTRY
S008  REPORT MENU
S009  ENTERING PARAMETER VALUE- SALES ORDER
S010  ENTERING PARAMETER VALUE- COMMISSION MEMORANDUM
S011  ENTERING PARAMETER VALUE- INVOICE
S012  ENTERING PARAMETER VALUE- SALES ORDER REPORT
SALES ORDER PROCESSING SYSTEM
INVENTORY MANAGEMENT SYSTEM
FINANCIAL AND ACCOUNTING SYSTEM
SALES ORDER PROCESSING SYSTEM

SOP MENU:

- CUSTOMER
- PRINCIPAL
- INVENTORY
- ORDER ENTRY
- REPORT MENU

Record: 1 of 1

Form View
Appendix C-2

The Data Dictionary for Screen

| Screen No. : | 001 |
| Screen Name : | Login-Menu |

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Type</th>
<th>Length</th>
<th>Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>login name</td>
<td>Character</td>
<td>8</td>
<td>XXXXXXXXX</td>
</tr>
<tr>
<td>password</td>
<td>Character</td>
<td>10</td>
<td>XX-XX-XXXX</td>
</tr>
</tbody>
</table>

| Screen No. : | 002 |
| Screen Name : | Main Menu |

Group of system name that allow to select one choice from the following list:
- Sales Order Processing System
- Inventory Management System
- Financial and Accounting System

| Screen No. : | 003 |
| Screen Name : | SOP Menu (Sales Order Processing Menu) |
| System Name : | SOP |

Group of system name that allow to select one choice from the following list:
- Customer
- Principal
- Inventory
- Order Entry
- Report Menu
<table>
<thead>
<tr>
<th>Field Name</th>
<th>Type</th>
<th>Length</th>
<th>Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer ID</td>
<td>Character</td>
<td>7</td>
<td>XX-XXXXX</td>
</tr>
<tr>
<td>Customer Name</td>
<td>Character</td>
<td>30</td>
<td>XXX...</td>
</tr>
<tr>
<td>Customer Address</td>
<td>Character</td>
<td>60</td>
<td>XXX...</td>
</tr>
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<td>99,999,999.99</td>
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<td>Total Sales Amount</td>
<td>Numeric(Fixed)</td>
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</table>
Screen No. : 008
Screen Name : Report Menu
System Name : SOP

Group of system name that allow to select one choice from the following list:

- Sales Order
- Commission Memorandum
- Invoice
- Sales Order Report
- Commission Memorandum Report
- Invoice Report
- Order Report
- Products on Order Report
- Indirect Sales by Sales Amount Report
- Sales Order's Commission Report
- Invoice's Commission Report
- Back Ordered Item Report
- Order Subform Report
- Sales Amount by Principal report
- Products by Indirect Sales Amount Report
- Direct Sales Report
### Screen No.: 009

**Screen Name:** Entering parameter value-Sales Order  
**System Name:** SOP

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<th>Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>Numeric(General)</td>
<td>6</td>
<td>9999999</td>
</tr>
<tr>
<td>Date</td>
<td>Date</td>
<td>8</td>
<td>99/99/99</td>
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</table>

### Screen No.: 010

**Screen Name:** Entering parameter value-Commission Memorandum  
**System Name:** SOP

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<th>Format</th>
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</tr>
<tr>
<td>Date</td>
<td>Date</td>
<td>8</td>
<td>99/99/99</td>
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### Screen No.: 011
### Screen Name: Entering parameter value-Invoice
### System Name: SOP

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<th>Format</th>
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</thead>
<tbody>
<tr>
<td>Number</td>
<td>Numeric(General)</td>
<td>6</td>
<td>999999</td>
</tr>
<tr>
<td>Date</td>
<td>Date</td>
<td>8</td>
<td>99/99/99</td>
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### Screen No.: 012
### Screen Name: Entering parameter value for Sales Order Report
### System Name: SOP

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</thead>
<tbody>
<tr>
<td>Enter beginning date</td>
<td>Date</td>
<td>8</td>
<td>99/99/99</td>
</tr>
<tr>
<td>Enter ending date</td>
<td>Date</td>
<td>8</td>
<td>99/99/99</td>
</tr>
</tbody>
</table>
Appendix C3-1

Order Form

Engineering & Science Associates Co., Ltd.'s Order Form

Date:  
No.:  

a: Customer ID: .................................. (if new customer fill out part b:)

b: For new customer only

Customer's name: ........................................................................................................ Phone:  

Street Address: ..............................................................................................................

City: ................................ State: .................................... Zip: ........................................

c: For new customer & changed information

Ship to adress: ..............................................................................................................

Bill to address: .............................................................................................................

d: Item ID  Item name  Unit type  Unit on order  Unit on order  Unit Price  Extension

PAYMENT: Cash:  
Term:  

Sub total: .................................

VAT: ..................................

Total: ..................................

SALES PERSON  STOCK CONTROLLER  SALES MANAGER
Appendix C3-2  Credit Customer Application Form

Engineering & Science Associates Co., Ltd.'s Credit Customer Application

Date: No.:

a: Customer_ID: (filled by sales person)

b: Customer's name: Phone: 

Street Address: 

City: State: Zip: 

c: For new customer & changed information

Ship to address: 

Bill to address: 

d: Credit consideration

Certificate of company register no: date: 

Capital registered: 

Bank: 

Committee's name 1): 

2): 

References' name 1): 

2): 

3): 

e) Expected purchase amount per month: 

Credit term requested in day: Credit amount in US: 

d) Authorized customer's full name: 

Sample Signature: 

SALES PERSON SALES MANAGER AUTHORIZED SIGNATURE 

Note: 

130
Appendix D

D1  Report

D2  Data Dictionary for Report
<table>
<thead>
<tr>
<th>Appendix D1</th>
<th>Report Forms (Output Design)</th>
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<tbody>
<tr>
<td>SOPR01</td>
<td>Sales Order</td>
</tr>
<tr>
<td>SOPR02</td>
<td>Commission Memorandum</td>
</tr>
<tr>
<td>SOPR03</td>
<td>Invoice</td>
</tr>
<tr>
<td>SOPR04</td>
<td>Sales Order Report</td>
</tr>
<tr>
<td>SOPR05</td>
<td>Commission Memorandum Report</td>
</tr>
<tr>
<td>SOPR06</td>
<td>Invoice Report</td>
</tr>
<tr>
<td>SOPR07</td>
<td>Order Report</td>
</tr>
<tr>
<td>SOPR08</td>
<td>Products on Order Report</td>
</tr>
<tr>
<td>SOPR09</td>
<td>Indirect Sales by Sales Amount Report</td>
</tr>
<tr>
<td>SOPR10</td>
<td>Salesperson by Indirect Sales Amount Report</td>
</tr>
<tr>
<td>SOPR11</td>
<td>Sales Order's Commission Report</td>
</tr>
<tr>
<td>SOPR12</td>
<td>Invoice's Commission Report</td>
</tr>
<tr>
<td>SOPR13</td>
<td>Back Ordered Item Report</td>
</tr>
<tr>
<td>SOPR14</td>
<td>Order Subform Report</td>
</tr>
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<td>SOPR15</td>
<td>Sales Amount by Principal Report</td>
</tr>
<tr>
<td>SOPR16</td>
<td>Products by Indirect Sales Amount Report</td>
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<tr>
<td>SOPR17</td>
<td>Direct Sales Report</td>
</tr>
<tr>
<td>SOPR18</td>
<td>Salesperson Sales Report</td>
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# Sales Order

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<th>Qty.</th>
<th>Description</th>
<th>Unit Price</th>
<th>Extension</th>
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</table>

**VAT**

**Total**

---

**Principal name:**

**Bank:**

**Remark:**

---

**Sales Person**

**Sales Manager**
Commission Memorandum

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<th>Sales Person:</th>
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<td>Order no.:</td>
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<td>Date:</td>
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<tr>
<td>Sales Order no.:</td>
<td>Prin Inv. no.:</td>
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Bank:

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<th>Qty.</th>
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CIF charge to Bangkok

Total Sales Amount

Commission due

Paid via ................................Date:........................................

Checked and Accepted for correctness of Sales Entry

__________________________    __________________________
Sales Person                  Authorized Signature
## Invoice/Tax Invoice

<table>
<thead>
<tr>
<th>Item_ID</th>
<th>Qty.</th>
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<th>Extension</th>
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</table>

**VAT**

**Total**

**Total amount in word**

**Remark:**

Received the above products in good condition

---

Customer Signature

Authorized Signature

Date:..........................
# Sales Order Report

## Period

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<th>Order Type</th>
<th>Order No.</th>
<th>Date</th>
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<th>Sales Person</th>
<th>Currency</th>
<th>Extension</th>
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### Commission Memorandum Report

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<th>Order No.</th>
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# Order Report

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Printed date: ............

Engineering & Science Associates Co., Ltd.
# Products on Order Report

Period:  

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<th>Unit on Order</th>
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Salesperson by Indirect Sales Amount Report

Period: _____________________________

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### Sales Order's Commission Report

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# Invoice's Commission Report

Period: ..............................................................

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# Back Ordered Item Report

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# Order Subform Report

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## Sales Amount by Principal Report

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## Products by Indirect Sales Amount Report

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## Direct Sales Report

Period: 

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### Salesperson Sales Report

**Period**

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**Report ID:** SOPR01  **Sales Orders**

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## Appendix E1  Database Design

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