



Snunsin Electric Company Limited

by

Mr. Snunsin Jaroonwatthana

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

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

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Academic Year : November 1999

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The Graduate School of Assumption University has approved this final report of the three-credit course, CS6998 System Development Project, submitted in partial fulfillment of the requirements for the degree of Master of Science in Computer Information Systems.

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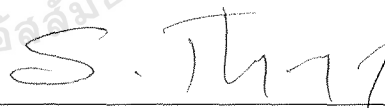
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## ABSTRACT

In today's business environment, the information technology has created the competitive firms, managed global corporations, and provided useful products and services to customers. Information systems have become so vital to the management, organization, operation, and products of large organizations. Information systems serve a number of specific purposes in organizations. They can lead to operational efficiency, doing things better, faster or cheaper. They can result in functional effectiveness, better decision making and the work will be accomplished within shorter period with more accuracy. Therefore, the manual system must be taken over by the computerized system to increase the competitive advantages against their competitors.

System analysis and design methods are used to develop information system and computer application for the organization. FAST methodology has been employed successfully for continuous system development and improvement. Many important phases are conducted step by step to make sure that all processes have been performed very well.

Therefore this final information system will be intended to provide the better solution to the existing problems and increase the performance and productivity of the operations. This information system will be serving for management and end users of the organization with consistency, accuracy, timeliness, security, and reliability.

## ACKNOWLEDGEMENTS

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## I. INTRODUCTION

### 1.1 Background of the Project

The company is Somjin Electric Co., Ltd. Or “SEC” which has been established 5 years ago with 5 million Bahts for an initial invested capital. The main business of “SEC” is the third agent of the electrical equipment, complementary products and accessories such as TV, VDO, Stereo Tape Cassette, Speaker, etc.

These products are classified as the necessary appliances with high demand. They are playing a major role to enrich and comfort the daily working life for everybody. There is a very high and strong competition in the market place. The customer has been proposing the best condition of both cash and credit sales. Furthermore many vendors try to gain more market share by exploiting the short-term marketing activities. SEC has been positioned in the top 3 of the overall market with 38% market share. The main target markets are home use and SOHO (Small Office and Home Office). SEC has utilized the selling strategy of cash and credit sales that maintain the ratio by 40% and 60% respectively.

Even SEC has gained more than one-third of total market share but SEC is still facing many serious problems of both internal and external views;

#### 1.1.1 Internal view

The total cost of ownership of the company is slightly increasing from time to time. The manual working system is a major concern, which leads to the higher operation cost. The company cannot avoid the manpower expenses whenever the customer needs more satisfaction. On the other hand, the more the customer is satisfied, the higher is the operation cost. In addition, the company is running the business in the strong competition market. The revenue of SEC has relied on the credit sales about 60%



of total sales. SEC has to cope with the high risk of delay payment or bad debt inevitably. So, SEC has taken the cost of debt collection into consideration, which will result to the higher cost with lower profit.

#### 1.1.2 External view

The economic crisis of the region has a direct and strong impact to the small and medium business. Many serious problems have been accompanying with the crisis which result to many losses.

The company has increased more collectible due debts as well as over due ones. The company lacks of the cash flow due to the purchasing power of the customer has been decreasing. Unfortunately, the operation cost is much increasing with the higher interest rate.

The company realizes that nothing to do with the macro economic problems. In order to survive in the market and create the competitive edge, the company has to find the solution to solve the micro economic problems such as high total cost of ownership, manual working system, debt collection system and best customer satisfaction.

Finally, the committee concludes to come up with the project of “Credit Sales Information System” which is the computerized processing of credit sales.

“CSIS” will be classified into 4 main processes, which are needed to have 2 major departments closely working together – Sales and Accounting Department. Other departments has fully supported and facilitated to achieve the selling objective.

First, the process to check the customer credit and the quantity of the product before signing the sales contract. This process is supposed to be prerequisite of the next process.

- (1) Customer profile by Sales and Marketing Department.
- (2) Customer credit by Accounting Department.

- (3) Product quantity by Inventory Department.

Second, the process to sign the sales contract which is very necessary to record all important information of the customer and sales conditions such as the present address, payment term, witness and etc.

- (1) Sales contract by Sales and Marketing Department.
- (2) Sign contract and make down payment by Customer
- (3) Issue a receipt by Accounting Department.

When first 2 processes are finished, then will be in the front office. Then the next process is the responsibility of the customer to have another payments cited in payment term of the contract.

Third, the processes of debt payment from the customer are classified into 3 terms of payment, as mentioned below;

- (1) Before due date, the customer will get the discount if the customer pays before due but in the correct payment and specified period of time from the company.
- (2) At due date in the correct amount, get nothing.
- (3) After due date , the customer will pay the interest with the pre-established percentage.

Accounting Department is in charge to take all responsibilities to collect the payment and inform Sales Department customer lists who are having over due debts.

Fourth, the process to generate the report requested from any department in charge such as

- (1) Overdue lists by Accounting Department.
- (2) Credit sales report by Sales Department.
- (3) Product and quantity sold by Inventory Department.

Notice that “CSIS” is the computerized business information system, which will absolutely cover all processes of credit sales from the beginning to the end. “CSIS” is supposed to be Transaction Processing System (TPS) which perform the daily sales transaction and Decision Support System which perform to be the information for decision making of the top level management. So, “CSIS” is the application which does support the customer satisfaction, reduce the total cost of ownership and improve all the working system of the company.

## **1.2 Objective**

- (1) To computerize the process of credit sales
- (2) To keep the customer data into the usable format (Document, File)
- (3) To reduce each transaction cost of credit sales
- (4) To develop a tracking system for debt payment of the customer
- (5) To handle and collect the customer payment efficiently
- (6) To rank the customer grade and status for next decision
- (7) To draw the working cooperation between a related departments
- (8) To create a sales report and credit report

## **1.3 Scope**

- (1) Sales Quotation to Customer

Salesperson sends the details of requested products from the customer in term of product part number, brief product description, unit price and payment term which has been approved by the authorized person.

- (2) Submit Purchasing Order

After a customer is satisfied with sales quotation, the customer will send the purchasing order to his responsible salesperson. In order to fulfill the buying needs of the customer, two issues will be checked before further processing to the next process.

Those are to check the customer credit whether there is an unpaid outstanding amount or not, and to verify the ordered quantity whether there is a number in inventory or not.

When two issues have been satisfied, the customer credit will be approved and the ordered quantity will be locked for sales. During the time, the total quantities in the stock will be updated.

### (3) Customer Contract

After a while, the customer is satisfied with the condition in the sales quotation. The customer issues the purchasing order to be processed based in the leasing contract made by salesperson. The customer is required to give the correct information, which will be recorded in the contract. Other evidences such as ID Card, Census Registration, statement and witness are the must. The customer signature in the contract is determined as the acceptance of all the condition s and terms which will be complied inevitably and willingly.

### (4) Down Payment

During the process of leasing contract, the customer must complete the down payment of the pre-established amount, which is supposed to be the first payment of credit sales. The customer will get the copies of leasing contract and cash receipt of down payment issued by salesperson.

After down payment, the delivery order will be submitted to Inventory Department which duty is to ship the ordered products to the customer. The customer will sign the delivery note when the shipment has been made successfully.

### (5) Next Payment for Remaining Amount

The customer is committed to finish the remaining amount of payment within the specific time frame.

The debt payment can be classified into 3 types of time frame;



(a) Before Due Date

The customer will get the discount with pre-defined percentage with the correct amount of debt has been paid before the specific due date.

(b) At Due Date

The customer may get the discount with pre-defined percentage when the correct amount of debt has been paid at the specific due date.

(c) After Due Date

The customer may be charged with pre-defined percentage of fees if the customer has not paid the correct amount of debt after specific due date.

(6) Report

Any business activities, which facilitate or increase the working efficiency, productivity of the transaction processing levels and support the process of decision making of the top management, will be presented in a report format.

## II. EXISTING SYSTEM

### 2.1 Background of the Organization

The company is Somjin Electric Co., Ltd. Or “SEC” that has been running the business for 5 years with 5 million Bahts for an initial capital investment. The main business is the third agent of the electrical instrument, electronic equipment and appliance, complementary products and accessories. “SEC” has dealt with many dealers for a top brand name products such as National, Panasonic, Sherwood, Sharp, Hitachi, Mitsubishi, Pioneer, Sony, Sumsung, Distar, Tanin and etc. Product lines of the company have been classified into 5 main types, which can be detailed as following;

- (1) Television & V.D.O & Accessory (TV&VDO)
- (2) Tape & Stereo & Speaker & Accessory (TSSA)
- (3) Gas & Cooker & Accessory (GCA)
- (4) Electrical Equipment & Accessory (EEA)
- (5) Bicycle (BIC)
- (6) Debt Payment (DP)

Debt payment (DP) is the transaction performed by the customer who bought the product in credit basis. It contributes to the major ratio of the company revenue about 40%, EEA 20%, TV&VDO 15%, TSSA 12%, GCA 10% and BIC 3%.

“SEC” gained 40% of total market share. The target market of the company is quite big due to having directly served the end customer in the concept of “One Stop Service” both cash and credit sales. A customer can shop everything they need in every product lines. Most of the customers are loyalty to the company who believed in the service after sales with a reasonable price. Moreover the company got new customers by word of mouth of the loyalty customers.

## St. Gabriel's Library

This company is quite having the purchasing and bargaining power by which this company can get the good offer from many dealers. Each dealer is trying the best to propose the competitive deal among few main competitors who supply the same product lines. That is the great advantage in which the company never relies on only one dealer. So this company also has the competitive advantages over their competitors in the marketplace.



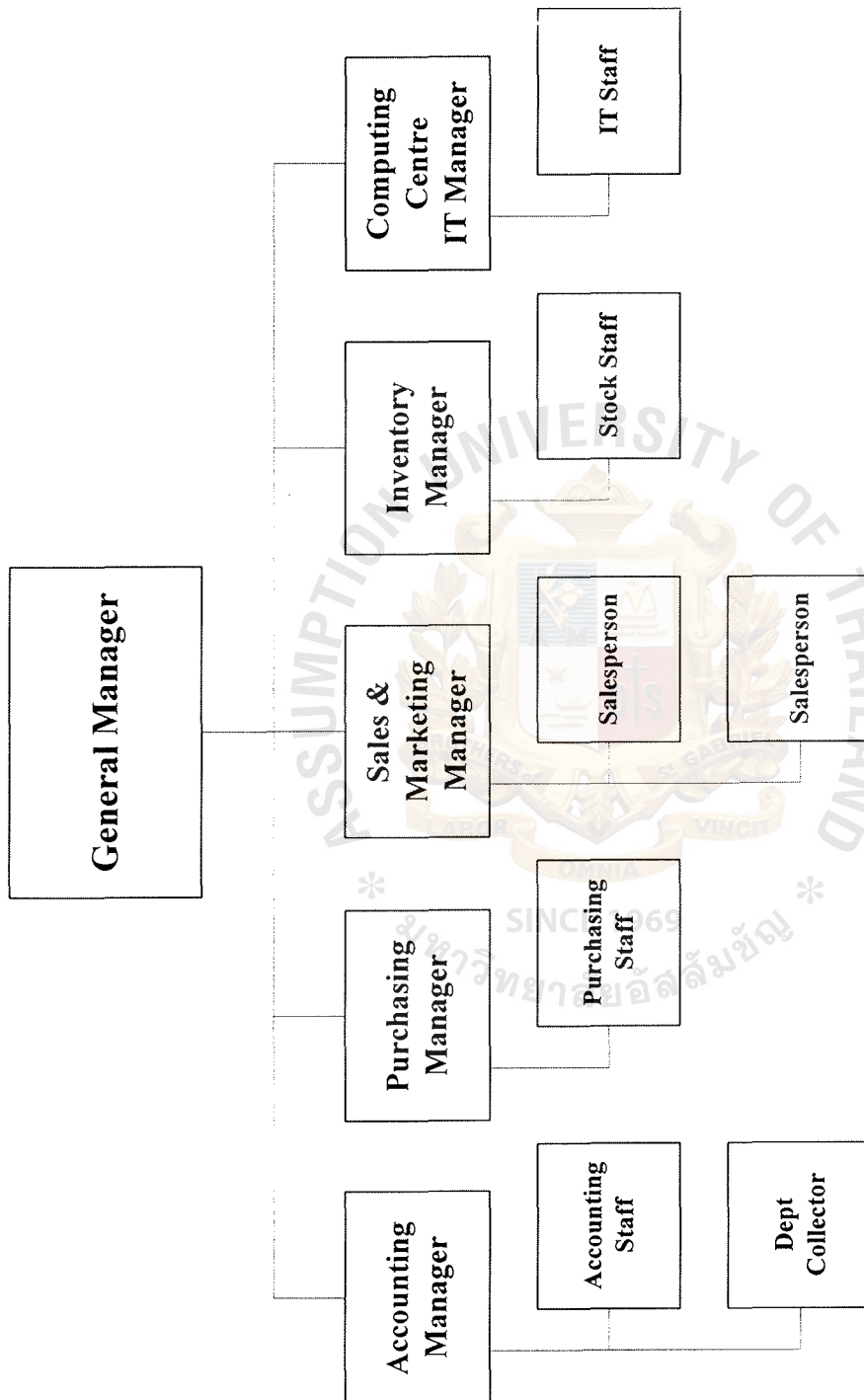


Figure 2.1.1. Organization Chart of "SEC".



## 2.2 Existing Business Functions

“SEC” consists of 4 main departments as shown in Figure 2.1. with their duties and responsibilities as below;

### (1) Accounting Department

- To control the financial resources of the company
- To manage the internal financial transaction
- To handle and collect the customer payment
- To control the financial credit of the customer
- To cooperate with Sales Department in allowing a credit sales

### (2) Purchasing Department

- To deal with the dealers of the company
- To negotiate the competitive advantage to the company
- To control the shipment schedule
- To handle all burden of purchasing activities

### (3) Sales & Marketing Department

- To fulfil the customer's need in term of product and services
- To make more revenue and profit to the company
- To increase the market share of the company
- To conduct the efficient market activities
- To keep and utilize the useful market information
- To cooperate with Accounting Department to allow credit sales

### (4) Inventory Department

- To optimize the warehouse space for product inventory
- To achieve the customer's need in term of shipment
- To manage the list of product inventory effectively

All working processes of the company are not computerized system. Every transaction will be performed manually. An officer of each department will communicate and run the business with a paper. Even the company is not so big but many routine jobs are struck by the red tape with the lack of the cooperation. The authority has not been decentralized to the lower level.

### **2.3 Current Problems and Area for Improvements**

#### **2.3.1 Current Problems**

The company has relied to the credit sales about 60% of total sales. Even the company gained the highest market share in the marketplace, the company cannot maximize the profit. The manual working system not only causes the higher operation cost but also the lower working efficiency, productivity and throughput. There is a lack of coordination among the interrelated departments. Furthermore the company doesn't have the management of information system. Sales teams don't have the report to summarize the sales transactions, manage the customer deals, forecast the sales figure and do the market plan. The Accounting Department cannot list the customer names, which are over due and do the financial plan. Other department can not optimize their own duties and responsibilities without the information.

#### **2.3.2 Area for Improvements**

In practice, Sales Team and Accounting Department are playing major roles to handle the credit sales. They have to do the on going activity that is the payment collection from the customer. The company can solve many serious problems by improving the working system of both departments.

##### **Sales Department**

- Computerize the credit sales processes
- Develop the customer database

## St. Gabriel's Library

- Reduce an input errors
- Generate sales, customer report
- Implement the integrated system to other departments

### Accounting Department

- Computerize the payment collection processes
- Develop the customer credit status
- Generate financial report
- Implement the integrated system to other departments



### III. PROPOSED SYSTEM

#### 3.1 User requirements

##### 3.1.1 Input Requirements

- (1) Cash Deal: is the table which records all information and details of cash sales such as Cash Sales ID (Primary Key), Customer ID, Product ID, Cash Receipt ID, Sales Price and etc.
- (2) Credit Deal: is the table which records all information of credit sales such as Credit Sale ID (Primary Key), Customer ID, Employee ID, Product ID, Credit Receipt ID, Down Payment, Payment Term and other necessary details that make the credit contract perfect and legal.
- (3) Customer: is the table, which contains all the properties of the customers who buy the product from the company and commit to pay the charge, listed on invoice. Customer table consists of Customer ID (Primary Key), Company Name, Contact Name, Surname, Photograph and etc.
- (4) Debtor Payment: is the table, which records the transaction of customer payment for credit sales to the company. This table consists of Receipt ID (Primary Key), Credit Sales ID, Customer ID, Payment Amount and etc.
- (5) Employee: is the table, which records the properties of the employees who work in the company classified in the different department. This table consists of Employee ID (Primary Key), Name, Surname, Title, Department, Supervisor ID, Date Hired, Salary, Photograph and etc.
- (6) Product: is the table that contains the details of the product, which is demanded by the customer and supplied by a supplier. This table consists of Product ID (Primary Key), Product Name, Description, Unit Price and etc.



- (7) Supplier: is the table that contains the properties of the suppliers who acknowledged P/O, supplied the products and services to the company. This table consists of Supplier ID (Primary Key), Supplier Name, Contact Name, Title, Address, Payment Term, Lead Times and etc.

Notice that every table has the primary key, which complies the uniqueness of the property. However, the referential integrity of each table shows the relationship between the corresponding table is never avoided. The author relied on the concept of Entity Relationship to specify the cardinality of each table and make sure that all tables have been proved at least the third step of normalization.

### 3.1.2 Output Requirements

- (1) Product Request: is the form that is submitted to Purchasing Department by salesperson in case of product is not available in the inventory and the customer committed to buy that product. This form consists of Request ID (Primary Key), Requested Employee ID (Salesperson who submitted the request form), Acknowledged Employee ID (Purchased officer of the company who acknowledged the request form and issue P/O to the supplier), Customer ID, Sales Price and etc.
- (2) Purchasing Order: is the form that is submitted to the supplier by Purchasing Department which wishes to buy the product in the agreeable unit price, payment term and delivery term. Other different agreements can be written down in P/O. This form consists of Purchasing Order ID (Primary Key), Supplier ID, Product ID, Ordered Employee ID (Purchased officer of the company who submitted P/O to the supplier), Request ID (In case of P/O is made to the request of salesperson, if no Request ID it can be a sales forecast)

- (3) Customer List: is the form that shows the properties of the customer in the printed format, which contains the important details. Actually Customer List can be the major way in search by entering the key word into the form. The record that shows the search condition is displayed.
- (4) Employee List: is the form that shows the properties of the employee in the printed format, which contains the important details. Actually Employee List can be the major way in search by entering the key word into the form. The record that shows the search condition is displayed.
- (5) Sales Report: is the report that concludes the details of all sales transaction, which is performed successfully. Sales Report may include both of Cash and Credit Sales upon which kind of sales the user would like to search. This report consists of the major attributes, which can be further performed to a decision making by the related level of management.
- (6) Inventory Report: is the report that mostly finalizes the quantity of each Product ID in the inventory. A result of the report, which can be a printed format or the on-line search, may be taken to perform other actions by the related departments.

The user involvement is playing a major responsibility to create the effective forms and reports, which are very valuable assets of Decision Support System. Other effective forms and reports can be generated from this.

## **3.2 System Design**

### **3.2.1 Database Design**

Databases are the collections of the interrelated files, which have ability to share the same data across multiple application and systems. If database is well designed, different combination of the same data can be easily accessed to fulfill future report and

query needs. The database scope can even be extended without impacting the existing programs that is used.

The goals of database design are the following criteria:

- (1) Data must be simple and easy to use.
- (2) Data is essential independent, greatly reduce data redundancy.
- (3) Data must be reliable which the stored data should have high integrity to promote user trust.
- (4) Data should provide for the efficient storage, update, and retrieval of data.
- (5) Data should be flexible, adaptable and scalable for future requirements and applications.

Database integrity provides necessary internal controls at least 3 types of data integrity that must be designed into any databases.

**Key Integrity:** Every table should have primary key (which may be concatenated) which must never be allowed to have a null value. The primary key must be controlled such that no two records in the table have the same primary key value or uniquely identify the record.

**Domain Integrity:** Appropriate controls must be designed to ensure that no field takes on a value that is outside of the range of legal value.

**Referential Integrity:** The architecture of relational databases implements relationships between the records in the table via foreign keys. The use of foreign keys increases the flexibility and scalability of any databases. However the referential integrity error exists when a foreign key value in a table has no matching primary value in the related table.

### 3.2.2 Software Design

The system has been developed by the popular strategy for determining an optimal modular design for program. The technique deals with the size and complexity of a program by breaking up the program into a hierarchy of module.

The module is a group of executable instructions with single point of entry and single point of exit that result in a computer program that is easier to implement and maintain. Specifically the program has been partitioned into smaller more manageable modules, the hierarchy and organization of those modules and the communication interfaces between modules. The system that was developed has followed an above approach to assume that

- (1) Each function in each abstraction has single, well-defined purpose to achieve a specific task.
- (2) It is easy to identify all routines that share major data structure.

#### Top-Down Approach

The system is typically based on above approach. As the system progresses, the system is decomposed into subsystem. It provides an orderly and systematic framework for the system. Top down approach of the system is illustrated in tree diagrams of the program.

The following qualities of software have been considered in order to design software;

- (1) It is user friendliness, as users can interact with it easily, and it does not take a long time for user to master the system.
- (2) It is very easy to understand, there are no intricacies to understand the program, and it requires the minimum number of keys pressed to call up the desired screen.

(3) It can be evolved according to the future requirements of use.

(4) It is reliable, as users can depend of it.

This approach enhances design clarity, which in turn eases implementation, debugging, testing, documenting and maintenance of the system.

### 3.2.3 Input Design

The computer output will never be presented effectively unless the data in database has the correct input. Computer input originates with the system user, human factors play a significant role in input design. Input should be simple in a possible designed to reduce their possibility of incorrect data being entered.

There are many principles applied to design input:

- (1) The volume of input data is minimized. The more data that are input, the greater the potential number of input errors.
- (2) Input is only variable data captured.
- (3) Derived attribute is never captured as the computer input.

Source document and computer screens are used to capture data. They are very easy for system users to complete and subsequently enter into the system user the following principles:

- (1) The user can read the instruction to complete the form.
- (2) Data to be entered has been sequenced by the psychological senses of human factors.

### 3.2.4 Output Design

The system users really need to have the output, which is the most visible component of a working information system. User involvement is playing a major responsibility to design the effective output format. Certainly the format serves both to communicate information as well as collect information.



Mostly the user can get the output via 2 main kinds, these are on the computer screen and the printed format. However many principles have been applied to design the output of “CSIS”

- (1) The output should be easy to read and interpret
  - a) Every reports or output screens have a title.
  - b) Reports and screens include section heading to segment large amounts of information.
  - c) Information in columns has column headings.
  - d) The legends are also used to formally define all fields on reports and screens.
- (2) Their recipients can receive output while the information is pertinent to transaction or decisions.
- (3) Output has been distributed sufficiently to assist all relevant system users.
- (4) Output design contains a required information accepted by users

### **3.3 Hardware and Software Requirements**

#### **3.3.1 Hardware Requirements**

##### **3.3.1.1 Server**

Compaq Prosignia 200

- Processor 350MHz Intel Pentium II
- Memory 64MB EDO ECC memory expandable to 512MB using Industry standard buffered EDO ECC DIMMs
- Cache Memory 512KB second level ECC cache
- Form Factor Flexible tower to rack chassis, 5U Rack Model.

- Expansion Slots 2PCI and 4 shared PCI/EISA
- Network Controller Compaq Nettetelligent 10/100TX PCI UTP  
Controller on PCI local bus
- Storage Controller Integrated Dual Channel Wide Ultra SCSI3
- Storage and Expansion 4 removable media bays: one 1.44MB  
Diskette Drive one Internal 16X MAX CD  
ROM DRIVE IDE and two available 5.25-  
inch removable media bays. Capacity for  
3\*1.6 inch or 3\*1.0 inch hot plug hard  
drives.
- Maximum Storage Internal : 54.6GB (3\*18.2GB hot plug  
drive), 81.9GB Maximum Storage.  
External: 1.15TB (7\*18.2GB)\*9=1.15TB
- External Interface Wide Ultra SCSI-3, network (RJ45 and  
AUI), Parallel, two serial ports, graphics,  
keyboard and pointing device (mouse)
- Graphics Integrated 1024\*768, 256 color non  
Interlaced on PCI bus (1MB Video  
Memory)
- Manageability Compaq Insight Manager Automatic  
Server Recovery-2 Integrated Remote  
Console Off-line Backup Processor Pre-  
Failure Warranty
- Security Multi Lock security features; power on

password; keyboard password. Diskette drives control. Diskette boot control. Quick Lock. Quick Blank, Network Server Mode. Parallel and serial interface control; administrator's password; disk configuration lock.

- Software Smart Start, the server configuration and software integration tool from Compaq, is shipped standard with Compaq Proliant servers. Both Smart Start and Compaq Insight Manager are included in the setup and management pack.
- Power Supply 325 watts CE Mark Compliant Hot Pluggable Redundant Power Supply
- Service and Support Compaq Services provides a wide range of service offerings including a three-year limited warranty fully supported by a worldwide network of resellers and service providers; life time toll free 7\*24 hardware technical phone support; Pre Failure Pentium II processor, Disaster recovery services are available through partnership with Comdisco.

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### 3.3.1.2 PC

#### Compaq Deskpro EP Series

- Processor Intel Celeron 333MHz.
- System Bus 66MHz.
- Cache 128KB
- NIC or Modem Optional
- Memory 32 SDRAM DIMM, Expandable to 256MB
- Hard Drive 2.1GB and 3.2GB Smart II Ultra ATA
- Sound Enhanced Business Pro Audio, ESS 1869  
16Bit Full Duplex (CDS Models)
- Graphics ATI RAGE IIC AGP
- Video Memory/Max 2MB / 2MB
- Diskette Drive 1.44MB
- Expansion Slots : 6Total : 2/2PCI, 2/1ISA,  
Total/Available 1/1Combo,1/0AGP
- Expansion Bays : 5Total : 2/1Internal, 3/1External  
Total/Available
- Ports 2Serial, 1Parallel, 2USB
- Operation System MS Windows 95
- Service and support 3 Year parts, 1 Year labor

### 3.3.1.3 Printer

#### HP LaserJet 1100

- Technology Laser (Dry Electrophotography)
- Microprocessor Motorola ColdFire 5202, 35MHz.

- Speed 8ppm-rated engine speed, first page out in 18 seconds, instant on fusing eliminate warm up time
- Resolution 600\*600dpi plus HP's resolution Enhancement technology and HP UltraPrecise Toner Cartridge
- Printer Language HP PLC 5e
- Fonts 26Intellifont scalable fonts built in; Additional fonts and font management Provided With HP FontSmart for Windows
- Media Types Plain paper, envelopes, transparencies, card stock, postcard and labels
- Media Weights 60 to 105g/m2
- Media Sizes A4m Letter, Legal and custom paper sizes
- Media Handling One 125 sheet paper input bin and single sheet priority feed slot, One 100 sheet paper output in and alternate straight through path for wrinkle free envelop
- Printer Control Panel Simplified front panel with one operator button/LED plus two LEDs for status
- Memory 2MB standard plus HP's memory enhancement technology , 1DIMM slot expand to 18MB with 100pin EDO DIMM
- Interface IEEE-1284 ECP compliant parallel port using 36-pin high-density female



- connector (C type), 2m IEEE-1284  
compliant parallel cable included with  
printer
- Software
  - Includes the printing system (with printer  
drivers for Windows 3.1,9x,NT4.0),  
HP FontSmart for Windows 25 font  
manager, On line User Guide and DOS  
printer utilities (printing from DOS, Unix  
or other environments possible in  
compatibility mode).
  - Minimum of 3MB of free hard disk space  
required for printing from Windows.
- Toner
  - All in one HP UltraPrecie toner cartridge,  
average 2,500 pages at 5% coverage.  
Econo-mode printing uses up to 50% less  
toner
- Estimated Usage
  - Up to 7,000 pages per month (Duty Cycle)

#### 3.3.1.4 Networking Product

##### D-Link Dual Speed Managed Hub

##### For Department Workgroups

These hubs have provided the highest level of flexibility. With Ethernet/Fast Ethernet support, users can deploy 100Mbps when and still run 10Mbps on some desktops on the network.

##### Easy Migration

These hubs protect user's investment by extending their life span through transition from 10Mbps to 100Mbps.

#### Scalable Expansion

Stackable in-groups of 5, the hubs allow users to gradually add ports as their network expands. Users can start with a single device with 16 ports, then add hubs to eventually reach 120 ports per stack, without incrementing the repeated counts. Ad MDI interface allows easy cascading of 2 hub stacks to bring the port density up to 238.

#### Easy to Use

All ports support auto sensing dual 10/100Mbps speeds. The stack auto negotiates the speed with the connected nodes, and creates independent 10Mbps and 100Mbps segments. With a 10/100Mbps-switch module, connection between 10Mbps and 100Mbps segments is transparent, allowing users to mix Ethernet and fast Ethernet stations on the same network completely without any need to configure.

#### Cable Extension

Through optional 100BASE-TX twisted pair and 100BASE-FX fiber modules users extend the cables beyond the Fast Ethernet repeater constraint. They can also avoid traffic bottlenecks between 2 hub stacks without having to purchase and install a separate switch device.

#### Industry standard SNMP

Built in SNMP agent in the master hub allows the stack to be managed from a station under Windows. In addition, Telnet is supported to permit TCP/IP and Unix users to configure and control the hubs.

## 4.2) Ethernet Network Interface Card for PCI Bus

### High-performance

Designed especially for Pentium and Pentium Pro machines, this adapter provides the performance that turns today's desktops into powerful workstations and servers. With its low cost of ownership and standard compliance, this card is the perfect choice for cost-effective workgroup networking.

### High-speed Throughput

Using 32-bit high-throughput data transfer with the host, the adapter provides robust performance in very heavy traffic environments, and is mandatory form applications with large file transfer and heavy disk I/O in the server.

### Full-duplex Operation

With the full-duplex function, the adapter allows a PC to connect to a switch and become a power workstation or server, receiving and transmitting data at the same time on a dedicated 20Mbps bandwidth.

### Features

- PCI local bus specifications 2.1
- 32-bit data transfer with host
- Integrated Data Prefetch performance enhancement
- 20Mbps full duplex supported
- Plug and play installation
- 10BASE-T port supports UPT/STP
- Auto-detects connected media
- Easy-to-view diagnostic LEDs
- FCC Class B, CE Mark, VCCI Class B

### Boot Servers

- Novell RPL Boot ROM code
- Novell NetWare 3.x, 4.x RPL server
- Microsoft Windows NO 3.51, 4.x RPL server
- Microsoft LAN Manager remote boot server
- IBM OS/2 LAN Server 3.x, 4.x
- IBM LAN Server 3.x, 4.x, IBM Warp Server

### LAN Drivers

- Novell NetWare 3.x, 4.x server, ODI drivers
- Microsoft Windows 95, Windows NT 3.x, 4.x
- Microsoft Windows for Workgroups, LAN Manager
- IBM LAN Server, IBM PC LAN Support Program
- SCO TCP/IP for Unix, OpenServer 5.0

#### 3.3.1.5 Backup System

##### SU1000INET APC (American Power Conversion)

- Capacity 1000VA (670W)
- Topology Line Interactive
- PowerChute Plus Software WIN 3.XX, 95, NT, NetWare
- Input: Voltage:Frequency 220 Volts +/-20% (176-282 Vac), single Phase, 50Hz (auto-sensing)
- Output: Voltage:Frequency 220 Volts +/-5%, 50Hz +/-0.2%
- Wave Form Output Pure Sine Wave
- Transfer Time (typ/max) 2/4 ms
- Protection Full time EMI/RFI filters prevent line

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noise from causing data errors and meet Novell's approval for network protection without the need for additional external conditioners.

- Performance

SmartBoost and SmartTrim provide voltage so batteries last longer, fast charge cuts battery recharge time by 75%.

SmartSlot to enhance UPS performance.

SNMP compatibility for enterprise UPS power management

- Indicator or LED

Battery Replacement Warning, Load capacity Power and voltage Meters, Low Battery Indicator, overload indicator, TestSwitch, SmartBoost, SmartTrim

- Others

Hot-Swappable Batteries, Automatic

Voltage Regulation, 0-95% Humidity

Environment, Two 12V, 11AH for Sealed,

maintenance free lead acid batteries with

3-6 years typical lifetime, >98% efficiency

(full load), 0-40 degrees Celsius

Temperature, Less than 41dB Audible

noise, 1-2 hours Recharge Time, GS licnd

by VDE to EN50091/EN60950, IEC801-2,

-3, -4, CE mark applied, 216\*170\*436mm

Max Dimensions 18.8kg Net Weight.



### 3.3.2 Software Requirements

(1) Network Operating System

Microsoft Windows NT 4.0

(2) Operating System

Microsoft Windows 95

(3) Programming Language

Microsoft Visual Basic 5

(4) Application Software

Microsoft Office 97 (Access 97)



Table 3.1. Characteristics of Proposed System.

Characteristic	Proposed System
Portion of System Computerized : Brief description of that portion of a system that would be computerized in this proposed system.	CSIS; Quotation, Customer Contract, Down Payment, Product Delivery, Next Payment and Sales Report. On-line to Account, Inventory Dept.
Benefit : Brief description of business benefits that would be realized for this proposed system.	Solution is customized, implemented directly to solve an actual problems of the company.
Servers and Workstations : A description of the servers and PC needed to support this proposed system.	Compaq Server and PC, MS Windows NT 4.0 and MS Windows 95. See Appendices of HW, SW
Software Tools Needed : Software Tools Needed to design and build the proposed system (DBMS, OS, Emulators).	Visual Basic 5.0 is prepared for customization and data integration. See Appendices of SW.
Application Software : A description of the software to be purchased, built, accessed, or some combination of this techniques	MS Access 97 will be used to code the software package. See Appendices of SW.
Method of Data Processing : Generally a combination of on-line, batch, deferred batch, remote batch, and real time.	Client Server. Batch processing will be implemented for first 3 months, and on-line later
Output Devices & Implications : Description of output devices that would be used, special output requirements and considerations.	HP LaserJet 1100 and Dot Matrix will be shared in the company. See Appendices HW.
Input Devices & Implications : Description of input methods to be used, input devices, special input requirements, considerations	Keyboard & Mouse
Storage Devices & Implications : Describe what data would be stored, what data will be accessed, what storage media would be used, how much storage capacity would be needed, and how data would be organized.	MS SQL Server DBMS, 100GB arrayed capacity.

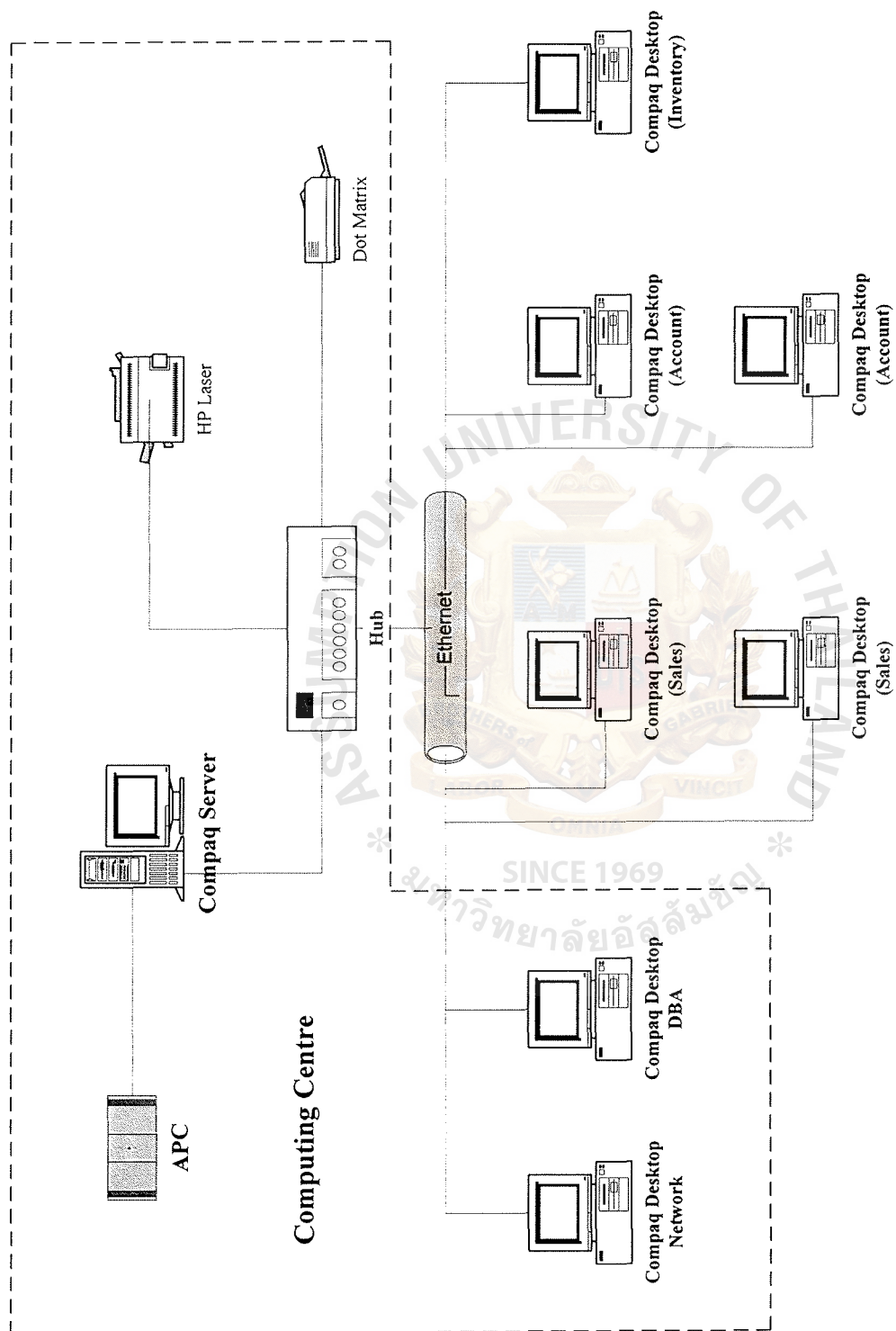


Figure 3.1. Network Diagram for "CSIS".

### 3.4 Security and Control

Telecommunication is playing a significant role in different computing systems around the world. The communication and transportation is no longer limited in the specific border and territory. The computing system is a collection of hardware, software, storage media, data, and people that an organization used to do computing task. The more the computing systems are open or exposure, the higher the possible risks and losses in the computing system. An authorized and unauthorized person can access the computing system. Certainly an unauthorized access is always the cause of the damaged systems.

The goal of computing system is to institute controls that preserve confidentiality – preventing an unauthorized disclosure, integrity – preventing unauthorized modification and availability – preventing denial of authorized access.

The company has proposed the security policy and action plan to protect all pieces of computing system as to the following:

- The computer room will be locked and allowed only authorized persons access to the corporate assets.
- Training and administration follow immediately after the establishment of new policies.
- Multilevel of ID, Password is assigned for authorized access to software such as NOS, DBMS and Application Package “CSIS” and frequently change of Password.
- ID, Password is assigned for authorized access to hardware and frequently change of Password.
- The important and confidential information is only displayed on the screen and can not be printed on paper.

- Authorized persons are responsible to sign source document.
- UPS prevents the losses of data during a power failure.
- Backup copies of important software and information will be usually performed.
- Internetworking security is implemented to protect the access of unauthorized persons such as firewall software.
- Periodic review of security and control is regularly handled.

### 3.5 System Costs Evaluation and Comparison

#### 3.5.1 Cost-Benefit Analysis

Economic feasibility has been defined as a cost-benefit analysis, which amounts to little more than judging whether the possible benefits of solving the problem are worthwhile. As soon as the specific requirements and solutions have been identified, the analyst can weigh the costs and benefits of each alternative.

Costs fall into two categories. There are costs associated with developing a system and costs associated with operating the system.

Benefits have been defined to be a valuable and worthwhile return of the investment. Benefits normally increase profits or decrease costs both highly desirable characteristics of a new information system. Benefits are classified as tangible – those that can be easily quantified and usually measured in terms of annual savings or intangible – those believed to be difficult or impossible to quantify.

#### Tangible Benefit

- Cost reduction of paper works	20,000	Baht
- Cost reduction of employment	240,000	Baht
- Reduction of miscellaneous costs	96,000	Baht
- Reduction of welfare benefits	32,000	Baht



- Reduction of transaction costs	60,000	Baht
- Reduction of training costs	20,000	Baht
- Reduction of rental fees	58,000	Baht
Total Cost Reduction	<u>538,000</u>	Baht

#### Intangible Benefit

- Higher working performance, efficiency and productivity.
- More improvement of customer service quality.
- Stronger market share and royalty customer.
- Reduction of error and invalid information.
- Effective time and resources management.
- Various kinds of useful reports are generated.
- Computer based information system organization.
- Intra-organization cooperation.
- Morale and motive of employees in working.
- Ability to transform the large data into information for decision making.
- Competitive advantages over the competitors.
- Good image and prestige in the marketplace.

### 3.5.2 Payback Period

Payback Period is the technique for determining if and when an investment will pay for itself. Because system developments cost are incurred long before benefits begin to accrue, it will take some time period for the benefit to overtake the costs. Payback analysis determines how much time will lapse before accrued benefits overtake accrued and continuing costs.

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

I = Investment Cost

= 1,321,490 Baht

T = Tax (30%)

R = Annual saving realized investment

= 538,000 Baht

$$P = \frac{I}{(1 - T) R}$$

$$= \frac{1,321,490}{(1 - 0.3) \times 538,000}$$

$$= \frac{1,321,490}{376,000}$$

$$P = \text{About 3.5 Years}$$

Table 3.2. Feasibility Analysis of Proposed System.

Feasibility Criteria	Weight	Proposed System
<p>Operational Feasibility</p> <p>Functionality : Description of what degree a proposed system would benefit a company , how well a system would work.</p> <p>Political : Description of how well received this solution would be from management, users and organization views.</p>	30	<p>Support all of sales team to do their business functionality. On-line the information to a related departments.</p> <p>This solution is problem-oriented package for Sales &amp; Account Dept. Users and management will be satisfied.</p>
Score		90
<p>Technical Feasibility</p> <p>Technology : Assessment of a maturity, availability, desirability of the computer technology needed to support a proposed system.</p> <p>Expertise : Assessment of a technical expertise needed to develop,operate,maintain the proposed system.</p>	30	<p>The current technology is quite familiar with user and management. Backup both off and on-line system.</p> <p>Need more training to perform a customization and integration.</p>
Score		85
<p>Economic Feasibility</p> <p>Cost to develop : Payback Period (discount ) :  Detailed calculation</p>	30	<p>Approximate B 1,321,490 Approximate 3.5 Years</p> <p>See Appendices Table 3.5.1 - 3.5.4</p>
Score		88
<p>Schedule Feasibility</p> <p>Assessment of how long the solution will take to design and implement.</p>	10	4 Months
Score		85
Ranking	1	0.85

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Table 3.3. Market Price Comparison & Evaluation (Baht).

Product Item	Price/Unit	Proposed System	Unit	Total
Hardware :				
Server		82,000	1	82,000
Compaq	82,000			
Hewlett Packard	79,000			
Tape Backup		35,000	1	35,000
Compaq Tape Backup				
PC		36,500	7	255,500
Compaq	36,500			
Hewlett Packard	37,200			
Printer		39,000	1	39,000
HP (Laser Printer)	16,500			
HP (Dot Matrix)	8,000			
Print Server	14,500			
UPS		8,500	1	8,500
APC SU1000INET	8,500			
Networking Product :				
LAN Card		1,500	7	10,500
3Com	3,200			
D-Link	1,500			
Hub		22,800	1	22,800
3Com (12 Ports)	35,000			
D-Link (16 Ports)	22,800			
Cable & Connector :				
UTP (Meter)	15	15	100	1,500
RJ45	10	10	20	200
RJ45 Wall Plate	30	30	20	600
Labor Cost/Project		5,000	1	5,000
System Software :				
NOS	10 Users	50,000	1	50,000
Novell Netware 5	65,000			
MS Windows NT 4.0	50,000			
OS		3,800	7	26,600
MS Windows 95	3,800			
Programming Language		22,000	1	22,000
MS Visual Basic 5.0	22,000			
DBMS	10 Users	89,000	1	89,000
MS SQL	89,000			
Application Package		18,000	7	126,000
MS Office 97 (Access 97)	18,000			
Trainning Course		35,000	1	35,000

Table 3.4. Total Project Cost of Proposed System (Baht).

Product Items	Proposed System		
Hardware :			
Server	82,000		
Tape Backup	35,000		
UPS APC SU1000INET	8,500		
PC	255,500		
Printer	39,000		
LAN Card	10,500		
Hub	22,800		
Total Hardware Cost	453,300		
Software :			
NOS	50,000		
OS	26,600		
Programming Language	22,000		
DBMS	89,000		
Application Package	126,000		
Total Software Cost	313,600		
Wiring Cost	7,300		
Training Course / Project	35,000		
Total Investment Cost	809,200		
Personnel	Fee / Hour (B)	Hours Used	Total Cost
(1) : System Analyst	150	160	24,000
(1) : System Designer	150	160	24,000
(1) : Programmer	180	120	21,600
(1) : Database Specialist	150	120	18,000
(1) : Telecommunication	150	80	12,000
Total Personnel Cost	99,600		
Development Costs	(Investment Cost + Personnel Cost) 908,800		

Annual MIS Cost	Monthly Fee	Proposed System
EDP Manager	20,000	240,000
Technician	8,000	96,000
Total Operation Costs	336,000	
Hardware M.A (10% a year)	45,330	
Software M.A (10% a year)	31,360	
Total Maintenance Cost	76,690	
Operation & Maintenance	412,690	

Remark : Operation & Maintenance Cost will be 5% increased annually



Table 3.5. Payback Analysis for "CSIS" Development (Baht).

Cash Flow Description	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Computerized System						
System Development	(908,800)	0	0	0	0	0
Operation & Maintenance Cost		(412,690)	(433,324)	(454,990)	(477,740)	(501,627)
Cumulative Time Adjusted Costs over Lifetime	(908,800)	(1,321,490)	(1,342,124)	(1,363,790)	(1,386,540)	(1,410,427)
Benefits Derived from Operation of New System	0	538,000	538,000	538,000	538,000	538,000
Tax Rate		0.70	0.70	0.70	0.70	0.70
Time Adjusted Benefits to Tax Rate		376,600	376,600	376,600	376,600	376,600
Cumulative Time Adjusted Benefits over Lifetime	0	376,600	753,200	1,291,200	1,829,200	2,367,200
Cumulative Lifetime Adjusted Costs & Benefits	(908,800)	(944,890)	(588,924)	(72,590)	442,659.74	956,772.73

Table 3.6. Cost Comparison Between Computerized System and Manual System (Baht).

Description	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Computerized System :						
Hardware and Related Costs	453,300	226,650	113,325	56,663	28,331	14,166
Software Cost	313,600	156,800	78,400	39,200	19,600	9,800
Wiring and Training Cost	42,300	20,000	15,000	15,000	10,000	10,000
System Development & Programming Cost	99,600	30,000	25,000	20,000	10,000	10,000
Salaries & Overhead for EDP Personnel	336,000	352,800	370,440	388,962	408,410	428,831
Maintenance Cost		76,690	76,690	76,690	88,194	88,194
Total Cost	1,244,800	862,940	678,855	596,515	564,535	560,990
Accumulative Cost (Baht)	1,244,800	2,107,740	2,786,595	3,383,110	3,947,644	4,508,634
Manual System :						
Hardware and Related Costs	200,000	240,000	288,000	345,600	414,720	497,664
Software Cost	100,000	120,000	144,000	172,800	207,360	248,832
Salaries & Overhead for EDP Personnel	336,000	403,200	483,840	580,608	696,730	836,076
Maintenance Cost	30,000	36,000	43,200	51,840	62,208	74,650
Total Cost	666,000	799,200	959,040	1,150,848	1,381,018	1,657,221
Accumulative Cost (Baht)	666,000	1,465,200	2,424,240	3,575,088	4,956,106	6,613,327

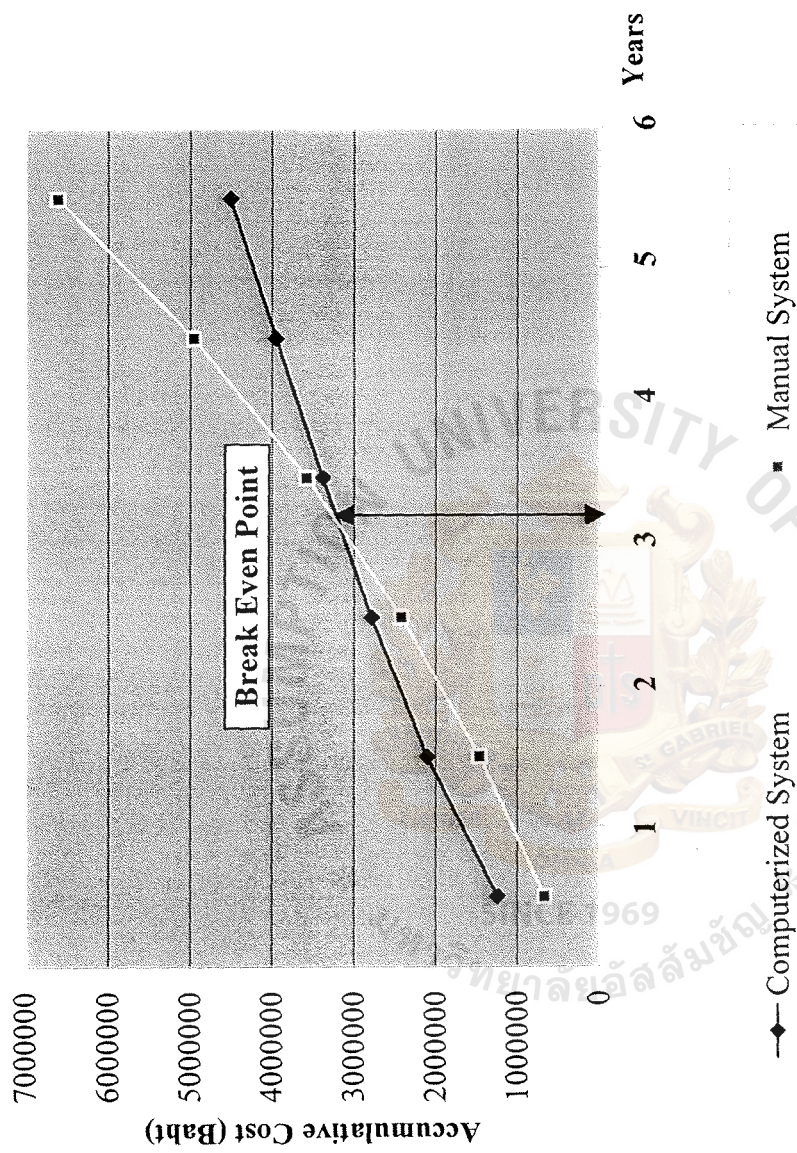


Figure 3.2. Cost Comparison Between Computerized System and Manual System (Baht).

## IV. PROJECT IMPLEMENTATION

### 4.1 Overview of the Project Implementation

The implementation phases will be triggered by the approval from the system owner or the management to accept the new system and continue the project into systems design. They consist of the installation of the prototype system, testing, programming, and training for the new system. It concerns with hardware, software, and personnel. The table 4.1 has shown the project schedule. The Gantt Chart enables the analysts to utilize their manpower more efficiency and effectively.

The implementation part consists of the following activities:

#### 4.1.1 Prototype Installation

Before the installation of prototype programs, the analyst team makes sure that the infrastructure of the organization will be ready. The existing or new network has been established to serve all installed prototype programs. The databases are the resources that can be shared to all installed prototype programs.

Recall the prototype programs are frequently constructed in the design phase which are included in the technical design statement that specifies a schedule for completing systems implementation. They are developed to verify the user's business requirements and discover the better solution to solve expected problems by proposing computerized business processes, called Credit Sales Information System , which are written in Microsoft Access.

#### 4.1.2 Testing

Testing is an important instrument that can not be overlooked in academic courses on computer programming or even system development project. The purpose of this



activity is to test all programs to be developed in the organization and also find out the errors or bugs of all installed prototype programs. Testing may be categorized broadly as to the following:

- (a) Stub Testing is the test performed on individual modules, whether they become main program, subroutine, subprogram, block, or paragraph.
- (b) Unit or Program Testing is the test whereby all the modules that have been coded and stub tested as an integrated unit. A test data is created and input to the system, each module of the program has performed instruction correctly.
- (c) System Testing is the test that ensures that application programs written in isolation work properly when they are integrated into the total system.
- (d) Peak Load Testing is the test that determines whether the system can handle the volume of activities in the peak period of processing demand.
- (e) Storage Testing is the test that determines the storage capacity of the system to store transaction data on a disk or in other files.
- (f) Backup and Recovery Testing is the test that all backup and recovery procedures are working properly with consistency. A team should simulate a data loss disaster and test the time required to recover from the disaster and perform a before-and-after comparison of the data to ensure that data were recovered properly.
- (g) Performance or Response Time Testing is the test that determines how long will be used by the system to process one instruction.
- (h) Human Factors Testing is the test that determines how users will react when they use the system such as input, output and interface design.



#### 4.1.3 Training

The purpose of this activity is to provide training and documentation to system users to prepare them for a smooth transition to new system. Converting to the new system necessitates that system users be trained and provided with documentation that guides them through using a new system. Training will be performed in group basis because it is a better use of time, and it encourages group learning possibilities.

However, system training will be conducted to the power users who possess a highly skill in business functions and computer knowledge. Power users are people who train the group of end users. The team prepares the training course to end users that can be prioritized as to the following;

- (a) Systems Operators who are the member of computing center will be trained to handle possible operation problems, and unexpected situations.
- (b) Power Users who possess high skills in business function and computer knowledge will be trained individually of each department.
- (c) End-Users. This group training is provided to the users to familiar with the processing system and in using the application.

#### 4.1.4 Convert to New System

At this stage, installed prototype programs have been accepted by the end-users and approved by the management that they can solve the expected problems. The purpose of this activity is to prepare the conversion plan to provide a smooth transition from the existing system to the new system.

The development team definitely agrees that the parallel conversion strategy will be exploited to provide the smooth transition to the new system. Both the existing and new systems will be operated for some time. This is done to ensure all major problems

in the new system which have been solved before the existing system is discarded. This strategy minimizes the risk of major flaws in the new system causing irreparable harm to business; however, it also means the cost of running two systems over some time must be incurred.

### 4.1.5 System Support

System support is the ongoing maintenance of a system after it has been placed into operation. This includes program maintenance and system improvements. Regardless of how well designed, constructed, and tested a system or application may be errors or bugs will inevitably occur.

The fundamental objectives of system maintenance are:

- (a) To make predictable changes to existing programs to correct errors that were made during systems design and implementation. Consequently, the team excludes enhancements and new requirements from this activity.
- (b) To preserve those aspects of the programs that were already correct. Inversely, the team tries to avoid the possibility that fixes to programs cause other aspects of those programs to function differently.

However the team can classify the maintenance into 3 types which will be certainly performed in the system as to the following;

- (1) Corrective Maintenance
- (2) Adaptive Maintenance
- (3) Protective Maintenance

Especially the last and unavoidable support is end-user assistance.

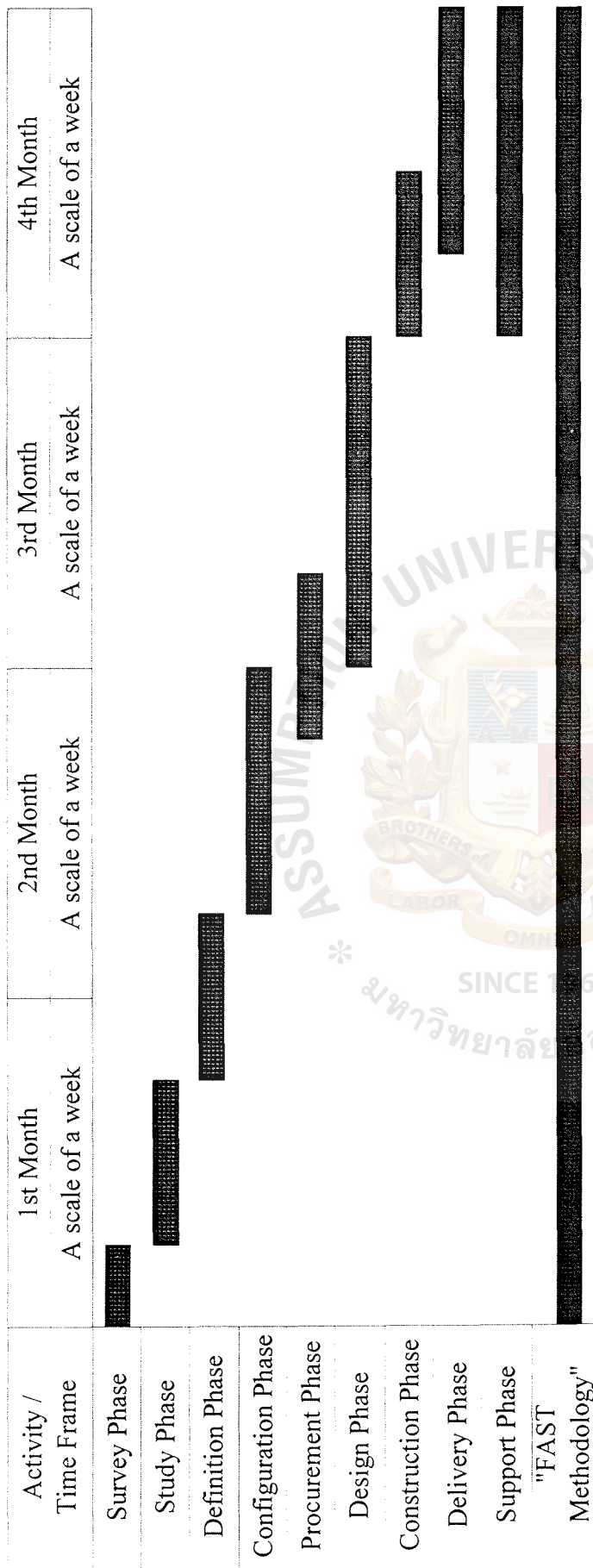


Figure 4.1. Project Implementation Schedule for "CSIS".

## V. CONCLUSIONS AND RECOMMENDATIONS

### 5.1 Conclusions

Somjin Electric Co., Ltd. Or “SEC” has been established for 5 years with 5 million Bahts for an initial capital investment. The main business of “SEC” is the third agent of the electrical equipment, complementary products and accessories such as TV, VDO, Stereo Tape Cassette, Speaker, etc. There is a very high and strong competition in the market place. The customer has been proposed the best condition of both cash and credit sales. SEC has been positioned in the top 3 of the overall market with 38% market share. The main target markets are home use and SOHO (Small Office and Home Office). SEC has utilized the selling strategy of cash and credit sales that maintain the ratio by 40% and 60% respectively.

The company has faced seriously both of internal and external problems such as the increasing total cost of ownership, higher operation cost, higher risk of credit sales with delay payment or bad debt, lacking of the cash flow and higher interest rate. In order to survive in the market and create the competitive edge, the company can not run business with manual systems. Finally the committee concludes to come up with the project of “Credit Sales Information System” or “CSIS” which is the computerized processes of credit sales. “CSIS” will be developed to facilitate the working systems of two main departments, which are Sales and Accounting Team as to the following;

#### Sales Department

- Computerize the credit sales processes
- Develop the sales, customer database and report
- Reduce an input errors
- Implement the integrated system to other departments

## Accounting Department

- Computerize the payment collection processes
- Develop the customer credit status
- Generate financial report
- Implement the integrated system to other departments

## 5.2 Recommendations

SEC has become the computerized business information system and integrated network. So the local area network (LAN) has come to play a central role in information distribution and office functioning and process within business and other organizations. In addition, businesses are relying on increasingly powerful server to handle transaction and databases processing and to support massive client-server network in the future. There are absolute requirements to interconnect those systems for;

### (1) Sharing

The need to share data and expensive resources are compelling reasons for interconnection. Individual users of computer resources do not work in isolation. They need facilities to exchange messages with other users, to access data from several sources in the preparation of a document or for an analysis with other members of a work group. They need to share those expensive devices among number of users to justify the cost of the equipment.

### (2) Incremental Growth

The good network infrastructure of the organization is very important design for future growth. The company can add more attached devices easily into the system with the lowest cost of operation and higher productivity. Moreover the company should be ready for E-Commerce.





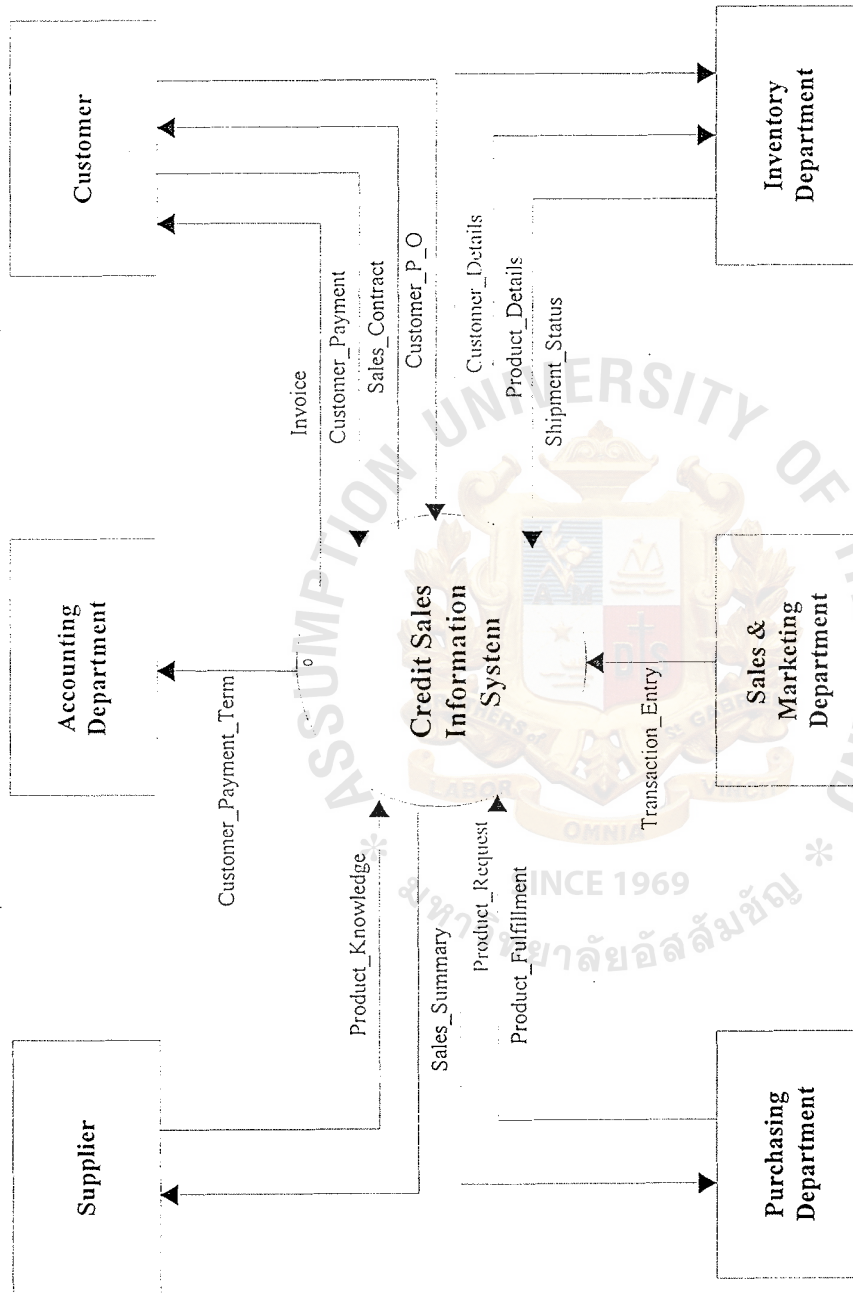


Figure A.1. Context Diagram for Existing System.

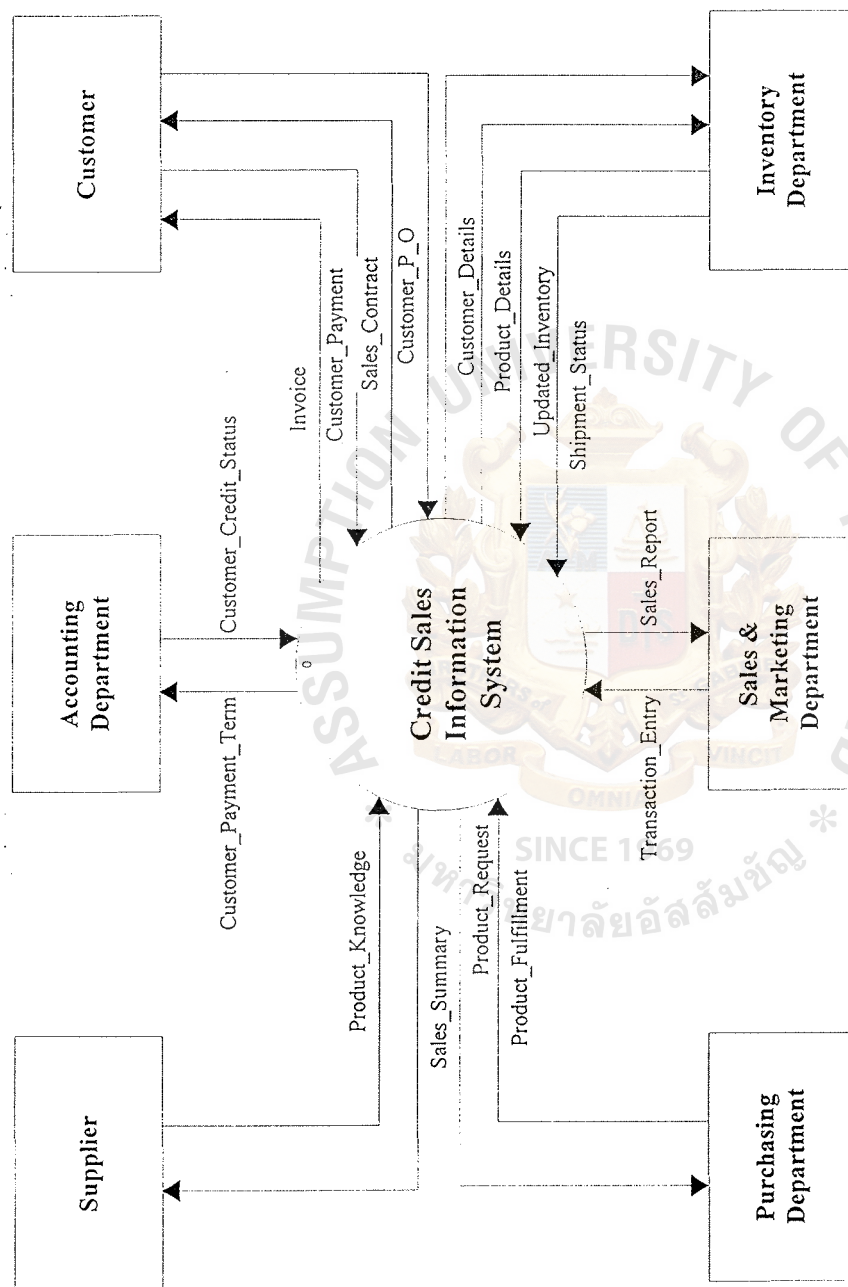


Figure A.2. Context Diagram For "Credit Sales Information System".



## APPENDIX B

### ENTITY RELATIONSHIP DIAGRAM

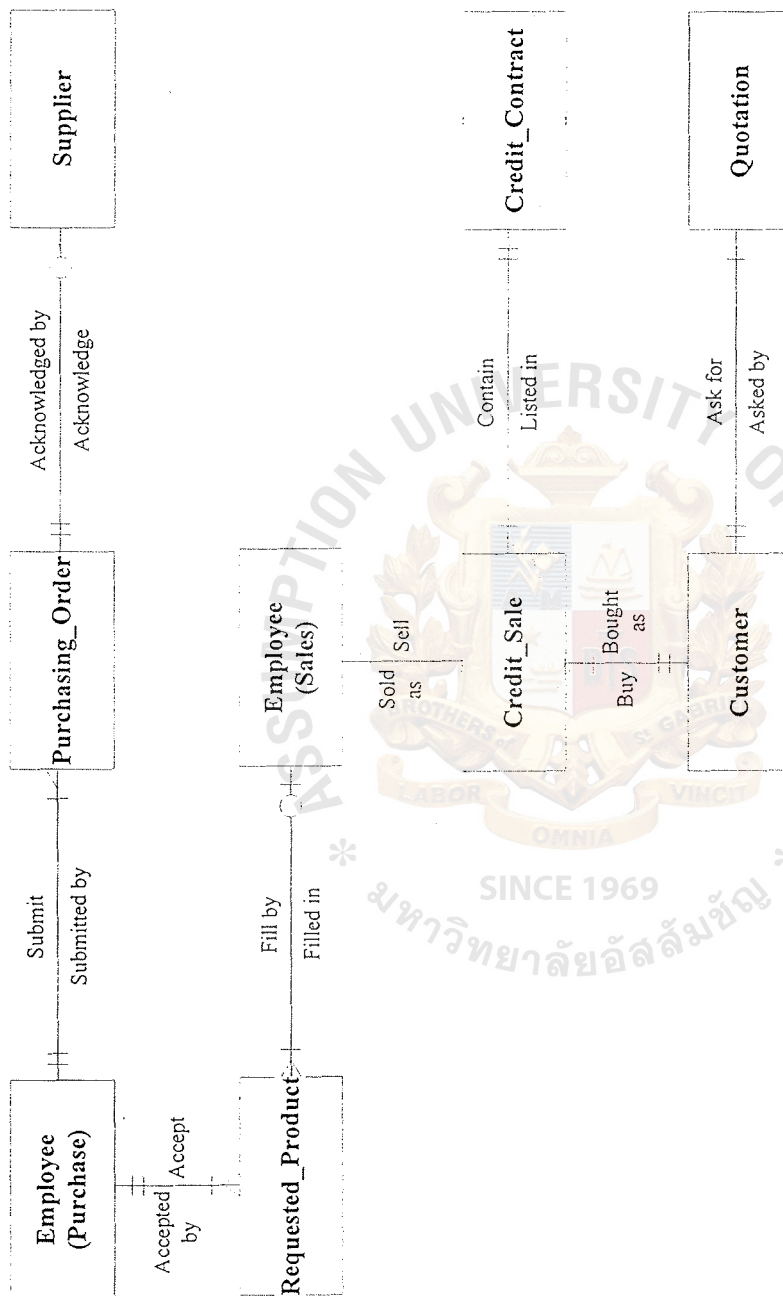


Figure B.1. ER Diagram of "Credit Sales Information System".



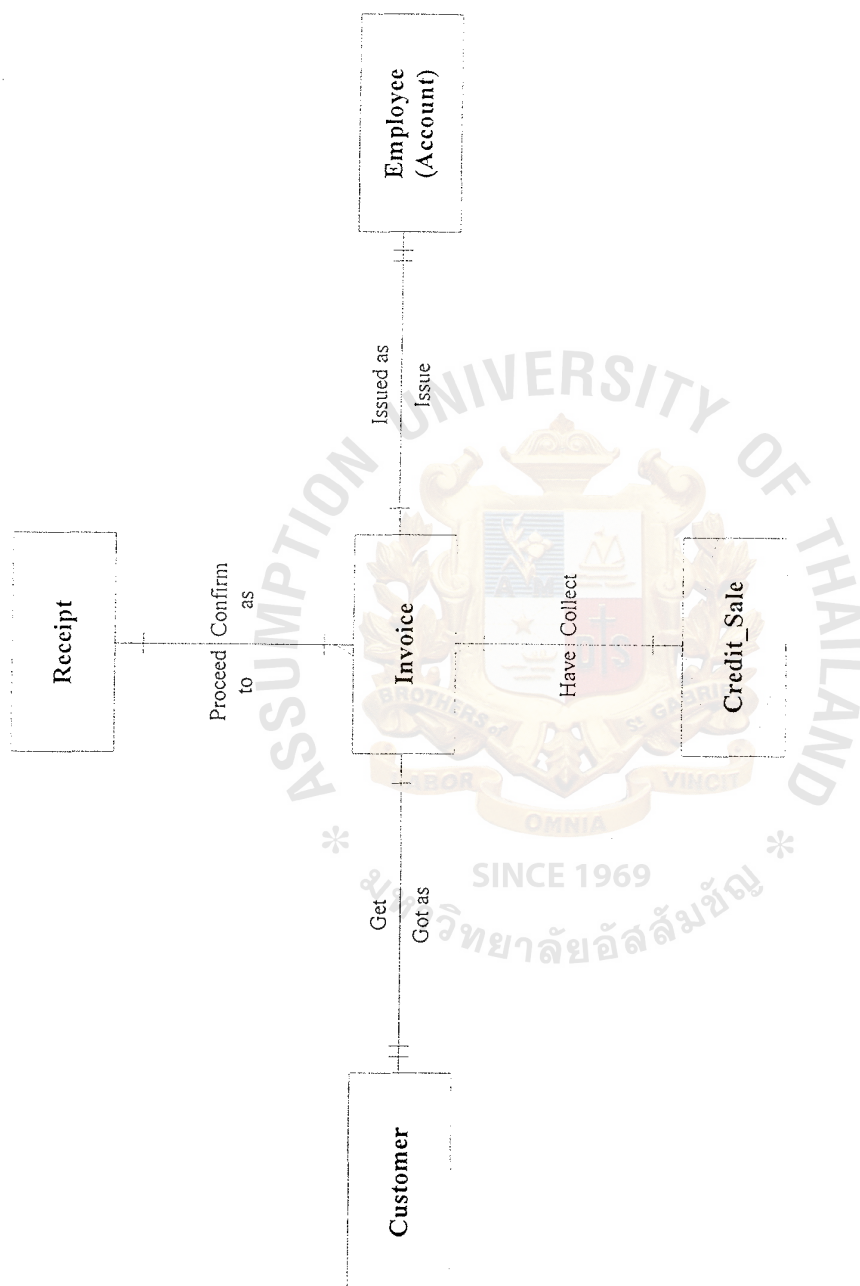


Figure B.2. ER Diagram of "Credit Sales Information System".

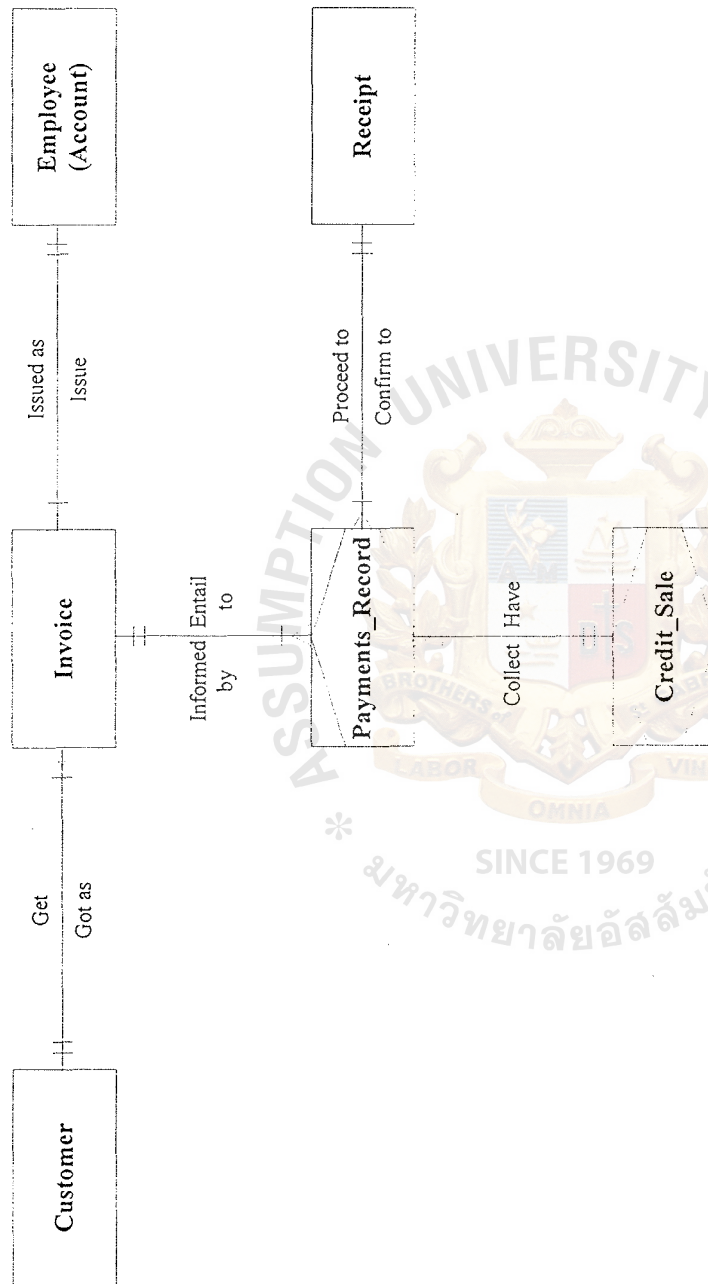


Figure B.3. ER Diagram of "Credit Sales Information System".

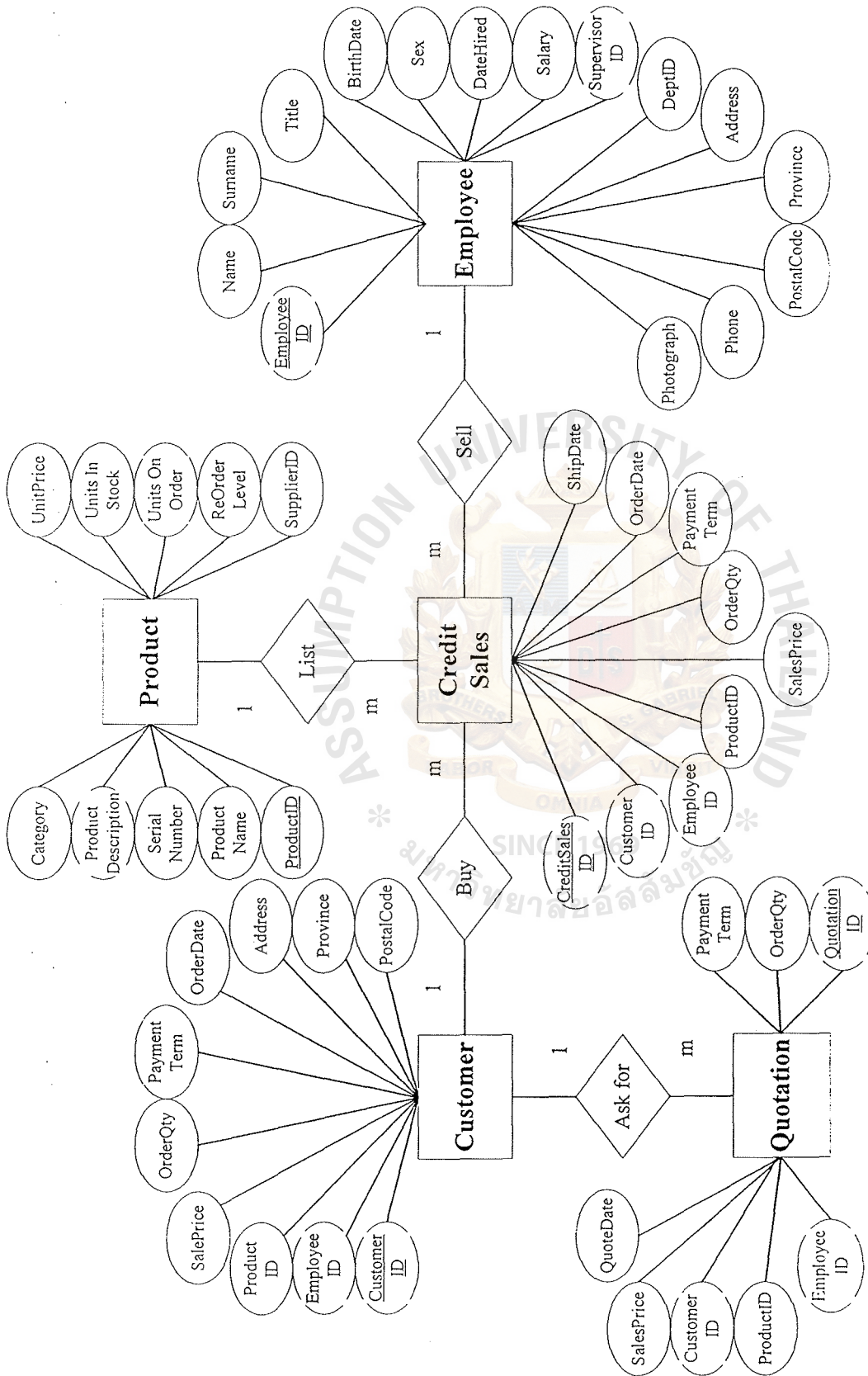


Figure B.4. ER Diagram of Credit Sales Contract.

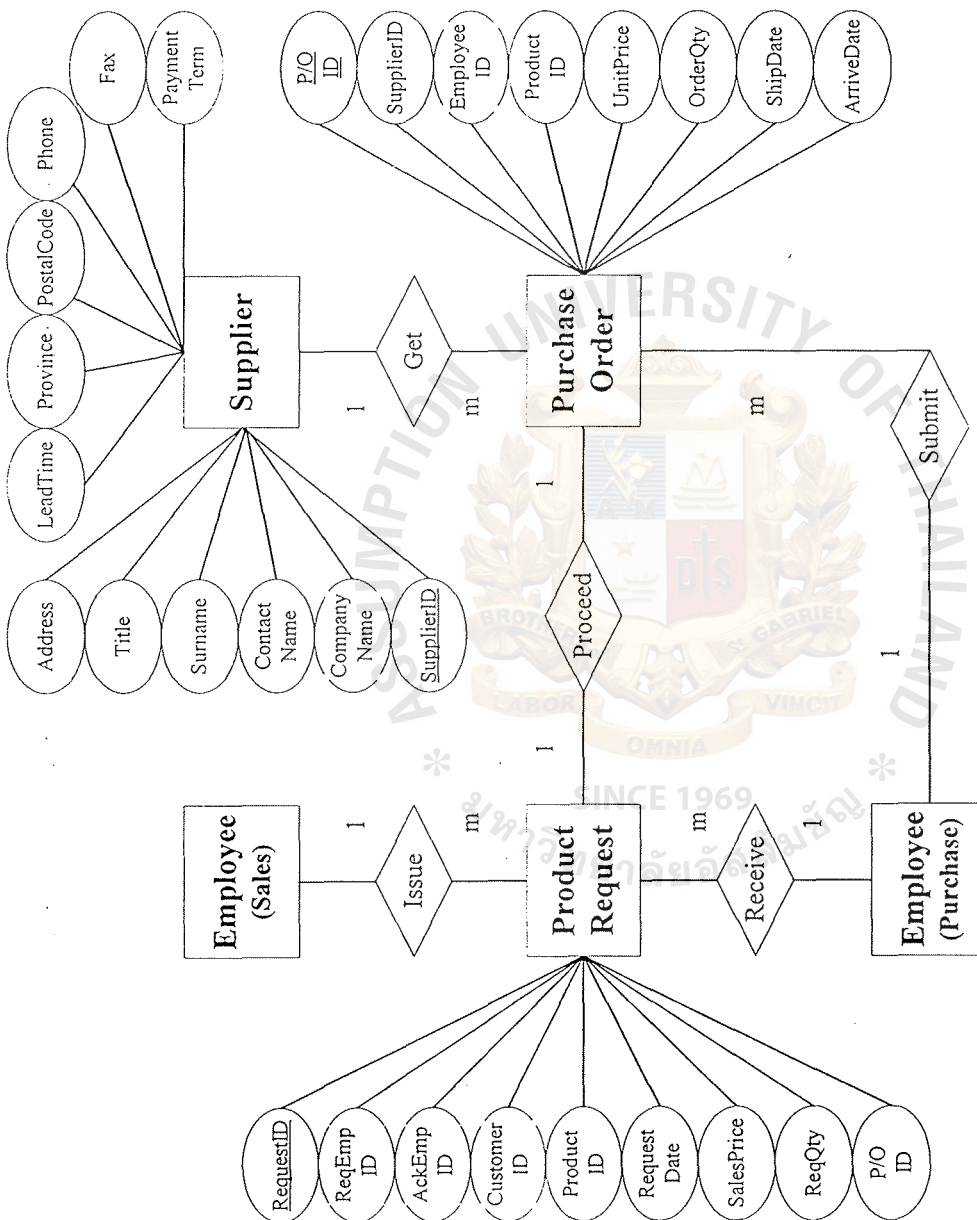


Figure B.5. ER Diagram of Procurement Processes.

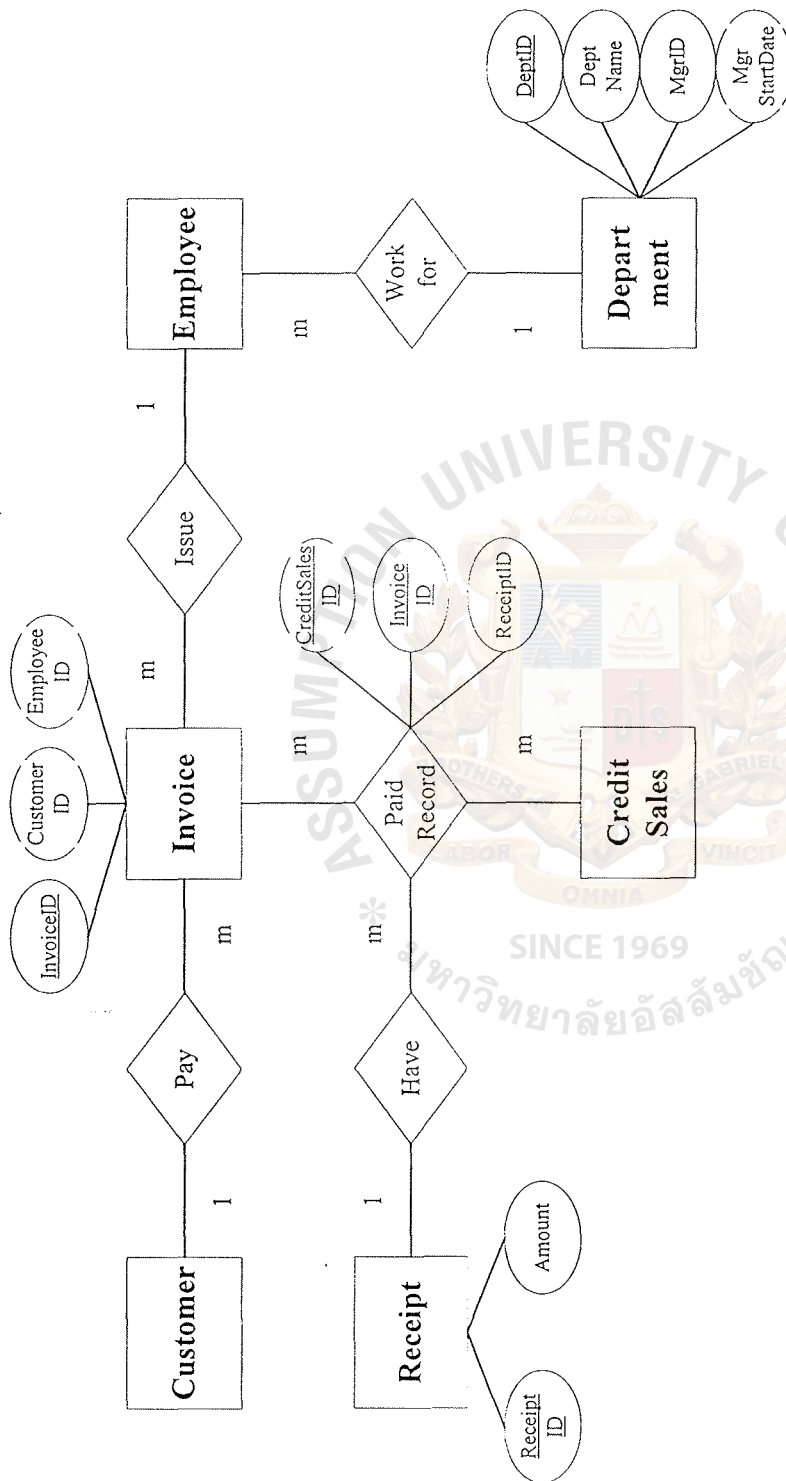
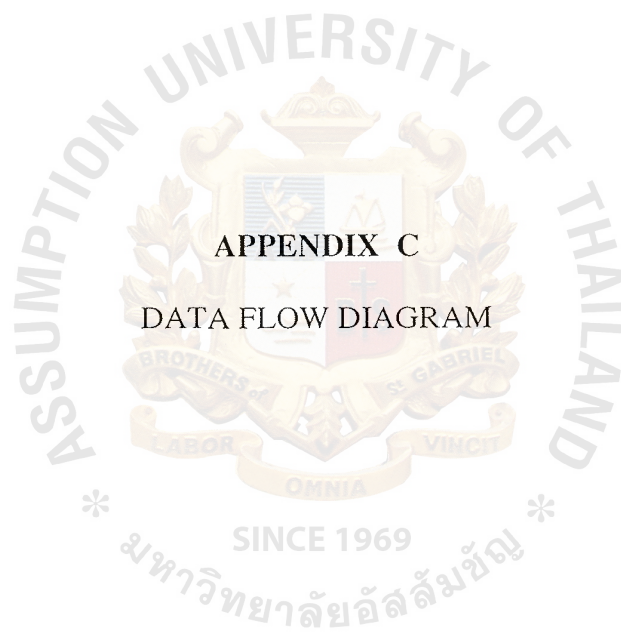


Figure B.6. ER Diagram of Payment Record for Credit Sales.





APPENDIX C

DATA FLOW DIAGRAM

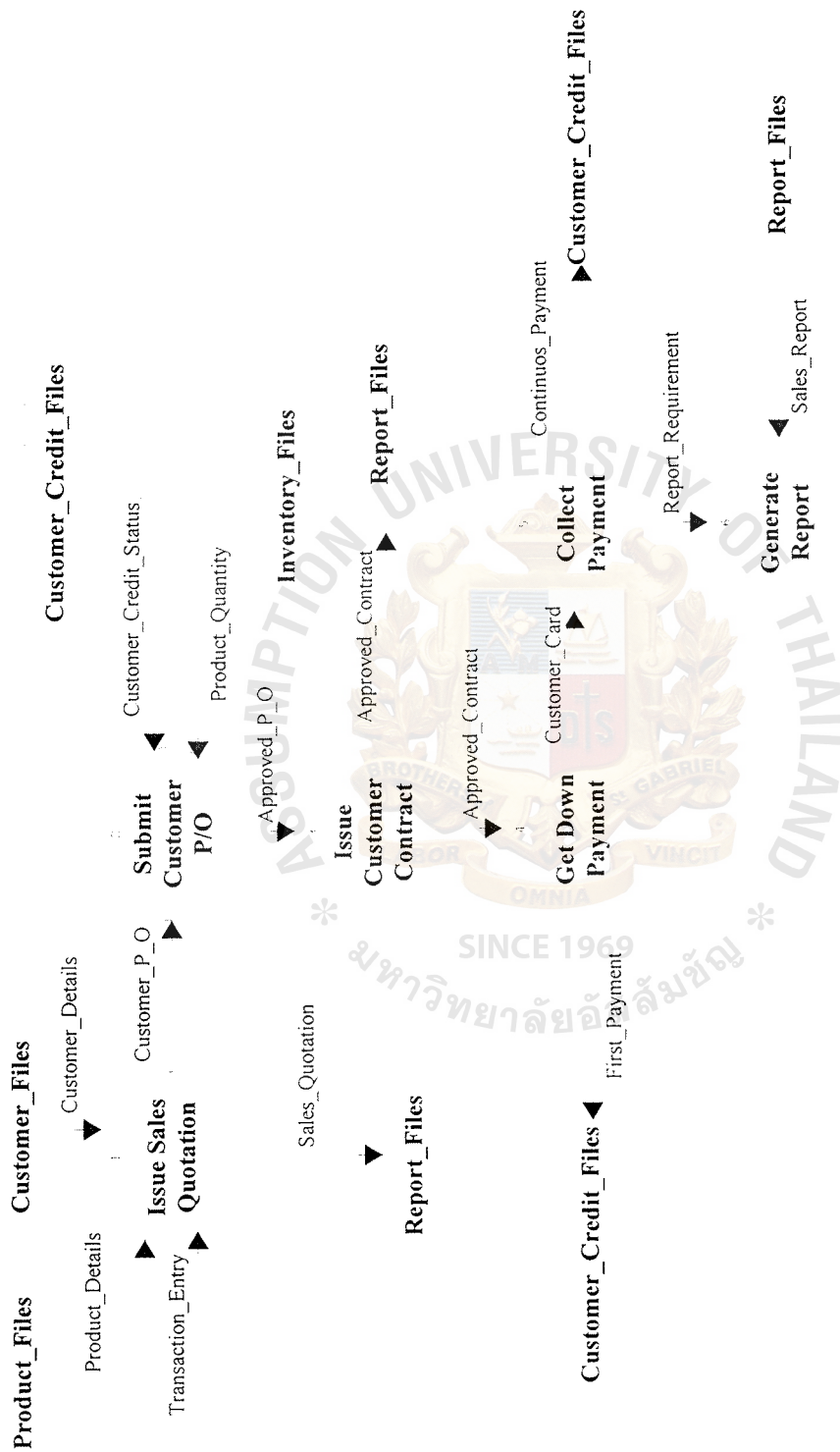


Figure C.1. Level 0 Data Flow Diagram of "Credit Sales Information System".

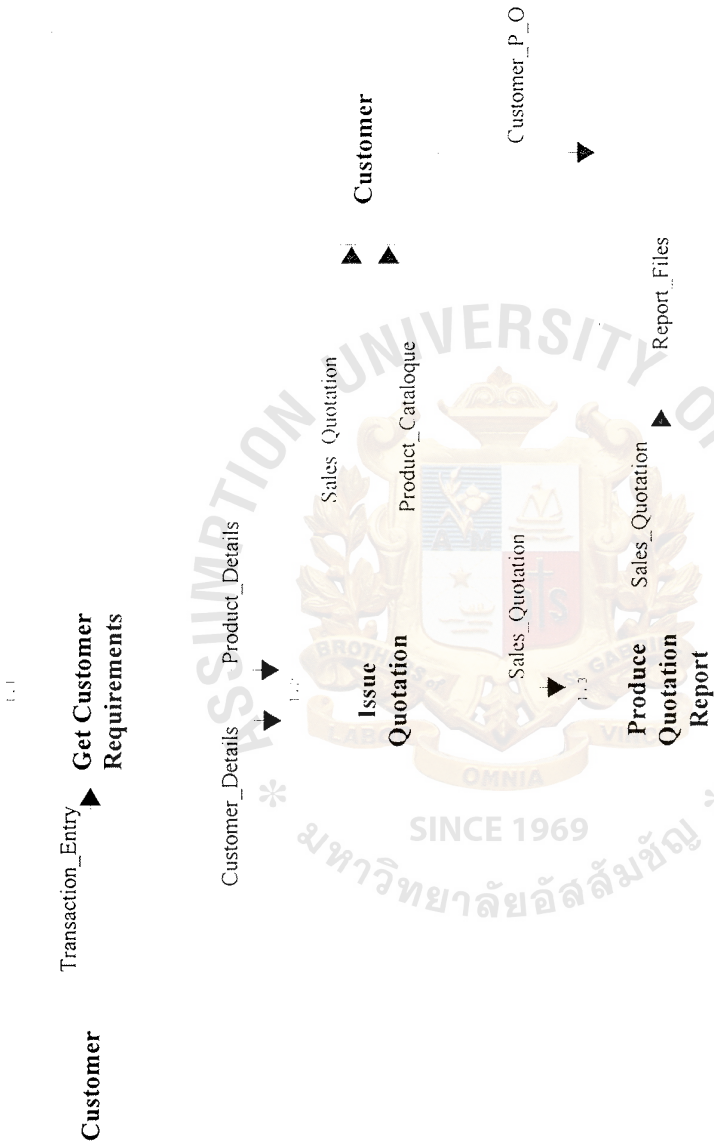


Figure C.2. Level 1 Data Flow Diagram of "Issue Sales Quotation" Process.

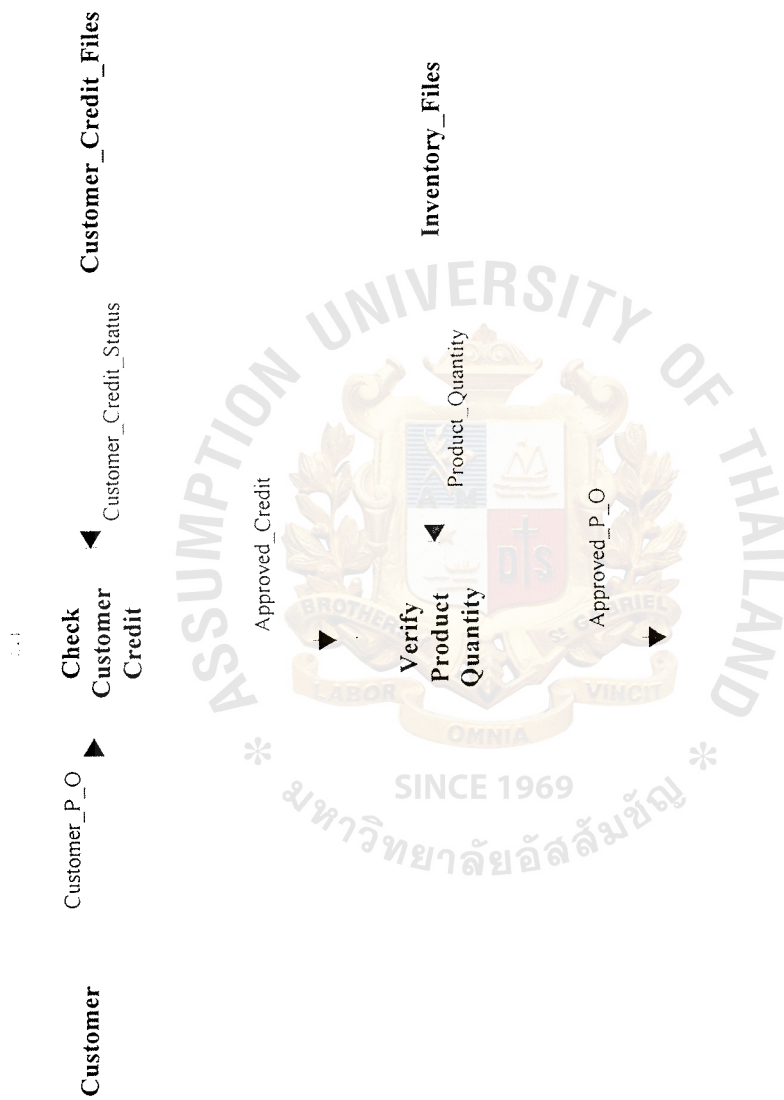


Figure C.3. Level 1 Data Flow Diagram of "Submit Customer P/O" Process.

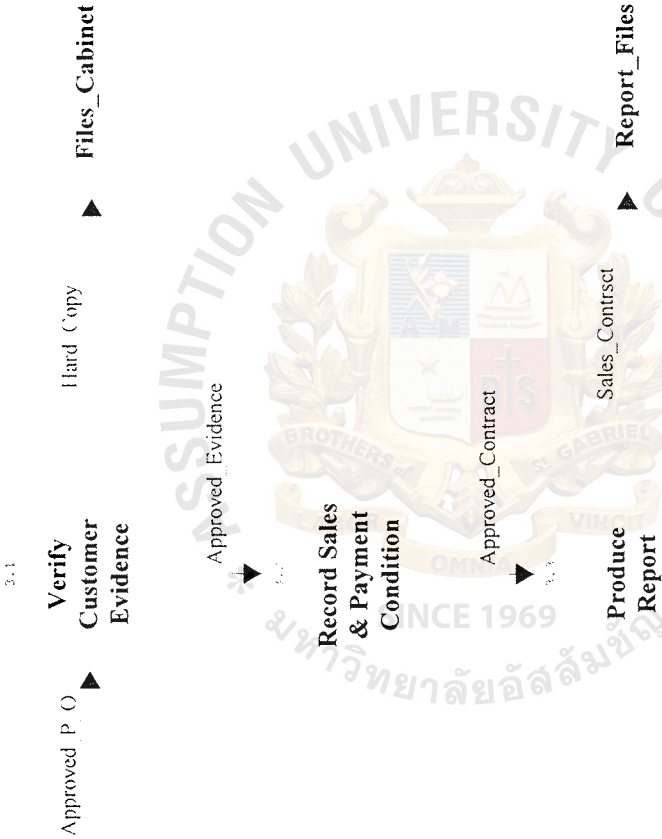


Figure C.4. Level 1 Data Flow Diagram of "Issue Customer Contract" Process.



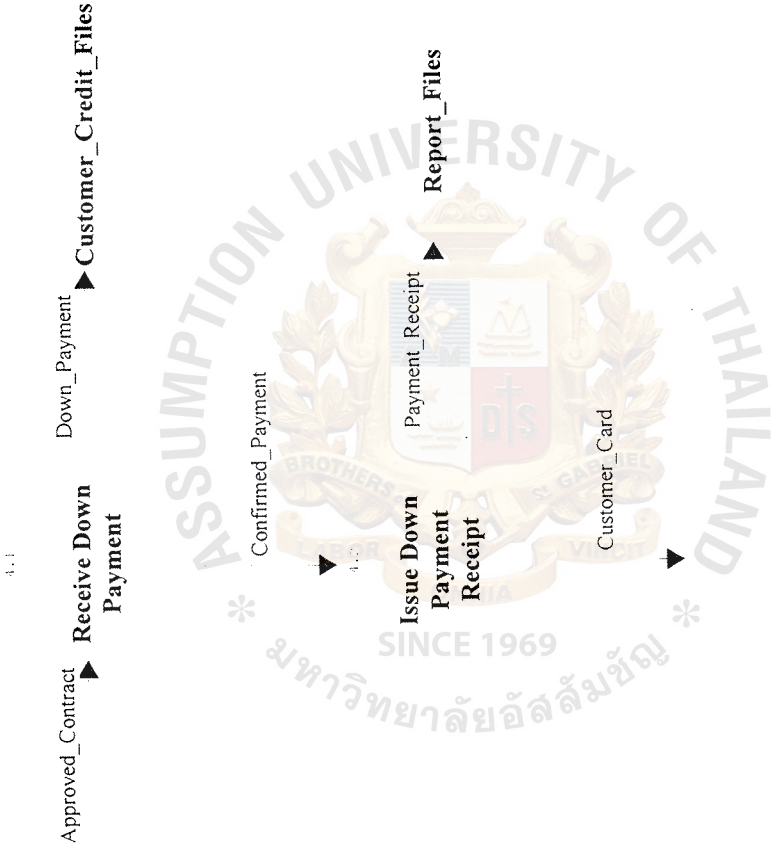


Figure C.5. Level 1 Data Flow Diagram of "Get Down Payment" Process.

5.2

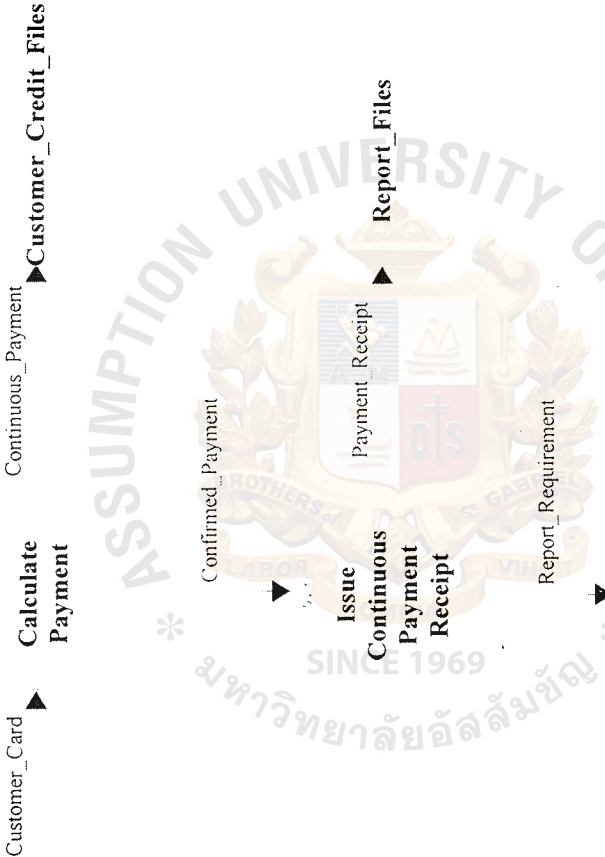


Figure C.6. Level 1 Data Flow Diagram of "Collect Payment" Process.

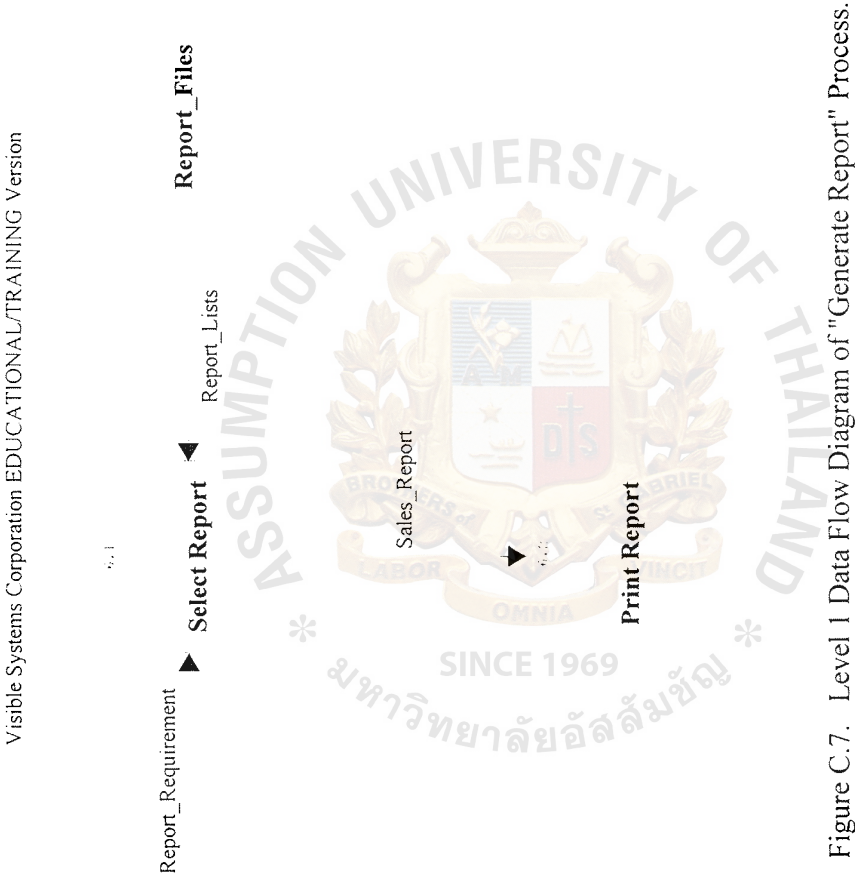


Figure C.7. Level 1 Data Flow Diagram of "Generate Report" Process.

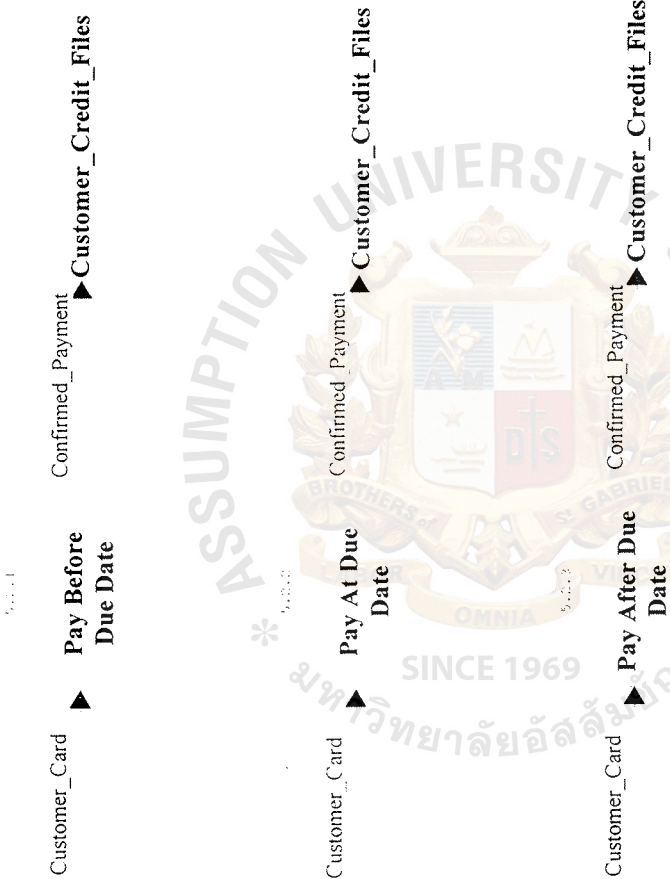


Figure C.8. Level 2 Data Flow Diagram of "Calculate Payment" Process.



## APPENDIX D

### DATABASE SCHEMA



Table D.1. Database Schema of "Customer" Table.

<u>Customer ID</u>	Company	Name	Surname	Address	Province	PostalCode	Phone	Fax
BillingAdd	Province	PostalCode	Phone	Fax	Witness	Photograph		

Table D.2. Database Schema of "Product" Table.

<u>ProductID</u>	Name	Description	SerialNo.	Category	UnitPrice	UnitInStock	UnitOnOrder	OrderLevel	SupplierID
------------------	------	-------------	-----------	----------	-----------	-------------	-------------	------------	------------

Table D.3. Database Schema of "Employee" Table.

<u>EmployeeID</u>	Name	Surname	Title	Sex	BirthDate	DateHired	Salary	Address	Province
PostalCode	Phone	Photo	DeptNo.	SupvrID					

Table D.4. Database Schema of "Supplier" Table.

<u>SupplierID</u>	Company	Name	Surname	Title	Address	Province	PostalCode	Phone	Fax
Pay Term	LeadTime								

Table D.5. Database Schema of "Credit Sales" Table.

<u>CreditSalesID</u>	CustomerID	EmployeeID	ProductID	SalesPrice	OrderQty	OrderDate	DownPayment
PaymentTerm	ShipName	ShipAddress	ShipProvince	ShipPostalCode	ShipPhone	ShipDate	CreditReceiptID

Table D.6. Database Schema of "Quotation" Table.

<u>QuotationID</u>	CustomerID	EmployeeID	ProductID	ProductName	SalesPrice	OrderQty	QuoteDate
PaymentTerm	Notes						

Table D.7. Database Schema of "Product Request" Table.

<u>RequestID</u>	ReqEmpID	AckEmpID	CustomerID	ProductID	RequestDate	SalesPrice	ReqQty	P/O ID
------------------	----------	----------	------------	-----------	-------------	------------	--------	--------

Table D.8. Database Schema of "Purchasing Order" Table.

<u>P/O ID</u>	SupplierID	RequestID	ProductID	ProductName	OrderDate	OrderEmpID	UnitPrice	OrderQty
ShipDate	ArrivalDate							

Table D.9. Database Schema of "Department" Table.

<u>DeptID</u>	DeptName	MgrID	MgrStartDate
---------------	----------	-------	--------------

Table D.10. Database Schema of "Payment Record" Table.

<u>PaidReceiptID</u>	<u>CreditSalesID</u>	<u>InvoiceID</u>	<u>ReceiptID</u>	CustomerID	EmpRecID	PaymentDate	PaidAmount
----------------------	----------------------	------------------	------------------	------------	----------	-------------	------------



Table D.11. Database Schema of "Invoice" Table.

<u>InvoiceID</u>	CustomerID	EmployeeID	PaidAmount	InvoiceDate	ShipDate	Notes
------------------	------------	------------	------------	-------------	----------	-------

Table D.12. Database Schema of "Receipt" Table.

<u>ReceiptID</u>	PaidAmount	ReceiptDate
------------------	------------	-------------



APPENDIX E  
INPUT SCREEN DESIGN

Microsoft Access - [CashDeal]

File Edit View Insert Format Records Tools Window Help

Order Date  
CashReceiptID

### Cash Sales

ProductID	Description	Quantity	Price / Unit
		1	
		1	
		1	

Company Name  
Ship Address  
Province  
Phone Number  
Ship Date

Postal Code  
( ) - 0

Record: 1 of 1  
Form View

Exploiting - 3.5 Floppy (A:) Microsoft Access - [C...]

NUM 133

Figure E.1. Cash Deal Screen of "CSIS".

Microsoft Access - [CreditDeal]

File Edit View Insert Format Records Tools Window Help

**Credit Sales**

Credit Sales ID:  Customer ID:  Sales ID:  Order Date:  Credit Receipt ID:

Product ID	Description	Quantity	Sales Price
		1	
		1	
		1	

Down Payment:  Payment Terms:

Ship Name:  Ship Address:  Ship Province:  Phone Number:  Ship Date:  Postal Code:

Record: 14 of 1 Form View

NUM

Exploing - Lab (C:) Microsoft Word Calculator 1:58

Figure E.2. Credit Deal Screen of “CSIS”.

Microsoft Access - [Customers]

File Edit View Insert Format Records Tools Window Help

Print Undo Redo Cut Copy Paste Find & Replace Sort & Filter Show/Hide Objects Database Window

### Please enter your informations ...

Customer ID	[Empty Field]		Photograph	[Empty Field]
Company	[Empty Field]			
Name	[Empty Field]			
Surname	[Empty Field]			
Address	[Empty Field]			
Province	[Empty Field]	Code [Empty Field]		
Phone	[Empty Field]	Fax [Empty Field]		
Billing To	[Empty Field]			
Province	[Empty Field]	Code [Empty Field]		
Phone	[Empty Field]	Fax [Empty Field]		

Record: 1 of 1

Form View

เริ่ม - Start HP9

Exploring - Lab (C)

Microsoft Access - [...]

Microsoft Word

NUM 2:13

Figure E.3. Customer Screen of "CSIS".



Microsoft Access - [DebtorPayments]

File Edit View Insert Format Records Tools Window Help

Debt Payment Details

PaidReceiptID  Payment Date

CreditSalesID  Employee ID

Customer ID  Payment Amount

InvoiceID  ReceiptID

Company Name  Surname

Phone  ( ) - 0 Fax

Record: 14 of 1

Form View

Start Microsoft Word Microsoft Access ... Exploring Lab (C) 2:47 PM

Figure E.4. DebtorPayment Screen of "CSIS".

Microsoft Access - [Employees]

File Edit View Insert Format Records Tools Window Help

Please enter your informations ...

Employee ID	[text/limited]		Photograph	
Name				
Surname				
Department				
Supervisor ID				
Title			Date Hired	
Birth Date			Salary	
Address				
Province			Postal Code	0

Record: 14 of 1  
Form View

Start Hp.9 Microsoft Access - Exploing - Lab (C:) Microsoft Word - Docu... NUM 2:54 PM

Figure E.5. EmployeeList Screen of "CSIS".

Microsoft Access - [Invoices]

File Edit View Insert Format Records Tools Window Help

Invoice Details

Invoice ID:  Invoice Date:

Amount:

Customer ID:

Employee ID:

Ship Date:

Notes:

Receipt ID:

Receipt Date:

Amount:

Record: 1 of 1

Form View

Start

Microsoft Access - [Exploing - Lab (C)]

Microsoft Word

NUM

3:00 PM

Figure E.6. Invoices Screen of "CSIS".

Microsoft Access - [ProductRequest]

File Edit View Insert Format Records Tools Window Help

Product Request Form

RequestID Request Date

ProductID	Product Name	RequestQty	Sale Price
0			
0			
0			
0			

Customer ID  
Requested By  
Acknowledged By

Record: 14 of 1  
Form View

Microsoft Access - [ProductRequest] - IP... Microsoft Word

NUM 17:52

Figure E.7. ProductRequest Screen of "CSIS".

Microsoft Access - [Products]

File Edit View Insert Format Records Tools Window Help

### Product Details

Product ID	Product Name	
Description	Category	Reorder Level
Unit Price	Supplier ID	
Supplier Name Contact Name Title Payment Terms Lead Time Phone		

Record: 14 of 1

Form View

Start Microsoft Access - IP ... Microsoft Word - FigE7

NLM 1800

Figure E.8. Product Screen of “CSIS”.







Microsoft Access - [Quotation]

File Edit View Insert Format Records Tools Window Help

### Quotation Details

QuotationID	CustomerID	EmployeeID	Quote Date

ProductID	Product Name	OrderQty	SalesPrice
			\$0.00
			\$0.00
			\$0.00
			\$0.00

PaymentTerm

Notes

Record: 14 of 1

Form View

Microsoft Access - [Quotation] Microsoft Word - FigE9 18:22

Figure E.10. Quotation Screen of “CSIS”.

Microsoft Access - [Supplier]

File Edit View Insert Format Records Tools Window Help

Supplier Details

Supplier ID		
Supplier Name		
Payment Terms		
Lead Time		
Contact Name		
Title		
Address		
Province	Postal Code	
Phone	Fax	

Record: 1 of 1

Form View

Start Microsoft Access - [S... Microsoft Word - FigE10

NUM 18:24

Figure E.11. Supplier Screen of "CSIS".



**APPENDIX F**  
REPORT FORMS (OUTPUT DESIGN)

Best Supplier

SupplierName	Product ID	Product Name	Unit Price
--------------	------------	--------------	------------



Cash Deal Report

CashSalesID	ProductID	Description	Sales Price
-------------	-----------	-------------	-------------



CreditCustomer

CreditSalesID	Customer ID	Company Name	Revenue
---------------	-------------	--------------	---------





## Credit Deal Report

CreditSalesID

Product ID

Product Name

---



---

## Debt Payment Report

---

*CreditSalesID*

PaidReceiptID	Customer ID	EmpRecID	Paid Date	Paid Amount
---------------	-------------	----------	-----------	-------------

---



## Inventory Lists

Product ID

Product Name

ty On Han

Reorder Qty



2 January 2000

Page 1 of 1

Invoices

InvoiceID	Customer ID	Employee ID	Invoice Date	Ship Date
-----------	-------------	-------------	--------------	-----------



2 January 2000

## Product Lists

Product ID	Product Name	Category Name	Unit Price
------------	--------------	---------------	------------

---



---

# Product Request Report

---

*RequestID*

ProductID	ProductName	RequestQty	Sale Price
-----------	-------------	------------	------------

---

---





Purchase Order Report

SupplierID	PurchaseOrderID	OrderDate	Product ID	Order Qty	Unit
------------	-----------------	-----------	------------	-----------	------



## Quotation Report

QuotationID	CustomerID	EmployeeID	ProductID	ProductName	OrderQty	SalesPrice	QuoteDate
-------------	------------	------------	-----------	-------------	----------	------------	-----------





Table G.1. Data Dictionary for "CashDeal" Table of "CSIS".

Field Name	Data Type	Length	Format
Cash Sales ID	AutoNumber	6	999999
Customer ID	Number	6	999999
ProductID	Number	8	99999999
Description	Text	30	XXX...
Employee ID	Number	6	999999
Sales Price	Currency	10	99999999.99
Order Quantity	Number	4	9999
Order Date	Date/Time	6	DD/MM/YY
Ship Name	Text	25	XXX...
Ship Address	Text	30	XXX...
Ship Province	Text	15	XXX...
Ship Postal Code	Number	5	99999
Phone Number	Number	10	(999)999-9999
Ship Date	Date/Time	6	DD/MM/YY
CashReceiptID	Number	6	999999

Table G.2. Data Dictionary for "CreditDeal" Table of "CSIS".

Field Name	Data Type	Length	Format
CreditSalesID	AutoNumber	6	999999
Customer ID	Number	6	999999
Employee ID	Number	6	999999
Product ID	Number	6	999999
Sales Price	Currency	10	99999999.99
Order Quantity	Number	4	9999
Down Payment	Currency	10	99999999.99
Payment Terms	Text	30	XXX...
Order Date	Date/Time	6	DD/MM/YY
Ship Name	Text	25	XXX...
Ship Address	Text	30	XXX...
Ship Province	Text	15	XXX...
Ship Postal Code	Number	5	99999
Phone Number	Number	10	(999)999-9999
Ship Date	Date/Time	6	DD/MM/YY
CreditReceiptID	Number	6	999999

Table G.3. Data Dictionary for "Customer" Table of "CSIS".

Field Name	Data Type	Length	Format
Customer ID	AutoNumber	6	999999
Company Name	Text	25	XXX...
Customer Name	Text	15	XXX...
Surname	Text	20	XXX...
Present Address	Text	30	XXX...
PrestProvince	Text	15	XXX...
Postal Code	Number	5	99999
PrestPhone	Number	10	(999)999-9999
PrestFax	Number	10	(999)999-9999
Billing Address	Text	30	XXX...
BillProvince	Text	15	XXX...
Postal Code	Number	5	99999
BillPhone	Number	10	(999)999-9999
BillFax	Number	10	(999)999-9999
Witness	OLE Object		Graphic File
Photograph	OLE Object		Graphic File



Table G.4. Data Dictionary for "DebtorPayment" Table of "CSIS".

Field Name	Data Type	Length	Format
PaidReceiptID	AutoNumber	6	999999
CreditSalesID	Number	6	999999
InvoiceID	Number	6	999999
ReceiptID	Number	6	999999
Customer ID	Number	6	999999
EmpRecID	Number	6	999999
Payment Date	Date/Time	6	DD/MM/YY
Payment Amount	Currency	10	99999999.99

Table G.5. Data Dictionary for "Department" Table of "CSIS".

Field Name	Data Type	Length	Format
DeptID	Number	6	999999
DeptName	Text	15	XXX...
MgrID	Number	6	999999
MgrStartDate	Date/Time	6	DD/MM/YY

Table G.6. Data Dictionary for "Employees" Table of "CSIS".

Field Name	Data Type	Length	Format
Employee ID	AutoNumber	6	999999
Employee Name	Text	15	XXX...
Surname	Text	20	XXX...
Title	Text	10	XXX...
Sex	Text	1	X
DeptID	Number	6	999999
Supervisor ID	Number	6	999999
Birth Date	Date/Time	6	DD/MM/YY
Date Hired	Date/Time	6	DD/MM/YY
Salary	Currency	10	99999999.99
Address	Text	30	XXX...
Province	Text	15	XXX...
Postal Code	Number	5	99999
Phone	Number	10	(999)999-9999
Photograph	OLE Object		Graphic File

Table G.7. Data Dictionary for "Invoices" Table of "CSIS".

Field Name	Data Type	Length	Format
Invoice ID	AutoNumber	6	999999
Customer ID	Number	6	999999
Employee ID	Number	6	999999
Invoice Date	Date/Time	6	DD/MM/YY
Ship Date	Date/Time	6	DD/MM/YY
PaidAmount	Currency	10	99999999.99
Notes	Memo	50	XXX...

Table G.8. Data Dictionary for "ProductRequest" Table of "CSIS".

Field Name	Data Type	Length	Format
RequestID	AutoNumber	6	999999
Requested By	Number	6	999999
Acknowledged By	Number	6	999999
Customer ID	Number	6	999999
ProductID	Number	6	999999
ProductName	Text	20	XXX...
Request Date	Date/Time	6	DD/MM/YY
Sale Price	Currency	10	99999999.99
RequestQty	Number	4	9999

Table G.9. Data Dictionary for "Products" Table of "CSIS".

Field Name	Data Type	Length	Format
Product ID	AutoNumber	6	999999
Product Name	Text	20	XXX...
Product Description	Text	30	XXX...
Serial Number	Number	8	99999999
Category Name	Text	10	XXX...
Unit Price	Currency	10	99999999.99
Units In Stock	Number	4	9999
Units On Order	Number	4	9999
Reorder Level	Number	4	9999
Supplier ID	Number	6	999999

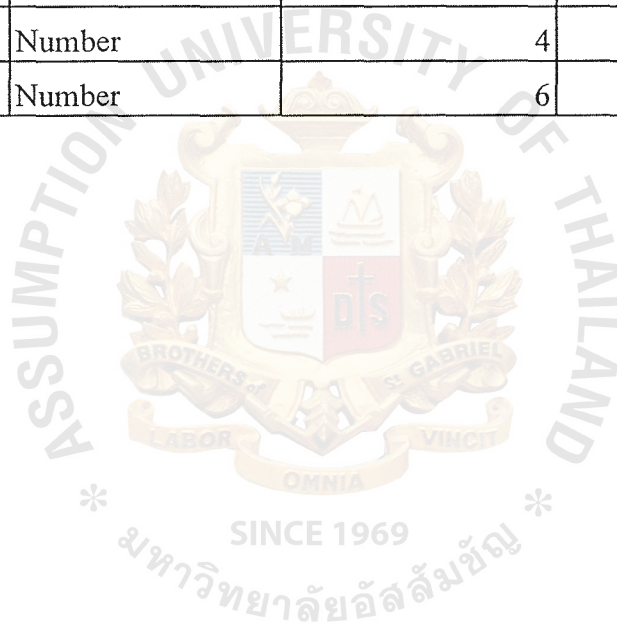


Table G.10. Data Dictionary for "PurchaseOrder" Table of "CSIS".

Field Name	Data Type	Length	Format
Order ID	AutoNumber	6	999999
Supplier ID	Number	6	999999
Requested By	Number	6	999999
Product ID	Number	6	999999
ProductName	Text	20	XXX...
Ordered By	Number	6	999999
Unit Price	Currency	10	99999999.99
Reorder Qty	Number	4	9999
OrderDate	Date/Time	6	DD/MM/YY
Ship Date	Date/Time	6	DD/MM/YY
Arrive Date	Date/Time	6	DD/MM/YY

Table G.11. Data Dictionary for "Quotation" Table of "CSIS".

Field Name	Data Type	Length	Format
QuotationID	AutoNumber	6	999999
CustomerID	Number	6	999999
EmployeeID	Number	6	999999
ProductID	Number	6	999999
ProductName	Text	20	XXX...
SalesPrice	Currency	10	99999999.99
OrderQty	Number	4	9999
QuoteDate	Date/Time	6	DD/MM/YY
PaymentTerm	Text	30	XXX...
Notes	Memo	50	XXX...

Table G.12. Data Dictionary for "Receipt" Table of "CSIS".

Field Name	Data Type	Length	Format
ReceiptID	Number	6	999999
ReceiptDate	Date/Time	6	DD/MM/YY
PaidAmount	Currency	10	99999999.99

Table G.13. Data Dictionary for "Supplier" Table of "CSIS".

Field Name	Data Type	Length	Format
Supplier ID	AutoNumber	6	999999
Supplier Name	Text	25	XXX...
Contact Name	Text	15	XXX...
SupSurname	Text	20	XXX...
Title	Text	10	XXX...
Address	Text	30	XXX...
Province	Text	15	XXX...
Postal Code	Number	5	99999
Phone	Number	10	(999)999-9999
Fax	Number	10	(999)999-9999
Payment Terms	Text	30	XXX...
Lead Time	Text	30	XXX...



Table G.14. Data Dictionary for "CashDeal" Screen of "CSIS".

Field Name	Data Type	Length	Format
Cash Sales ID	AutoNumber	6	999999
Customer ID	Number	6	999999
ProductID	Number	8	99999999
Description	Text	30	XXX...
Employee ID	Number	6	999999
Sales Price	Currency	10	99999999.99
Order Quantity	Number	4	9999
Order Date	Date/Time	6	DD/MM/YY
Ship Name	Text	25	XXX...
Ship Address	Text	30	XXX...
Ship Province	Text	15	XXX...
Ship Postal Code	Number	5	99999
Phone Number	Number	10	(999)999-9999
Ship Date	Date/Time	6	DD/MM/YY
CashReceiptID	Number	6	999999

Table G.15. Data Dictionary for "CreditDeal" Screen of "CSIS".

Field Name	Data Type	Length	Format
CreditSalesID	AutoNumber	6	999999
Customer ID	Number	6	999999
Employee ID	Number	6	999999
Product ID	Number	6	999999
Sales Price	Currency	10	99999999.99
Order Quantity	Number	4	9999
Down Payment	Currency	10	99999999.99
Payment Terms	Text	30	XXX...
Order Date	Date/Time	6	DD/MM/YY
Ship Name	Text	25	XXX...
Ship Address	Text	30	XXX...
Ship Province	Text	15	XXX...
Ship Postal Code	Number	5	99999
Phone Number	Number	10	(999)999-9999
Ship Date	Date/Time	6	DD/MM/YY
CreditReceiptID	Number	6	999999

Table G.16. Data Dictionary for "CustomerLists" Screen of "CSIS".

Field Name	Data Type	Length	Format
Customer ID	AutoNumber	6	999999
Company Name	Text	25	XXX...
Customer Name	Text	15	XXX...
Surname	Text	20	XXX...
Present Address	Text	30	XXX...
PrestProvince	Text	15	XXX...
Postal Code	Number	5	99999
PrestPhone	Number	10	(999)999-9999
PrestFax	Number	10	(999)999-9999
Billing Address	Text	30	XXX...
BillProvince	Text	15	XXX...
Postal Code	Number	5	99999
BillPhone	Number	10	(999)999-9999
BillFax	Number	10	(999)999-9999
Witness	OLE Object		Graphic File
Photograph	OLE Object		Graphic File

Table G.17. Data Dictionary for "DebtorPayments" Screen of "CSIS".

Field Name	Data Type	Length	Format
PaidReceiptID	AutoNumber	6	999999
CreditSalesID	Number	6	999999
InvoiceID	Number	6	999999
ReceiptID	Number	6	999999
Customer ID	Number	6	999999
EmpRecID	Number	6	999999
Payment Date	Date/Time	6	DD/MM/YY
Payment Amount	Currency	10	99999999.99



Table G.18. Data Dictionary for "EmployeeLists" Screen of "CSIS".

Field Name	Data Type	Length	Format
Employee ID	AutoNumber	6	999999
Employee Name	Text	15	XXX...
Surname	Text	20	XXX...
Title	Text	10	XXX...
Sex	Text	1	X
DeptID	Number	6	999999
Supervisor ID	Number	6	999999
Birth Date	Date/Time	6	DD/MM/YY
Date Hired	Date/Time	6	DD/MM/YY
Salary	Currency	10	99999999.99
Address	Text	30	XXX...
Province	Text	15	XXX...
Postal Code	Number	5	99999
Phone	Number	10	(999)999-9999
Photograph	OLE Object		Graphic File

Table G.19. Data Dictionary for "Invoices & Receipt" Screen of "CSIS".

Field Name	Data Type	Length	Format
Invoice ID	AutoNumber	6	999999
Customer ID	Number	6	999999
Employee ID	Number	6	999999
Invoice Date	Date/Time	6	DD/MM/YY
Ship Date	Date/Time	6	DD/MM/YY
PaidAmount	Currency	10	99999999.99
Notes	Memo	50	XXX...

Field Name	Data Type	Length	Format
ReceiptID	Number	6	999999
ReceiptDate	Date/Time	6	DD/MM/YY
PaidAmount	Currency	10	99999999.99



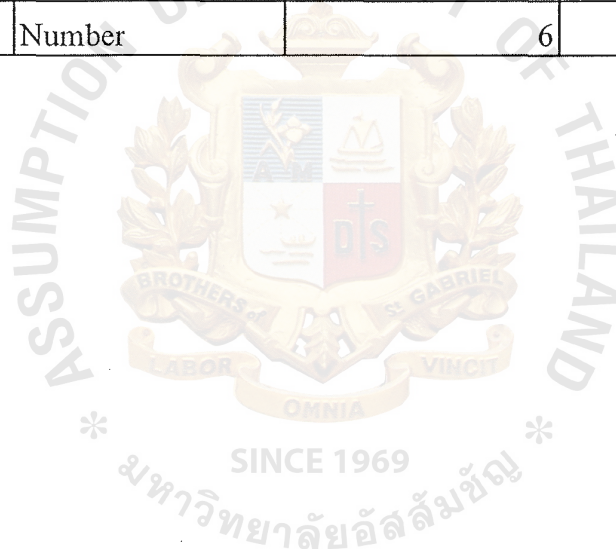
Table G.20. Data Dictionary for "ProductRequest" Screen of "CSIS".

Field Name	Data Type	Length	Format
RequestID	AutoNumber	6	999999
Requested By	Number	6	999999
Acknowledged By	Number	6	999999
CustomerID	Number	6	999999
ProductID	Number	6	999999
ProductName	Text	20	XXX...
Request Date	Date/Time	6	DD/MM/YY
Sale Price	Currency	10	99999999.99
RequestQty	Number	4	9999



Table G.21. Data Dictionary for "Products" Screen of "CSIS".

Field Name	Data Type	Length	Format
Product ID	AutoNumber	6	9999999
Product Name	Text	20	XXX...
Product Description	Text	30	XXX...
Serial Number	Number	8	999999999
Category Name	Text	10	XXX...
Unit Price	Currency	10	99999999.99
Units In Stock	Number	4	9999
Units On Order	Number	4	9999
Reorder Level	Number	4	9999
Supplier ID	Number	6	999999



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Table G.22. Data Dictionary for "PurchaseOrder" Screen of "CSIS".

Field Name	Data Type	Length	Format
Order ID	AutoNumber	6	999999
Supplier ID	Number	6	999999
Requested By	Number	6	999999
Product ID	Number	6	999999
ProductName	Text	20	XXX...
Ordered By	Number	6	999999
Unit Price	Currency	10	99999999.99
Reorder Qty	Number	4	9999
OrderDate	Date/Time	6	DD/MM/YY
Ship Date	Date/Time	6	DD/MM/YY
Arrive Date	Date/Time	6	DD/MM/YY

Table G.23. Data Dictionary for "Quotation" Screen of "CSIS".

Field Name	Data Type	Length	Format
QuotationID	AutoNumber	6	999999
CustomerID	Number	6	999999
EmployeeID	Number	6	999999
ProductID	Number	6	999999
ProductName	Text	20	XXX...
SalesPrice	Currency	10	99999999.99
OrderQty	Number	4	9999
QuoteDate	Date/Time	6	DD/MM/YY
PaymentTerm	Text	30	XXX...
Notes	Memo	50	XXX...



Table G.24. Data Dictionary for "Supplier" Screen of "CSIS".

Field Name	Data Type	Length	Format
Supplier ID	AutoNumber	6	999999
Supplier Name	Text	25	XXX...
Contact Name	Text	15	XXX...
SupSurname	Text	20	XXX...
Title	Text	10	XXX...
Address	Text	30	XXX...
Province	Text	15	XXX...
Postal Code	Number	5	99999
Phone	Number	10	(999)999-9999
Fax	Number	10	(999)999-9999
Payment Terms	Text	30	XXX...
Lead Time	Text	30	XXX...

Table G.25. Data Dictionary for "BestSupplier" Report of "CSIS".

Field Name	Data Type	Length	Format
SupplierName	Text	25	XXX...
ProductID	Number	6	999999
ProductName	Text	20	XXX...
UnitPrice	Number	6	999999

Table G.26. Data Dictionary for "CashDeal" Report of "CSIS".

Field Name	Data Type	Length	Format
Cash Sales ID	AutoNumber	6	999999
ProductID	Number	8	99999999
Description	Text	30	XXX...
Sales Price	Currency	10	99999999.99



Table G.27. Data Dictionary for "CreditCustomer" Report of "CSIS".

Field Name	Data Type	Length	Format
CreditSalesID	AutoNumber	6	9999999
Customer ID	Number	6	9999999
Company Name	Text	25	XXX...
Revenue	Currency	10	99999999.99

Table G.28. Data Dictionary for "CreditDeal" Report of "CSIS".

Field Name	Data Type	Length	Format
CreditSalesID	AutoNumber	6	9999999
Product ID	AutoNumber	6	9999999
Product Name	Text	20	XXX...

Table G.29. Data Dictionary for "DebtorPayments" Report of "CSIS".

Field Name	Data Type	Length	Format
CreditSalesID	Number	6	999999
PaidReceiptID	AutoNumber	6	999999
CustomerID	Number	6	999999
EmpRecID	Number	6	999999
Payment Date	Date/Time	6	DD/MM/YY
Payment Amount	Currency	10	99999999.99

Table G.30. Data Dictionary for "Inventory" Report of "CSIS".

Field Name	Data Type	Length	Format
Product ID	AutoNumber	6	999999
Product Name	Text	20	XXX...
Qty On Hand	Number	4	9999
Reorder Level	Number	4	9999

Table G.31. Data Dictionary for "Invoices" Report of "CSIS".

Field Name	Data Type	Length	Format
Invoice ID	AutoNumber	6	999999
Customer ID	Number	6	999999
Employee ID	Number	6	999999
Invoice Date	Date/Time	6	DD/MM/YY
Ship Date	Date/Time	6	DD/MM/YY
PaidAmount	Currency	10	99999999.99

Table G.32. Data Dictionary for "Product" Report of "CSIS".

Field Name	Data Type	Length	Format
Product ID	AutoNumber	6	999999
Product Name	Text	20	XXX...
Category Name	Text	10	XXX...
Unit Price	Currency	10	99999999.99

Table G.33. Data Dictionary for "ProductRequest" Report of "CSIS".

Field Name	Data Type	Length	Format
RequestID	AutoNumber	6	999999
ProductID	Number	6	999999
ProductName	Text	20	XXX...
RequestQty	Number	4	9999
Sale Price	Currency	10	99999999.99

Table G.34. Data Dictionary for "PurchaseOrder" Report of "CSIS".

Field Name	Data Type	Length	Format
Supplier ID	Number	6	999999
Order ID	AutoNumber	6	999999
OrderDate	Date/Time	6	DD/MM/YY
Product ID	Number	6	999999
Order Qty	Number	4	9999
Unit Price	Currency	10	99999999.99

Table G.35. Data Dictionary for "Quotation" Report of "CSIS".

Field Name	Data Type	Length	Format
QuotationID	AutoNumber	6	999999
CustomerID	Number	6	999999
EmployeeID	Number	6	999999
ProductID	Number	6	999999
ProductName	Text	20	XXX...
OrderQty	Number	4	9999
SalesPrice	Currency	10	99999999.99
QuoteDate	Date/Time	6	DD/MM/YY



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