



Web-based Sales Information System for Furniture Trader

by

Ms. Woraluk Kamolvit

A Final Report of the Six-Credit Course
CS 6998 - CS 6999 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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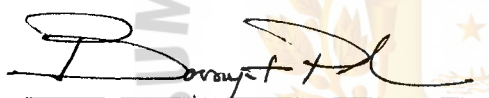
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Academic Year July 20, 2003

The Graduate School of Assumption University has approved this final report of the six-credit course, CS 6998 – CS 6999 System Development Project, submitted in partial fulfillment of the requirements for the degree of Master of Science in Computer Information Systems.

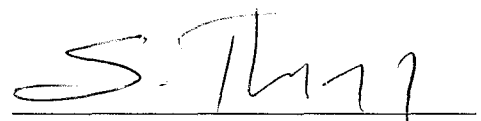
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ABSTRACT

Krue Thai Furniture Co., Ltd. was established on 1997. The major business is related to the selling of furniture and home accessories. Since the beginning of this business, the company has a small group of customers. The existing system of Krue Thai Furniture Co., Ltd. is a manual system.

While the company is growing, and has a higher number of customers, the data as well as number of daily transactions is also growing constantly. It was realized that the manual sales processing that they are using, is alone not enough. Thus, a Web-based Sales Information System is developed in the hope of increasing efficiently and reliably to serve the needs of their customers.

The proposed system uses Microsoft Access 2000 to create a database system and uses Active Server Pages of Microsoft that is a server-side scripting technology for building web pages. The user interfaces are implemented on a web browser. The web site design concepts are user friendly and easy to do payment. It provides facilities to the customer and increases efficiency of the system.

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I. INTRODUCTION

1.1 Background of the Project

Internet technology is creating a universal technology platform for buying and selling goods and for driving important business process. It has inspired new ways of organizing, managing and transforming businesses and the use of information systems in everyday life. Many companies are starting to use the web sites to communicate with their customers. The web site can help companies to provide the information of the products or service at a much lower cost than traditional companies.

Krue Thai Furniture Co., Ltd. was established on 1997. Its major business is related to the selling of furniture and home accessories. Since the beginning of this business, it has our small group of customers. The existing system of Krue Thai Furniture Co., Ltd. is a manual one.

While the company has been growing, the company has higher number of customers; the amounts of data as well as the number of transactions per day have also grown. The manual sales processing is found to be insufficient to cope with present business atmosphere. Thus, the web site online is developed with the hope of increasing to serve the needs of customers both efficiently and reliably.

The Krue Thai Furniture web site will help by providing an ordering system, inventory information, reduce redundant processes, manage customer information, and impress them with new service and technology.

1.2 Objectives of the Project

The objectives of developing the Web-based Sales Information System for Krue Thai Furniture Co., Ltd. of this project are as follows:

- (1) To study the existing system of selling furniture and home accessories to understand the current system and to analyze the current problems and user requirement.
- (2) To study the strategies of selling the furniture and home accessories online via the Internet.
- (3) To design and implement the new Web-based Sales Information System that solves the current problems and supports a user-friendly interface.
- (4) To increase performance, efficiency and effectiveness of the new system.
- (5) Provide management information to be able to plan and make the right decisions.

1.3 Scope of the Project

The project will develop a web site on the Internet that has a graphic user interface (GUI) base on client/server architecture. Web sites will be available to consumers 24 hours a day thus bringing many new benefits and opportunities to the system.

The Web-based Sales Information System consist of many functions including:

- (1) Catalogs Online: Customer can access information of the products available from the web site and receive new promotions via email.
- (2) Ordering System: Customer can order products from the web site. After the customer submits their order, the system will then send an email to confirm the customer order.
- (3) Payment Method: Customer can select either bank transfer form or online credit card as that payment method.

- (4) Customer Information: Customer can edit their profile directly.
- (5) Inventory Management: Administrator can manage the inventory directly from the back end system.
- (6) Management Information: The new system will automatically generate reports that support the manager's requirements.

1.4 Deliverables

The deliverables of the project are as follows:

- (1) Screen layout for the customer
 - (a) Customer registration
 - (b) Customer login
 - (c) Catalogs online
 - (d) Ordering form
 - (e) Payment method
 - (f) Promotion products
- (2) Screen layout for back office
 - (a) Administrator login
 - (b) Inventory status report
 - (c) Product report
 - (d) Customer report
- (3) Design and implementation of automatically system
 - (a) The system will generate numerous reports such as a report of daily and monthly sale, a customer report etc.
 - (b) The information will be kept in the database automatically.

1.5 Project Plan

This project has been set up since March 2003 and has 4 steps. First, the analysis of the existing system takes three weeks. Second, the new system analysis takes three weeks. Third, to design the new system and model takes one month and the last step is test and install the system that takes approximately one month and three weeks. The system development plan is presented in Gantt chart in Figure 1.1.



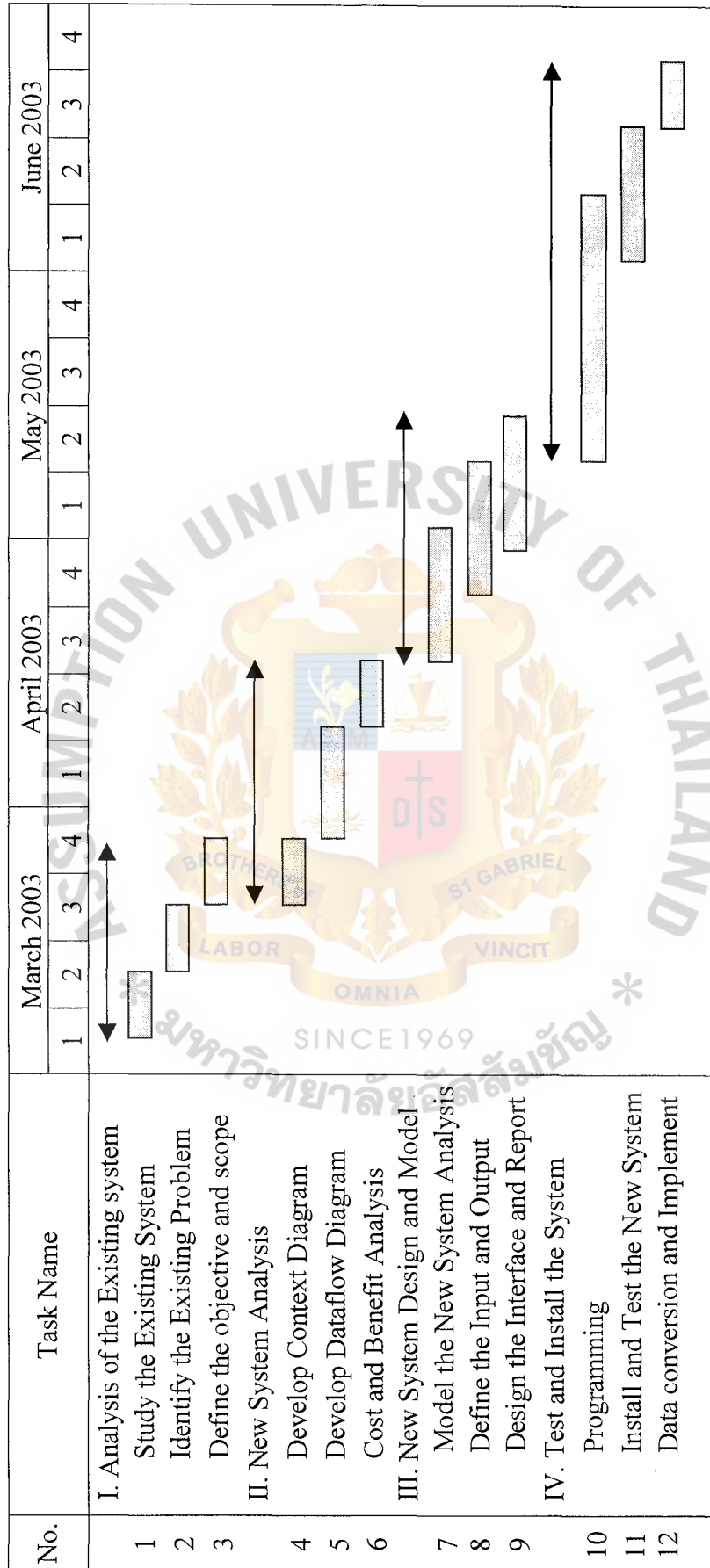


Figure 1.1. Project Plan of Web-based Sales Information System.

II. THE EXISTING SYSTEM

2.1 Background of the Organization

Krue Thai Furniture Co., Ltd. was established on 1997 with the registered capital of 500,000 baht. The company is a high quality line of contemporary furniture and classical home furnishings located in Changmai province, Thailand. The major business is related to selling furniture for the living room, dining/ kitchen, bedroom, home office, chair / sofa, home accessory and bath utility. The furniture is made from wood and all our lines are very clean and simple. The company policy is work something out that will make customers very happy. The company has staffs to take care of our customers with quality, price and delivery. The company is divided into three departments. Organization chart of Krue Thai Furniture Co., Ltd. is shown in Figure 2.1.



Figure 2.1. Organization Chart of Krue Thai Furniture Co., Ltd.

- (1) Merchandise Department
 - (a) Purchasing Section: Gives purchase orders to supplier for the merchandises to be bought.
 - (b) Warehouse Section: Controls inventory process and informs purchasing section when the stock is at a minimum.
 - (c) Shipping Section: Is responsible to deliver the products to customers.
- (2) Sales and Marketing Department
 - (a) Take care of customer information.
 - (b) Responsible for the order processing and order confirmation with the customer.
 - (c) Create new promotions campaign and inform the customer.
 - (d) Monitor trends of market.
- (3) Accounting Department
 - (a) Handle the expense transactions of the company.
 - (b) Take care of salary and tax of all employees.
 - (c) Send out invoice to the customer.
 - (d) Responsible for customer payment transaction.

The flow of process in each department is shown in Figure 2.2.

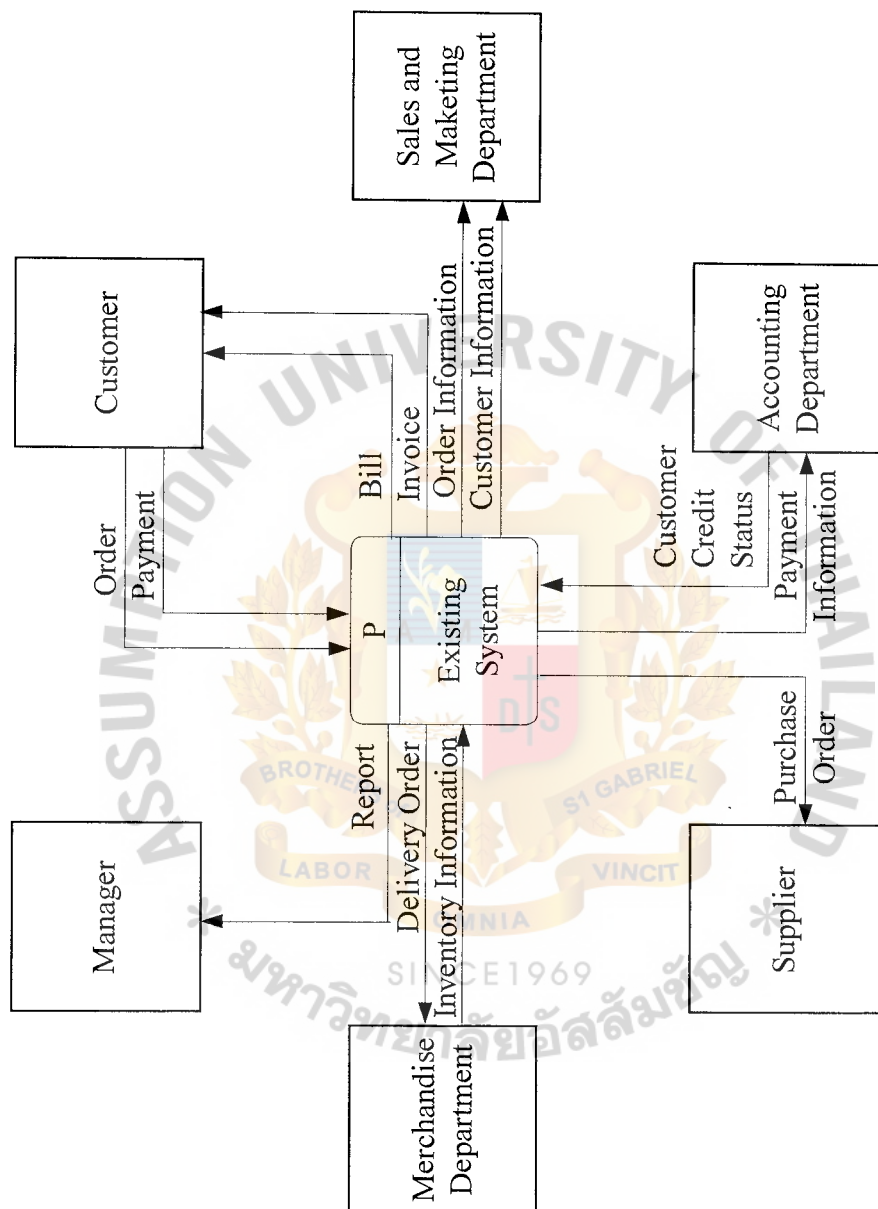


Figure 2.2. Context Diagram of Existing System.

2.2 Existing Business Function

The existing system of Krue Thai Furniture Co., Ltd. is to run all processes manually. The processes are as follows:

- (1) The customers receive information of products via brochures or leaflets.
- (2) The customers can place an order with the sales staff in sales and marketing department.
- (3) The sales staff takes note of the order and checks available product at the warehouse section.
- (4) If the products are available, the staff will confirm the order to the customer and send the order to the accounting department to generate an invoice.
- (5) If the products are not available, the staff will inform the purchasing section to issue a purchase order for the merchandise.
- (6) The warehouse section updates the balance of stock.
- (7) The shipping section prepares and sends out products to the customer.
- (8) The accounting department is responsible for customer payment, and for sending out bills to the customer.

2.3 Current Problems and Area for Improvement

Krue Thai Furniture Co., Ltd. focuses on selling furniture. All the systems are still manual systems. The company has found many problems from the existing system. The problems are as follows:

- (1) The balances of stock are not correct and they spend a lot of time in stock updating and inventory report generating.
- (2) The order process has too high response time.
- (3) Lack of updated information such as customer information, product and price information and new promotion.

- (4) Manual system has no security, which means that information can be lost without cause.
- (5) Data may be inconsistent because data is kept in different departments.
- (6) Consumes human resources and paper.

The company will change from existing system to the new systems. The areas of improvement are as follows:

- (1) Web site is the way to enhance the company and reduce response time of the sales and order process.
- (2) Catalogs online can help get information to the customer and is available to consumers 24 hours a day.
- (3) Order online provides facilities to the customer such as: - customer can place the order anywhere and anytime, reduce steps to place an order and reduce paper form to order.
- (4) Payment online allows the customer to pay for product, more easily and ensure the information is quickly and securely authorized and processed.
- (5) Inventory management can increase effectiveness in controlling and managing by minimizing delay time in the process.
- (6) Generate automatic report can provide necessary report for manager for planning and decision-making.

III. THE PROPOSED SYSTEM

After studying the existing system there are many problems. Therefore, the proposed system will be developed to use Internet technology so that it can also be applied to the internal management of the sales and marketing department. The new system has a website that needs to be concerned with the back end and the front end of the business. All data is kept in the database and the network environment is set as Two-Tier Client/Server Architectures connected by Local Area Network (LAN) that is coordinating the activities of the company.

3.1 System Specifications

The system specifications of the proposed system are as follows:

- (1) Input/Output for front end
 - (a) The system must have login page to verify only authorized customer.
 - (b) The system must have registration page for new customer to join as a member, and the member can edit their profile.
 - (c) The system must check and validate data input from customers such as:- email address, credit card number etc.
 - (d) The system must have a view cart page and calculate the total amount of products automatically.
 - (e) The system must have payment online page that the customers can select payment method themselves.
 - (f) The system must be confirming an order via email when the customer submits the order.
 - (g) The system must have search engine to help the customer find information of product easily.

- (h) The system must have customer service to help the customer connect with company by email when they have a problem.
- (2) Input/Output for back end
 - (a) The system must have login page for back end staff.
 - (b) The system must allow back end staff to add, update and delete information of the product.
 - (c) The system must show transactions and current stock of each sold product.
 - (d) The system must have purchase order form to purchase order to the suppliers.
 - (e) The system must generate daily, weekly and monthly reports that the staff and manager request.

3.2 System Design

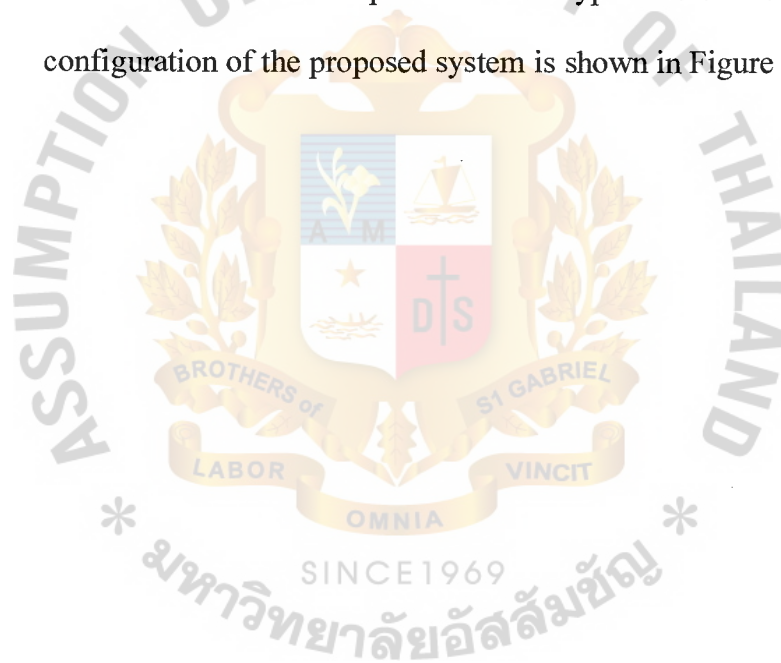
(1) Network Design

A network environment is set as Two-Tier Client/Server computing that means the data and data manipulation layers are placed on the server and the application logic, presentation logic and presentation are placed on the clients.

Two-Tier Client/Server computing solutions offer several advantages such as much less network traffic because only the database requests and the database record that are needed are actually transported to and from the client workstations, database integrity is easier to maintain because only the records in use by a client must typically be locked. Therefore other clients can simultaneously work on other records in the same table or database.

For the topologies for LANs, it uses Star Topology where each station is directly connected to a common central node. The central element of the star is an active element, referred to as the hub. In a Star, each device needs only one link and one I/O port to connect it to any number of others. This factor also makes it easy to install and reconfigure.

Other advantages include robustness. If one link fails, only that link is affected. All other links remain active. This factor also lends itself to easy fault identification and fault isolation. As long as the hub is working, it can be used to monitor link problems and bypass defective links. The network configuration of the proposed system is shown in Figure 3.1.



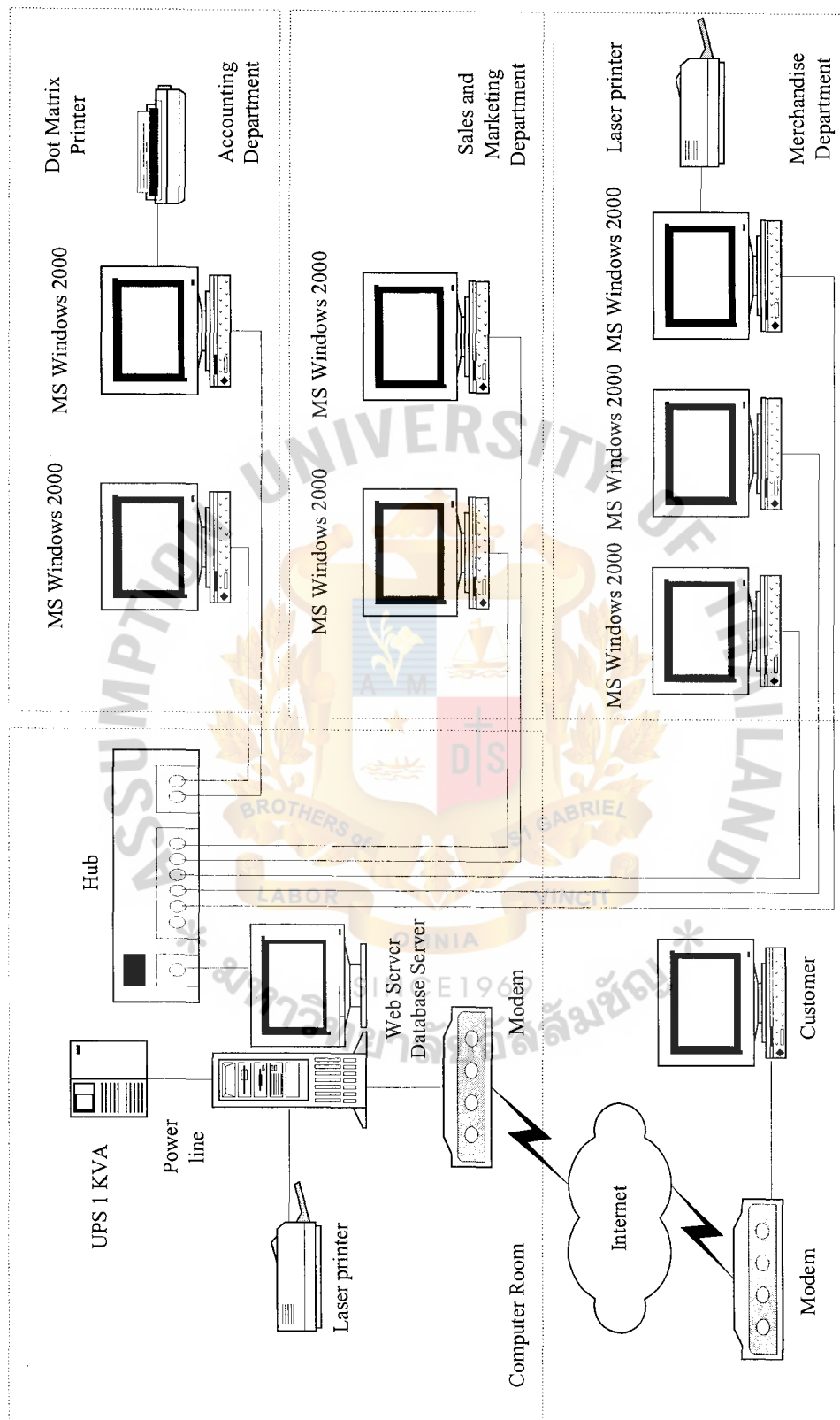


Figure 3.1. The Network Configuration of Web-based Sales Information System.

(2) Process Design

The process design of the proposed system is divided into six processes that the details are as follows:

(a) Check Customer

When the customer visits the web site, the system must verify the customer. As for new customers, the web page contains a registration page to enter information about the customers into the database. The new customers have to fill in two parts; these are customer information, and shipping information. For existing customers, they must enter their login and password to allow authorized access to order the product.

(b) Order Product

After a customer has logged in, they can order a product by clicking add to cart button that show in each page of product or customer can enter the number of product directly. The Web-based Sales Information System will check available product. If, the product is available, the system will receive the order and show the products in cart including calculating the total payment.

(c) Verify Payment

Customers can select the payment method by themselves. The system has two choices for payments; these are credit card and bank transfer form. After that the system will send confirmation order and delivery date to the customer by email.

(d) Prepare Delivery Product

The system will generate a delivery order and bill and send to the shipping section of merchandise department to perform the delivery of the product to the customer.

(e) Update Stock

The warehouse section of merchandise department performs an update of stock when the product purchased or sold.

(f) Generate Report

The system will generate reports and send them to the manager for planning and decision-making.

To understand the process design, this project uses a Context Diagram to describe the processes of the business and use a Data Flow Diagram to describe data in and data out of each the processes. The Context Diagram is shown in Figure 3.2 and the Data Flow Diagram is shown in Figures 3.3. - 3.9.

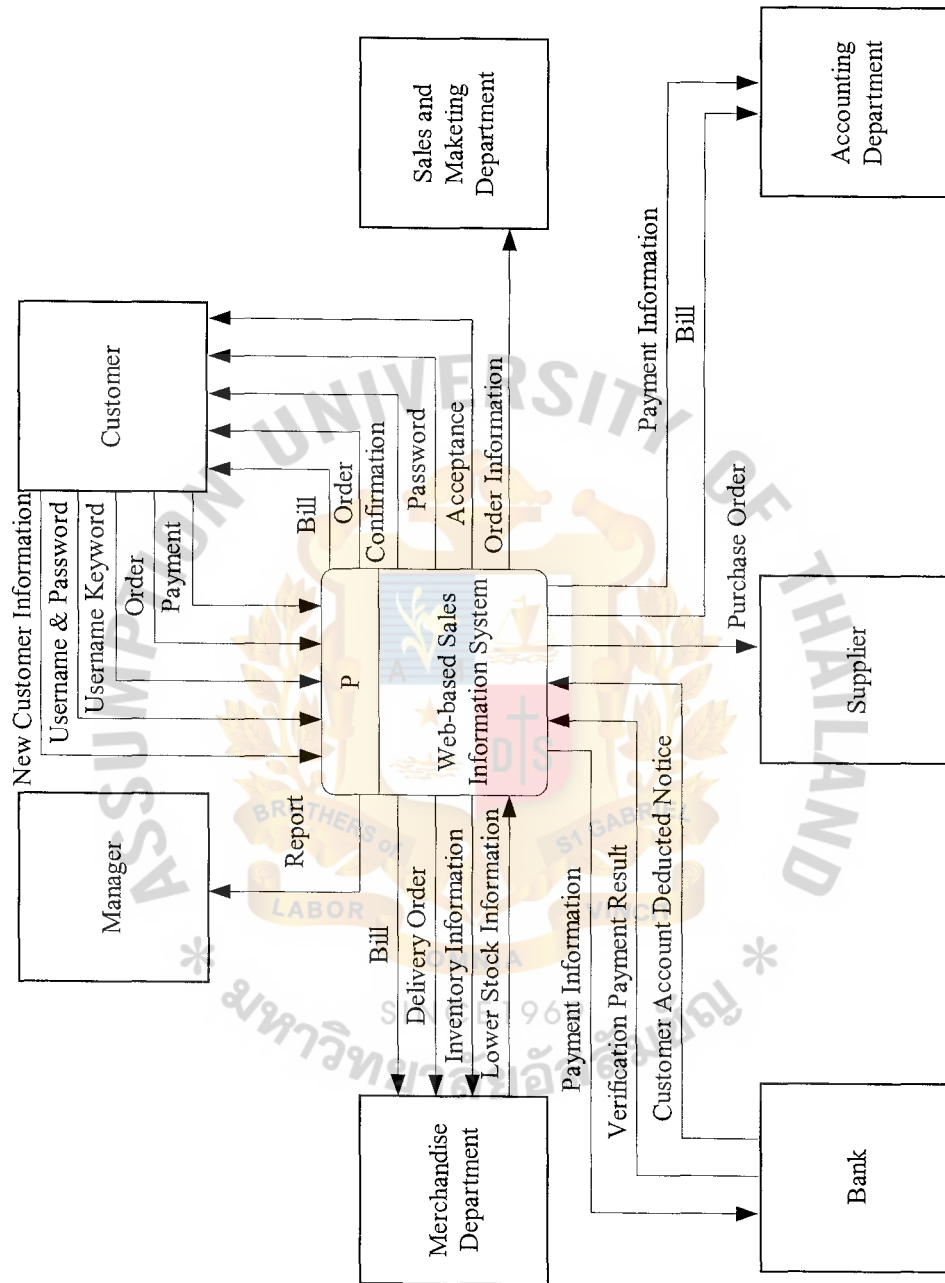


Figure 3.2. Context Diagram of Proposed System.

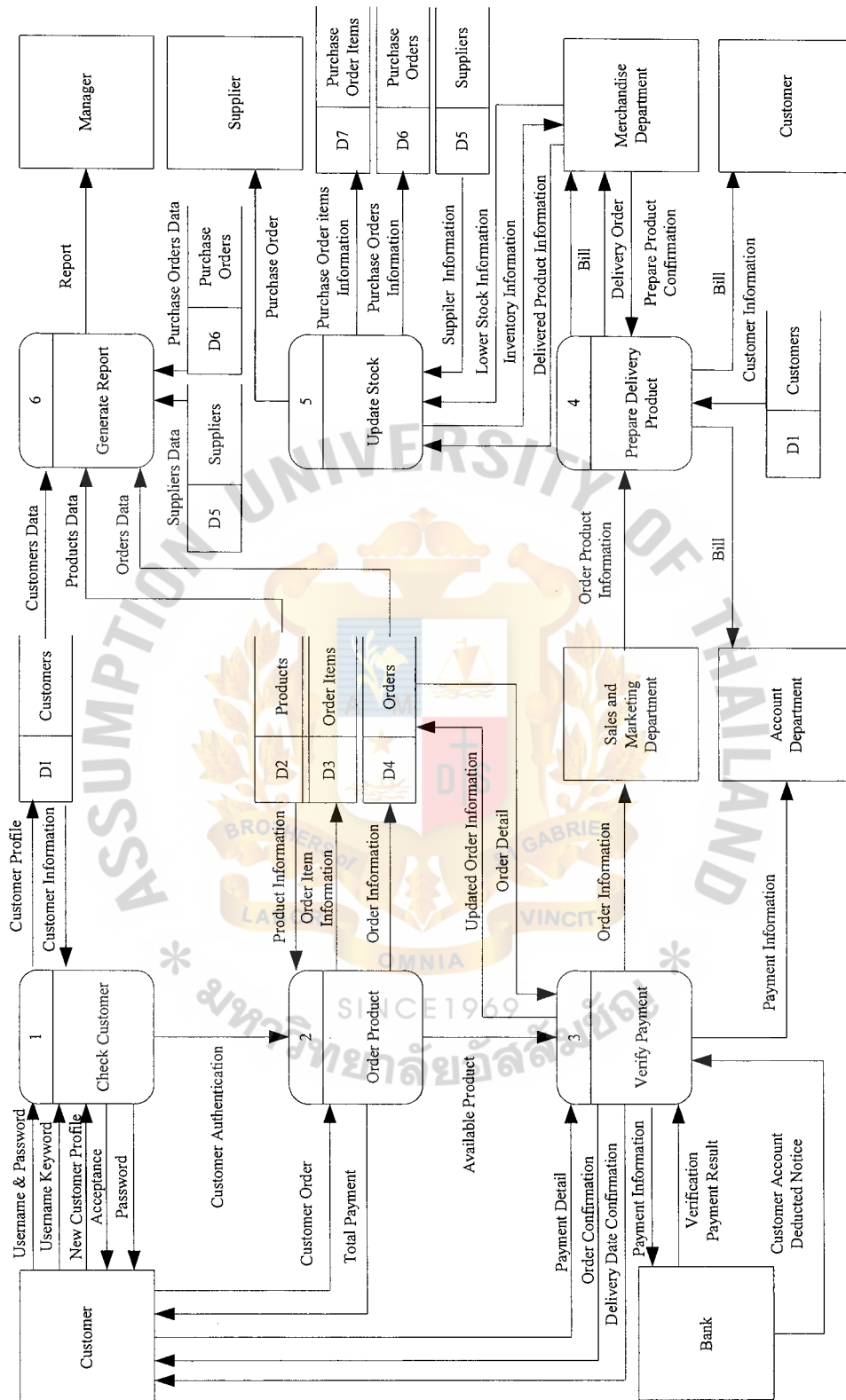


Figure 3.3. Level 0 Logical Data Flow Diagram of Web-based Sales Information System.

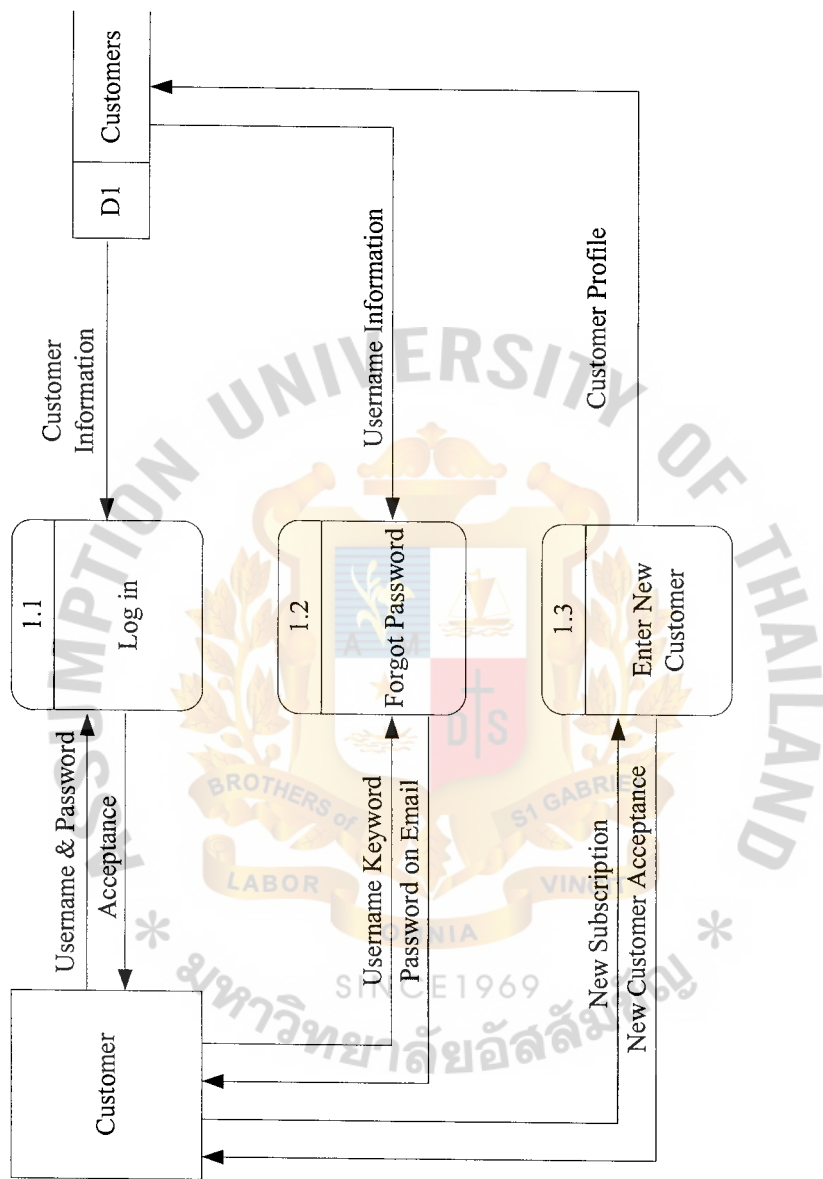


Figure 3.4. Level 1 Logical Data Flow Diagram of Check Customer.

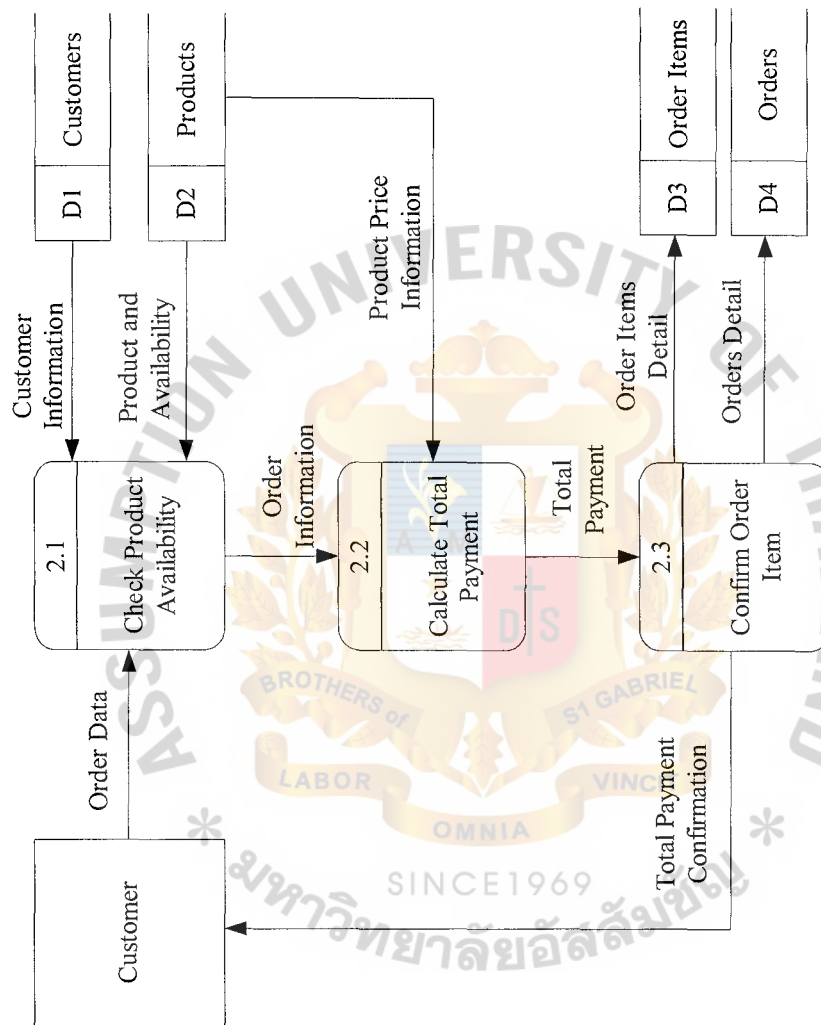


Figure 3.5. Level 1 Logical Data Flow Diagram of Order Product.

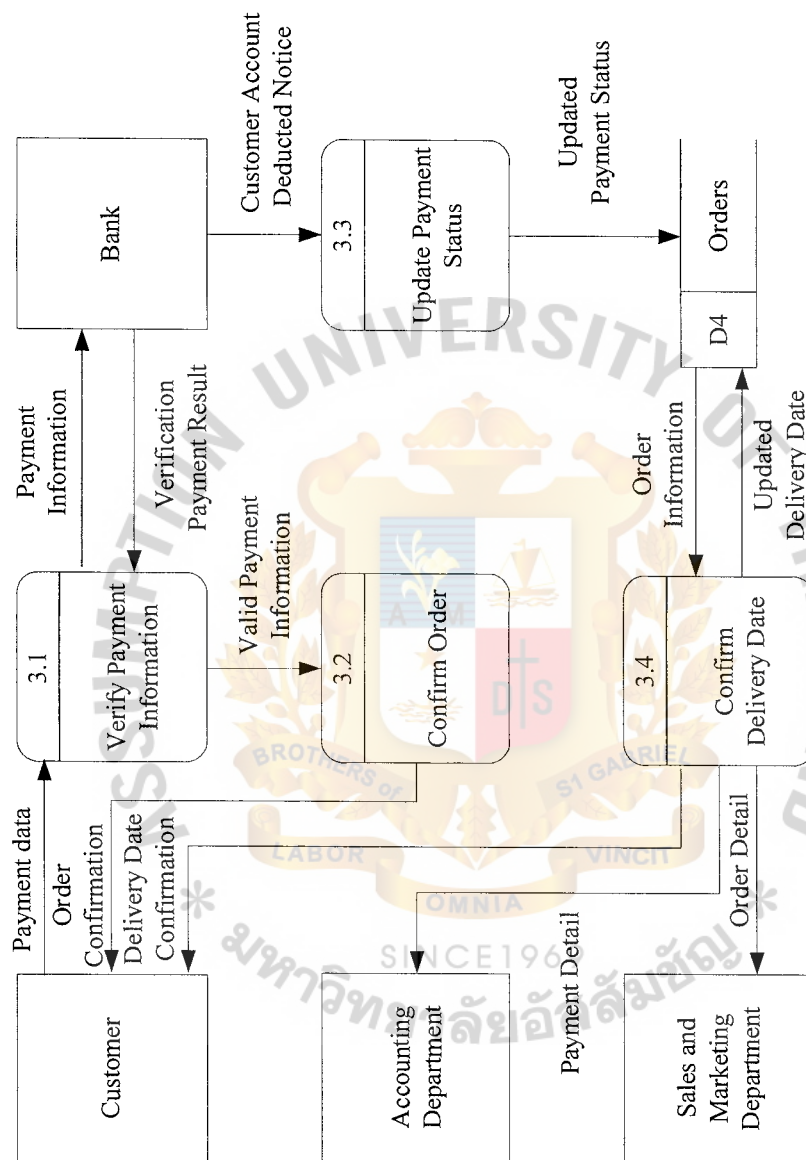


Figure 3.6. Level 1 Logical Data Flow Diagram of Verify Payment.

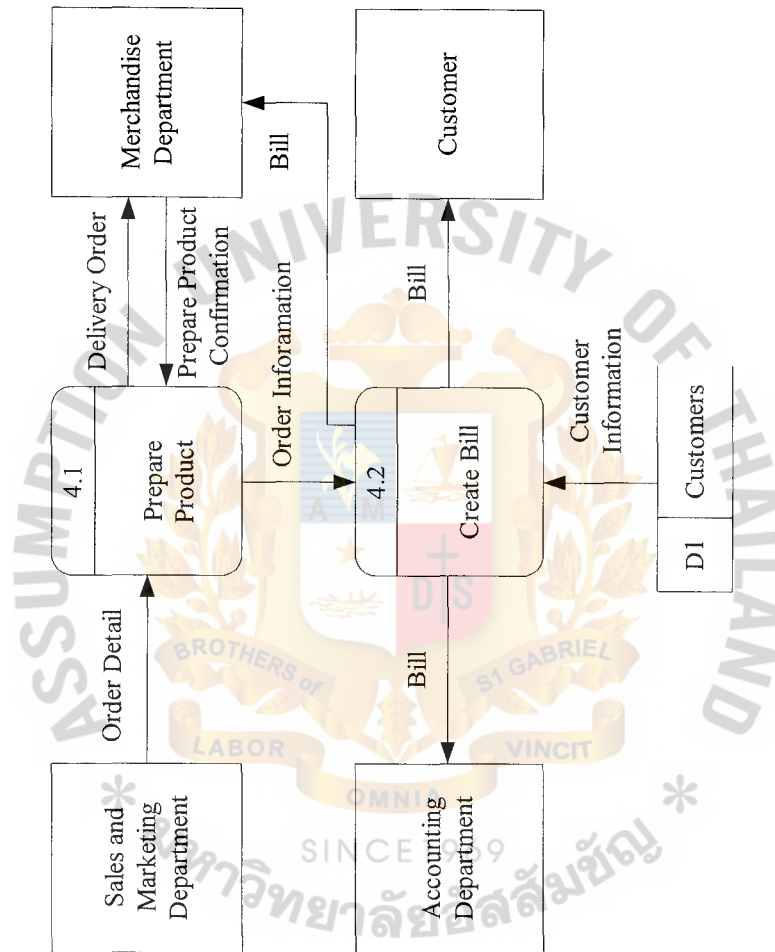


Figure 3.7. Level 1 Logical Data Flow Diagram of Prepare Delivery Product.

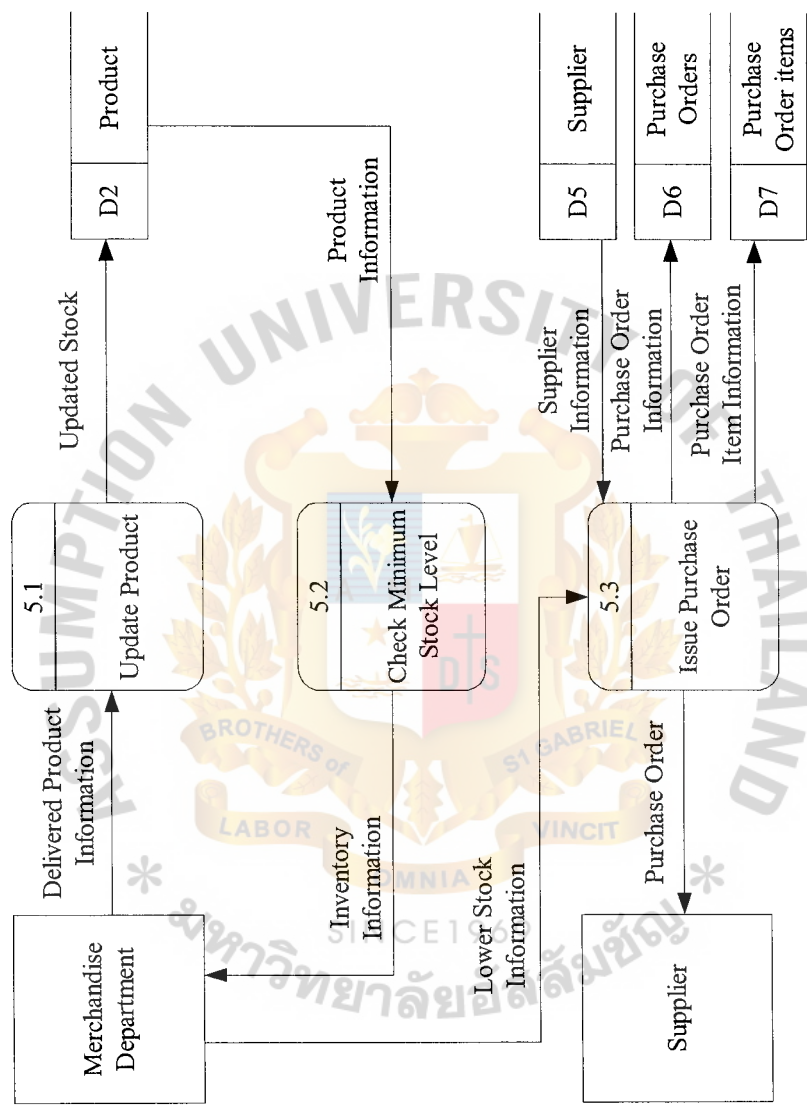


Figure 3.8. Level 1 Logical Data Flow Diagram of Update Stock.

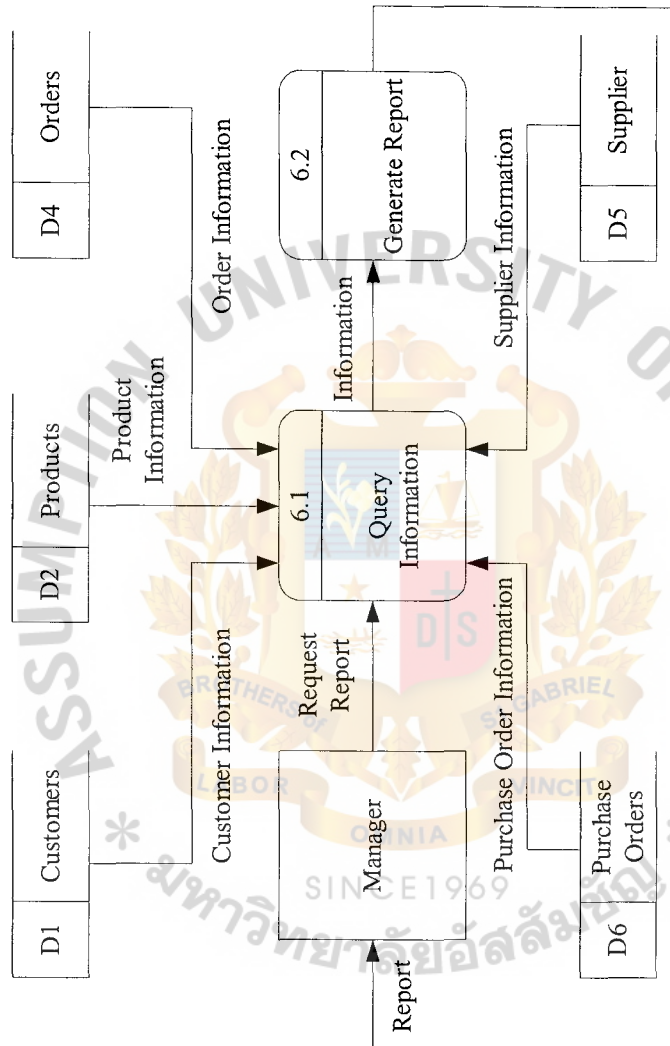


Figure 3.9. Level 1 Logical Data Flow Diagram of Generate Report.

(3) Database Design

The database designs are as follows:

- (a) A database should provide for the efficient storage, update and retrieval of data.
- (b) A database should be reliable, this means that the stored data should have high integrity to promote the user to trust that data.
- (c) A database should be adaptable and scalable to new and unforeseen requirements and applications.

For efficiency of database design, the normalization technique is used in this project that places the data model into first normal form, second normal form, and third normal form. Furthermore, Entity Relationship Diagram (ERD) be used for describing the database relationship of each table and the details which shown in Figures 3.10. - 3.12.

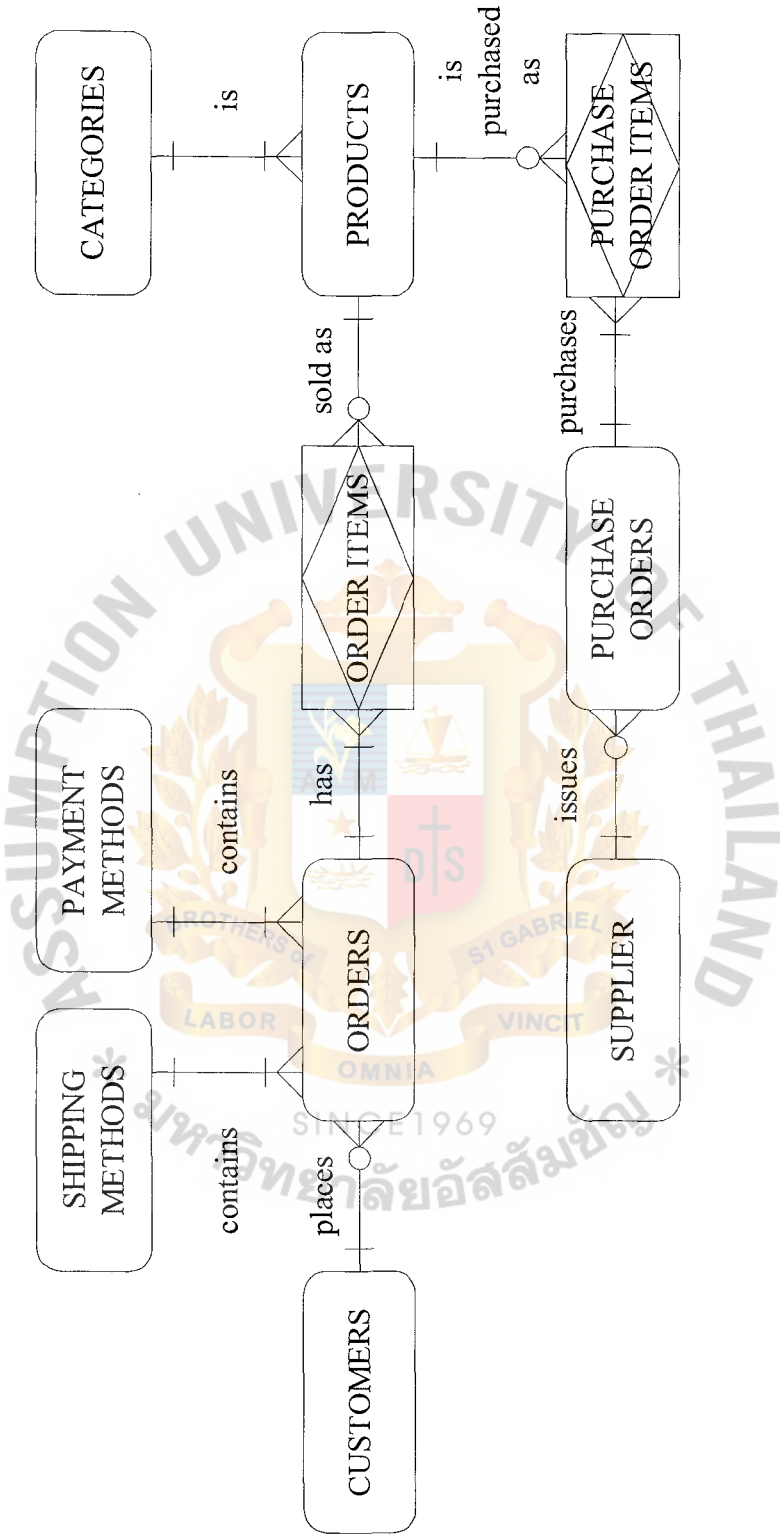


Figure 3.10. Context Data Model of Entity Relationship Diagram.

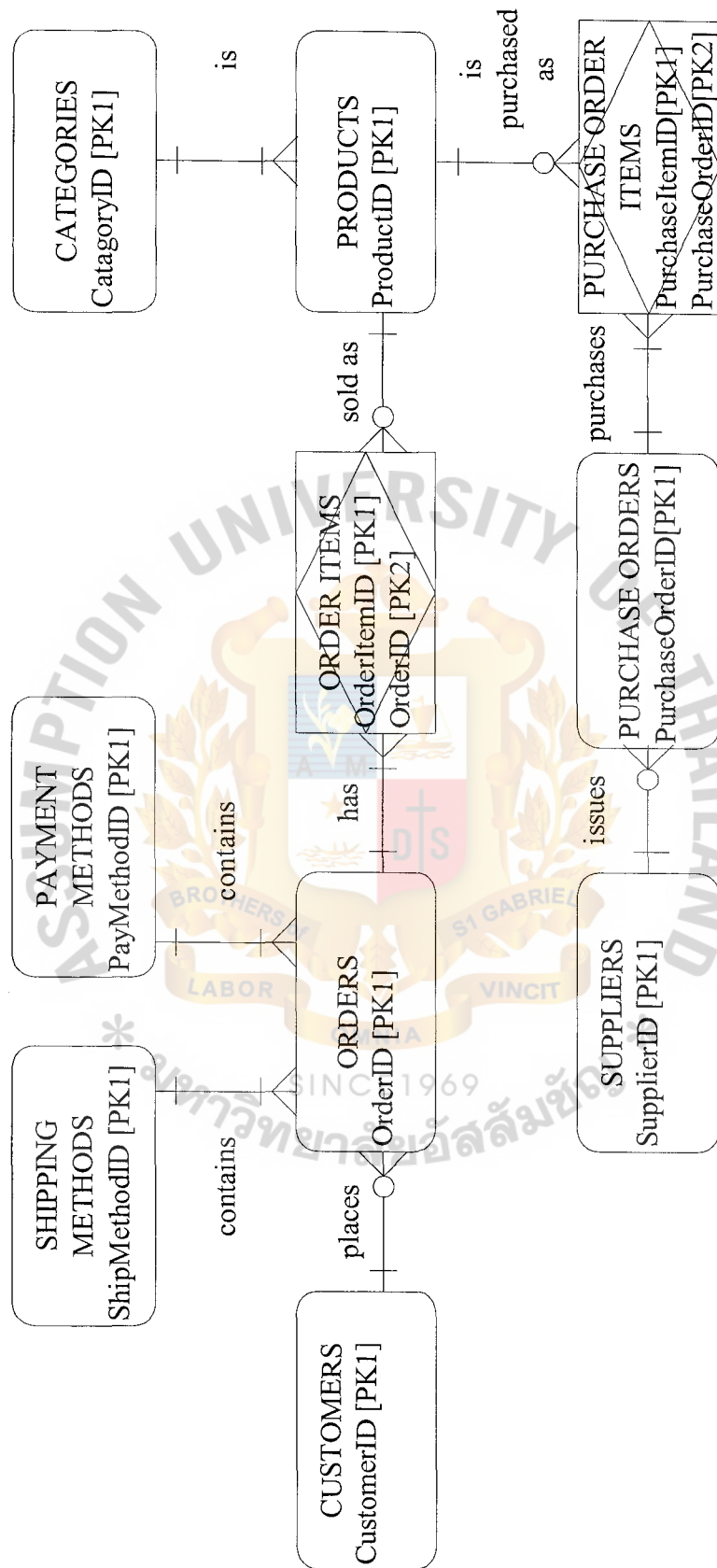


Figure 3.11. Key-based Data Model of Entity Relationship Diagram.

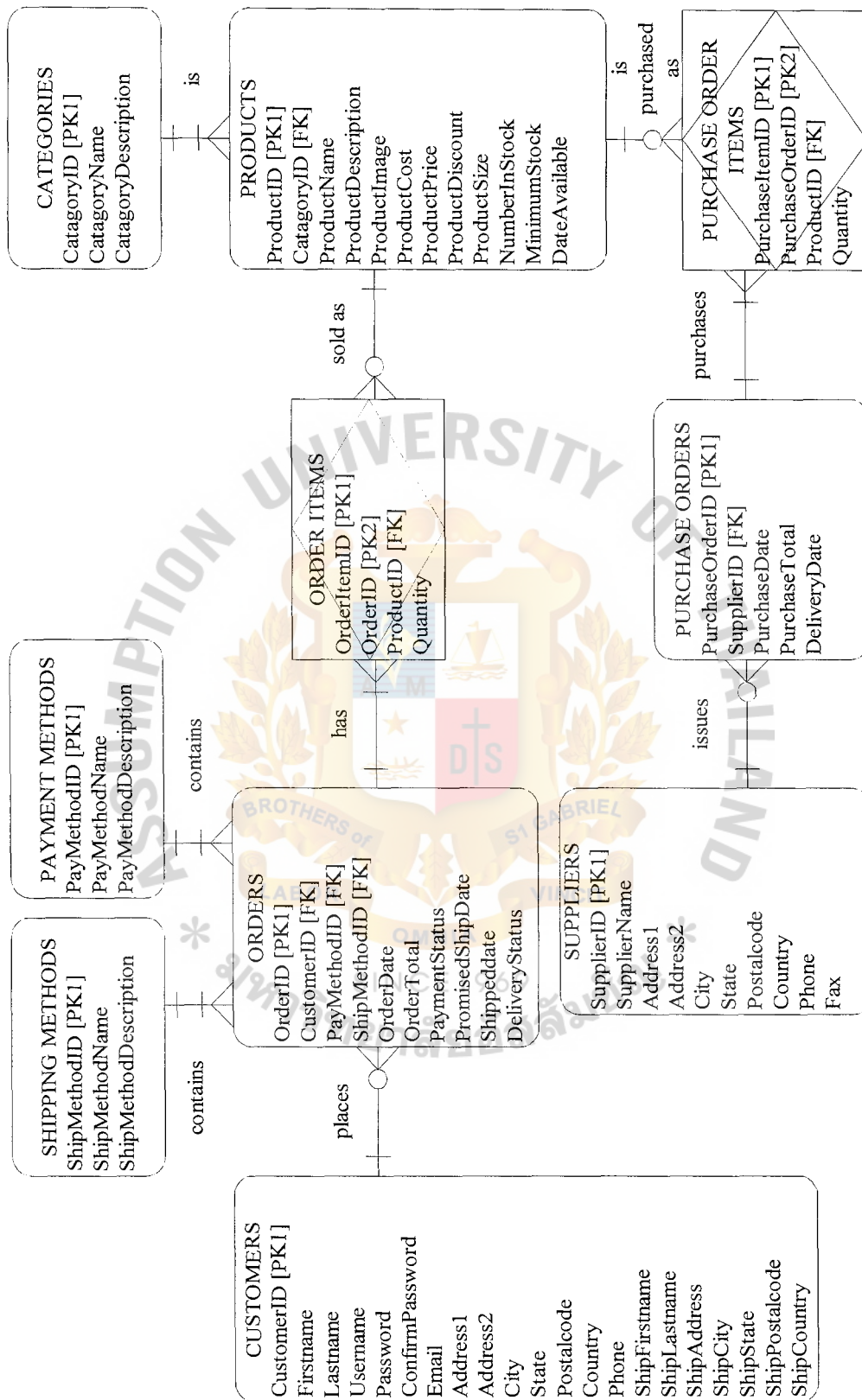


Figure 3.12. Fully Attributed Data Model of Entity Relationship Diagram.

(4) Structured Design

Structured design is a process-oriented technique for breaking up a large program into a top-down hierarchy of modules that result in a computer program that is easier to implement and maintain. The structured designs of the system are shown in Appendix D.

(5) User Interface Design

Most of today's user interfaces are graphical. This project realizes to this point so the structure of the Graphical User Interface (GUI) is the one of important thing that is developed in this project. The user interface is implemented with the PC's Web browser such as Microsoft Internet Explorer and Netscape Navigator. The concepts of the web site are simple and user friendly. The user interface designs are shown in Appendix F.

3.3 System Analysis

After the system diagrams are completed, the candidate solution for the proposed system must be identified. Each solution is shown as follows:

(1) Candidate Solution Analysis

There are three alternative candidates for proposed system. Each candidate has a different cost and has its own application development tools and database management system shown as follows:

(a) Candidate 1: PHP and MySQL

Professional Homepage (PHP) is a widely used general-purpose scripting language that is especially suited for Web development and can be embedded into HTML. In this case, the system will want to install an Apache web server with PHP support on Windows operating

system. The system will most likely want to install a database as well such, as MySQL.

(b) Candidate 2: JSP and Oracle 9i

Java Server Pages technology (JSP) 2.0 provides a simplified, fast way to create dynamic web content. JSP technology enables rapid development of web-based applications that are server and platform independent. The system will want to install an Apache web server run on Windows operating system and use Oracle 9i database.

(c) Candidate 3: ASP and Microsoft Access 2000

Using Microsoft Active Server Page (ASP) 3.0 technology to rapidly develop and easily maintain information-rich, dynamic web pages, which will run on Microsoft Internet Explorer 6.0. For DBMS, Microsoft Access 2000 is selected because it is an easy to use and has a standard DBMS for Windows platform.

The candidate systems matrix is shown in Table 3.1.

Table 3.1. The Candidate System Matrix.

Characteristics	Candidate 1	Candidate 2	Candidate 3
Brief Description of Candidate Systems: Brief Description of the candidate systems, which are considered in this analysis.	PHP and MySQL	JSP and Oracle 9i	ASP and Microsoft Access 2000
Portion of System Computerized: Brief description of that portion of the system that would be computerized in this candidate.	Fully supports user required business processes plus possibility of high customization.	Fully supports user required business processes plus possibility of high customization.	Fully supports user required business processes plus possibility of high customization.
Benefits: Brief Description of the business benefits that would be realized for this candidate.	This solution can be implemented quickly and with little risk.	Same as Candidate 1.	Application development and Implementation is east with fast learning time.
Servers and Workstations: A description of the servers and workstations needed to support this candidate.	Server: 2.66 GHz INTEL Pentium 4 Processor PC: 2.4 GHz INTEL Pentium 4 Processor	Server: 2.66 GHz INTEL Pentium 4 Processor PC: 2.4 GHz INTEL Pentium 4 Processor	Server: 2.66 GHz INTEL Pentium 4 Processor PC: 2.4 GHz INTEL Pentium 4 Processor
Software Tools Needed: Software tools needed to design and build the candidate Not generally applicable if applications software packages are to be purchased.	Windows 2000 Server Windows 2000 Apache Web Server Internet Explorer 6.0 PHP MySQL	Windows 2000 Server Windows 2000 Apache Web Server Internet Explorer 6.0 JSP 2.0 Oracle 9i	Windows 2000 Server Windows 2000 Internet Information Services 5.0 Internet Explorer 6.0 ASP 3.0 Microsoft Access 2000
Application Software: A description of the software to be purchased, built, accessed, or some combination of these techniques.	Custom Solution.	Same as Candidate 1.	Same as Candidate 1.
Method of Data Processing: Generally some combination of: online, batch, deferred batch, remote batch, and real-time.	Client/Server.	Same as Candidate 1.	Same as Candidate 1.
Output Devices and Implications: A description of output devices that would be used, special output requirements.	Display monitor Laser printer	Same as Candidate 1.	Same as Candidate 1.
Input Devices and Implications: A description of input methods to be used input special, input requirements and input considerations.	Keyboard Mouse	Same as Candidate 1.	Same as Candidate 1.
Storage Devices and Implications: Brief Description of what data would be stored, what data would be accessed from existing stores, what storage media would be used, how much storage capacity would be needed, and how much data would be organized.	MySQL DBMS with 80GB arrayed capacity.	Oracle DBMS with 100GB arrayed capacity.	Microsoft Access DBMS with 80 GB arrayed capacity.

(2) Feasibility Analysis

After alternative candidates are identified, the feasibility of each candidate is then analyzed. The following are the four criteria for evaluating the feasibility of each solution.

(a) Operational feasibility

It is measure of what degree the candidate would benefit the company and how well the system would work. All candidates are considered to have very good operational feasibilities because they do not depend on platform, easy to publish for future expansion. Candidate 2 can satisfy user requirement better than other solutions because it has a lot features for the web and it is a good DBMS. Operational feasibility has also been given a weight of 20%.

(b) Technical feasibility

It is a measure of the practicality of a specific technical solution and the availability of technical resource and expertise. Candidate 1 and 2 is the most difficult to implement because the current staffs have not experience about its development tool, whereas candidate 3 are easy to design and implement because the development tool is a standard for Microsoft Windows platform. Technical feasibility has also been given a weight of 30%.

(c) Schedule feasibility

It indicates whether the solution can be designed and implemented within an acceptable period or not. Candidate 1 takes five months to develop and implement, candidate 2 takes six months to develop and implement and candidate 3 takes only four months to

develop and implement. Schedule feasibility has also been given a weight of 20%.

(d) Economic feasibility

It identifies whether the solution is cost effective or not. Candidate 2 is the most expensive solution because it requires a database specialist and a powerful hardware to implement and maintain it. In the other hand, Candidate 1 and 3 require only a medium hardware and system analyst to design and implement. Economic feasibility has also been given a weight of 20%.

The weight scores of each feasibility criteria are summed up for each candidate to rank the candidate solution of the proposed system. Candidate 3 is the most suitable alternative for the proposed system, because it takes the lowest development time and cost with acceptable performances. The feasibility analysis matrix is shown in Table 3.2.

Table 3.2. The Feasibility Analysis Matrix.

Characteristics	Wt.	Candidate 1	Candidate 2	Candidate 3
Brief Description of Candidate Systems: Brief Description of the candidate systems, which are considered in this analysis.		PHP and MySQL	JSP and Oracle 9i	ASP and Microsoft Access 2000
Operational Feasibility: Functionality - A description of to what degree the candidate would benefit the organization and how well the system would work. Political - A description of how well received this solution would be from user management, user, and organization perspective.	30%	Fully supports user-required functionality. Score: 90	Fully supports user-required functionality, plus has additional functionality. Score: 100	Same as Candidate 1. Score: 90
Technical Feasibility: Technology - An assessment of the maturity, availability (or ability to acquire), and desirability of the computer technology needed to support this candidate. Expertise - An assessment of the technical expertise needed to develop, operate, and maintain the candidate system.	30%	MySQL and PHP are matured technology. MySQL is a company standard for database application but PHP is open source code that makes its difficult to development because of not standard for application. Score: 85	Oracle is the leading database software that high efficiency. But the staffs have not experience with oracle product therefore they will require the continuous training course for operating and maintaining the system. Score: 70	Microsoft Access 2000 is the simplest way to develop database. ASP is a generally accepted technology in developing application with Microsoft product and Internet Explorer is available in all company. Score: 95
Economic Feasibility: Cost to Develop Payback Period Net Present Value Return-on-Investment Analysis Detailed Calculations	30%	Approximately 722,098.00 Approximately 3 years Approximately 3,845,731.97 Approximately 35 % See Appendix E Score: 95	Approximately 2,255,545.00 Approximately 4.1 years Approximately 1,546,713.97 Approximately 12 % See Appendix E Score: 75	Approximately 622,098.00 Approximately 2.53 years Approximately 4,386,991.03 Approximately 42 % See Appendix E Score: 100
Schedule Feasibility: An assessment of how long the solution will take to design and implement.	20%	Approximately 5 months. Score: 85	Approximately 6 months. Score: 80	Approximately 4 months. Score: 90
Ranking	100%	88.75%	81.25%	93.75%

3.4 Hardware and Software Requirements

The Internet is perhaps the most well known, and the largest, implementation of networking, linking hundreds of thousands of individual networks all over the world. Even today individuals cannot connect directly to the Internet although anyone with a computer, a modem, and the willingness to pay a small monthly usage fee can access it through an Internet Service Provider. An Internet Service Provider (ISP) is a commercial organization with a permanent connection to the Internet that sells temporary connections to subscribers.

The Internet is based on client/server technology. Individuals using the Internet control what they do through client applications such as Web browser software. All the data, including web pages are stored on servers. A client uses the Internet to request information from a particular Web server on a distant computer and the server sends the requested information back to the client via the Internet.

Web server software receives requests for a Web page from the client and accesses the Web pages from the disk where they are stored. Web servers can also access other information from an organization's internal information system and their associated databases and return that information to the client in the form of Web pages if desired. Specialized middleware, including application servers, is used to manage the interactions between the Web server and the organization's internal information systems for processing orders, maintaining product catalogs and other electronic commerce function.

This project was developed by Microsoft Active Server Page 3.0 (ASP) to create the web page, and use Microsoft Internet Explorer 6.0 as a web browser. The hardware and software specifications for the Web-based Sales Information System are shown in the Tables 3.3. – 3.9.

Table 3.3. The Hardware Specification for the Server.

Hardware	Specification
CPU	2.66 GHz INTEL Pentium 4 Processor
Memory	256 MB DDR-RAM
Hard Disk	80 GB
CD-Rom Drive	CD-RW 52x24x52x
Floppy Drive	1.44 MB
I/O	8 Ports: 6 USB, 1 Serial, 1 Parallel
Network	10/100 Mbps Fast Ethernet
Monitor	17" Color Monitor
Keyboard	Wireless Multimedia Keyboard
Mouse	Wireless Optical Mouse

Table 3.4. The Software Specification for the Server.

Software	Specification
Operating System	Microsoft Windows 2000 Server
Application Server	Microsoft Active Server Page (ASP)
Web Services	Microsoft Internet Information Services 5
Web Browser	Microsoft Internet Explorer 6.0
Database Server	Microsoft Access 2000

Table 3.5. The Hardware Specification for the Workstation.

Hardware	Specification
CPU	2.4 GHz INTEL Pentium 4 Processor
Memory	128 MB DDR-RAM
Hard Disk	40 GB
CD-Rom Drive	CD-RW 32x10x42
Floppy Drive	1.44 MB
I/O	4 USB Ports (V. 2.0)
Network	10/100 Mbps Fast Ethernet
Monitor	15" Color Monitor
Keyboard	Wireless Multimedia Keyboard
Mouse	Wireless Optical Mouse
Fax/Modem	Internal 56 K

Table 3.6. The Software Specification for the Workstation.

Software	Specification
Operating System	Microsoft Windows 2000
Application	Microsoft Office 2000
Web Service	Microsoft Internet Information Services 5
Web Browser	Microsoft Internet Explorer 6.0

Table 3.7. The Print Device Specification.

Hardware	Specification
Laser Printer	HP LaserJet 1200 Series
Dot Matrix Printer	Epson LX 300

Table 3.8. The Network Device Specification.

Hardware	Specification
Fax/Modem	External 56 K
Hub	Switching Hub 16 Ports 10/100 Mbps Fast Ethernet
Cable	UTP Cat 5

Table 3.9. The Power Supply Device Specification.

Hardware	Specification
UPS	On Line UPS 1 KVA

3.5 Security and Control

As today's enterprises extend to customer, partners, supplies and buyers, we must be assured a safe and trusted environment in which to process transactions. The increased threat of dangerous viruses, worms and malicious code puts an enterprise at greater risk than ever before. Sending and receiving email, sharing files, using online resources and conducting real-time transactions are common activities that can rapidly infect an unprotected environment. When large amounts of data are stored in electronic form they are vulnerable to many more kinds of threats than when they exist in manual form. Therefore, this project begins the security planning process in four key areas.

(1) Secure by Design

- (a) User Authorization: The processes and systems that identify the person they will interact with. The customer and the staff have to enter their username and password to verify they are an authorized person.

- (b) Time Restriction: The customer can access the system within the specific period of time.
- (2) Secure in Deployment
 - (a) Data Disaster Protection: Use antivirus solution that acts against the threat of viruses.
 - (b) Data backup: The ideal solution must be to back up all data everyday to protect the company when the data is damaged.
- (3) Secure in Network
 - (a) Encryption: To protect sensitive information transmitted over the Internet and other network. Encryption is the coding and scrambling of messages to prevent unauthorized access to or understanding of the data be transmitted. A message can be encrypted by applying a secret numerical code, called an encryption key, so that it is transmitted as a scrambled set of characters. In order to be read, the message must be decrypted with a matching key. This project uses Secure Sockets Layer (SSL) protocols for secure information transfer over the Internet. They allow client and server computers to manage encryption and decryption activities as they communicate with each other during a secure Web session. As you enter personal information (such as your password or address and phone number), SSL encodes it so that it is available only to you and the customer service representatives who will help make sure your order processes smoothly.

3.6 Cost and Benefit Analysis

- (1) Costs of Manual System

Table 3.10. Manual System Costs Analysis, Baht.

Cost Items	Years				
	1	2	3	4	5
<u>Fixed Cost</u>					
Typewriter 2 units@7,000	14,000.00	-	-	-	-
Calculator 5 units@1,500	7,500.00	-	-	-	-
Total Fixed Cost	21,500.00	-	-	-	-
<u>Operating Cost</u>					
<u>Salary</u>					
Manager 1 person @ 30,000	30,000.00	33,600.00	38,640.00	44,436.00	51,101.40
Accounting Officer 2 persons@ 12,000	24,000.00	26,400.00	27,720.00	29,106.00	30,561.30
Marketing Officer 2 person @ 1,0000	20,000.00	22,000.00	24,200.00	26,620.00	29,282.00
Sales Staff 2 persons@ 8,000	16,000.00	17,600.00	19,360.00	21,296.00	23,425.60
Merchandise Officer 3 persons@ 12,000	36,000.00	39,600.00	43,560.00	47,916.00	52,707.60
Delivery Staff 1 person @ 6,500	6,500.00	6,825.00	7,098.00	7,381.92	7,677.20
Total Monthly Salary Cost	132,500.00	146,025.00	160,578.00	176,755.92	194,755.10
Total Annual Salary Cost	1,590,000.00	1,752,300.00	1,926,936.00	2,121,071.04	2,337,061.16
<u>Office Supplier & Miscellaneous Cost</u>					
Paper Per Annual	20,000.00	20,000.00	25,000.00	30,000.00	35,000.00
Stationary Per Annual	10,000.00	10,000.00	11,500.00	13,000.00	14,500.00
Utility Per Annual	10,000.00	11,500.00	13,000.00	14,500.00	16,000.00
Miscellaneous Per Annual	5,000.00	5,500.00	7,150.00	12,155.00	23,094.50
Total Annual Office Supplier & Miscellaneous Cost	45,000.00	47,000.00	56,650.00	69,655.00	88,594.50
Total Annual Operating Cost	1,635,000.00	1,799,300.00	1,983,586.00	2,190,726.04	2,425,655.66
Total Manual System Cost	1,656,500.00	1,799,300.00	1,983,586.00	2,190,726.04	2,425,655.66

Table 3.11. Five Years Accumulated Manual System Costs, Baht.

Year	Total Manual Cost	Accumulated Cost
1	1,656,500.00	1,656,500.00
2	1,799,300.00	3,455,800.00
3	1,983,586.00	5,439,386.00
4	2,190,726.04	7,630,112.04
5	2,425,655.66	10,055,767.70
Total	10,055,767.70	-

(2) Costs of Computerized System

Table 3.12. Computerized System Costs Analysis, Baht.

Cost Items		Years				
		1	2	3	4	5
<u>Fixed Cost</u>						
<u>Hardware Cost</u>						
Computer Server	1 unit @ 85,000	17,000.00	17,000.00	17,000.00	17,000.00	17,000.00
Computer Workstation	7 units @ 48,000	67,200.00	67,200.00	67,200.00	67,200.00	67,200.00
Laser Printer	2 units @ 32,700	13,080.00	13,080.00	13,080.00	13,080.00	13,080.00
Dot Matrix Printer	1 unit @ 14,500	2,900.00	2,900.00	2,900.00	2,900.00	2,900.00
UPS	1 unit @ 6,600	1,320.00	1,320.00	1,320.00	1,320.00	1,320.00
Modem (External)	1 unit @ 2,850	570.00	570.00	570.00	570.00	570.00
Hub	1 unit @ 13,550	2,700.00	2,700.00	2,700.00	2,700.00	2,700.00
UTP Cat 5		800.00	800.00	800.00	800.00	800.00
Total Hardware Cost		105,570.00	105,570.00	105,570.00	105,570.00	105,570.00
<u>Software Cost</u>						
Software Server Cost		11,984.00	11,984.00	11,984.00	11,984.00	11,984.00
Software Workstation Cost		15,544.00	15,544.00	15,544.00	15,544.00	15,544.00
Total Software Cost		28,528.00	28,528.00	28,528.00	28,528.00	28,528.00
<u>Web Hosting Cost</u>						
Domain Register	Per Annual	8,500.00	8,500.00	8,500.00	8,500.00	8,500.00
ISP Link Fee	Per Annual	5,200.00	5,200.00	5,200.00	5,200.00	5,200.00
Total Web Hosting Cost		13,500.00	13,500.00	13,500.00	13,500.00	13,500.00
<u>Maintenance Cost</u>						
Maintenance Cost		30,000.00	35,000.00	40,000.00	45,000.00	50,000.00
Total Maintenance Cost		30,000.00	35,000.00	40,000.00	45,000.00	50,000.00
<u>Implementation Cost</u>						
Design and Setup System Cost		380,000.00	-	-	-	-
Training Cost		70,000.00	-	-	-	-
Total Implementation Cost		450,000.00	-	-	-	-
<u>Office Equipment Cost</u>						
Calculator	3 Units @ 1,500	4,500.00	-	-	-	-
Total Office Equipment Cost		4,500.00	-	-	-	-
Total Fixed Cost		622,098.00	172,598.00	177,598.00	182,598.00	187,598.00

Table 3.12. Computerized System Costs Analysis, Baht (Continued).

Cost Items		Years				
		1	2	3	4	5
<u>Operating Cost</u>						
<u>Salary</u>						
Manager	1 person @ 30,000	30,000.00	33,600.00	38,640.00	44,436.00	51,101.40
Accounting Officer	2 persons@ 12,000	24,000.00	26,400.00	27,720.00	29,106.00	30,561.30
Marketing Officer	1 person @ 10,000	10,000.00	11,000.00	12,100.00	13,310.00	14,641.00
Sales Staff	1 person @ 8,000	8,000.00	8,800.00	9,680.00	10,648.00	11,712.80
Merchandise Officer	2 persons@ 12,000	24,000.00	26,400.00	29,040.00	31,944.00	35,138.40
Delivery Staff	1 person @ 6,500	6,500.00	6,825.00	7,098.00	7,381.92	7,677.20
Total Monthly Salary Cost		102,500.00	113,025.00	124,278.00	136,825.92	150,832.10
Total Annual Salary Cost		1,230,000.00	1,356,300.00	1,491,336.00	1,641,911.04	1,809,985.16
<u>Office Supplier & Miscellaneous Cost</u>						
Paper	Per Annual	10,000.00	20,000.00	25,000.00	30,000.00	35,000.00
Stationary	Per Annual	10,000.00	11,500.00	13,000.00	14,500.00	16,000.00
Utility	Per Annual	10,000.00	11,500.00	13,000.00	14,500.00	16,000.00
Miscellaneous	Per Annual	5,000.00	5,500.00	6,050.00	6,655.00	7,320.50
Total Annual Office Supplier & Miscellaneous Cost		35,000.00	48,500.00	57,050.00	65,655.00	74,320.50
Total Annual Operating Cost		1,265,000.00	1,404,800.00	1,548,386.00	1,707,566.04	1,884,305.66
Total Computerized System Cost		1,887,098.00	1,577,398.00	1,725,984.00	1,890,164.04	2,071,903.66

Table 3.13. Five Years Accumulated Computerized System Costs, Baht.

Year	Total Computerized Cost	Accumulated Cost
1	1,887,098.00	1,887,098.00
2	1,577,398.00	3,464,496.00
3	1,725,984.00	5,190,480.00
4	1,890,164.04	7,080,644.04
5	2,071,903.66	9,152,547.70
Total	9,152,547.70	-

(3) The Comparison of the System Costs between Computerized System and Manual System.

Table 3.14. The Comparison of the System Costs, Baht.

Year	Accumulated Manual Cost	Accumulated Computerized Cost
1	1,656,500.00	1,887,098.00
2	3,455,800.00	3,464,496.00
3	5,439,386.00	5,190,480.00
4	7,630,112.04	7,080,644.04
5	10,055,767.70	9,152,547.70

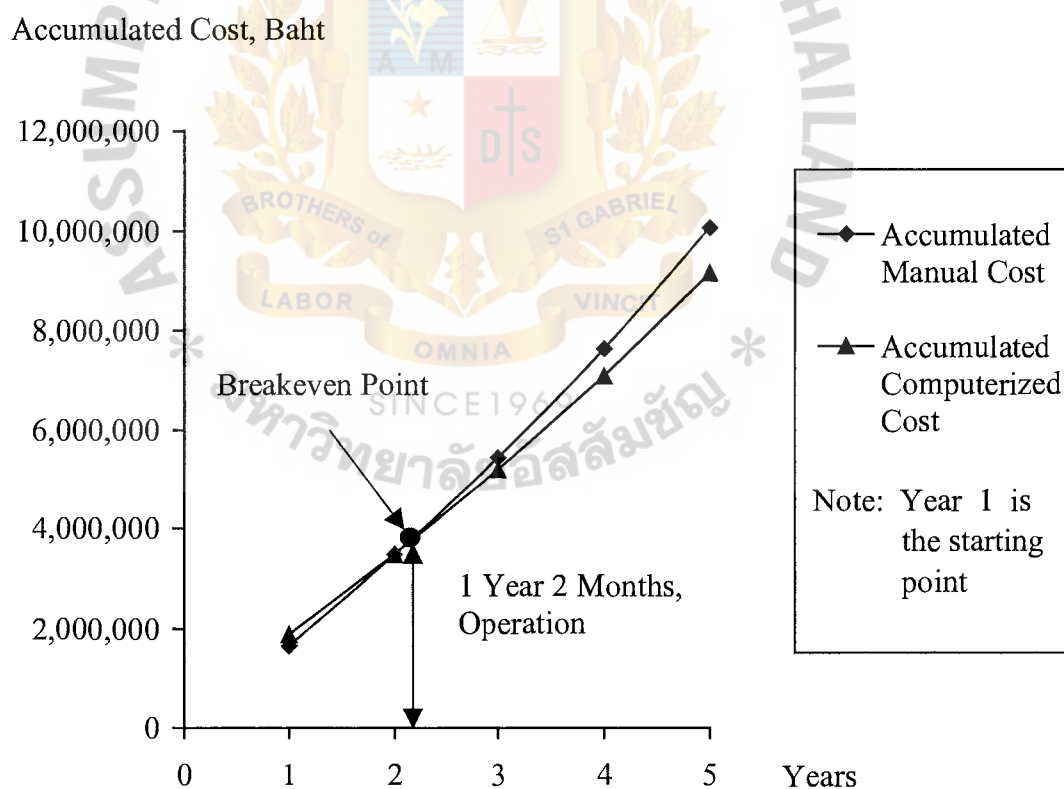


Figure 3.13. Costs Comparison between Manual System and Computerized System.

(4) Payback Analysis.

This project uses Payback Analysis for determining if an investment will pay for itself. The payback period can be calculated as follows:

$$P = L + \frac{C}{A}$$

Where P = Payback Period

L = Last year of negative cash

C = Cumulative difference last negative year

A = Absolute value of cumulative difference

$$P = 2 + \frac{873295.52}{873295.52 + 774283.87}$$

$$P = 2.53 \text{ Years}$$

Table 3.15. Payback Period Matrix Analysis, Baht.

Cash Flow Description	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Development cost:	-3,902,000.00					
Operation & maintenance cost:		-1,887,098.00	-1,577,398.00	-1,725,984.00	-1,890,164.04	-2,071,903.66
Discount factors for 12%:	1.000	0.893	0.797	0.712	0.636	0.576
Time-adjusted costs (Adjusted to present value):	-3,902,000.00	-1,685,178.51	-1,257,186.21	-1,228,900.61	-1,202,144.33	-1,193,416.51
Cumulative time-adjusted costs over lifetime:	-3,902,000.00	-5,587,178.51	-6,844,364.72	-8,073,265.33	-9,275,409.66	-10,468,826.17
Benefits derived from operation of new system:	0	3,390,000.00	3,693,600.00	4,040,000.00	4,589,000.00	5,364,000.00
Discount factors for 12%:	1.000	0.893	0.797	0.712	0.636	0.576
Time-adjusted benefits (Current of present value):	0	3,027,270.00	2,943,799.20	2,876,480.00	2,918,604.00	3,089,664.00
Cumulative time-adjusted benefits over lifetime:	0	3,027,270.00	5,971,069.20	8,847,549.20	11,766,153.20	14,855,817.20
Cumulative lifetime time-adjusted cost + benefit:	-3,902,000.00	-2,559,908.51	-8,73,295.52	774,283.87	2,490,743.54	4,386,991.03

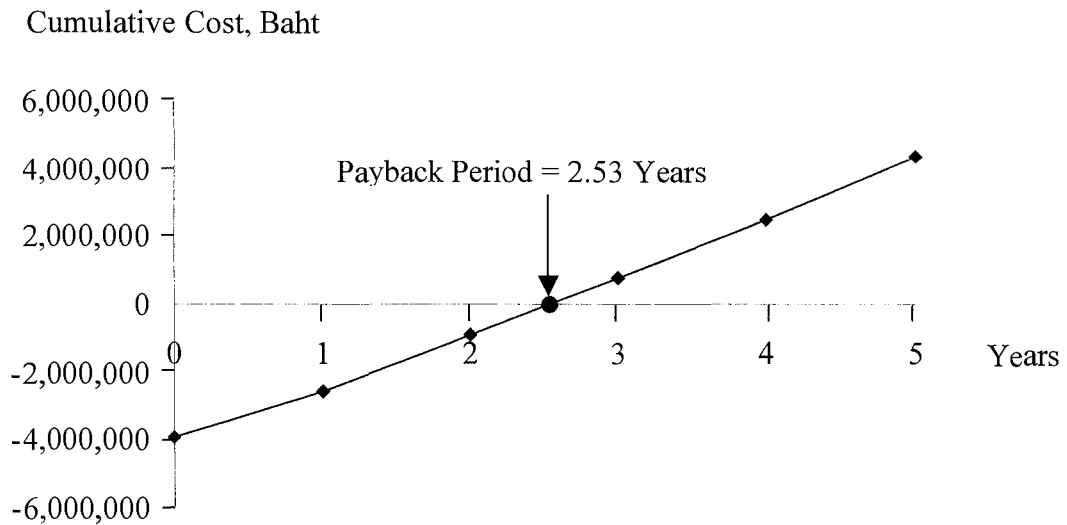


Figure 3.14. Payback Analysis.

(5) Net Present Value

The Net Present Value of an investment alternative is considered the preferred cost-benefit technique that is shown in Table 3.16.

Table 3.16. Net Present Value Analysis, Baht.

Cash Flow Description	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Development cost:	-3,902,000.00						
Operation & Maintenance cost:		-1,887,098.00	-1,577,398.00	-1,725,984.00	-1,890,164.04	-2,071,903.66	
Discount factors for 12%:	1.000	0.893	0.797	0.712	0.636	0.576	
Present value of annual costs:	-3,902,000.00	-1,685,178.51	-1,257,186.21	-1,228,900.61	-1,202,144.33	-1,193,416.51	
Total present value of lifetime costs:							-10,468,826.17
Benefits derived from operation of new system:	0	3,390,000.00	3,693,600.00	4,040,000.00	4,589,000.00	5,364,000.00	
Discount factors for 12%:	1.000	0.893	0.797	0.712	0.636	0.576	
Present value of annual benefits:	0	3,027,270.00	2,943,799.20	2,876,480.00	2,918,604.00	3,089,664.00	
Total present value of lifetime benefits:							14,855,817.20
NET PRESENT VALUE:							4,386,991.03

(6) Return-on-Investment Analysis

The Return-on-Investment (ROI) Analysis is a percentage rate that measures the relationship between the amounts the business gets back from an investment and the amount invested. The lifetime ROI for a potential solution is calculated as follows:

$$\text{Lifetime ROI} = (\text{Estimated lifetime benefits} - \text{Estimated lifetime costs}) /$$

$$\text{Estimated lifetime costs}$$

$$\text{Lifetime ROI} = (14,855,817.20 - 10,468,826.17) / 10,468,826.17$$

$$= 0.419$$

$$= 42\%$$

$$\text{Average ROI} = 8.40 \text{ percent per year}$$

(7) Summary of Cost Analysis

The lifetime benefits will overtake the lifetime costs between years 2 and 3 years. The Figure 3.14 is shown payback period approximately 2.53 years after the system begins operating. The company has set the payback period and ROI to determine the investment. The payback period for all investments must have a payback period which is less than or equal to three years and the minimum acceptable ROI should be greater than 8 percent per year. When comparing multiple solutions, it is a good investment and it is the highest positive net present value.

IV. PROJECT IMPLEMENTATION

4.1 Overview of Project Implementation

In the system development life cycle, after the approval of the technical design statement and prototypes, the project comes to the construction and implementation phase. The purpose of the construction phase is to develop and test a functional system that fulfills business and design requirements and to implement the interface between the new system and existing system. The purpose of the implementation phase is to smoothly convert from the old system to the new system.

To complete the construction and implementation process of Web-based Sales Information System, the steps are as follows:

- (1) Study of all the documents in sales and marketing department and warehouse section that relates to the documents of order processing and stock management.
- (2) Analyze the process including specific sequences to follow from the outputs and then the input. This process will get the input data.
- (3) Design the database, the Web-based Sales Information System will include the database of customer, product, order information and payment information.
- (4) Coding the new system, all the modules should be run at one time to check for any errors.
- (5) Testing the new system to ensure that the system is operating properly without errors and is effective.
- (6) While testing the new system, training may be needed as it takes time for the staff to run parallel systems during the implementation.

- (7) The final step is the maintenance and periodic system review, which is necessary to determine if there are any further problems.

4.2 Coding

This project used Microsoft Access 2000 to create the database system because the program structure is not complicated to develop and it manipulates an unlimited number of record databases.

The Web-based Sales Information System was by using Active Server Pages of Microsoft. Active Server Pages is a server-side scripting technology for building web pages that are both dynamic and interactive. The dynamic web pages have been created using server-side executable programs. A standardized web server interface allows an executable program to access all the information within incoming requests from clients. The program can then generate all the output required to make up the return page (the HTML, script code, text, etc.) and send it back to the client via the web server. These make the programmer's life easier, and save time having to create executable programs.

4.3 Testing

The system testing is very important because it will give an opportunity for the programmer to find hidden failures, errors and missed requirements. The several difference types to testing are as follows:

- (1) Program Testing
 - (a) Test program performance such as add, delete, update of records.
 - (b) Test program with sample data and invalid data.
 - (c) Test linking between the programs.
 - (d) Test user interface to guarantee that the users can successfully interact with the system.

(2) System Testing

- (a) Test system performance to check throughput and response time to make sure processing is adequate to meet a normal processing workload.
- (b) Test concurrent use to see data integrity and data sharing.
- (c) Test entire system to ensure that, it is able to input data properly and the overall system flow can work properly.

(3) Hardware and Software Testing

- (a) Test peak workload processing performance to ensure the system can handle the workload during peak processing periods. If not, improved hardware and/or software may be needed to increase efficiency.
- (b) Test system, hardware and software compatible to each other.

(4) Security Testing

- (a) Test user login and the system authentication.
- (b) Test backup and restart is performed to prevent any file from being destroyed by accident and to make sure that the system can be restarted in case of a disaster.

4.4 Conversion

Once a successful system test has been completed, the next step is preparing the new system into operation. The strategy for converting from an existing to a new system is parallel conversion. Both the old and new systems are operated for some time period to ensure that all major problems in the new system are solved before the old system is discarded.

Although the parallel conversion will increase cost and waste time by running two systems at the same time, it is suitable because of safety and minimizes the risk of the new system.



V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The company set the cost and benefit analysis and payback period to determine the investment in the proposed system. The proposed system is the best way to reduce cost and give a payback period of approximately 2.53 years that is a good investment. Thus, they should replace the existing system with the proposed system.

The Web and other network technologies are inspiring new approaches for customer service and support. Many companies are using their Web sites and email to answer customer questions or to provide customers with helpful information since electronic commerce is a fast-moving target. Nowadays, more and more people are using the Internet to buy products or service, because of cost and timesavings.

Krue Thai Furniture Co., Ltd. uses a web site to provide information on the products sold and creates Web-based Sales Information System to support the order from customers. All data will be kept in the database server and are accessed through the web server. The user interfaces are implemented on web browser. The web site design concepts are user friendly and easy to pay. There are many functions to provide facilities to the customer as follows:

(1) Applying for the new member

The customer can enter the information directly on the web site that can reduce time to fill in the paper.

(2) Online Catalog

A content rich catalog provides customers with a vast amount of information to facilitate products selection and buying. The customers can

view product information by viewing the catalog, which is displayed in a categorized format.

(3) Product Sourcing and Searching

A variety of product searching techniques enables customers to easily find the product they intend to buy.

(4) Ordering Product

Upon completion of the products selection, order(s) are automatically generated and routed to predefined authorized persons for approval.

(5) Payment

The web site is a fully enabled E-commerce shopping site using Secure Socket Layer (SSL) server services to secure customer information collection.

(6) Order Tracking

Customers can view and track status of submitted purchase orders.

(7) Customer Relationship Management

Customers and company can exchange opinions, enquiries, inform news, join in activities and share information via email.

Table 5.1. Show the time performance comparing the existing system and the proposed system.

Table 5.1. Comparison of Degree of Achievement.

Process	Existing System	Proposed System
Apply new member	10 mins.	3 mins.
Product inquiry	5 mins.	1 min.
Approve order	8 mins.	2 mins.
Payment	20 mins.	1 min.
Order Tracking	12 mins.	2 mins.
Stock Management	1 hr. 15 mins.	4 mins.
Generate Report	2 hrs. 30 mins.	3 mins.

From Table 5.1. The proposed system is much faster than the existing system because the existing system is run manually that causes to errors happen more easily than the computer. The data in manual system is kept on the paper that may be damaged and be complicated to organize. On the other hand, the proposed system will keep data in a database that is easy to maintain and takes less time to query data.

In conclusion, the proposed system can reduce the time spent to run the process, decrease the cost of maintenance and make the company more efficient and effective than the existing system.

5.2 Recommendations

Within the next few years, the Web will be accessible from almost anywhere, as customers turn to wireless telephones, handheld digital appliances, interactive television and information appliances to link to the Internet.

Krue Thai Furniture Co., Ltd. thinks about their activities through the Internet, especially about using the Internet to increase customer groups and selling new product

lines. Therefore, the system will still be able to support the growth. This project has plans to improve and redesign the web site as follows:

- (1) Dynamic Trading: The system will support dynamic trading that means the customers or suppliers can interactively negotiate accept or reject on a price.
- (2) Contacts with Customers: The system will redesign web site so that customers get better information about products, services and get feedback directly such as web board and FAQ.
- (3) Increase Payment Method: The system will increase different ways of payment such as digital cash and electronic checks.
- (4) Support WAP Technology: Wireless Application Protocol (WAP) is a system of protocols and technologies that lets cell phones and other wireless devices with tiny display, low bandwidth connections and minimal memory access Web-based information and services. In the future the customer can order products via cell phone or handheld PDA to increase sales volume and improvement of the company image.



APPENDIX A
PROCESS SPECIFICATION

Table A.1. Process Specification of Process 1.1.

Items	Description
Process Name	Log in
Data In:	Username and password
Data Out:	Customer information
Process:	<ol style="list-style-type: none"> 1. Receive username and password 2. Retrieve customer information which match with the existing customer 3. Verify the correctness of username and password information receipt 4. Log in to the shopping cart
Attachment:	<ol style="list-style-type: none"> 1. Customer 2. Customer data store

Table A.2. Process Specification of Process 1.2.

Items	Description
Process Name	Forgot Password
Data In:	Username keyword
Data Out:	Password via email
Process:	<ol style="list-style-type: none"> 1. Receive username keyword 2. Execute forgot password process 3. Check username which match with the existing username. 4. Sent password to customer via email
Attachment:	<ol style="list-style-type: none"> 1. Customer 2. Customer data store

Table A.3. Process Specification of Process 1.3.

Items	Description
Process Name	Enter new customer
Data In:	New customer subscription
Data Out:	New customer record
Process:	<ol style="list-style-type: none"> 1. Receive customer information on the screen 2. Check the correctness of customer information receipt 3. Show the result of checking 4. Get all new customer data 5. Record the customer data into the database
Attachment:	<ol style="list-style-type: none"> 1. Customer 2. Customers data store

Table A.4. Process Specification of Process 2.1.

Items	Description
Process Name	Check Product Availability
Data In:	Order information
Data Out:	Check product availability response
Process:	<ol style="list-style-type: none"> 1. Receive order information on the screen 2. Check product availability 3. If the products are available, add product to cart 4. If the products are not available, show unavailable product
Attachment:	<ol style="list-style-type: none"> 1. Customer 2. Order information 3. Products data store

Table A.5. Process Specification of Process 2.2.

Items	Description
Process Name	Calculate Total Payment
Data In:	Order information
Data Out:	Total price detail
Process:	<ol style="list-style-type: none"> 1. Receive order information on the screen 2. Calculate total price 3. Show total price on the screen
Attachment:	<ol style="list-style-type: none"> 1. Customer 2. Products data store

Table A.6. Process Specification of Process 2.3.

Items	Description
Process Name	Confirm Order Item
Data In:	Order information
Data Out:	Total payment detail
Process:	<ol style="list-style-type: none"> 1. Receive order information on the screen 2. Verify the correctness of order information 3. Show confirm total payment on the screen 4. Record order information into order items database
Attachment:	<ol style="list-style-type: none"> 1. Customer 2. Order information 3. Orders data store 4. Order items data store

Table A.7. Process Specification of Process 3.1.

Items	Description
Process Name	Verify Payment Information
Data In:	Payment data
Data Out:	Result of payment verification
Process:	<ol style="list-style-type: none"> 1. Receive payment data from the customer 2. Sent payment form to the bank 3. If the payment detail is correct, pass to process 3.2 4. If the payment detail is not correct, show unaccepted data 5. Show online payment form to enter information again 6. Repeat to step 2
Attachment:	<ol style="list-style-type: none"> 1. Customer 2. Bank

Table A.8. Process Specification of Process 3.2.

Items	Description
Process Name	Confirm Order
Data In:	Valid payment information
Data Out:	Order confirmation response
Process:	<ol style="list-style-type: none"> 1. Receive valid payment result 2. Show order confirmation on the screen
Attachment:	<ol style="list-style-type: none"> 1. Customer 2. Orders data store

Table A.9. Process Specification of Process 3.3.

Items	Description
Process Name	Update Payment Status
Data In:	Customer account deducted notice
Data Out:	Payment status
Process:	<ol style="list-style-type: none"> 1. Receive customer account deducted notice from the bank 2. Retrieve orders information into the database 3. Update payment status into the database
Attachment:	<ol style="list-style-type: none"> 1. Customer 2. Bank 3. Orders data store

Table A.10. Process Specification of Process 3.4.

Items	Description
Process Name	Confirm Delivery Date
Data In:	Valid payment result
Data Out:	Delivery order
Process:	<ol style="list-style-type: none"> 1. Receive update payment status 2. Generate confirmation delivery date to the customer 3. Update delivery date into the database 4. Send order detail to the sales and marketing department 5. Send payment detail to the sales and marketing department
Attachment:	<ol style="list-style-type: none"> 1. Customer 2. Merchandise department 3. Accounting department 4. Orders data store

Table A.11. Process Specification of Process 4.1.

Items	Description
Process Name	Prepare Product
Data In:	Order detail
Data Out:	Delivered order
Process:	<ol style="list-style-type: none"> 1. Receive order detail 2. Create delivery order to the merchandise department 3. Receive prepare product confirmation 4. Send order information to create bill
Attachment:	<ol style="list-style-type: none"> 1. Products data store 2. Orders data store 3. Merchandise Department

Table A.12. Process Specification of Process 4.2.

Items	Description
Process Name	Create Bill
Data In:	Order information
Data Out:	Bill
Process:	<ol style="list-style-type: none"> 1. Receive order information 2. Retrieve delivery location which match the order delivery information 3. Create bill to accounting, merchandise, sales and marketing department
Attachment:	<ol style="list-style-type: none"> 1. Orders data store 2. Customers data store 3. Merchandise department 4. Accounting department 5. Sales and marketing department

Table A.13. Process Specification of Process 5.1.

Items	Description
Process Name	Update Product
Data In:	Delivered product information
Data Out:	Update product record
Process:	<ol style="list-style-type: none"> 1. Receive delivered product information 2. Retrieve quantity stock product into the database 3. Update new quantity product into the database
Attachment:	<ol style="list-style-type: none"> 1. Products data store 2. Orders data store 3. Order items data store

Table A.14. Process Specification of Process 5.2.

Items	Description
Process Name	Check Minimum Stock Level
Data In:	Quantity stock information
Data Out:	Result of check quantity stock
Process:	<ol style="list-style-type: none"> 1. Receive quantity stock information 2. Retrieve product information into the database 3. Compare quantity stock with the minimum stock 4. Send the result to the merchandise department
Attachment:	<ol style="list-style-type: none"> 1. Products data store 2. Merchandise department

Table A.15. Process Specification of Process 5.3.

Items	Description
Process Name	Issue Purchase Order
Data In:	Lower stock level
Data Out:	Purchase order information
Process:	<ol style="list-style-type: none"> 1. Receive lower stock information 2. Retrieve supplier information into the database 3. Issue purchase order to the supplier 4. Update purchase order and purchase order items into the database
Attachment:	<ol style="list-style-type: none"> 1. Supplier 2. Suppliers data store 3. Purchase orders data store 4. Purchase order items data store

Table A.16. Process Specification of Process 6.1.

Items	Description
Process Name	Verify Report Request
Data In:	Report request command
Data Out:	Information
Process:	<ol style="list-style-type: none"> 1. Receive report request command 2. Select table to generate report (customer, product) 3. Select time to generate report (daily, monthly) 4. Retrieve information which match the criteria
Attachment:	<ol style="list-style-type: none"> 1. Manager 2. Customers data store 3. Products data store 4. Suppliers data store 5. Orders data store 6. Purchase orders data store

Table A.17. Process Specification of Process 6.2.

Items	Description
Process Name	Generate Report
Data In:	Information into the database
Data Out:	Report
Process:	<ol style="list-style-type: none"> 1. Receive the all information 2. Generate format of report 3. Show the report on the screen 4. Print the report
Attachment:	<ol style="list-style-type: none"> 1. Customers data store 2. Products data store 3. Orders data store





APPENDIX B
DATA DICTIONARY

DATA DICTIONARY

Table B.1. Data Dictionary of Database.

Field Name	Meaning
Address1	Home number of customer address
Address2	Street name of customer address
CategoryDescription	Description of category product
CategoryID	Category product identification
CategoryName	Name of category product name
City	The city of customer address
ConfirmPassword	Confirm character key by customer to access the system
Country	Country of customer address
CustomerID	Customer identification
DateAvailable	Date of available product
DeliveryDate	Date of delivery product
DeliveryStatus	Check status of delivery
Email	Electronic mail address
Firstname	First name of customer
Lastname	Last name of customer
MinimumStock	Number of minimum product must have to order
NumberInStock	Number of product in stock
OrderDate	Date of ordered product
OrderID	Order identification
OrderItemID	Order item identification
OrderTotal	Total price of order product
Password	Character key by customer to access the system
PaymentStatus	Check status of payment
PayMethodDescription	Description of payment method
PayMethodID	Payment method identification

Table B.1. Data Dictionary of Database (Continued).

Field Name	Meaning
PayMethodName	Payment method name
Phone	Phone number of customer
Postalcode	The postal code of customer address
ProductCost	Cost of product
ProductDescription	Description of product
ProductDiscount	Discount of product
ProductID	Product identification
ProductImage	Picture of product
ProductName	Name of product
ProductPrice	Price of product
ProductSize	Size of product
PromisedShipDate	Date of promised to ship the product
PurchaseDate	Date of purchase order
PurchaseItemID	Purchase item identification
PurchaseOrderID	Purchase order item identification
PurchaseTotal	Total purchase product
Quantity	Order quantity per item
ShipAddress	Home number and street to ship the product
ShipCity	The city to ship the product
ShipCountry	The country to ship the product
ShipFirstname	First name to deliver a product
ShipLastname	Last name to deliver a product
ShipMethodDescription	Description of shipping method
ShipMethodID	Shipping method identification
ShipMethodName	Shipping method name
Shippeddate	Date to shipped product
ShipPostalcode	The city to ship the product

Table B.1. Data Dictionary of Database (Continued).

Field Name	Meaning
ShipState	The state to ship the product
State	The state of customer address
SupplierAddress1	Home number of supplier address
SupplierAddress2	Street name of supplier address
SupplierCity	City of supplier address
SupplierCountry	Country of supplier address
SupplierFax	Fax number of supplier address
SupplierID	Supplier identification
SupplierName	Supplier name
SupplierPhone	Phone number of supplier address
SupplierPostalcode	Postal code of supplier address
SupplierState	State of supplier address
Username	Name of using to access the system



Web-based Sales Information System

Table C.1. Customers Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	CustomerID	Text (7)	Y	Y		Orders		Primary Key
2	Firstname	Text (30)						Attribute
3	Lastname	Text (30)						Attribute
4	Username	Text (10)	Y	Y				Attribute
5	Password	Text (8)					At least 4 characters	Attribute
6	ConfirmPassword	Text (8)					Same as password	Attribute
7	Email	Text (50)					@	Attribute
8	Address1	Text (50)						Attribute
9	Address2	Text (50)						Attribute
10	City	Text (20)						Attribute
11	State	Text (20)						Attribute
12	Postalcode	Text (5)					Only 5 characters	Attribute
13	Country	Text (20)						Attribute
14	Phone	Text (20)						Attribute
15	ShipFirstname	Text (30)						Attribute
16	ShipLastname	Text (30)						Attribute
17	ShipAddress	Text (100)						Attribute
18	ShipCity	Text (20)						Attribute
19	ShipState	Text (20)						Attribute

Table C.1. Customers Table (Continued).

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
20	ShipPostalcode	Text (5)						Attribute
21	ShipCountry	Text (20)						Attribute

Table C.2. Products Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	ProductID	Text (5)	Y	Y		Order Items, Purchase Order Items		Primary Key
2	CatagoryID	Text (2)						Foreign Key
3	ProductName	Text (30)		Y				Attribute
4	ProductDescription	Memo						Attribute
5	ProductImage	Text (100)		Y				Attribute
6	ProductCost	Currency						Attribute
7	ProductPrice	Currency						Attribute
8	ProductDiscount	Currency						Attribute
9	ProductSize	Text (50)						Attribute
10	NumberInStock	Number						Attribute
11	MinimumStock	Number						Attribute
12	DateAvailable	Date/Time			Y		dd/mm/yy	Attribute

Table C.3. Categories Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	CatagoryID	Text (2)	Y	Y		Products		Primary Key
2	CatagoryName	Text (30)		Y				Attribute
3	CatagoryDescription	Memo						Attribute

Table C.4. Shipping Methods Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	ShipMethodID	Text (2)	Y	Y		Orders		Primary Key
2	ShipMethodName	Text (30)		Y				Attribute
3	ShipMethodDescription	Memo						Attribute

Table C.5. Payment Methods Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	CatagoryID	Text (2)	Y	Y		Orders		Primary Key
2	CatagoryName	Text (30)		Y				Attribute
3	CatagoryDescription	Memo						Attribute

Table C.6. Orders Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	OrderID	Text (8)	Y	Y				Primary Key
2	CustomerID	Text (7)	Y					Foreign Key
3	PayMethodID	Text (2)						Foreign Key
4	ShipMethodID	Text (2)						Foreign Key
5	OrderDate	Date/Time					dd/mm/yy	Attribute
6	OrderTotal	Currency		Y				Attribute
7	PaymentStatus	Yes/No						Attribute
8	PromisedShipDate	Date/Time					dd/mm/yy	Attribute
9	Shippeddate	Date/Time					dd/mm/yy	Attribute
10	DeliveryStatus	Yes/No						Attribute

Table C.7. Order Items Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	OrderItemID	Autonumber	Y	Y			Increment number	Primary Key
2	OrderID	Text (8)	Y					Primary Key
3	ProductID	Text (5)	Y					Foreign Key
4	Quantity	Number	Y					Attribute

Table C.8. Suppliers Table.

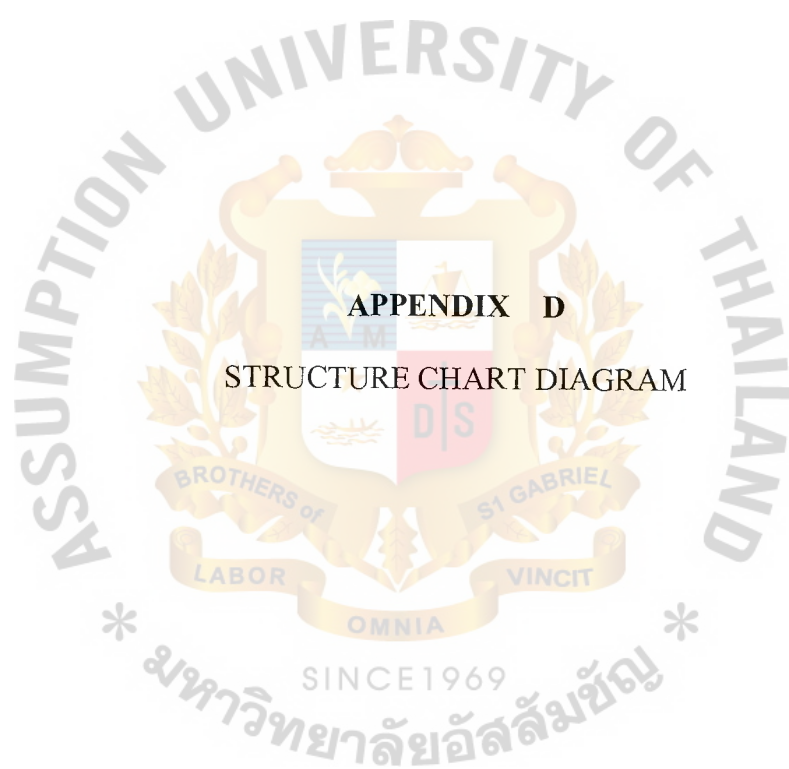
No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	SupplierID	Text (7)	Y	Y		Purchase Orders		Primary Key
2	SupplierName	Text (30)						Attribute
3	Address1	Text (50)						Attribute
4	Address2	Text (50)						Attribute
5	City	Text (20)						Attribute
6	State	Text (20)						Attribute
7	Postalcode	Text (5)					Only 5 characters	Attribute
8	Country	Text (20)						Attribute
9	Phone	Text (20)						Attribute
10	Fax	Text (20)						Attribute

Table C.9. Purchase Order Items Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	PurchaseItemID	Autonumber	Y	Y			Increment number	Primary Key
2	PurchaseOrderID	Text (8)	Y					Primary Key
3	ProductID	Text (5)	Y					Foreign Key
4	Quantity	Number	Y					Attribute

Table C.10. Purchase Orders Table.

No.	Field Name	Field Type	Index	Unique	Nullable	Foreign Key to Table	Check	Key Type
1	PurchaseOrderID	Text (8)	Y					Primary Key
2	SupplierID	Text (7)	Y	Y				Foreign Key
3	PurchaseDate	Date/Time						Attribute
4	PurchaseTotal	Currency						Attribute
5	DeliveryDate	Date/Time						Attribute



APPENDIX D
STRUCTURE CHART DIAGRAM

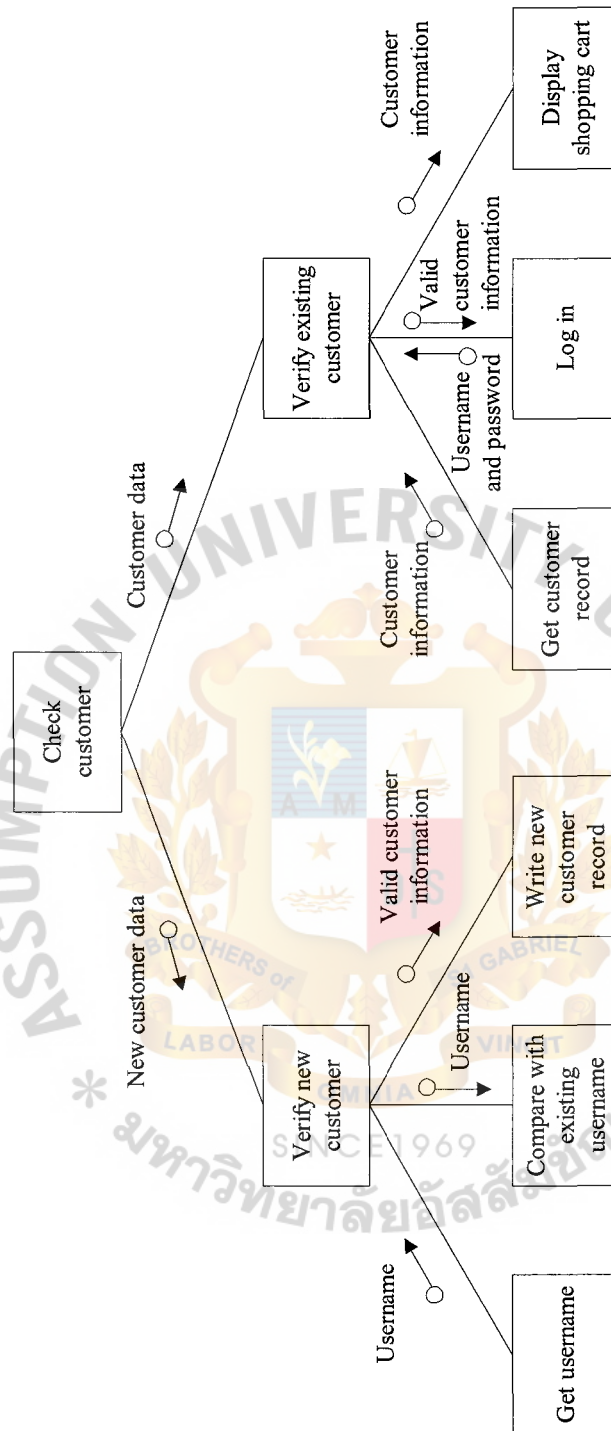


Figure D.1. Structure Chart of Check Customer.

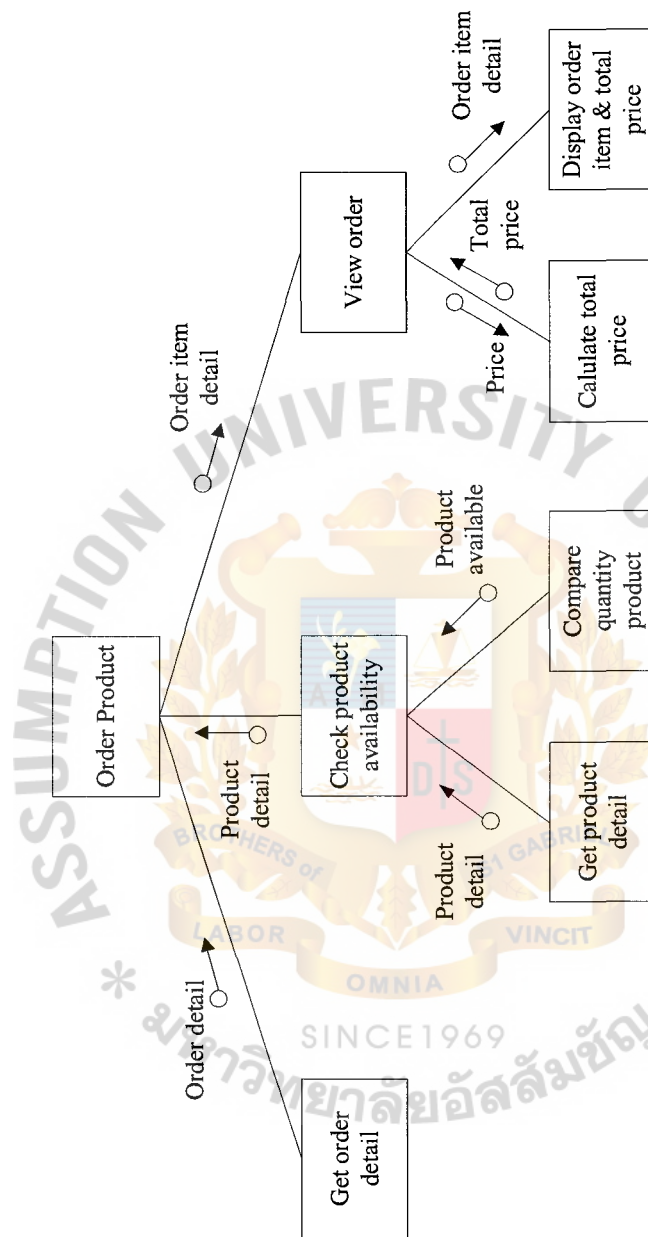


Figure D.2. Structure Chart of Order Product.

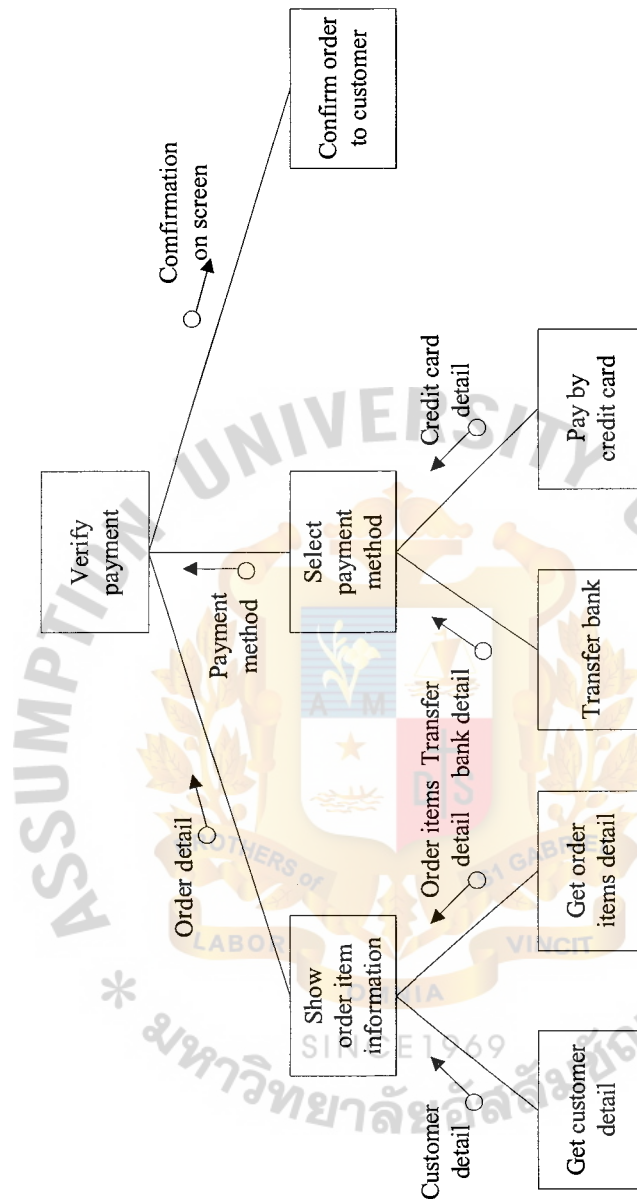


Figure D.3. Structure Chart of Verify Payment.

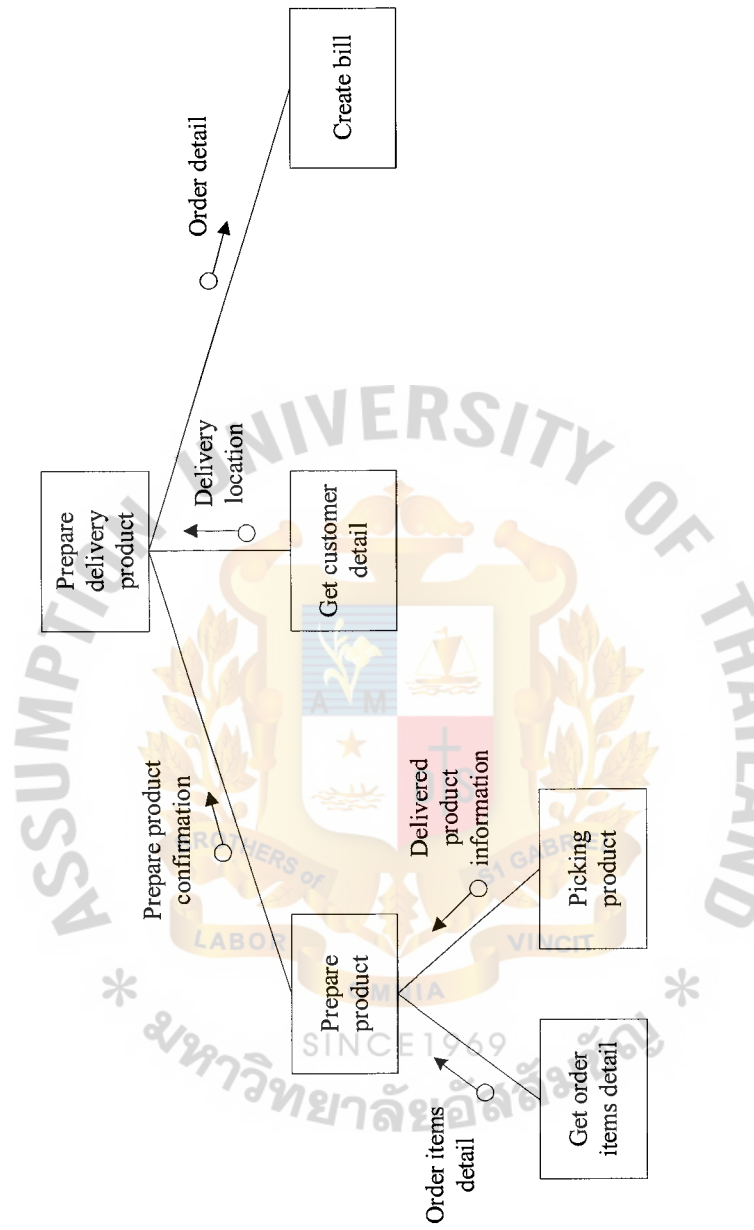


Figure D.4. Structure Chart of Prepare Delivery Product.

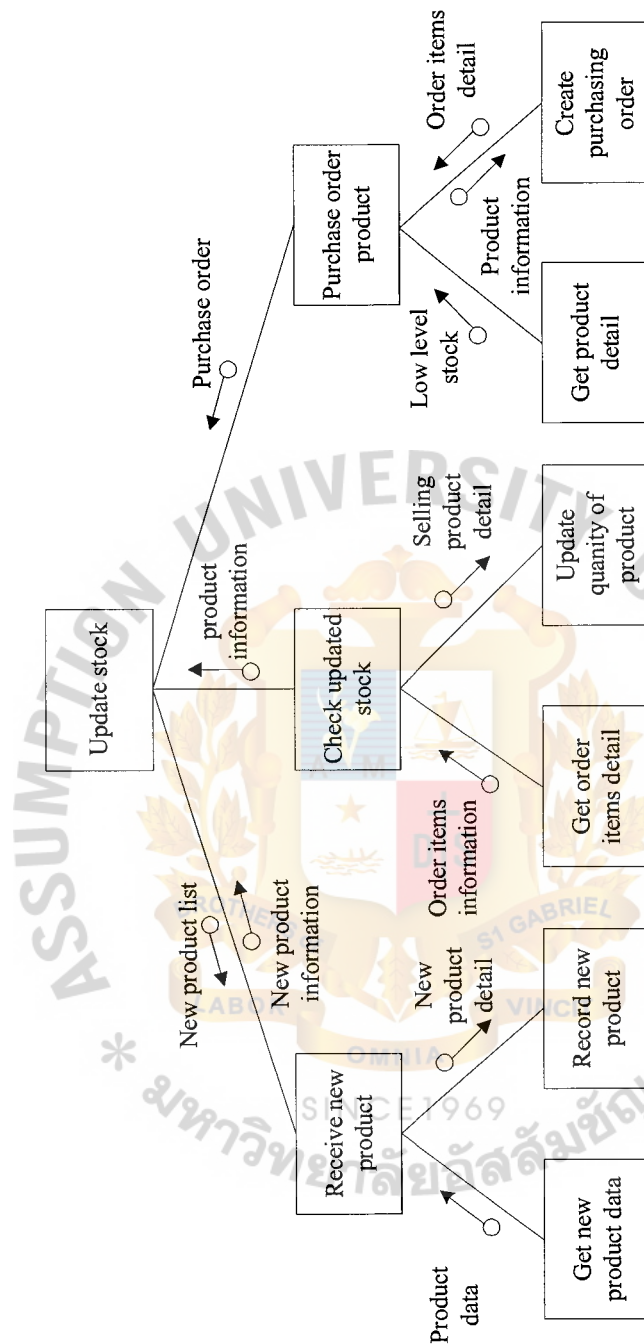


Figure D.5. Structure Chart of Update Stock.

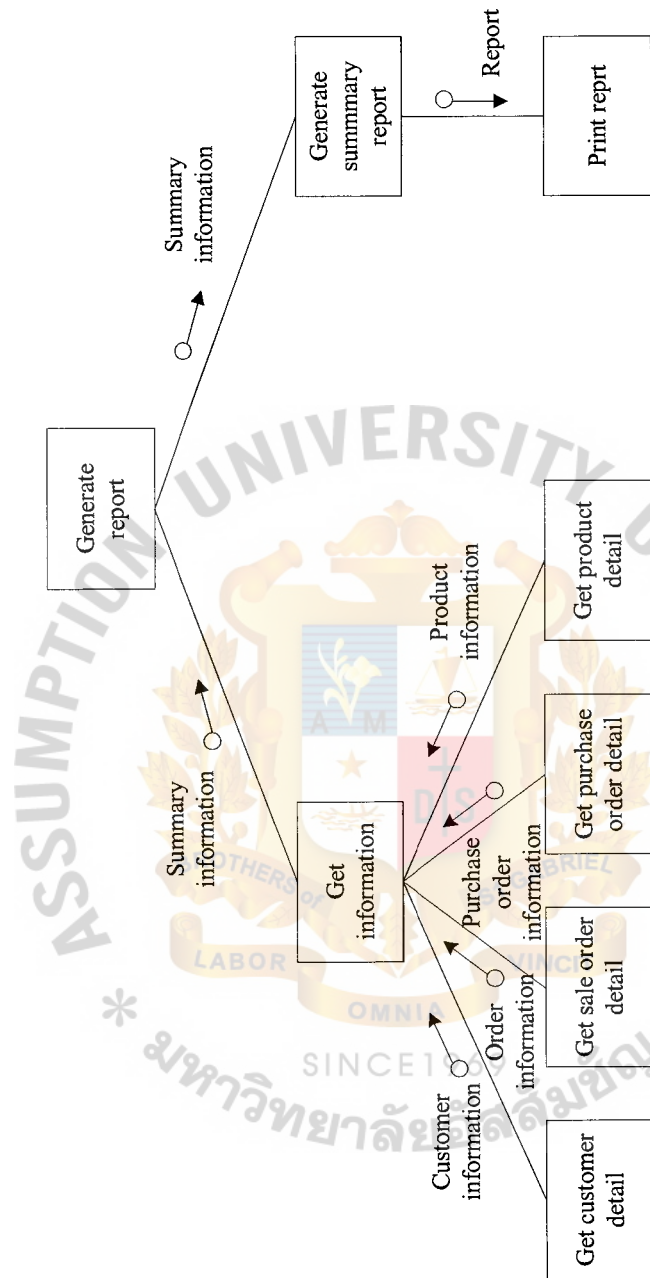


Figure D.6. Structure Chart of Generate Report.



Table E.1. Computerized System Costs Analysis of Candidate 1, Baht.

Cost Items		Years				
		1	2	3	4	5
<u>Fixed Cost</u>						
<u>Hardware Cost</u>						
Computer Server	1unit @85,000	17,000.00	17,000.00	17,000.00	17,000.00	17,000.00
Computer Workstation	7units@48,000	67,200.00	67,200.00	67,200.00	67,200.00	67,200.00
Laser Printer	2units@32,700	13,080.00	13,080.00	13,080.00	13,080.00	13,080.00
Dot Matrix Printer	1unit @ 14,500	2,900.00	2,900.00	2,900.00	2,900.00	2,900.00
UPS	1unit @ 6,600	1,320.00	1,320.00	1,320.00	1,320.00	1,320.00
Modem(External)	1unit @ 2,850	570.00	570.00	570.00	570.00	570.00
Hub	1unit @ 13,550	2,700.00	2,700.00	2,700.00	2,700.00	2,700.00
Coaxial Cable		800.00	800.00	800.00	800.00	800.00
Total Hardware Cost		105,570.00	105,570.00	105,570.00	105,570.00	105,570.00
<u>Software Cost</u>						
Software Server Cost		11,984.00	11,984.00	11,984.00	11,984.00	11,984.00
Software Workstation Cost		15,544.00	15,544.00	15,544.00	15,544.00	15,544.00
Total Software Cost		28,528.00	28,528.00	28,528.00	28,528.00	28,528.00
<u>Web Hosting Cost</u>						
Domain Register	Per Annual	8,500.00	8,500.00	8,500.00	8,500.00	8,500.00
Monthly Fee	Per Annual	5,200.00	5,200.00	5,200.00	5,200.00	5,200.00
Total Web Hosting Cost		13,500.00	13,500.00	13,500.00	13,500.00	13,500.00
<u>Maintainance Cost</u>						
Maintainance Cost		30,000.00	35,000.00	40,000.00	45,000.00	50,000.00
Total Maintainance Cost		30,000.00	35,000.00	40,000.00	45,000.00	50,000.00
<u>Implematation Cost</u>						
Design and Setup System Cost		380,000.00	-	-	-	-
Training Cost		170,000.00	-	-	-	-
Total Implematation Cost		550,000.00	-	-	-	-
<u>Office Equipment Cost</u>						
Calculator	3 Units@ 1,500	4,500.00	-	-	-	-
Total Office Equipment Cost		4,500.00	-	-	-	-
Total Fixed Cost		722,098.00	172,598.00	177,598.00	182,598.00	187,598.00

Table E.1. Computerized System Costs Analysis of Candidate 1, Baht (Continued).

Cost Items		Years				
		1	2	3	4	5
<u>Operating Cost</u>						
<u>Salary</u>						
Manager	1 person @ 30,000	30,000.00	33,600.00	38,640.00	44,436.00	51,101.40
Accounting Officer	2 persons@ 12,000	24,000.00	26,400.00	27,720.00	29,106.00	30,561.30
Marketing Officer	1 person @ 10,000	10,000.00	11,000.00	12,100.00	13,310.00	14,641.00
Sales Staff	1 person @ 8,000	8,000.00	8,800.00	9,680.00	10,648.00	11,712.80
Merchandise Officer	2 persons@ 12,000	24,000.00	26,400.00	29,040.00	31,944.00	35,138.40
Delivery Staff	1 person @ 6,500	6,500.00	6,825.00	7,098.00	7,381.92	7,677.20
Total Monthly Salary Cost		102,500.00	113,025.00	124,278.00	136,825.92	150,832.10
Total Annual Salary Cost		1,230,000.00	1,356,300.00	1,491,336.00	1,641,911.04	1,809,985.16
<u>Office Supplier & Miscellaneous Cost</u>						
Paper	Per Annual	10,000.00	20,000.00	25,000.00	30,000.00	35,000.00
Stationary	Per Annual	10,000.00	11,500.00	13,000.00	14,500.00	16,000.00
Utility	Per Annual	10,000.00	11,500.00	13,000.00	14,500.00	16,000.00
Miscellaneous	Per Annual	5,000.00	5,500.00	6,050.00	6,655.00	7,320.50
Total Annual Office Supplier & Miscellaneous Cost		35,000.00	48,500.00	57,050.00	65,655.00	74,320.50
Total Annual Operating Cost		2,409,719.00	2,000,019.00	1,700,019.00	1,712,785.04	1,844,524.66
Total Computerized System Cost		3,131,817.00	2,172,617.00	1,877,617.00	1,895,383.04	2,032,122.66

Table E.2. Five Years Accumulated Computerized System Costs of Candidate 1, Baht.

Year	Total Computerized Cost	Accumulated Cost
1	3,131,817.00	3,131,817.00
2	2,172,617.00	5,304,434.00
3	1,877,617.00	7,182,051.00
4	1,895,383.04	9,077,434.04
5	2,032,122.66	11,109,556.70
Total	11,109,556.70	-

Table E.3. Computerized System Costs Analysis of Candidate 2, Baht.

Cost Items		Years				
		1	2	3	4	5
<u>Fixed Cost</u>						
<u>Hardware Cost</u>						
Computer Server	1 unit @ 85,000	17,000.00	17,000.00	17,000.00	17,000.00	17,000.00
Computer Workstation	7 units@ 48,000	67,200.00	67,200.00	67,200.00	67,200.00	67,200.00
Laser Printer	2 units@ 32,700	13,080.00	13,080.00	13,080.00	13,080.00	13,080.00
Dot Matrix Printer	1 unit @ 14,500	2,900.00	2,900.00	2,900.00	2,900.00	2,900.00
UPS	1 unit @ 6,600	1,320.00	1,320.00	1,320.00	1,320.00	1,320.00
Modem (External)	1 unit @ 2,850	570.00	570.00	570.00	570.00	570.00
Hub	1 unit @ 13,550	2,700.00	2,700.00	2,700.00	2,700.00	2,700.00
UTP Cat 5		800.00	800.00	800.00	800.00	800.00
Total Hardware Cost		105,570.00	105,570.00	105,570.00	105,570.00	105,570.00
<u>Software Cost</u>						
Software Server Cost		245,475.00	245,475.00	245,475.00	245,475.00	245,475.00
Software Workstation Cost		250,500.00	250,500.00	250,500.00	250,500.00	250,500.00
Total Software Cost		495,975.00	495,975.00	495,975.00	495,975.00	495,975.00
<u>Web Hosting Cost</u>						
Domain Register	Per Annual	15,000.00	15,000.00	15,000.00	15,000.00	15,000.00
Monthly Fee	Per Annual	4,500.00	4,500.00	4,500.00	4,500.00	4,500.00
Total Web Hosting Cost		19,500.00	19,500.00	19,500.00	19,500.00	19,500.00
<u>Maintenance Cost</u>						
Maintenance Cost		20,000.00	65,000.00	110,000.00	195,000.00	240,000.00
Total Maintenance Cost		20,000.00	65,000.00	110,000.00	195,000.00	240,000.00
<u>Implementation Cost</u>						
Design and Setup System Cost		1,200,000.00	-	-	-	-
Training Cost		400,000.00	-	-	-	-
Total Implementation Cost		1,600,000.00	-	-	-	-
<u>Office Equipment Cost</u>						
Calculator	3 Units @ 1,500	4,500.00	-	-	-	-
Total Office Equipment Cost		4,500.00	-	-	-	-
Total Fixed Cost		2,255,545.00	656,045.00	661,045.00	666,045.00	671,045.00

Table E.3. Computerized System Costs Analysis of Candidate 2, Baht (Continued).

Cost Items		Years				
		1	2	3	4	5
<u>Operating Cost</u>						
<u>Salary</u>						
Manager	1 person @ 30,000	30,000.00	33,600.00	38,640.00	44,436.00	51,101.40
Accounting Officer	2 persons@ 12,000	24,000.00	26,400.00	27,720.00	29,106.00	30,561.30
Marketing Officer	1 person @ 10,000	10,000.00	11,000.00	12,100.00	13,310.00	14,641.00
Sales Staff	1 person @ 8,000	8,000.00	8,800.00	9,680.00	10,648.00	11,712.80
Merchandise Officer	2 persons@ 12,000	24,000.00	26,400.00	29,040.00	31,944.00	35,138.40
Delivery Staff	1 person @ 6,500	6,500.00	6,825.00	7,098.00	7,381.92	7,677.20
Total Monthly Salary Cost		102,500.00	113,025.00	124,278.00	136,825.92	150,832.10
Total Annual Salary Cost		1,230,000.00	1,356,300.00	1,491,336.00	1,641,911.04	1,809,985.16
<u>Office Supplier & Miscellaneous Cost</u>						
Paper	Per Annual	10,000.00	20,000.00	25,000.00	30,000.00	35,000.00
Stationary	Per Annual	10,000.00	11,500.00	13,000.00	14,500.00	16,000.00
Utility	Per Annual	10,000.00	11,500.00	13,000.00	14,500.00	16,000.00
Miscellaneous	Per Annual	5,000.00	5,500.00	6,050.00	6,655.00	7,320.50
Total Annual Office Supplier & Miscellaneous Cost		35,000.00	48,500.00	57,050.00	65,655.00	74,320.50
Total Annual Operating Cost		2,409,719.00	2,600,019.00	2,700,019.00	2,912,785.04	2,444,524.66
Total Computerized System Cost		4,665,264.00	3,256,064.00	3,361,064.00	3,578,830.04	3,115,569.66

Table E.4. Five Years Accumulated Computerized System Costs of Candidate 2, Baht.

Year	Total Computerized Cost	Accumulated Cost
1	4,665,264.00	4,665,264.00
2	3,256,064.00	7,921,328.00
3	3,361,064.00	11,282,392.00
4	3,578,830.04	14,861,222.04
5	3,115,569.66	17,976,791.70
Total	17,976,791.70	-

Table E.5. Computerized System Costs Analysis of Candidate 3, Baht.

Cost Items		Years				
		1	2	3	4	5
<u>Fixed Cost</u>						
<u>Hardware Cost</u>						
Computer Server	1 unit @ 85,000	17,000.00	17,000.00	17,000.00	17,000.00	17,000.00
Computer Workstation	7 units@ 48,000	67,200.00	67,200.00	67,200.00	67,200.00	67,200.00
Laser Printer	2 units@ 32,700	13,080.00	13,080.00	13,080.00	13,080.00	13,080.00
Dot Matrix Printer	1 unit @ 14,500	2,900.00	2,900.00	2,900.00	2,900.00	2,900.00
UPS	1 unit @ 6,600	1,320.00	1,320.00	1,320.00	1,320.00	1,320.00
Modem (External)	1 unit @ 2,850	570.00	570.00	570.00	570.00	570.00
Hub	1 unit @ 13,550	2,700.00	2,700.00	2,700.00	2,700.00	2,700.00
UTP Cat 5		800.00	800.00	800.00	800.00	800.00
Total Hardware Cost		105,570.00	105,570.00	105,570.00	105,570.00	105,570.00
<u>Software Cost</u>						
Software Server Cost		11,984.00	11,984.00	11,984.00	11,984.00	11,984.00
Software Workstation Cost		15,544.00	15,544.00	15,544.00	15,544.00	15,544.00
Total Software Cost		28,528.00	28,528.00	28,528.00	28,528.00	28,528.00
<u>Web Hosting Cost</u>						
Domain Register	Per Annual	8,500.00	8,500.00	8,500.00	8,500.00	8,500.00
Monthly Fee	Per Annual	5,200.00	5,200.00	5,200.00	5,200.00	5,200.00
Total Web Hosting Cost		13,500.00	13,500.00	13,500.00	13,500.00	13,500.00
<u>Maintenance Cost</u>						
Maintenance Cost		30,000.00	35,000.00	40,000.00	45,000.00	50,000.00
Total Maintenance Cost		30,000.00	35,000.00	40,000.00	45,000.00	50,000.00
<u>Implementation Cost</u>						
Design and Setup System Cost		380,000.00	-	-	-	-
Training Cost		70,000.00	-	-	-	-
Total Implementation Cost		450,000.00	-	-	-	-
<u>Office Equipment Cost</u>						
Calculator	3 Units@ 1,500	4,500.00	-	-	-	-
Total Office Equipment Cost		4,500.00	-	-	-	-
Total Fixed Cost		622,098.00	172,598.00	177,598.00	182,598.00	187,598.00

Table E.5. Computerized System Costs Analysis of Candidate 3, Baht (Continued).

Cost Items		Years				
		1	2	3	4	5
<u>Operating Cost</u>						
<u>Salary</u>						
Manager	1 person @ 30,000	30,000.00	33,600.00	38,640.00	44,436.00	51,101.40
Accounting Officer	2 persons@ 12,000	24,000.00	26,400.00	27,720.00	29,106.00	30,561.30
Marketing Officer	1 person @ 10,000	10,000.00	11,000.00	12,100.00	13,310.00	14,641.00
Sales Staff	1 person @ 8,000	8,000.00	8,800.00	9,680.00	10,648.00	11,712.80
Merchandise Officer	2 persons@ 12,000	24,000.00	26,400.00	29,040.00	31,944.00	35,138.40
Delivery Staff	1 person @ 6,500	6,500.00	6,825.00	7,098.00	7,381.92	7,677.20
Total Monthly Salary Cost		102,500.00	113,025.00	124,278.00	136,825.92	150,832.10
Total Annual Salary Cost		1,230,000.00	1,356,300.00	1,491,336.00	1,641,911.04	1,809,985.16
<u>Office Supplier & Miscellaneous Cost</u>						
Paper	Per Annual	10,000.00	20,000.00	25,000.00	30,000.00	35,000.00
Stationary	Per Annual	10,000.00	11,500.00	13,000.00	14,500.00	16,000.00
Utility	Per Annual	10,000.00	11,500.00	13,000.00	14,500.00	16,000.00
Miscellaneous	Per Annual	5,000.00	5,500.00	6,050.00	6,655.00	7,320.50
Total Annual Office Supplier & Miscellaneous Cost		35,000.00	48,500.00	57,050.00	65,655.00	74,320.50
Total Annual Operating Cost		1,265,000.00	1,404,800.00	1,548,386.00	1,707,566.04	1,884,305.66
Total Computerized System Cost		1,887,098.00	1,577,398.00	1,725,984.00	1,890,164.04	2,071,903.66

Table E.6. Five Years Accumulated Computerized System Costs of Candidate 3, Baht.

Year	Total Computerized Cost	Accumulated Cost
1	1,887,098.00	1,887,098.00
2	1,577,398.00	3,464,496.00
3	1,725,984.00	5,190,480.00
4	1,890,164.04	7,080,644.04
5	2,071,903.66	9,152,547.70
Total	9,152,547.70	-

Table E.7. Payback Period Matrix Analysis of Candidate 1, Baht.

Cash Flow Description	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Development cost:	-3,902,000.00					
Operation & maintenance cost:		-2,409,719.00	-2,000,019.00	-1,700,019.00	-1,712,785.04	-1,844,524.66
Discount factors for 12%:	1.000	0.893	0.797	0.712	0.636	0.576
Time-adjusted costs (Adjusted to present value):	-3,902,000.00	-2,151,879.07	-1,594,015.14	-1,210,413.53	-1,089,331.29	-1,062,446.20
Cumulative time-adjusted costs over lifetime:	-3,902,000.00	-6,053,879.07	-7,647,894.21	-8,858,307.74	-9,947,639.02	-11,010,085.23
Benefits derived from operation of new system:	0	3,390,000.00	3,693,600.00	4,040,000.00	4,589,000.00	5,364,000.00
Discount factors for 12%:	1.000	0.893	0.797	0.712	0.636	0.576
Time-adjusted benefits (Current of present value):	0	3,027,270.00	2,943,799.20	2,876,480.00	2,918,604.00	3,089,664.00
Cumulative time-adjusted benefits over lifetime:	0	3,027,270.00	5,971,069.20	8,847,549.20	11,766,153.20	14,855,817.20
Cumulative lifetime time-adjusted cost + benefit:	-3,902,000.00	-3,026,609.07	-1,676,825.01	-10,758.54	1,818,514.18	3,845,731.97

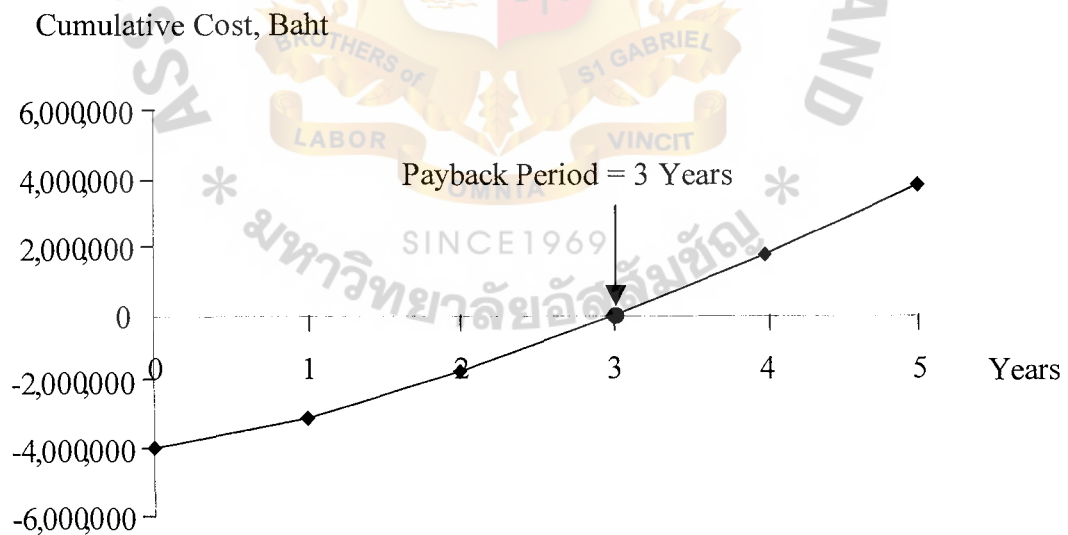


Figure E.1. Payback Analysis of Candidate 1.

Table E.8. Payback Period Matrix Analysis of Candidate 2, Baht.

Cash Flow Description	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Development cost:	-3,902,000.00					
Operation & maintenance cost:		-2,409,719.00	-2,600,019.00	-2,700,019.00	-2,912,785.04	-2,444,524.66
Discount factors for 12%:	1.000	0.893	0.797	0.712	0.636	0.576
Time-adjusted costs (Adjusted to present value):	-3,902,000.00	-2,151,879.07	-2,072,215.14	-1,922,413.53	-1,852,531.29	-1,408,046.20
Cumulative time-adjusted costs over lifetime:	-3,902,000.00	-6,053,879.07	-8,126,094.21	-10,048,507.74	-11,901,039.02	-13,309,085.23
Benefits derived from operation of new system:		3,390,000.00	3,693,600.00	4,040,000.00	4,589,000.00	5,364,000.00
Discount factors for 12%:	0	0.893	0.797	0.712	0.636	0.576
Time-adjusted benefits (Current of present value):	1.000	3,027,270.00	2,943,799.20	2,876,480.00	2,918,604.00	3,089,664.00
Cumulative time-adjusted benefits over lifetime:	0	3,027,270.00	5,971,069.20	8,847,549.20	11,766,153.20	14,855,817.20
Cumulative lifetime time-adjusted cost + benefit:	0	-3,026,609.07	-2,155,025.01	-1,200,958.54	-134,885.82	1,546,731.97

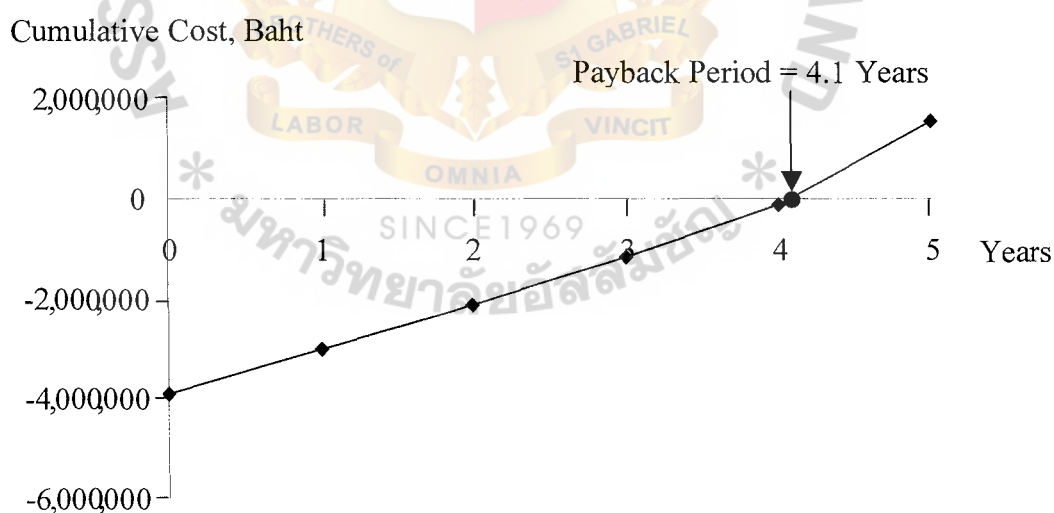


Figure E.2. Payback Analysis of Candidate 2.

Table E.9. Payback Period Matrix Analysis of Candidate 3, Baht.

Cash Flow Description	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Development cost:	-3,902,000.00					
Operation & maintenance cost:		-1,887,098.00	-1,577,398.00	-1,725,984.00	-1,890,164.04	-2,071,903.66
Discount factors for 12%:	1.000	0.893	0.797	0.712	0.636	0.576
Time-adjusted costs (Adjusted to present value):	-3,902,000.00	-1,685,178.51	-1,257,186.21	-1,228,900.61	-1,202,144.33	-1,193,416.51
Cumulative time-adjusted costs over lifetime:	-3,902,000.00	-5,587,178.51	-6,844,364.72	-8,073,265.33	-9,275,409.66	-10,468,826.17
Benefits derived from operation of new system:	0	3,390,000.00	3,693,600.00	4,040,000.00	4,589,000.00	5,364,000.00
Discount factors for 12%:	1.000	0.893	0.797	0.712	0.636	0.576
Time-adjusted benefits (Current of present value):	0	3,027,270.00	2,943,799.20	2,876,480.00	2,918,604.00	3,089,664.00
Cumulative time-adjusted benefits over lifetime:	0	3,027,270.00	5,971,069.20	8,847,549.20	11,766,153.20	14,855,817.20
Cumulative lifetime time-adjusted cost + benefit:	-3,902,000.00	-2,559,908.51	-8,73,295.52	774,283.87	2,490,743.54	4,386,991.03

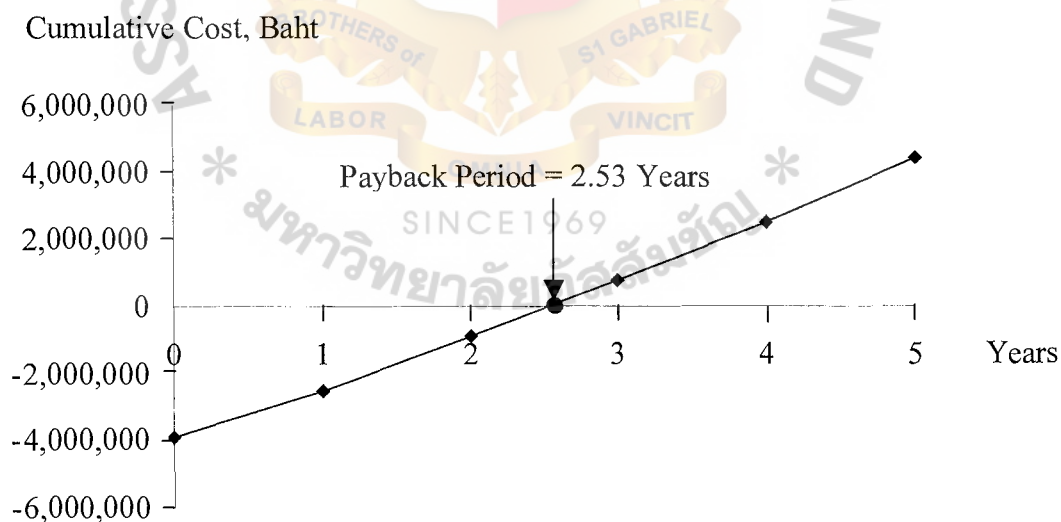


Figure E.3. Payback Analysis of Candidate 3.

Table E.10. Net Present Value Analysis of Candidate 1, Baht.

Cash Flow Description	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Development cost:	-3,902,000.00						
Operation & Maintenance cost:		-2,409,719.00	-2,000,019.00	-1,700,019.00	-1,712,785.04	-1,844,524.66	
Discount factors for 12%:	1.000	0.893	0.797	0.712	0.636	0.576	
Present value of annual costs:	-3,902,000.00	-2,151,879.07	-1,594,015.14	-1,210,413.53	-1,089,331.29	-1,062,446.20	
Total present value of lifetime costs:							-11,010,085.23
Benefits derived from operation of new system:	0	3,390,000.00	3,693,600.00	4,040,000.00	4,589,000.00	5,364,000.00	
Discount factors for 12%:	1.000	0.893	0.797	0.712	0.636	0.576	
Present value of annual benefits:	0	3,027,270.00	2,943,799.20	2,876,480.00	2,918,604.00	3,089,664.00	
Total present value of lifetime benefits:							14,855,817.20
NET PRESENT VALUE:							3,845,731.97

Table E.11. Net Present Value Analysis of Candidate 2, Baht.

Cash Flow Description	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Development cost:	-3,902,000.00						
Operation & Maintenance cost:		-2,409,719.00	-2,600,019.00	-2,700,019.00	-2,912,785.04	-2,444,524.66	
Discount factors for 12%:	1.000	0.893	0.797	0.712	0.636	0.576	
Present value of annual costs:	-3,902,000.00	-2,151,879.07	-2,072,215.14	-1,922,413.53	-1,852,531.29	-1,408,046.20	
Total present value of lifetime costs:							-13,309,085.23
Benefits derived from operation of new system:	0	3,390,000.00	3,693,600.00	4,040,000.00	4,589,000.00	5,364,000.00	
Discount factors for 12%:	1.000	0.893	0.797	0.712	0.636	0.576	
Present value of annual benefits:	0	3,027,270.00	2,943,799.20	2,876,480.00	2,918,604.00	3,089,664.00	
Total present value of lifetime benefits:							14,855,817.20
NET PRESENT VALUE:							1,546,731.97

Table E.12. Net Present Value Analysis of Candidate 3, Baht.

Cash Flow Description	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Development cost:	-3,902,000.00						
Operation & Maintenance cost:		-1,887,098.00	-1,577,398.00	-1,725,984.00	-1,890,164.04	-2,071,903.66	
Discount factors for 12%:	1.000	0.893	0.797	0.712	0.636	0.576	
Present value of annual costs:	-3,902,000.00	-1,685,178.51	-1,257,186.21	-1,228,900.61	-1,202,144.33	-1,193,416.51	
Total present value of lifetime costs:							-10,468,826.17
Benefits derived from operation of new system:	0	3,390,000.00	3,693,600.00	4,040,000.00	4,589,000.00	5,364,000.00	
Discount factors for 12%:	1.000	0.893	0.797	0.712	0.636	0.576	
Present value of annual benefits:	0	3,027,270.00	2,943,799.20	2,876,480.00	2,918,604.00	3,089,664.00	
Total present value of lifetime benefits:							14,855,817.20
NET PRESENT VALUE:							4,386,991.03

Table E.13. Return-on-Investment Analysis (ROI).

ROI	Candidate 1	Candidate 2	Candidate 3
Percent	35	12	42
Average Percent per Year	4.38	2.40	8.40



APPENDIX F
WEB INTERFACE DESIGN

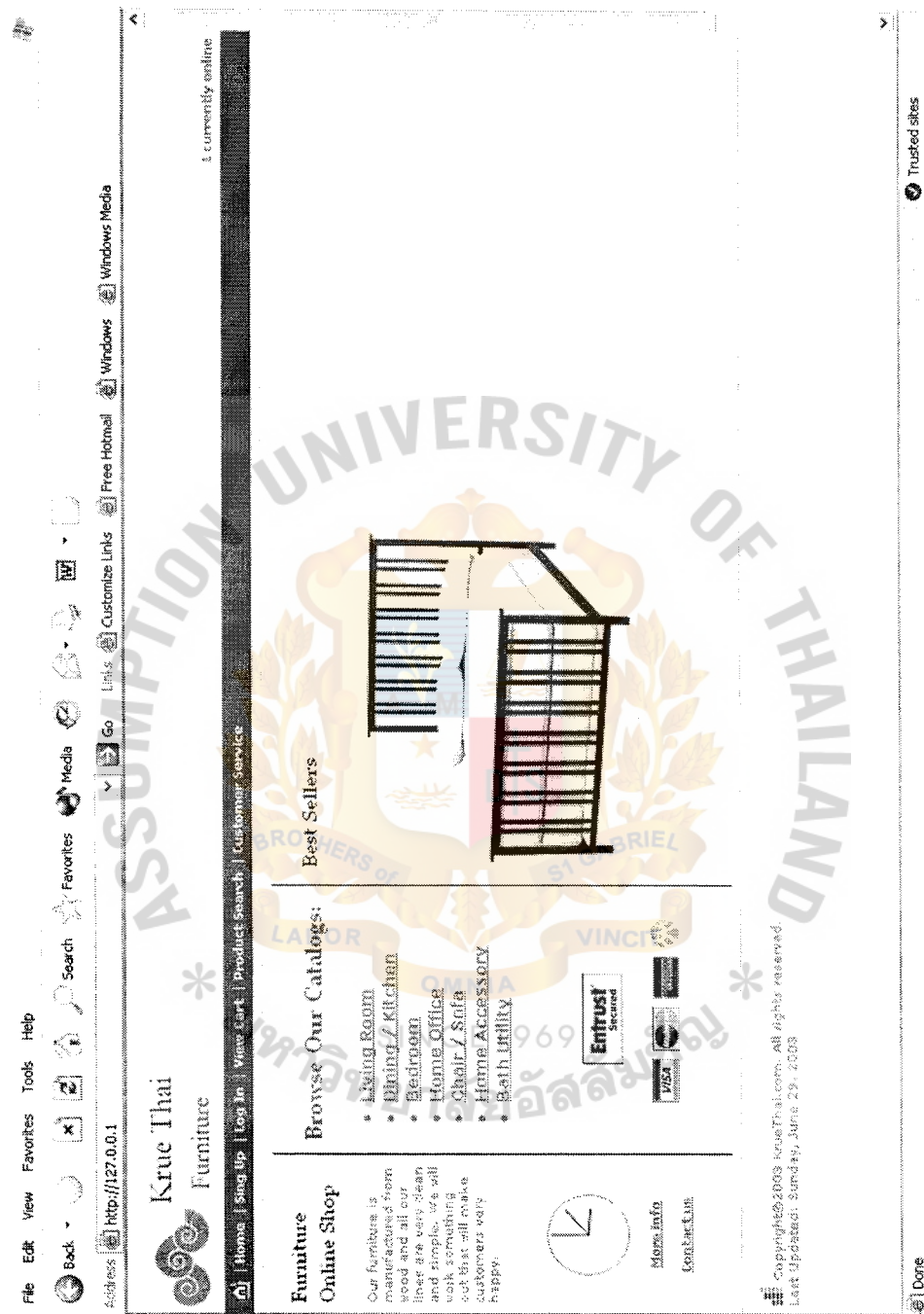


Figure F.1. Home Page.

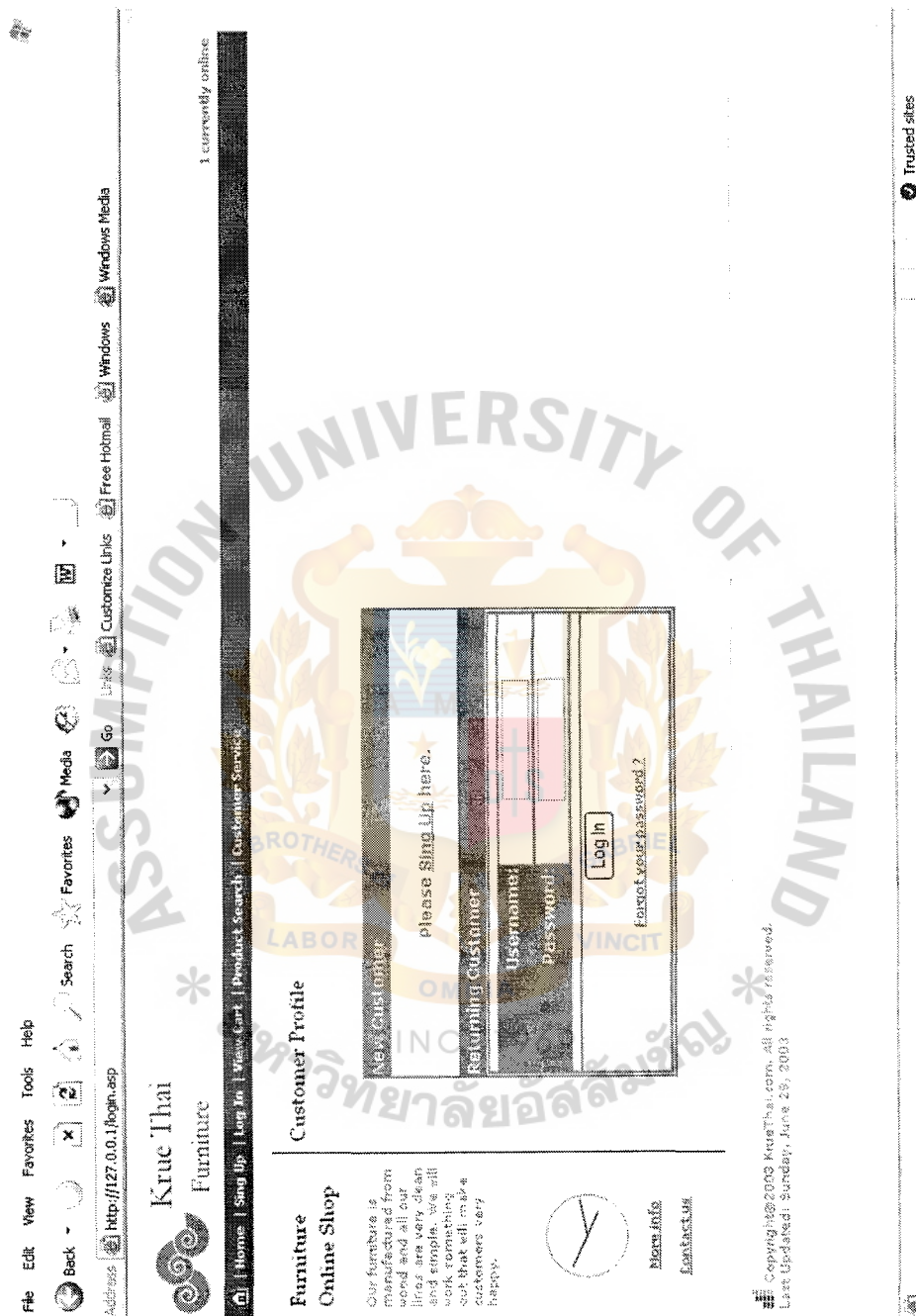


Figure F.2. Customer Log In Page.

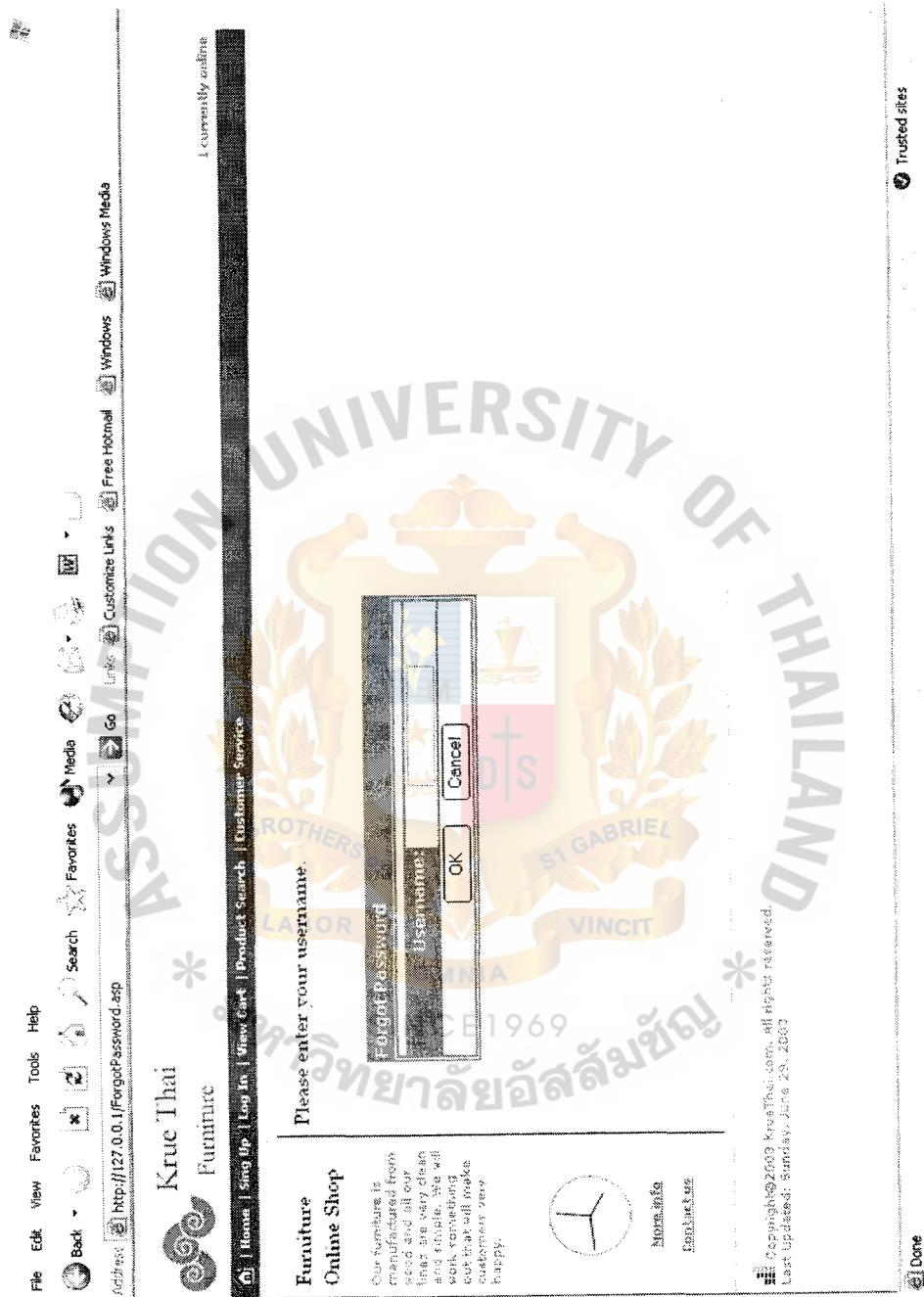


Figure F.3. Forgot Password Page.

File Edit View Favorites Tools Help

Back - Forward Stop Search Favorites Media Go Links Customizer Links Free HTML Windows Windows Media

Address http://127.0.0.1/signUp.asp

Krue Thai Furniture

Home | Sign Up | Log In | View Cart | Product Search | Customer Service

1 currently online

Furniture Online Shop

Our furniture is manufactured from wood and all our lines are very clean and simple. We will work something out that will make customers very happy.

More Info
Contact Us

Sign Up

* please fill out this form completely, and then press the Sign Up button to continue.

Customer Information

Name (First, Last): *

Login Name: *

Password: * * At least 4 characters

Confirm Password: *

E-mail Address: * Example: user@generalink.com

Street Address: *

P.O. Box/Rural Route: * * Enter "NA" if not applicable

City, State, Postal Code: *

Country: *

Telephone: * Example: 642-511-5755

Shipping Information (if different than Customer Information)

Name (First, Last):

Done Trusted sites

Figure F.4. Sign Up Page.

File Edit View Favorites Tools Help

Back Search Favorites Media Go Links Customize Links Windows Windows Media

Address: http://127.0.0.1/productsByCategory.aspx?catId=2&catName=Furniture

Krue Thai Furniture

Home Sign Up Log In View Cart Product Search Customer Service

Furniture Online Shop

Our furniture is manufactured from wood and all our lines are very clean and simple. We will work something out that will make customers very happy.

Dining / Kitchen

Product ID	Product	Unit Price	Picture	Product
11	Sullivan Extension Table	\$399.00		
12	Sullivan Chair	\$39.95		
13	Stanford Extension Table	\$349.00		
14	Nadison Chair	\$159.00		
15	Headland Folding Buffet	\$179.00		

More

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Last Updated: Sunday, June 29, 2003

Trusted Sites

Figure F.5. Browse Product by Category Page.

File Edit View Favorites Tools Help

Back Search Favorites Media Go Links Customize Links Free Home! Windows Windows Media

Address: http://127.0.0.1/product.asp?ProdID=13

Krue Thai Furniture

1 currently online

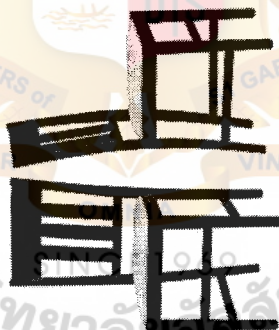
Home | Sing Up | Log In | View Cart | Product Search | Customer Service

Furniture Online Shop

Our furniture is manufactured from wood and all our lines are very clean and simple, we will work something out that will make customers very happy.

More Info
Contact Us

Madison Extension Table



Madison Extension Table: Space in styling, generous in capacity. This tailored table boasts two easy access extension leaves, quickly expanding the seating capacity to ten. 6' Madisons are on solid beechwood treads for maximum stability. Solid wood, veneers and multi-material construction, with a handsome espresso finish.

Size: Table: 85"X35.25"X29" H
(94.25" with leaves)

Price: \$349.00

Add to my order.

[Add to Cart](#)

[Review Your Order And/Or Check Out](#)

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Done

Trusted sites

Figure F.6. Product Detail Page.



Figure F.7. Confirm Add Product Page.

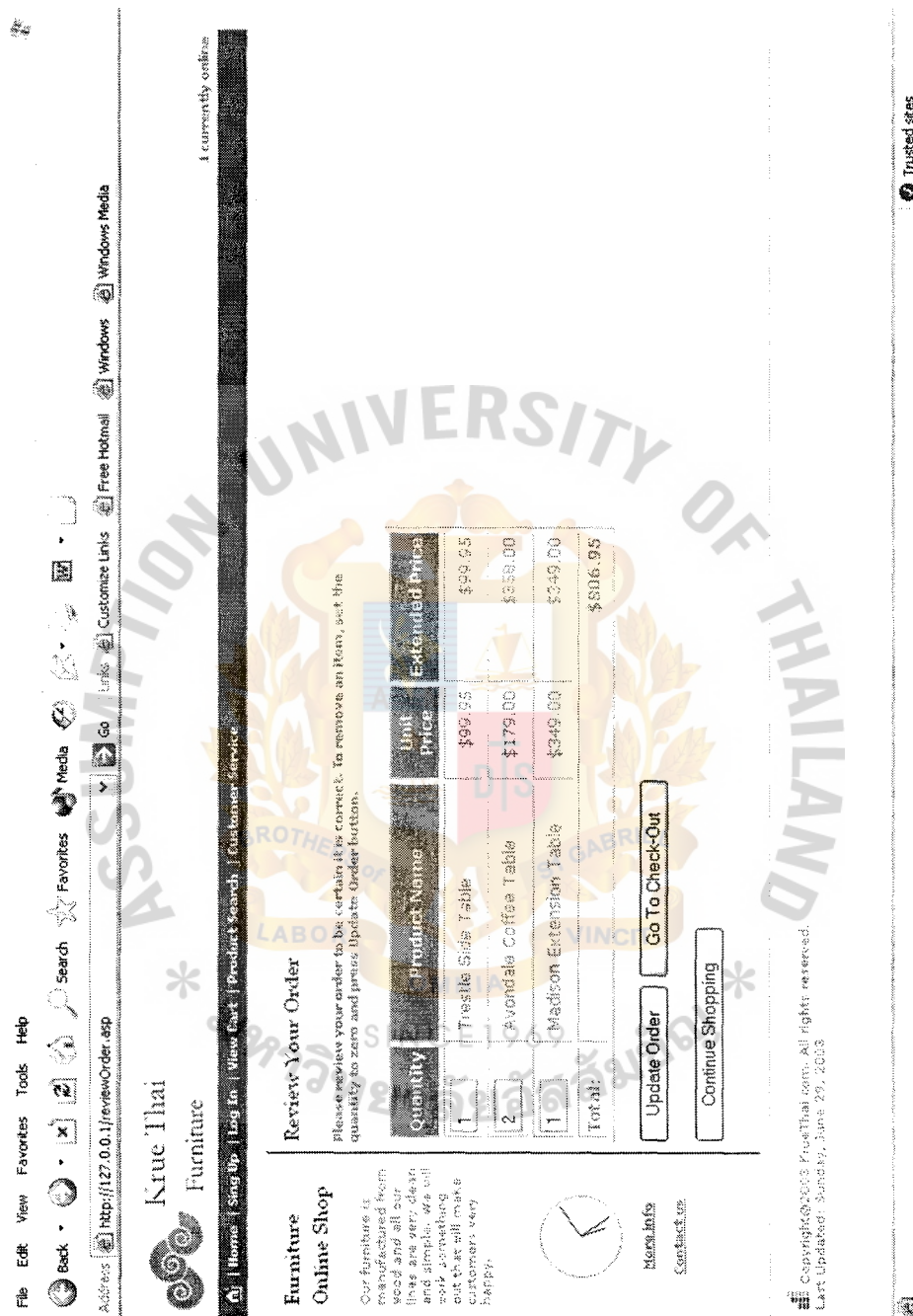


Figure F.8. Review Order Product Page.

File Edit View Favorites Tools Help

Back
Forward
Stop
Home
Search
Favorites
Media
Go
Link
Customize Links
Free Hotmail
Windows
Windows Media

http://127.0.0.1/checkout.asp

1 currently online

Home
Sign Up
Log In
View Cart
Product Search
Customer Service

Furniture Online Shop

Our furniture is manufactured from wood and all our lines are very clean and simple. We will work something out that will make customers very happy.

More Info
Contact Us

Confirm Your Order

Is something incorrect? Feel free to change your order.

Quantity	Prod. #	Description	Unit Price	Ext. Price
1	1	Trestle Side Table	\$99.95	\$99.95
2	14	Avondale Coffee Table	\$179.00	\$358.00
1	13	Madison Extension Table	\$349.00	\$349.00
Subtotal:				\$806.95
Shipping (5%):				\$40.35
Tax (8%):				\$64.55
Total:				\$911.85

Submit Order

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Done

Figure F.9. Check Out Order Product Page.

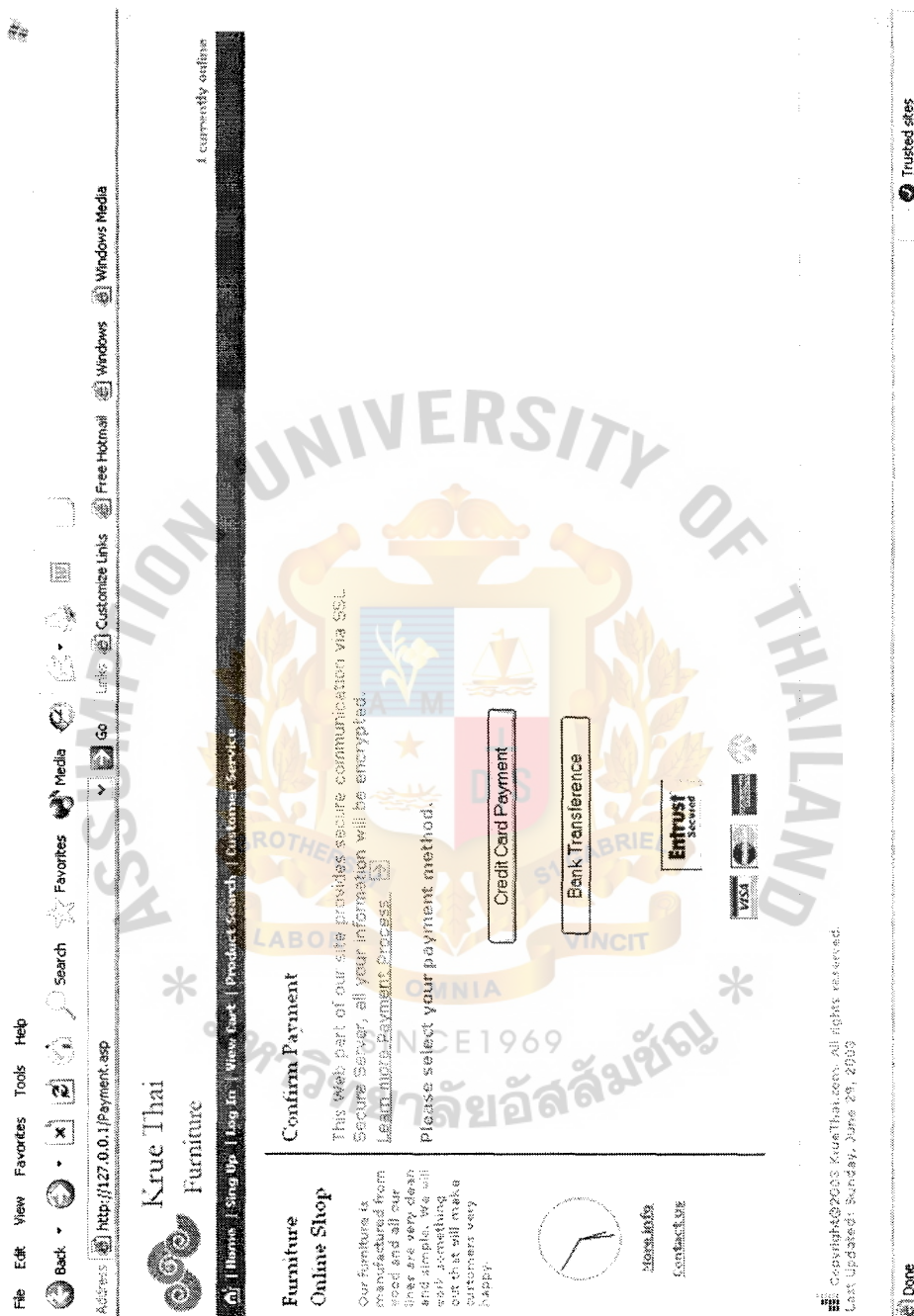


Figure F.10. Select Payment Method Page.

File Edit View Favorites Tools Help

Back Forward Stop Reload Home Search Favorites Media Go Links Customise Links Free HTML Mail Windows Windows Media

Address: http://127.0.0.1/PaymentCredit.asp

1 currently online

Krue Thai Furniture

Home | Sing Up | Log In | View Cart | Product Search | Customer Service

Furniture Online Shop

Our furniture is manufactured from wood and all our lines are very clean and simple. We will make sure you will be very happy.

[More Info](#)
[Contact Us](#)

Credit Card Payment

This Web part of our site provides secure communication means that your information that you provide, such as your name or credit-card number, is encrypted so that it can't be read or intercepted by other people. This ensures that no other site can assume the identity of the original site.

please enter this form completely

Credit Card Information

Card Type: * Choose one from drop-down list

Card Number: * Enter number without spaces

Card Expiration: * Format mm/yy, example: 01/01

Name on Card:

Billing Address: * Enter complete address + ZIP

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Last updated: Sunday, June 29, 2003

Done

Figure F.11. Select Credit Card Payment Method Page.

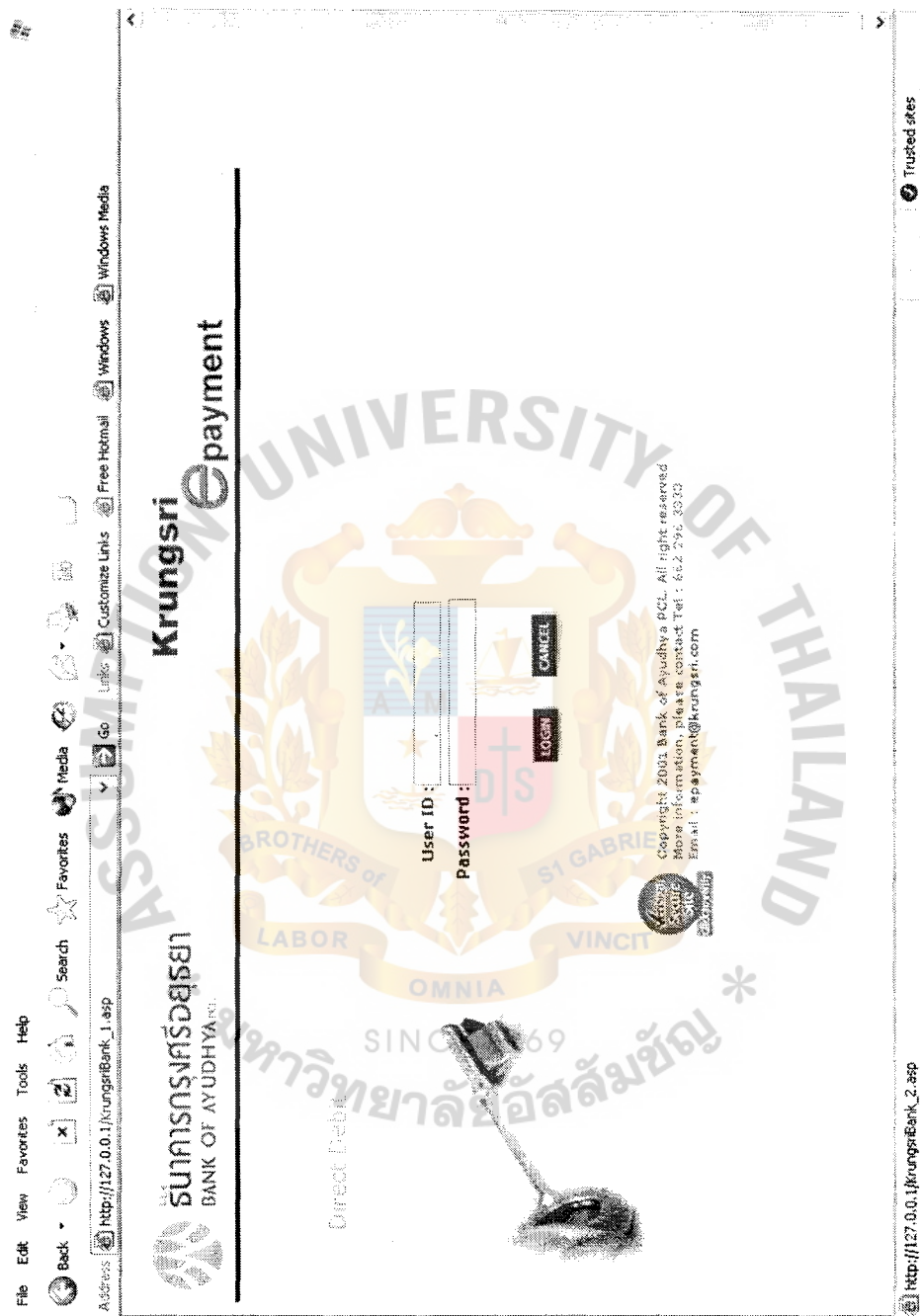


Figure F.12. Select Bank Transference Payment Method Page.



Figure F.13. Confirmation Order Page.



Figure F.14. Product Search Page.



Figure F.15. Search Results Page.



Figure F.16. More Information Page.

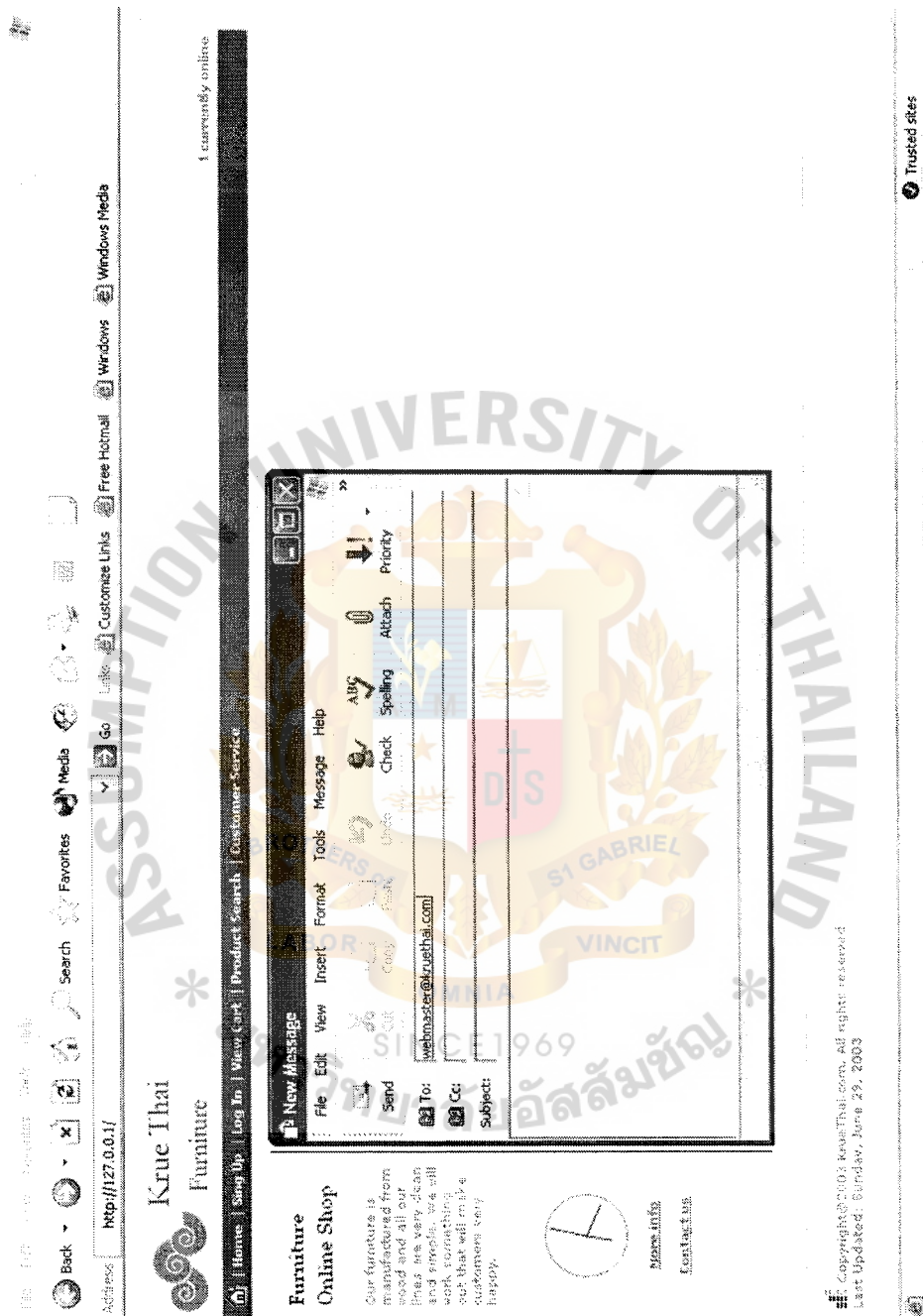


Figure F.17. Contact Us Page.



Figure F.18. Administrator Log In Page.

File Edit View Favorites Tools Help

Back
Forward
Home
Stop
Search
Favorites
Media
Go

Address: http://127.0.0.1/AdminEditProduct1.asp?intProdID=1

Krue Thai Furniture

Home
Sign Up
Log In
View Cart
Product Search
Customer Service

1 currently online

Furniture Online Shop

Our furniture is manufactured from wood and all our lines are very clean and simple. We will work something out that will make customers very happy.

More Info
fontaskas

For Administrator

Product ID: 1

Product Name: Trestle Side Table

Description: Simplicity itself in steel and glass. Our Trestle lamp table features chic, clean lines in solid, hand-welded industrial grade steel with a smooth, metallic powder-coat finish. Tabletop and fixed lower shelf are 3/8-inch glass.

Product Size: Table 18

Price: 99.95

Quantity in Stock: 9

Picture: images/Living Room/0101.jpg

Update
Cancel

Trusted sites

Figure F.19. Administrator Update Product Page.

File Edit View Favorites Tools Help

Address: http://127.0.0.1/AdminPurchaseForm.asp

Back Search Favorites Media Go Links Customize Links Free Hotmail Windows Windows Media

1 currently online

Krue Thai Furniture

Home Sing Up Log In View Cart Product Search Customer Service

Purchase Form

Supplier Information

Supplier ID: S001

Supplier Name: Thai Shop Furniture

Street Address: 379 Moo 3 Klongtheneon

City, State, Postal Code: Bangkok 10220

Country: Thailand

Telephone: 02-231-4667

Product Information

Product ID: P0101

Product Name: Trestle Side Table

Product Cost: 1500

Product Quantity: 5

Add Delete

Preview Print

Done

Trusted sites

Furniture Online Shop

Our furniture is manufactured from wood and all our lines are very clean and simple. We will work something out that will make customers very happy!

More info
Santarakul.ac

Figure F.21. Administrator Purchase Order Page.

File Edit View Favorites Tools Help

Back Search Favorites Media Go Links Customize Links Free Hotmail Windows Windows Media

Address http://127.0.0.1/AdminPurchase.asp

Kruec Thai Furniture

Home Sing Up Log In View Cart Product Search Customer Service

Furniture Online Shop

Our furniture is manufactured from wood and all our lines are very clean and simple. We will work something out that will make customers very happy.

More Info
Contact Us

currently online

Kruec Thai Furniture CO., Ltd.

232 Prechanivat Road, Muan, Changmai 50000 Tel. (053) 435-231
Purchase No. 8817 Date 25 June 2009

Purchase Order

Supplier : Thai Shop Furniture CO., Ltd.
Address : 3/79 Moo 3, Klongthanan, Salmali, Bangkok 10220

No.	Product Name	Product Price	Quantity
1	Trestle Side Table	1,500.00	5
2	Trestle Tower	1,000.00	2
3	Avondale Coffee Table	2,500.00	5
Total :			22,000
Vat 7% :			1,540
Grand Total :			23,540

Print

Figure F.22. Administrator Preview Purchase Order Page.



APPENDIX G
REPORT DESIGN

Products Report

No.	Product Name	Product Size	Price	Stock
1	Trestle Side Table	Table. 18"x18"x22"H	\$99.95	9
2	Trestle Tower	Tower. 13"x12"x60"H	\$159.00	56
3	Avondale Coffee Table	Table. 22"x44"x17"H	\$179.00	45
4	Noble Wine Bar	Wine Bar. 26.5"x18.75"x41.5"H	\$259.00	10
5	Madison Wine Tower	Tower. 16"sq.x66"H	\$239.00	12
6	Morrison Storage Cabinet	Cabinet. 21.5"x16"x44"H	\$169.00	33
7	Morrison Wall Cabinet with Mirror	Wall Cabinet. 39.5"x7.75"x18"H	\$149.00	53
8	Kali Coffee Table	Coffee Table. 22"x42"x16"H	\$179.00	6
9	Kali Side Table	Side Table. 22"sq.x22"H	\$129.00	14
10	Kali Wall Mirror	Mirror. 23.75"x31.75"	\$99.95	35

Figure G.1. Products Report.

Customers Report

State : Bangkok

First Name	Last Name	Address	Phone	Email
Araya	Plengkam	597/2 Nivat Road.	02-585-3060	Araya@thaimail.com
Ittichai	Palasuwan	302 Soi Janrunsanitwong 32	02-4344832	Ittichai@hotmail.com
Jirapa	Pokkanasut	106/2 Soi Sukhomvit 63	02-391-4353	Jirapa@thaimail.com
Malewan	Meemana	223/343 Sukhomvit	02-3424244	Malewan@yahoo.com
Nuntachai	Siripornphapat	96/167 Mooban Mantana	02-383-4810	Nun@ams.com
Sudang	Kantrakul	2411/29 Sukhomvit	02-538-6791	Sudang@yahoo.com
Wanthanee	Theerawatthanaset	52/1 Soi Sukhomvit 42	02-741-8516	Wanthanee@email.com

State : Changmai

First Name	Last Name	Address	Phone	Email
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Figure G.2. Customers Report.

Sales Order Report

Order No.	Order Date	Customer Name	Total Payment	Payment Method	Payment Status	Delivery Status
1	19/02/2003	Ittichai Palasuwan	\$100.00	Credit Card	Yes	Yes
2	20/02/2003	Malewan Meemana	\$159.00	Credit Card	Yes	Yes
3	20/02/2003	Chanin Pindanon	\$179.00	Credit Card	Yes	Yes
4	21/02/2003	Vinai Sirichartwapee	\$259.00	Bank Transference	Yes	Yes
5	24/02/2003	Araya Plengkam	\$239.00	Credit Card	Yes	Yes
6	05/03/2003	Wanthanee Theerawat	\$169.00	Bank Transference	Yes	Yes
7	10/03/2003	Nuntachai Siripornphapat	\$149.00	Credit Card	Yes	Yes
8	20/03/2003	An-chalee Cheensomboon	\$179.00	Bank Transference	Yes	Yes
9	21/03/2003	Ekachai Laima	\$129.00	Credit Card	Yes	Yes
10	27/03/2003	vasin wongrat	\$100.00	Credit Card	Yes	Yes

Figure G.3. Sales Order Report.

Minimum Product Weekly Report

No.	Product Name	Price	Last Balance Stock	Updated Date
1	Madison Chair	\$100.00	3	29/06/2003
2	Wood Baking Gadgets	\$179.00	2	29/06/2003
3	Gazebo Chair	\$349.00	3	29/06/2003
4	Sloane Bed	\$499.00	4	29/06/2003

Figure G.4. Minimum Product Weekly Report.

Top Ten Best Sellers Monthly Report

No.	Product Name	Price	Ordered Unit	Updated Date
1	Trestle Tower	\$159.00	35	30/06/2003
2	Avondale Coffee Table	\$179.00	30	30/06/2003
3	Morrison Wall Cabinet with Mirror	\$169.00	28	30/06/2003
4	Kali Coffee Table	\$149.00	26	30/06/2003
5	Kali Side Table	\$179.00	24	30/06/2003
6	Kali Wall Mirror	\$129.00	21	30/06/2003
7	Sullivan Chair	\$399.00	21	30/06/2003
8	Madison Extension Table	\$100.00	19	30/06/2003
9	Madison Chair	\$349.00	18	30/06/2003
10	Heartland Folding Buffet	\$159.00	17	30/06/2003

Figure G.5. Top Ten Best Sellers Monthly Report.

Inventory Report

No.	Product Name	Product Size	Price	Ordered Unit	Unit in Stock	Balance Stock
1	Trestle Side Table	Table. 18"x18"x22"H	\$100.00	1	4	3
2	Trestle Tower	Tower. 13"x12"x60"H	\$159.00	2	56	54
3	Avondale Coffee Table	Table. 22"x44"x17"H	\$179.00	3	45	42
4	Madison Wine Tower	Tower. 16"sq.x66"H	\$259.00	1	10	9
5	Morrison Storage Cabinet	Cabinet. 21.5"x16"x44"H	\$239.00	1	12	11
6	Morrison Wall Mirror	Wall Cabinet. 39.5"x7.75"x18"H	\$169.00	2	33	31
7	Kali Coffee Table	Coffee Table. 22"x42"x16"H	\$149.00	3	53	50
8	Kali Side Table	Side Table. 22"sq.x22"H	\$179.00	4	6	2
9	Kali Wall Mirror	Mirror. 23.75"x31.75"	\$129.00	2	14	12
10	Sullivan Extension Table	Chair. 17"x17.5"x37"H	\$100.00	1	35	34

Figure G.6. Inventory Report.

Sales Order by Category Report



Figure G.7. Sales Order by Category Report.

Trading Profit Annual Report

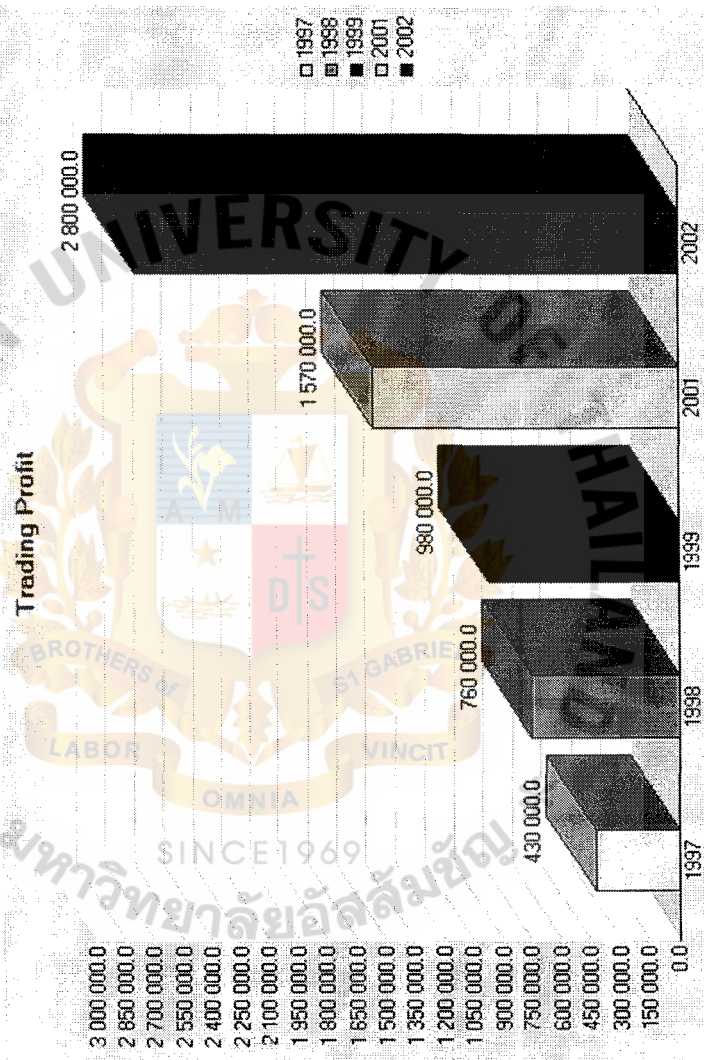


Figure G.8. Trading Profit Annual Report.

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