



Purchasing Information System of
Inter Medical Company Limited

by

Ms. Vanida Ammornmootta

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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Project Title	Purchasing Information System of Inter Medical Company Limited
Name	Ms. Vanida Ammornmootta
Project Advisor	Asst.Prof.Dr. Vichit Avatchanakorn
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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.

Approval Committee:



V. Avatchanakorn

(Asst.Prof.Dr. Vichit Avatchanakorn)
Advisor and Member

S. Charmonman

(Prof.Dr. Srisakdi Charmonman)
Chairman

AM-chulit Meesajjee

(Air Marshal Dr. Chulit Meesajjee)
Dean and Co-advisor

S. Thayarnyong

(Assoc.Prof. Somchai Thayarnyong)
MUA Representative

July 20, 2003

ABSTRACT

Information technology plays an important role in today's organizational design. As competition becomes more intense nowadays, we need to change the manual system to the computerized system.

The Purchasing Information System is developed according to the system analysis and design techniques. This system development project is to develop the information system of purchasing department to facilitate the medical purchasing process which currently operates manually. The manual process causes inefficiency in work and poor customer service.

This project is a study analysis, design and implementation of purchasing information system for Inter Medical Company Limited. The project focuses on fulfilling user requirements, system design, cost/benefit analysis, security and control of the system of purchasing process, providing medicine information, collecting supplier information and performing the purchase order report. The system helps to speed up the operations of the company and aids the management for strategic decision making.

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I. INTRODUCTION

1.1 Background of the Project

Purchasing Information System is a project development for Inter Medical Company Limited. All the services concerning order processing (medicine) are done at the company manually. According to nature of this business, the order processing is a key component of success. The major concerns of order processing are medicine database, supplier database, customer purchase order, and purchase order to supplier which affect the business in the way of profit, cash flow, and investment.

It is important for the company to survive in this competitive economy as the global economy is changing rapidly. Providing efficient services to the customers is very important in this state of economy. Therefore, the management has decided that the service of the company has to be improved in order to survive in the present economic situation. The existing business operations must first be analyzed before a new system can be designed and implemented.

1.2 Objectives of the Project

The objectives of the project are to study the existing system, analyze and evaluate the current problems, and conduct a feasibility study of a new system. The results obtained are then used to design and implement a computerized Purchasing Information System.

The objectives of this project are as follows:

- (1) Speed up the operations.
- (2) To provide prompt results in getting information and to offer efficient services to other department.

- (3) To reduce the redundant information.
- (4) To enhance the efficiency of database system.
- (5) To provide the data security for Purchasing Department.

1.3 Scope of the Project

Purchasing Information System is a computer-based system of the Purchasing Department in Inter Medical Company Limited.

The scopes of the project are as follows:

(1) Collect Medicine and Supplier Information

Purchasing Department has to collect all supplier information for contacting, ordering and asking some new information especially medicine price.

(2) Collect Purchasing Requisition

Sales Department performs purchasing requisition and sends to Purchasing Department in order to order the medicine.

(3) Check Stock Balance

After receiving purchasing requisition, Purchasing Department has to check stock available. If the stock is not enough they will perform more purchasing orders.

(4) Perform Purchasing Process

If the stock is not available, Purchasing Department has to prepare the purchase order and other documents to perform purchasing process.

(5) Produce Purchasing Report

Purchasing Department has the responsibility to produce purchasing reports and submit to Manager.

1.4 Deliverables of the Project

The deliverables of this project is the new Purchasing Control Information System. The proposed project provides the following:

- (1) Project Introduction
 - (a) Background of the Project
 - (b) Objectives of the Project
 - (c) Scope of the Project
 - (d) Project Plan
- (2) The Existing System
 - (a) Background of the Organization
 - (b) Existing Business Function
 - (c) Current Problems and Areas for Improvement
- (3) The Proposed System
 - (a) User Requirements
 - (b) System Design
 - (c) Hardware and Software Requirements
 - (d) Security and control
 - (e) Cost and Benefit Analysis
- (4) Project Implementation
 - (a) Programming
 - (b) Testing
 - (c) Installation
 - (d) Conversion
 - (e) Training
 - (f) Documentation

(5) Conclusions and Recommendations

(a) Conclusions

(b) Recommendations

1.5 Project Plan

Purchasing Information System is planned to be complete in a total 16 weeks or 4 months as shown in Figure 1.1.

The project plan can be categorized into three major steps as follows:

- (1) System Analysis: Five weeks will be spent for system analysis including defining the objective and scope, studying the existing system, identifying the existing company system, developing context diagram, and developing data flow diagram and cost and benefit analysis. It is necessary to study how the existing system works and get the user requirements to solve the existing problem.
- (2) System Design: Five weeks will be spent for system design. System design process includes user interface design, report layout design, database design and program design.
- (3) System Implementation: Six weeks or 1.5 months will be spent in system implementation. System implementation provides coding, testing, hardware and installation, and train users that will be the last step in project plan.

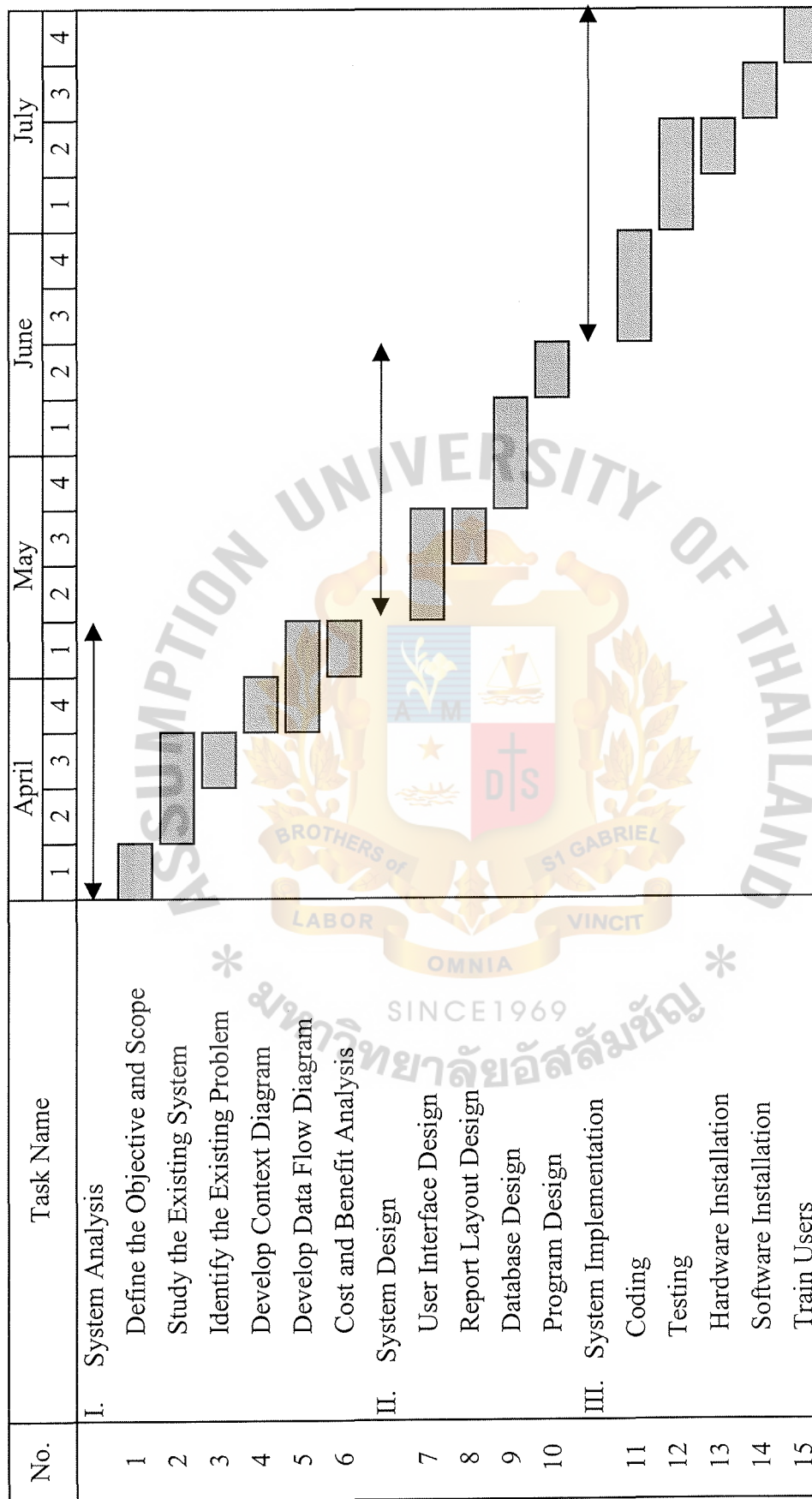


Figure 1.1. Project Plan of Purchasing Information System.

II. THE EXISTING SYSTEM

The existing system is the current system that company would like to analyze in order to design the new system. System analysis will include a through system checking starting from the background of the organization, the existing business function, the current problems and the existing system.

2.1 Background of the Organization

Inter Medical Company Limited was established in 1998 with 10 millions Baht of authorized capital. It is located in VAT Building 5th floor, Rama 9, Suanluang Bangkok.

The company mainly involves in providing all kinds of medicines to customers as it serves as an importer and dealer for several suppliers. With its vast connection to major customers and suppliers, the company mostly deals with its client through fax, phone and direct personal contacts. The current system is manual and the company has a plan to computerize the system through Purchasing Information System.

Initially, the company was only small business and was not exactly separated into departments. At present, the company is divided into six major departments: Purchasing Department, Operation Department, Sales Department, Finance and Accounting Department, Personnel Department and Warehouse. The organization chart is shown in Figure 2.1.

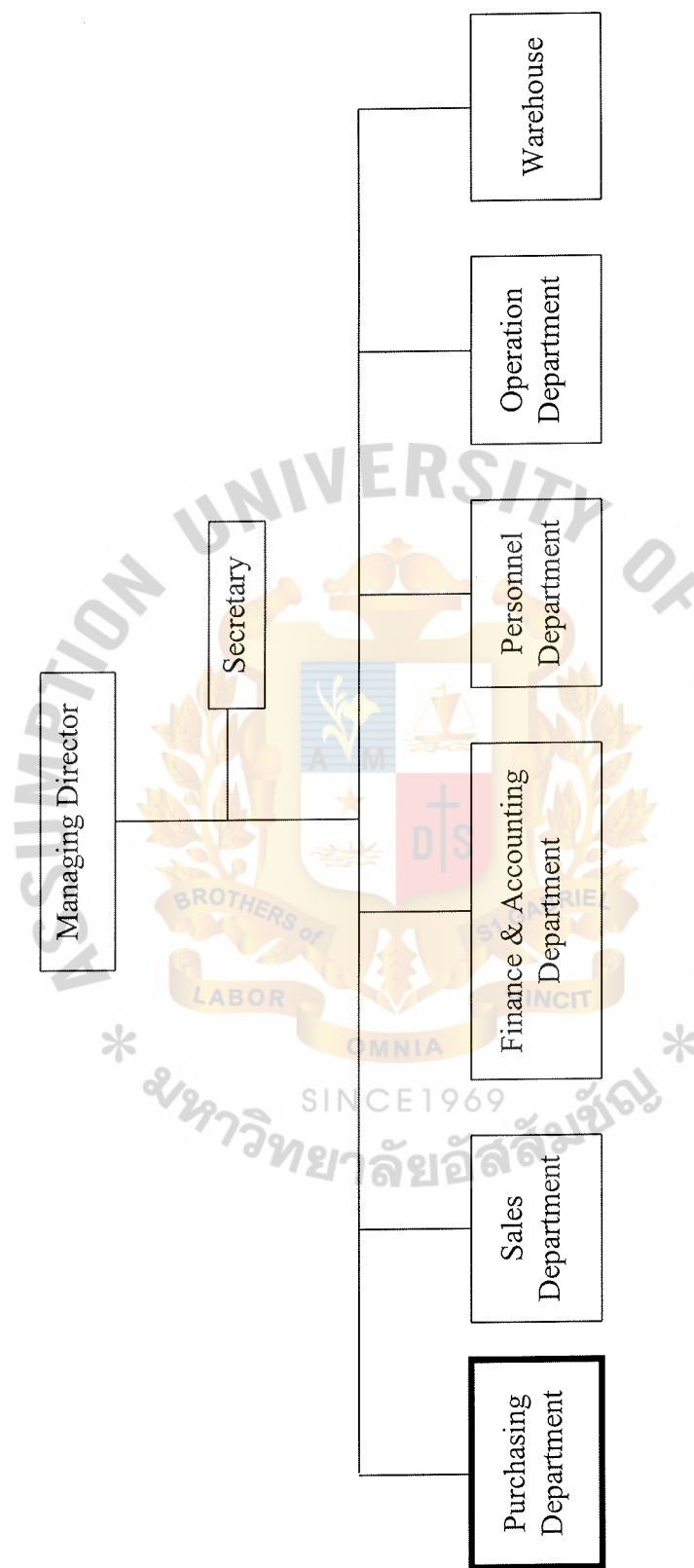


Figure 2.1. Organization Chart of Inter Medical Company Limited.

Function descriptions of departments are as follows:

(1) Purchasing Department

- (a) Receive the purchasing requisition from Sales Department.
- (b) Check the stock available.
- (c) Issue purchase order to supplier.
- (d) Collect and update all medicine and supplier information.
- (e) Provide information to Sales Department.
- (f) Prepare reports for manager.

(2) Operation Department

- (a) Prepare documents for Sales Department.
- (b) Deliver incoming fax to appropriate department.
- (c) Fax all documents in the company.

(3) Sales Department

- (a) Prepare promotion planning.
- (b) Propose quotation to customer.
- (c) Receive customer orders.
- (d) Check available quantity of medicine.
- (e) Make the purchasing requisition to Purchasing Department.

(4) Finance and Accounting Department

- (a) Record accounting transaction.
- (b) Collect money from customers.
- (c) Receive and record all invoices.
- (d) Prepare check for suppliers when invoice due.
- (e) Prepare the financial statement report for management.

- (5) Personnel Department
 - (a) Recruit and select new employees.
 - (b) Record the employee's personal information.
 - (c) Calculate salary and working hours.
 - (d) Provide training course to employee.
 - (e) Control the company rules.
- (6) Warehouse
 - (a) Receive medicine from suppliers.
 - (b) Record these received items into stock.
 - (c) Deliver medicine to customers according to purchase order.
 - (d) Check stock balance.
 - (e) Prepare reports for manager.

2.2 Existing Business Function

The existing system in Purchasing Department is a manual system. The following functions are performed manually by company staff:

- (1) Sales Department sends purchasing requisition to Purchasing Department.
- (2) Contact the Warehouse Department to check whether the medicine is in the stock. If there is insufficient medicine in stock, place the purchase order to supplier.
- (3) After receiving the actual invoice, copy it without price, and send this copy to Warehouse Department for checking when the stock arrived.
- (4) Send invoice to Finance and Accounting Department.
- (5) At the end of month, prepare purchase report for manager.

The above functions of the existing system are shown in the context diagram (Figure A.1).

2.3 Current Problems and Areas for Improvement

The existing system is based on manual system; thus many problems occur in the operation that can be summarized as follows:

- (1) Take time to create purchasing order because medicine information and supplier information is kept in the form of paper and it requires a lot of time in typing and editing the document.
- (2) Too much paper work.
- (3) Data redundancy when keeping the same data for more than one time.
- (4) Difficult to retrieve and store the record because it is not in a complete systematic way.
- (5) No database to collect information.
- (6) No computerized system used for improving the process.
- (7) Insufficient and unreliable information in making decisions, planning and forecasting the market trend.
- (8) Information is easily lost because of security in the existing system.
- (9) More time to write or prepare reports presented to the executive for management and decision making.

III. THE PROPOSED SYSTEM

3.1 User Requirements

The proposed system of Purchasing Information System will be designed to replace the existing system. During study and analysis of the existing system, the user requirements are important to fulfill in the system development. A good communication with the user is necessary during the system development project. Then the proposed system will solve all problems that occur in the existing system. The user requirements are as follows:

- (1) The new system should be a user friendly interface that are in electronic document.
- (2) The new system should provide up-to-date and precise information.
- (3) Database must be created to solve data redundancy in each transaction of all departments.
- (4) The system should provide the on-line processing system.
- (5) It must be Quick to inquire and search some information in the system.
- (6) System design must be structured and flexible.
- (7) Information must be shared among several users at the same time.
- (8) Security and operation control should be included in the new system.
- (9) Prepare various on time reports used for decision making and management level.
- (10) Can manage standard forms of input and output for easy to used and to understand.
- (11) Back-up and recovery system should be designed to protect loss of data.

3.2 System Design

The system design is used for evaluation of alternative solutions and the specification of the detailed computer-based solution. The objective of the system design is to replace an existing system, which is manual with computerized one, in order to improve control, performance, and services to compete with competitors.

The concept of the system design is restrictive definition of the process of design by drawing blueprints of the computer-based system to present the context and the data flow diagrams of the proposed system. The context and data flow diagrams are provided in the Appendix B.

Structure chart and module specifications are designing tools that help in program design process. Structure charts are shown in Appendix C.

Process specification specifies the process function and describes the design process of input data into the process and output from the process. Process specification can be seen in Appendix D.

All information of the proposed system is stored in files of the database. The type of files used in the system are master files and transaction files. Normalization is attempted in the design of the master files and other related files. Database design and entity relationship diagrams are shown in Appendix E.

Data dictionary specifies the content of each information of the proposed system in the data flow diagrams. Data dictionary is shown in Appendix F.

Feasibility analysis is the measure of how beneficial or practical the development system will be to an organization. The feasibility analysis is identified into three alternative candidate solutions that are shown in Appendix G.

Screen design is as important as it is the interface between the user and computer. Input designs are shown in Appendix H and output designs are shown in Appendix I.

3.3 Hardware and Software Requirements

The proposed specification consists of two parts that are hardware and software specifications.

3.3.1 Hardware Requirement

The system development will be based on client/server model. Client/server allocates 1 task between the workstation and server. There will be 7 workstations, 2 at the Sales Department, 2 at Finance and Accounting Department, 1 at Warehouse and 2 at Purchasing Department. Application processing will be Client-based processing. Application processing will be done at the client and database logic functions, which will be performed at the server. There are 5 major hardware components that are required for this new proposed system as follows:

- (1) Server 1 set
 - (a) Intel Pentium 4 Processor at 2 GHz
 - (b) 512 MB 333 MHz DDRRAM Memory (PC2007)
 - (c) 17" Super VGA flat monitor
 - (d) 36.4 GB Hard Disk
 - (e) 1.44 MB Floppy Disk
 - (f) CD-ROM 50X SCSI
 - (g) MS Keyboard and Mouse
 - (h) AVC-4000 Anti-Virus Card
 - (i) 3 Com 3C905C TXM 10/100 LAN Card
 - (j) Internal Tape Backup HP SureStore Tape DAT81 4/8 GB
- (2) Workstation 7 sets
 - (a) Intel Pentium III Processor at 750 MHz
 - (b) 256 MB 266 MHz DDRRAM (PC2001)

- (c) 4.3 GB Hard Disk
- (d) 17" Super VGA Color-digital
- (e) 40X CD-ROM Drive
- (f) 3 Com LAN Card 10/100
- (g) MS Keyboard and Mouse
- (3) Printer
 - (a) Laser Printer (HP LaserJet 3 sets)
 - (b) Dot Matrix Printer (EPSON LQ-2080I 1 set)
- (4) Network
 - (a) Hub 16 ports
 - (b) UTP cable
 - (c) Ethernet Card 10/100
- (5) Other Devices
 - (a) UPS 1500 VA

3.3.2 Software Requirement

- (1) Operating System
 - (a) MS Windows 2000 Server Enterprise Edition
 - (b) MS SQL Sever 2000
 - (c) MS Windows XP Thai Edition
- (2) Software Package
 - (a) MS Office XP Professional
 - (b) MS Access 2000 Professional Edition

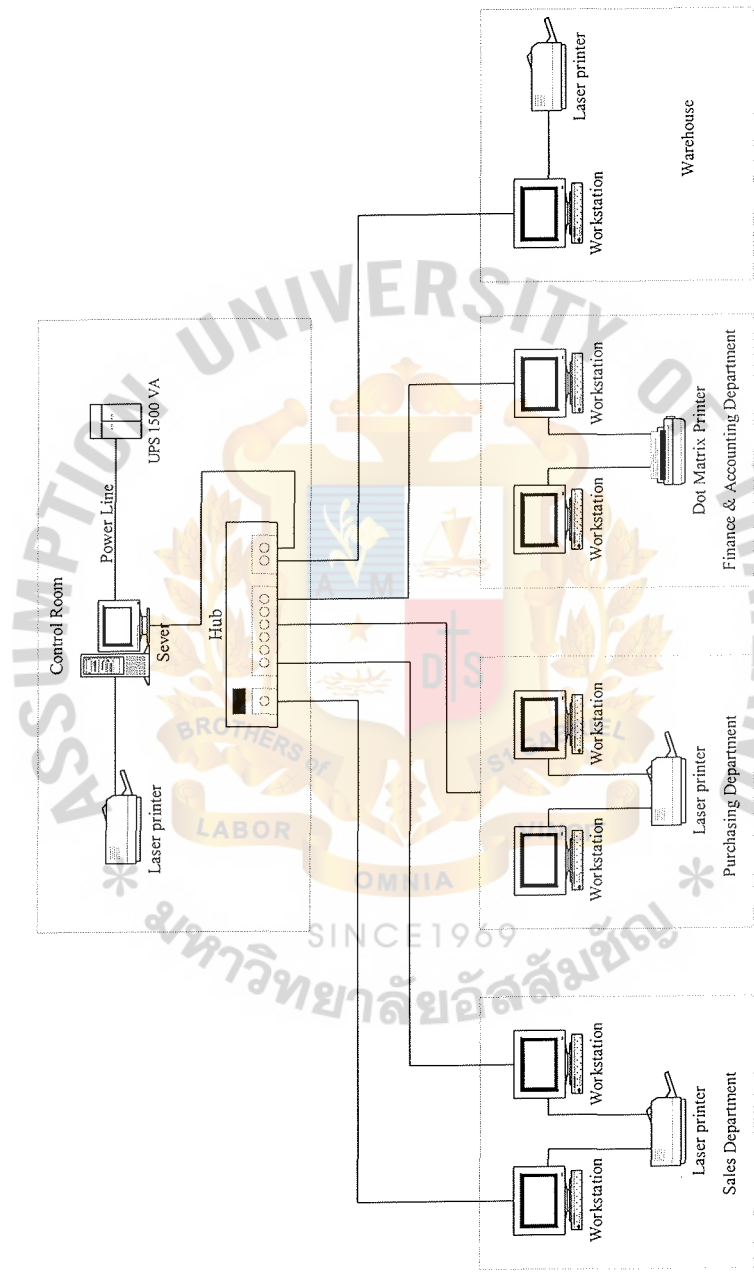


Figure 3.1. Hardware Configuration of the Proposed System.

3.4 Security and Control

User's Login and Password

Purchasing Information System is a new system, which contains important information of medicines, which will be used by only 3 departments that are Purchasing Department, Sales Department and Finance and Accounting Department. Other departments may use some information in some part of Purchasing Information System. Security is important for Purchasing Information System to protect loss of information and from unauthorized users. Each user will be assigned to each level of program usage. Purchasing Department can access overall part of the programs. In the mean time, Sales Department can only send purchasing requisitions and inquires the medicine price and description. Account users can only inquire and produce reports.

UPS

Interruption of services due to electricity loss and interception by theft are the hardware vulnerability. To protect data loss by electricity, UPS will be installed.

Backup System

Backup is planned to do automatically every day through the tape at 12.00 p.m. Monday backup tape is overwritten in next Monday backup tape, Tuesday backup tape is overwritten in next Tuesday backup tape and so on. Every Friday backup tape is not overwritten but is kept in the computer room. Month-end and Year-end backup tapes are also not overwritten but will be kept in secured computer room.

Security Room

All server computer hardware will be in the computer room. Only authorized persons are allowed to enter the computer room. They also require security cards and password to enter the computer room.

3.5 Cost and Benefit Analysis

3.5.1 Cost/Benefit Analysis

Cost and benefit analysis is an economic feasibility analysis method. It is widely used as a tool to judge whether the project is worthwhile to construct or not. Cost falls into two categories which are developing costs and operating costs. The costs associated with developing the system are estimated from the outset of a project and should be refined at the end of each phase of the project.

The operating costs can only be estimated once specific computer-based solutions have been defined during selection phase or later. They recur throughout the lifetime of the system.

Benefits normally profits or decrease costs, both highly desirable characteristics of a new information system. To as great a degree as possible, benefits should be quantified in currency unit.

Benefits are classified as tangible and intangible. Tangible benefits are those that can be easily quantified and usually are measured in term of monthly or annual saving or profit to the firm. While intangible benefits are those benefits believed to be difficult or impossible to quantify.

(1) Tangible Benefit

- (a) Saving on additional personnel no longer needed.
- (b) Saving on paper work documents.
- (c) Reducing on human error.
- (d) Reducing response time in processing.
- (e) Eliminating redundant tasks and steps in a process.

(2) Intangible Benefit

- (a) Increase customers' satisfaction.
- (b) Improve company image.
- (c) Improve accuracy in processing.
- (d) Increase employee productivity.
- (e) Better planning information.
- (f) Expanding the worker capability.

3.5.2 Payback Period Analysis

The payback analysis technique is a simple and popular method for determining when an investment will pay for itself. Because system development costs incurred long before benefits begin to accrue, it will take some time for the benefits to overtake the costs, after implementation, the additional operating expenses that should be recovered. Payback analysis determines how much time will lapse before accrued benefits overtake accrued and continuing costs.

In Figure 3.2, the payback period adjusted with a discount rate of 8% is in 2 years and 8 months. It will be more realistic than without adjusting present value. The net present value of the proposed system is equal to 555,352.82 Baht. It means the investment in this system is good and will get the return in positive revenue to the company.

Table 3.1. Payback Analysis of the Proposed System, Baht.

Cost Items	Years				
	0	1	2	3	4
Development Cost:	-446,000.00				
Operation and Maintenance Cost:		-653,500.00	-712,850.00	-778,135.00	-849,948.00
Discount factors for 8%:	1	0.926	0.857	0.794	0.735
Time adjusted costs(adjusted to present value):	-446,000.00	-605,141.00	-610,912.45	-617,839.19	-632,610.18
cumulative time-adjusted costs over lifetime:	-446,000.00	-1,051,141.00	-1,662,053.45	-2,279,892.64	-2,904,604.42
Benefit derived from operation of new system:	0	800,000.00	920,000.00	1,040,000.00	1,166,200.00
Discount factors for 8%:	1	0.926	0.857	0.794	0.735
Time adjusted cost (adjusted to present value):	0	740,800.00	788,440.00	825,760.00	857,157.00
Cumulative time adjusted benefit life time:	0	740,800.00	1,529,240.00	2,355,000.00	3,212,157.00
Cumulative lifetime time-adjusted cost + benefit:	-446,000.00	-310,341.00	-132,813.45	75,107.36	307,552.58
NPV:					555,352.82

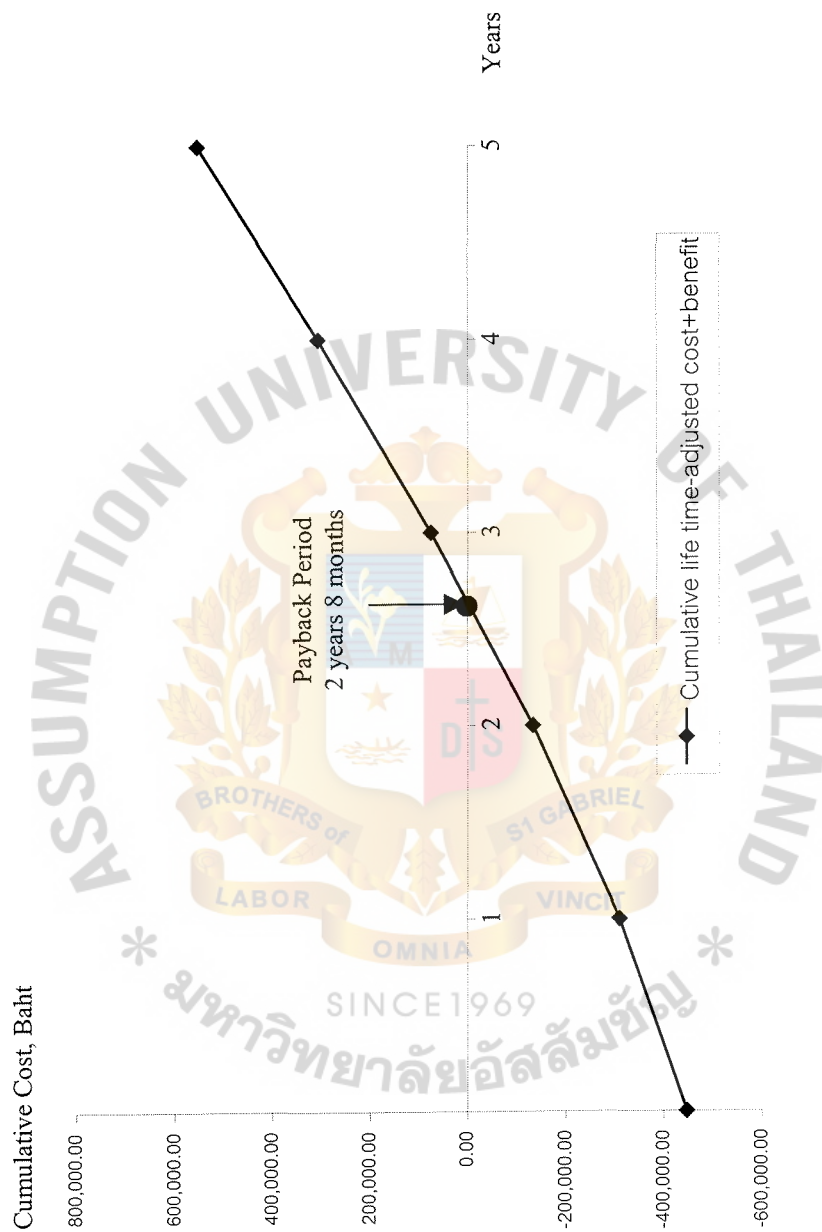


Figure 3.2. Payback Period of the Proposed System.

3.5.2 Break-even Analysis

Break-even point is the simplest form of cost comparison. We use this method when the costs of the proposed system intersect the costs of the manual system. At this point of intersection, the proposed system begins to generate a positive monetary return in comparison with the manual system. From now on, the amount invested in the new system will be offset by the saving the new system allows.

In Figure 3.3, the comparison between the costs of the existing system and proposed system can be seen apparently. After 1 year 8 months operation, the proposed system will reach the break-even point and after it will become more economical to operate than the existing system.



Table 3.2. Muanual System Cost Analysis, Baht.

Cost items	Years				
	1	2	3	4	5
Fixed Cost					
Typewriter 1 unit @ 5,000	5,00.00	-	-	-	-
Calculators 2 units @ 100	200.00	-	-	-	-
Total Fixed Cost	5,200.00	-	-	-	-
<u>Operation Cost</u>					
Salary Cost:					
Manager 1 person @ 23,000	23,000.00	25,300.00	27,830.00	30,613.00	33,674.30
Staffs 4 person @ 10,000	40,000.00	44,000.00	48,400.00	53,240.00	58,564.00
Total Monthly Salary Cost	63,000.00	69,300.00	76,230.00	83,853.00	92,238.30
Total Annual Salary Cost	756,000.00	831,600.00	914,760.00	1,006,236.00	1,106,859.60
Office Supplies and Miscellaneous Cost:					
Stationary Per Annual	10,000.00	11,000.00	12,100.00	13,310.00	14,641.00
Paper Per Annual	8,000.00	8,800.00	9,680.00	10,648.00	11,712.80
Utility Per Annual	12,000.00	13,200.00	14,520.00	15,972.00	17,569.20
Miscellaneous Per Annual	10,000.00	11,000.00	12,100.00	13,310.00	14,641.00
Total Annual Office Supplies & Miscellaneous Cost	40,000.00	44,000.00	48,400.00	53,240.00	58,564.00
Total Annual Operation Cost	796,000.00	875,600.00	963,160.00	1,059,476.00	1,165,423.60
Total Manual System Cost	801,200.00	875,600.00	963,160.00	1,059,476.00	1,165,423.60

Table 3.3. Five years Accumulated Manual System Cost, Baht.

Year	Total Manual System Cost	Accumulated Cost
1	801,200.00	801,200.00
2	875,600.00	1,676,800.00
3	963,160.00	2,639,960.00
4	1,059,476.00	3,699,436.00
5	1,165,423.60	4,864,859.60
Total	4,864,859.60	-

Table 3.4. Computerized System Cost Analysis, Baht.

Cost items	Years				
	1	2	3	4	5
Fixed Cost					
Hardware Cost:					
Server Cost 1 unit @ 120,000	120,000.00	-	-	-	-
PC Cost 2 units @ 35,000	70,000.00	-	-	-	-
Printer 1 unit @ 13,000	13,000.00	-	-	-	-
UPS 1.5 KVA 1 unit @ 55,000	55,000.00	-	-	-	-
Total Hardware Cost	258,000.00	-	-	-	-
Software Cost:					
Windows 2000 Server 1 unit	30,000.00	-	-	-	-
MS SQL Server 1 unit	18,000.00	-	-	-	-
MS Office XP 2 units	20,000.00	-	-	-	-
Total Software Cost	68,000.00	-	-	-	-
Implementation Cost:					
Network Cost	10,000.00	-	-	-	-
Software Development Cost	75,000.00	-	-	-	-
Training Cost	10,000.00	-	-	-	-
Set up Cost	25,000.00	-	-	-	-
Total implementation Cost	120,000.00	-	-	-	-
Maintenance Cost	60,000.00	60,000.00	60,000.00	60,000.00	60,000.00
Total Fixed Cost	506,000.00	60,000.00	60,000.00	60,000.00	60,000.00
Operation Cost					
Salary Cost:					
Manager 1 Person @ 23,000	23,000.00	25,300.00	27,830.00	30,613.00	33,674.30
Staffs 2 persons @ 12,000	24,000.00	26,400.00	29,040.00	31,944.00	35,138.40
Total Annual Salary Cost	564,000.00	620,400.00	682,440.00	750,684.00	825,752.40
Office Supplies & Miscellaneous Cost:					
Stationary Per Annual	8,000.00	8,800.00	9,680.00	10,648.00	11,712.80
Paper Per Annual	7,500.00	8,250.00	9,075.00	9,982.50	10,980.75
Utility Per Annual	8,000.00	8,800.00	9,680.00	10,648.00	11,712.80
Miscellaneous Per Annual	6,000.00	6,600.00	7,260.00	7,986.00	8,784.60
Total Annual Office Supplies & Miscellaneous Cost	29,500.00	32,450.00	35,695.00	39,264.50	43,190.95
Total Annual Operation Cost	593,500.00	652,850.00	718,135.00	789,948.50	868,943.35
Total Computerized System Cost	1,099,500.00	712,850.00	778,135.00	849,948.50	928,943.35

Table 3.5. Five Years Accumulated Computerized System Cost, Baht.

Year	Total Computerized Cost	Accumulated Cost
1	1,099,500.00	1,099,500.00
2	712,850.00	1,812,350.00
3	778,135.00	2,590,485.00
4	849,948.50	3,440,433.50
5	928,943.35	4,369,376.85
Total	4,369,376.85	-

Table 3.6. Cost Comparison between Manual System and Proposed System, Baht.

Year	Accumulated Manual Cost	Accumulated Computerized Cost
1	801,200.00	1,099,500.00
2	1,676,800.00	1,812,350.00
3	2,639,960.00	2,590,485.00
4	3,699,436.00	3,440,433.50
5	4,864,859.60	4,369,376.85

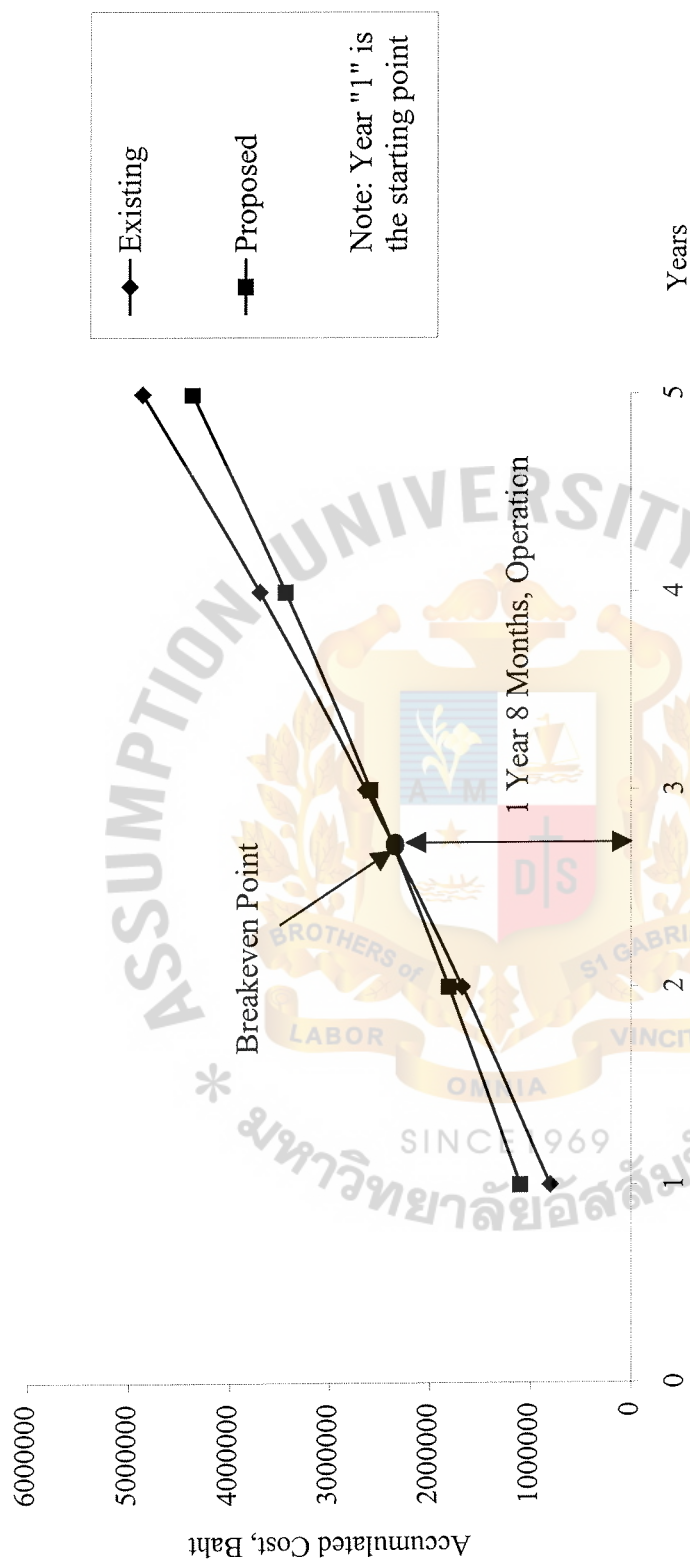


Figure 3.3. Cost Comparison between Existing System and Proposed System.

IV. PROJECT IMPLEMENTATION

Implementation will begin after the management decides to accept the new system. It replaces the existing manual system to be a computerized system. Proper implementation is essential for the company to provide reliable system to meet organization requirement.

The project implementation of the Purchasing Information System can be divided into 6 main parts; programming, testing, installation, conversion, training, data and file preparation and documentation.

4.1 Programming

The application programs are written in this phase. System specifications completed during analysis and design are needed for programmers to code the program such as data dictionary, process specification, file and database design, screen design and report output design. All modules are programmed, coded and debugged during the process. The document concerned in programming should be completed and updated for future reference.

4.2 Testing

To have reliable and efficient performance in the system, system testing is done throughout the system development. Testing is important in the success of project and it should not be underestimated. Not only the program testing but acceptance testing for management is also important. Testing of new hardware, all system interfaces are conducted.

Unit testing is done during the program development to test the individual module. White box testing technique is done for unit testing to ensure complete coverage and maximum error detection.

Integration testing addresses the issues associated with the dual problems of verification and program construction. Both black box testing and white box testing are done for integration testing.

The system is tested with both valid and invalid data. Error routines and normal processing routines are tested. The program is tested against addition, deletions of the records and updating in the database. The correctness of procedures invoking when called is tested.

For added security the system need to be tested for recovery testing.

Post implementation evaluation will be done to access the system quality, performance, efficiency and user satisfaction. Software will be tested against correctness, reliability, efficiency, integrity, usability, and flexibility.

4.3 Installation

The installation of the proposed system has 2 main parts, hardware installation and software installation. First, the hardware installation, the proposed system has to install some new hardware that does not have in the existing system. The existing system is the manual system, which is different from the proposed system; it is the computerized system. The hardware installation has to be concerned in many reasons, such as compatibility between each hardware component reason, suitable location of the hardware component reason and security of the hardware component reason. Second, the software installation, the proposed system has to install new software, which is designed for solving the current problems and increasing the ability of the system. Most of the existing hardware can be modified to operate with the proposed system, if it is compatible with the new software.

4.4 Conversion

There are many files in the existing system to collect and convert to the new computerized system. All these files will be backed up to prevent an unexpected error before the procedure of data conversion. Parallel conversion is selected to user for data conversion. Purchasing Department has to operate both the existing system and the new system to ensure that all problems in the new system have been solved before the old system is discarded. Both 2 systems will be operated concurrently for 1 month to make sure that there is nothing wrong with the new system.

4.5 Training

Training the staff is a necessary part in the implementation. The purpose of this activity is to train and teach the users how they can use the system, or what the system can do or cannot do. The objective of training depends on requirement of user's jobs.

First, system administrator is responsible for administering the use of a multi-user computer system, communication system, or both. A system administrator performs such duties as assigning user accounts and passwords, establishing security access levels, and allocating storage space.

Second, the end-user is responsible for learning the system for their task. The end-user deals with equipment usage and how to operate the system implemented. The operation of end-user emphasizes on the data handling activities and procedures. This includes adding data or new transaction, editing data, deleting data, inquiring the new system and generating the reports.

The method of training includes lecture and discussion about procedures, practice with the new equipment and demonstration of equipment.

4.6 Documentation

The user handbook describes the method to use the program in each step. The programming handbook describes the flow of the system, which helps the programmer to develop and maintain the system. The data dictionary describes all system components. All of these things should to be prepared for the proposed system.



V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The purchasing in existing system of Inter Medical Company Limited is a manual system which leads to many problems and cannot support the growing market of business. Purchase Information System is designed to solve the operational and management problems. Purchase Information System is a computerized system, which can be shared to other departments, especially for sharing medicine information to Sales Department.

This proposed system was designed following three requirements; user requirements, hardware requirements and software requirements. The system also provides security and control, which can be divided into confidentiality, integrity and availability that allow only authorized users to activate the system.

From the cost-benefit analysis used in the system evaluation, in the computerized system time-adjusted cumulative costs will be equal to the time-adjusted cumulative cost of manual system in 2 year 9 months and the payback period of the computerized system is around 2 years 8 months. This proposed system costs a large amount of investment. When compared to the existing system, the cost of new computerized system will be reduced while the cost of the existing system is higher in the next couple of years.

Microsoft Access is used as a tool for input design, output design and interface design of the system and is also used in database design. Input design contains screen designs to display existing information and data collection. Output design is designed into inspection report.

The system implementation plan consists of 6 activities – programming, testing, installation, conversion, training and documentation. The system analyst plans to construct, test and deliver the system into operation within 4 months. Most of the existing resources are used in the new computerized system except the new computer configuration that has to purchased and installed. As a well-planned project and good communication between system developer and system user along with a system development life cycle, the new system will be well-received by system user and can also meet the system development.

The proposed system also spends less time to operate than the existing system. This fact is illustrated in the following additional table.

Table 5.1. Comparison of Degree of Achievement between the Proposed System and the Existing System.

Process	Existing System	Proposed System
Receiver Order Process	25 minutes	10 minutes
Check Stock Process	30 minutes	15 minutes
Modification Process	45 minutes	10 minutes
Documentation Process	25 minutes	10 minutes
Generate Report Process	60 minutes	15 minutes

From Table 5.1, the proposed system can save around two hours and five minutes in the operating process. In the proposed system, receiver order process, check stock process, and modification process can use less time than the existing system because the efficiency of the database system. For documentation process, all required information is provided in the electronic form, it is more convenient and faster than the existing system. Furthermore, the proposed system can generate report for an executive to make

decisions that is more precisely and timely than the existing system since the electronic service report template assists the process.

5.2 Recommendations

Even though the proposed system is quite useful and successful to the user, there are still recommendations for a more efficient and flexible system to accompany future changes.

- (1) Extend the purchasing system to integrating to the supplier via e-purchasing.
- (2) Migrating the windows-based application into web-based application.
- (3) Extend the development to cover other business process i.e. Personnel Department, Sales Department, etc.





APPENDIX A

CONTEXT DIAGRAM OF EXISTING SYSTEM

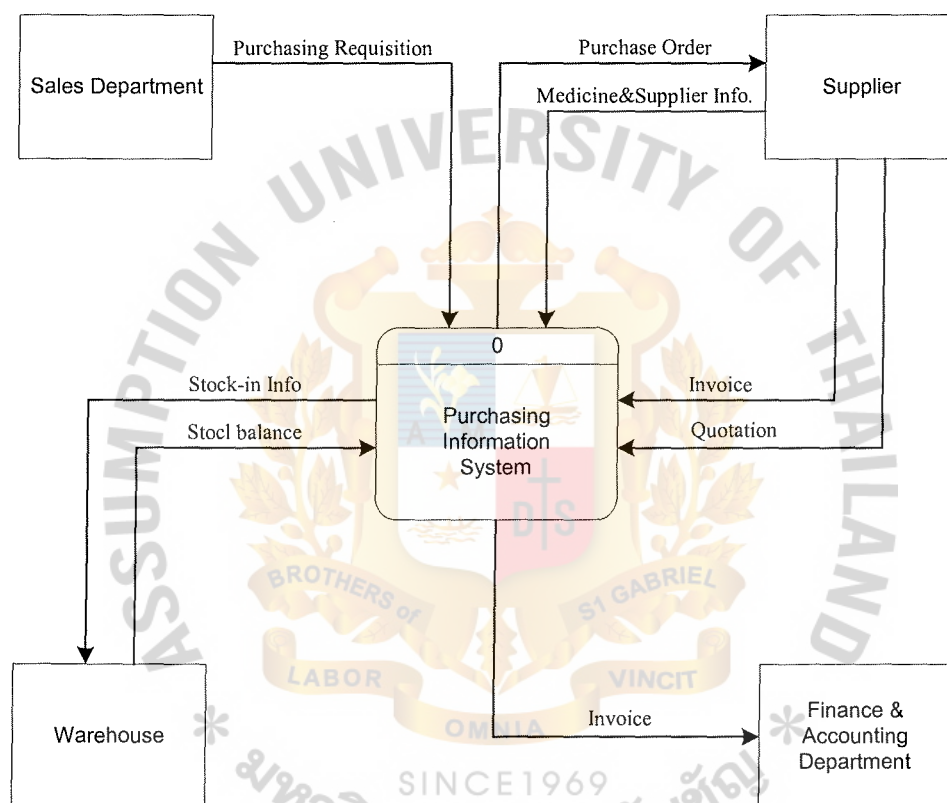
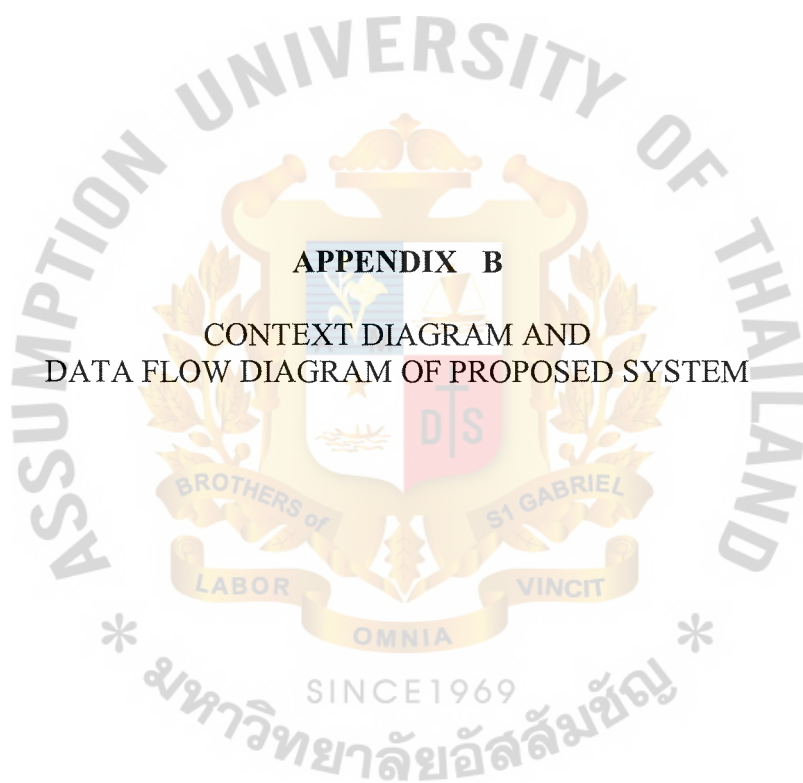


Figure A.1. Context Diagram of the Existing System.



APPENDIX B

CONTEXT DIAGRAM AND
DATA FLOW DIAGRAM OF PROPOSED SYSTEM

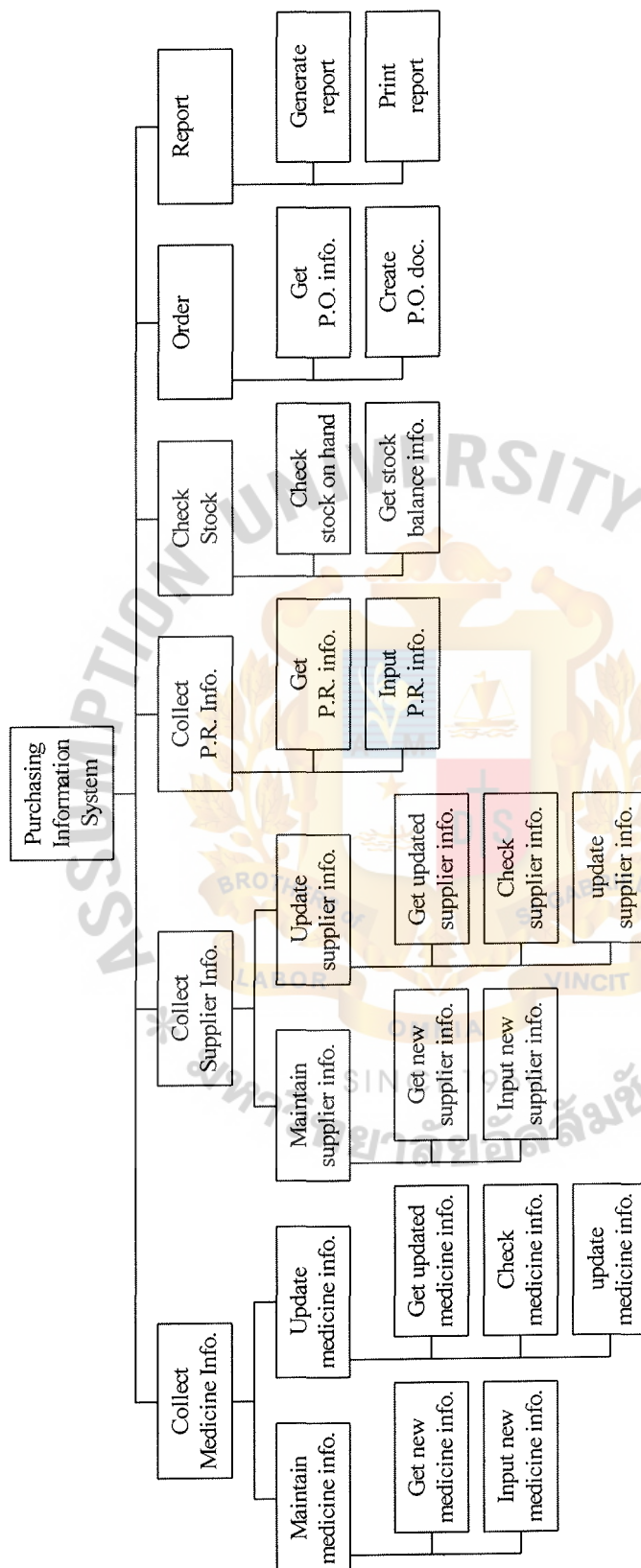


Figure B.1. Function Decomposition Diagram of Purchasing Information System.

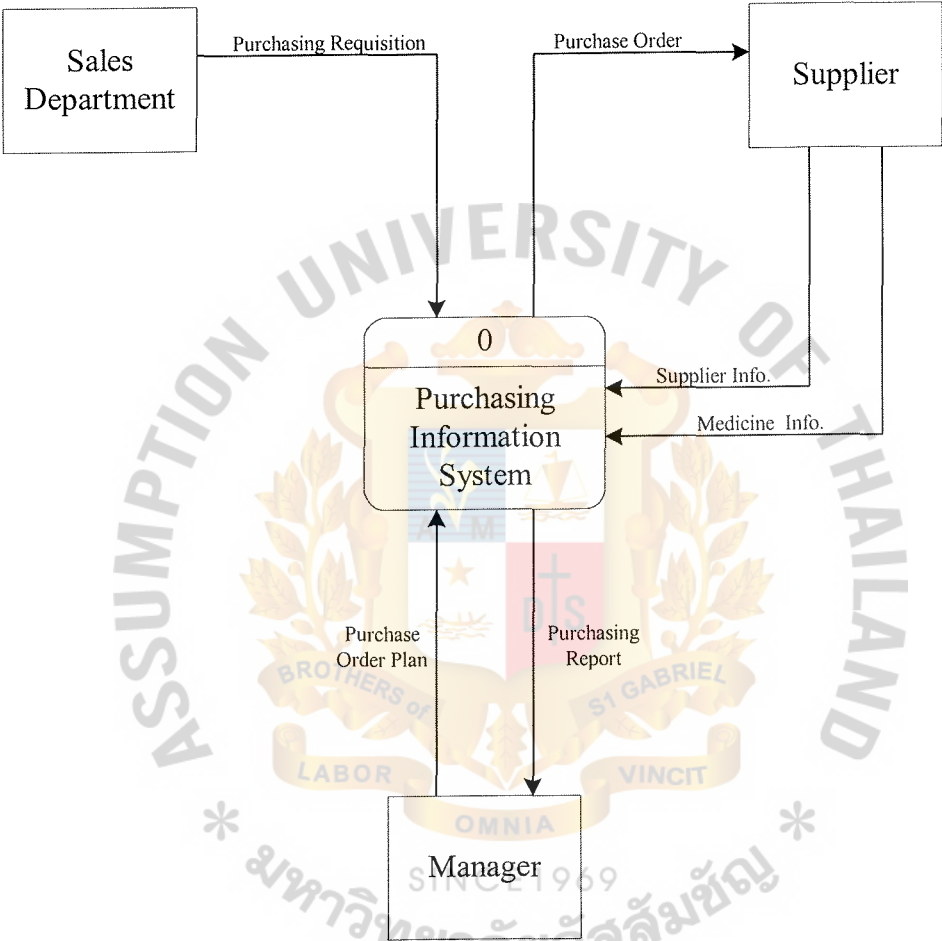


Figure B.2. Context Diagram of Proposed System.

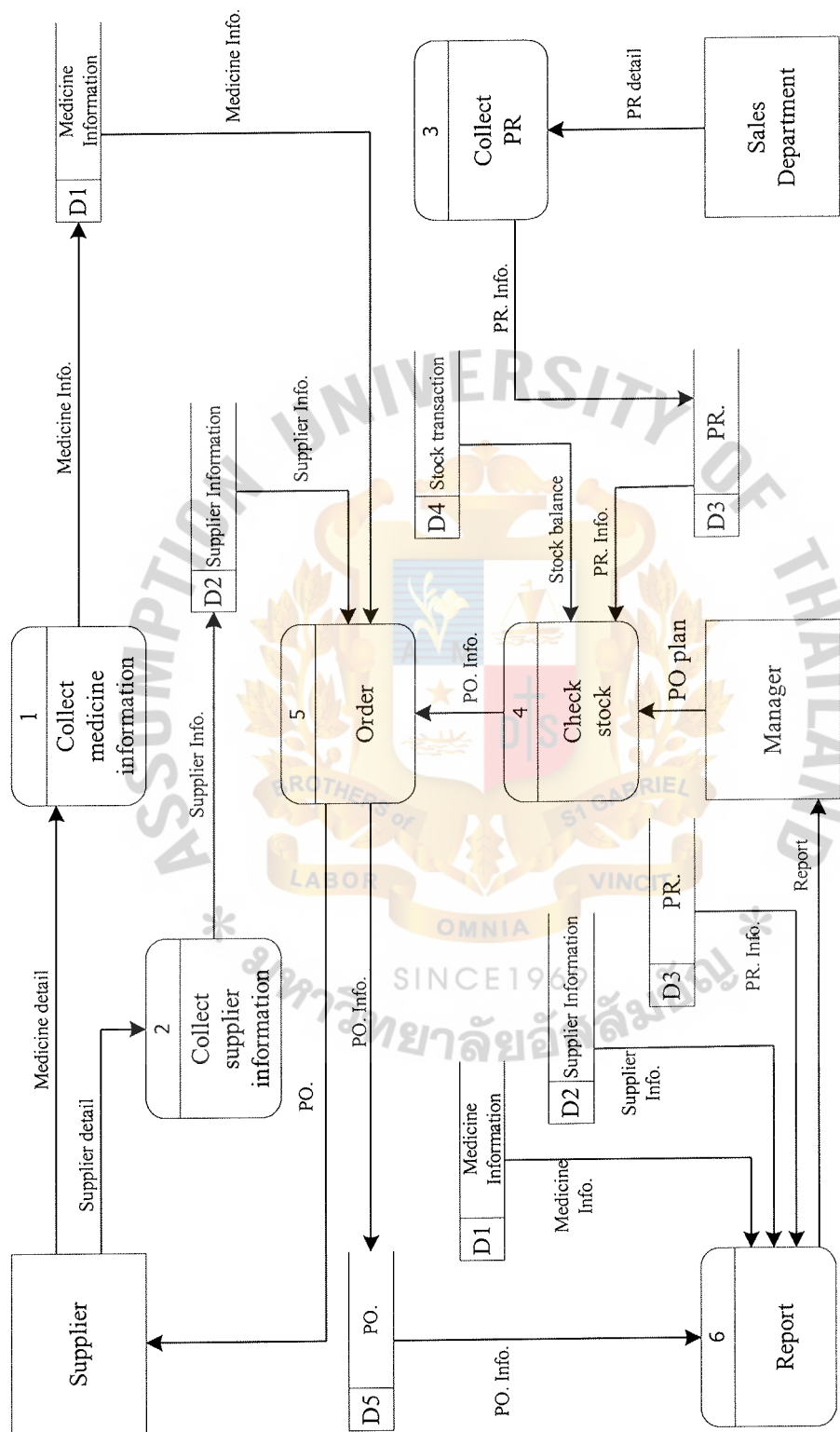


Figure B.3. Data Flow Diagram Level 0 of the Purchasing Information System.

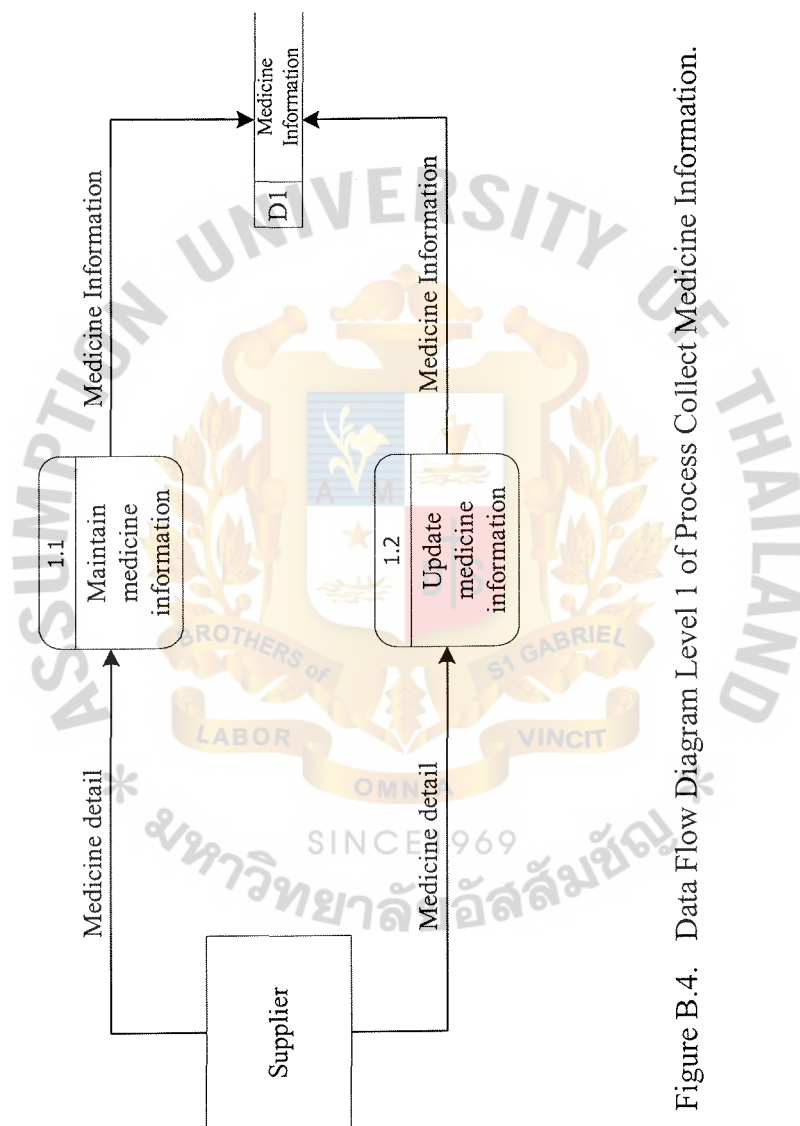


Figure B.4. Data Flow Diagram Level 1 of Process Collect Medicine Information.

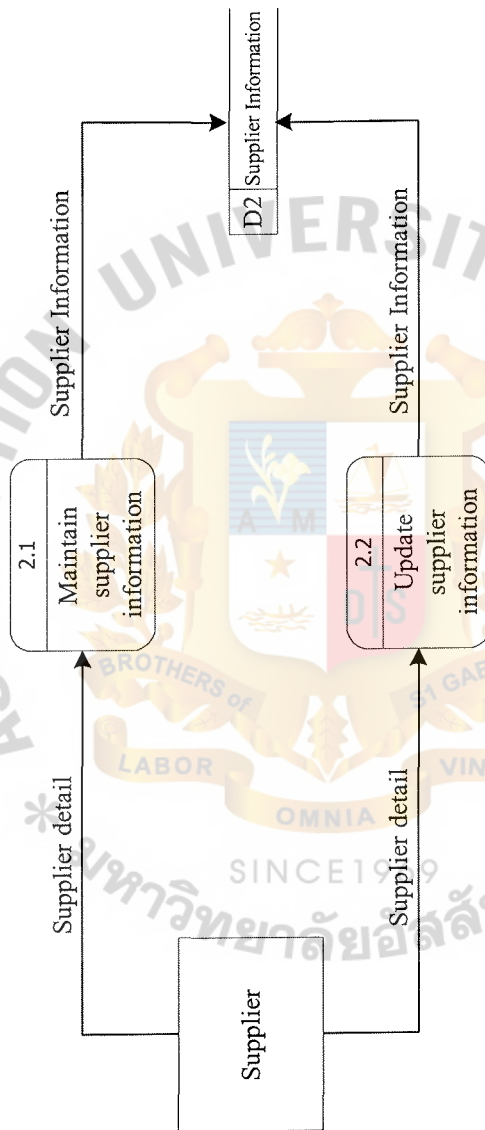


Figure B.5. Data Flow Diagram Level 1 of Process Collect Supplier Information.

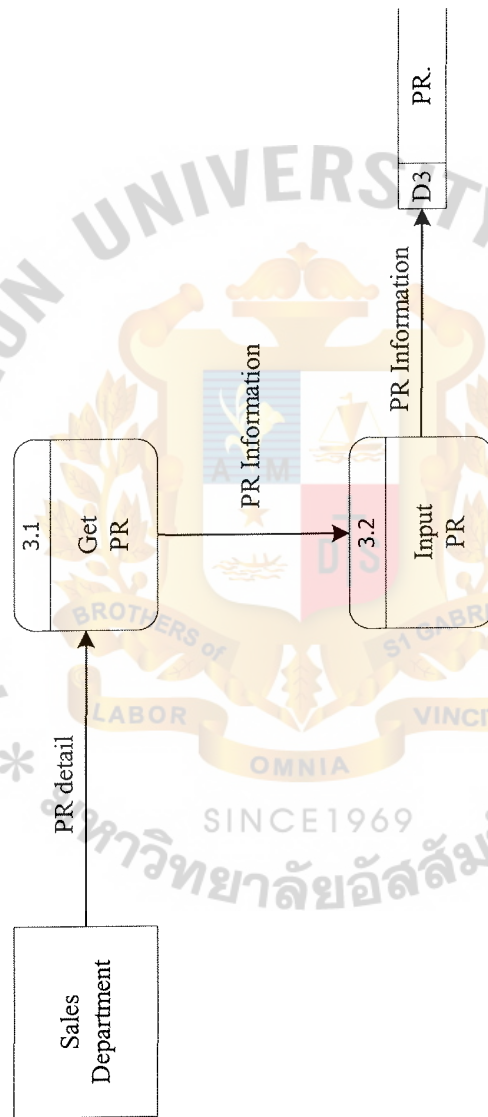


Figure B.6. Data Flow Diagram Level 1 of Process Collect Purchasing Requisition.

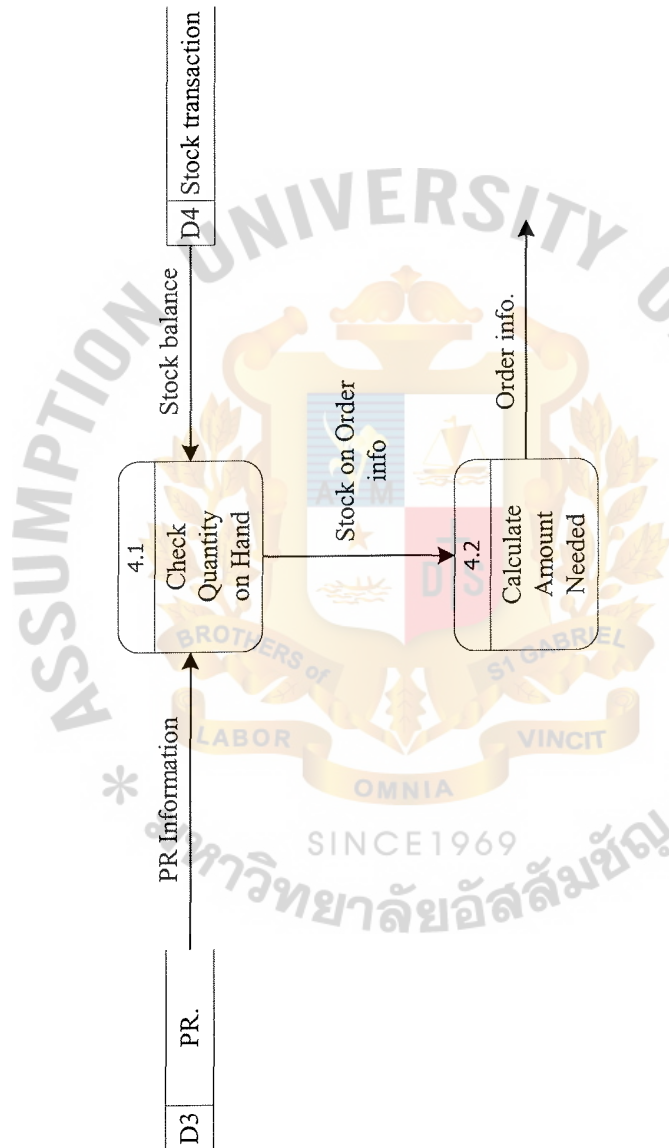


Figure B.7. Data Flow Diagram Level 1 of Process Check Stock.

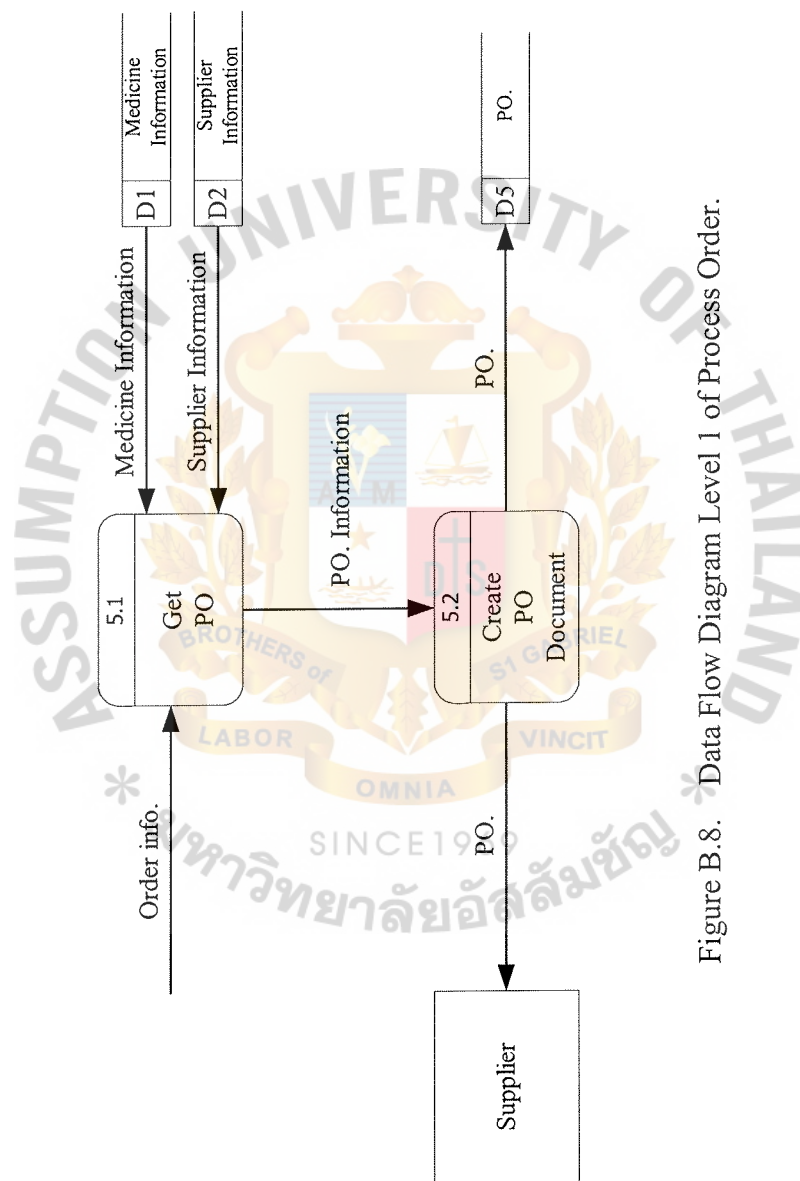


Figure B.8. Data Flow Diagram Level 1 of Process Order.

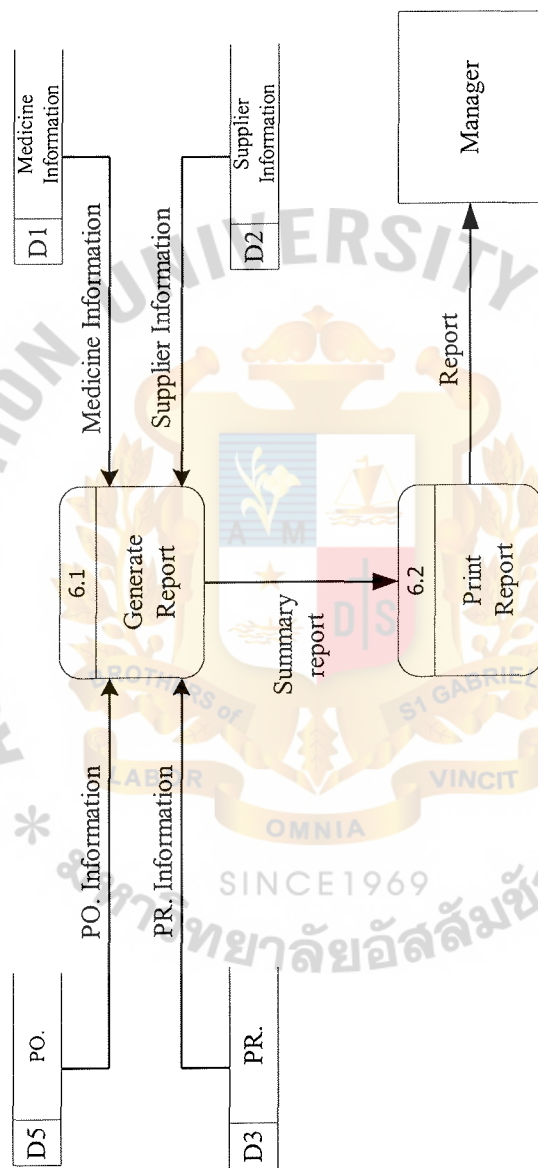


Figure B.9: Data Flow Diagram Level 1 of Process Report.

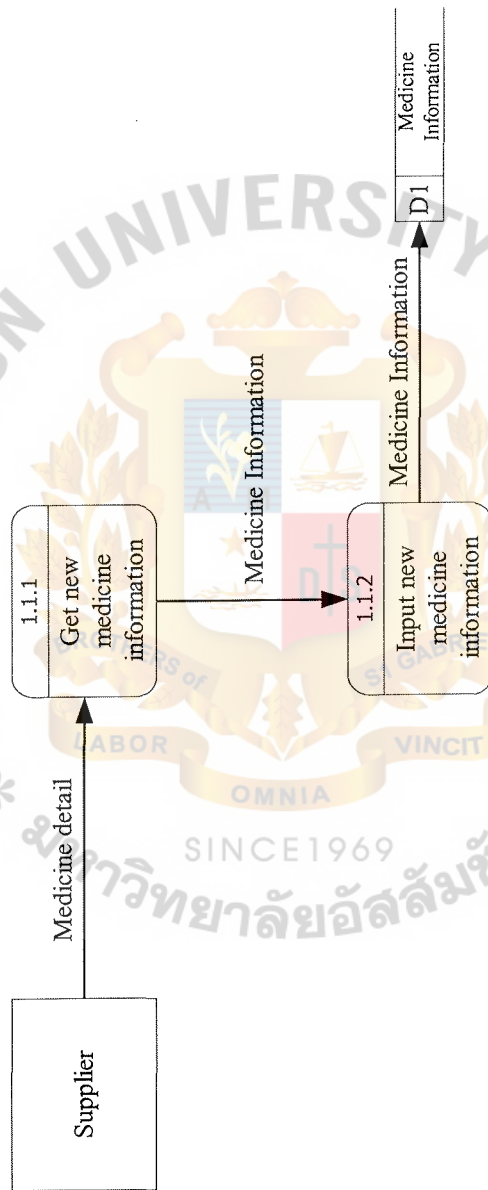


Figure B.10. Data Flow Diagram Level 2 of Process Maintain Medicine Information.

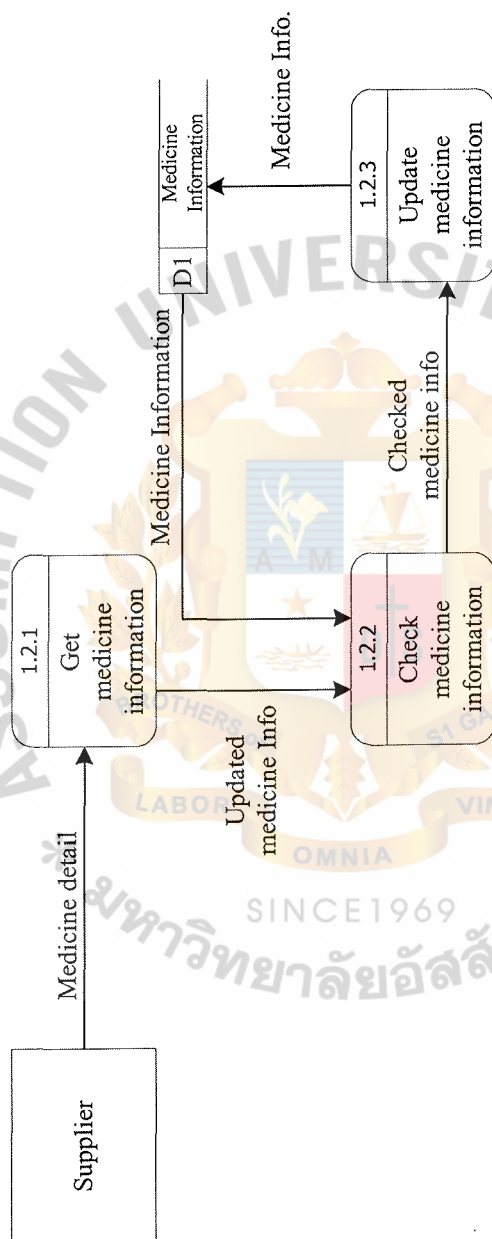


Figure B.11. Data Flow Diagram Level 2 of Process Update Medicine Information.

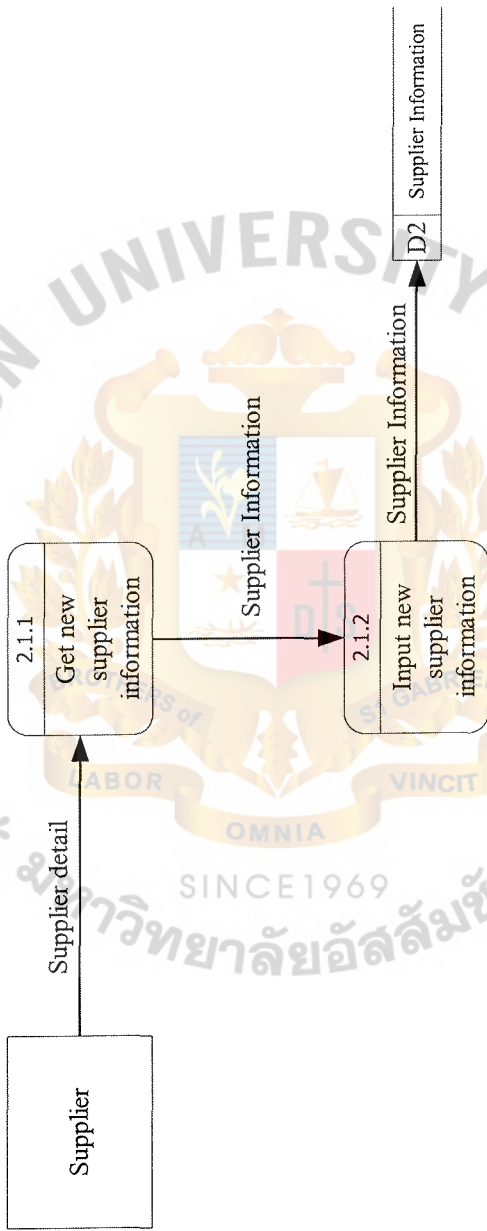


Figure B.12. Data Flow Diagram Level 2 of Process Maintain Supplier Information.

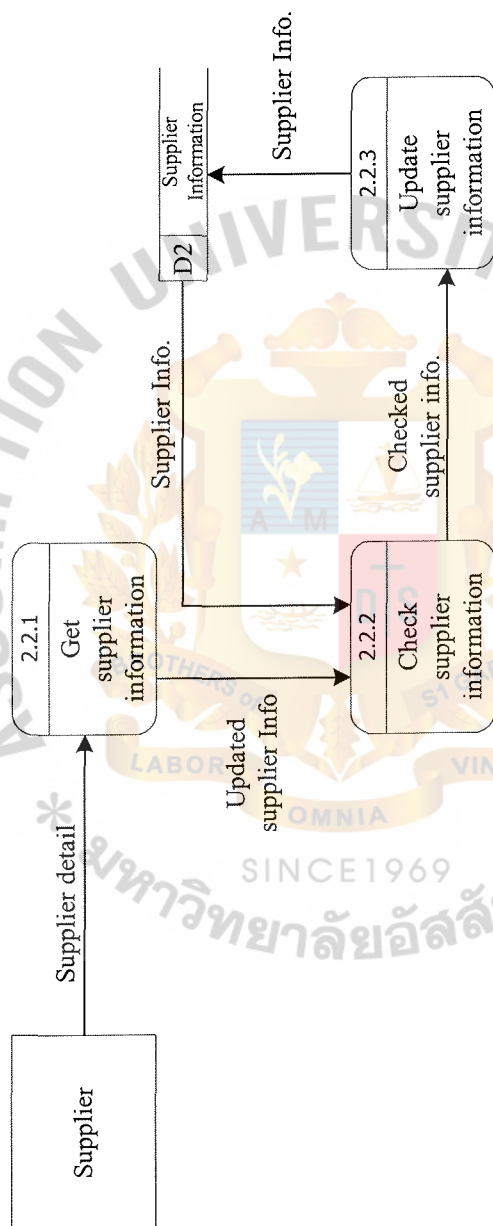


Figure B.13. Data Flow Diagram Level 2 of Process Update Supplier Information.



APPENDIX C
STURCTURE DESIGN

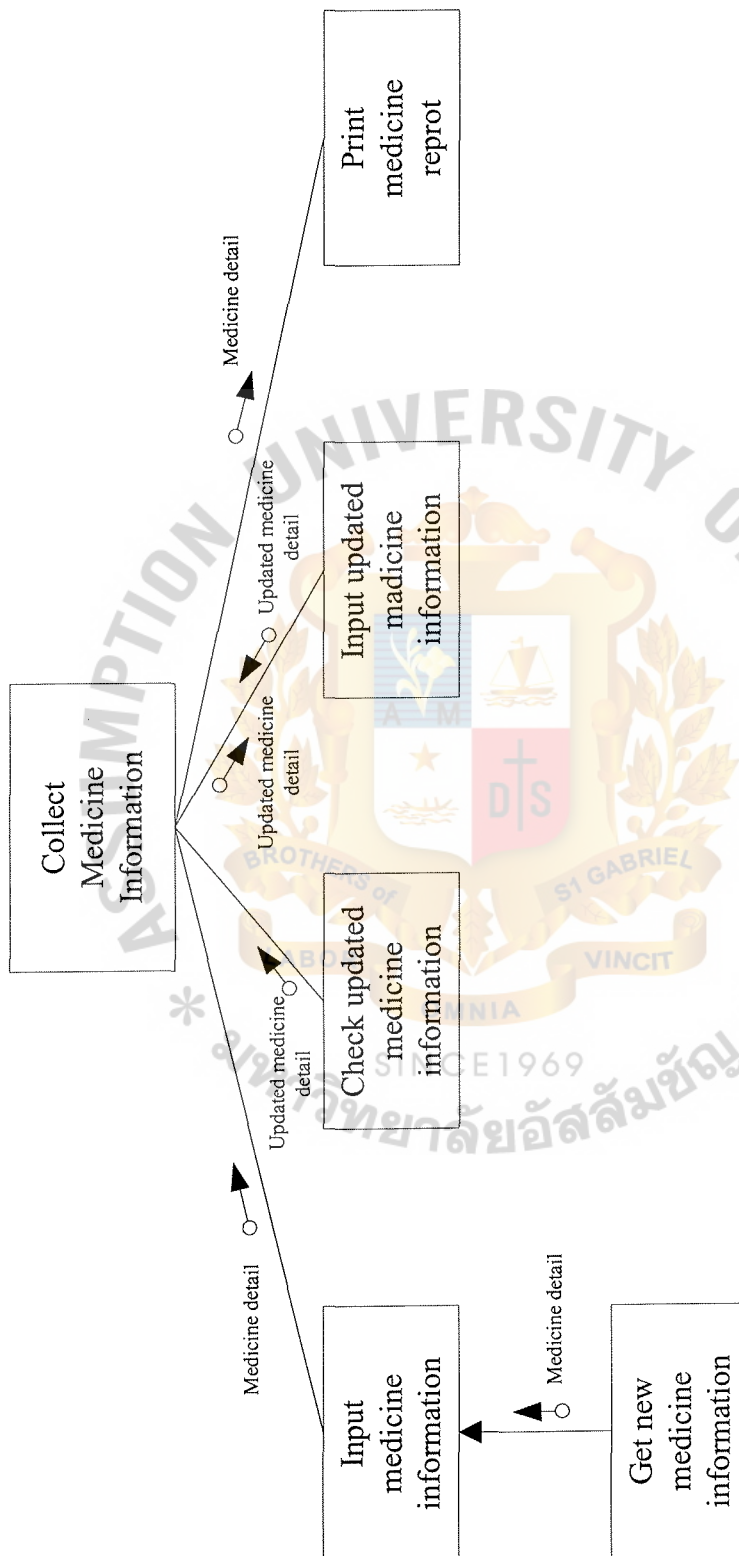


Figure C.1. Structure Chart of Process Collect Medicine Information.

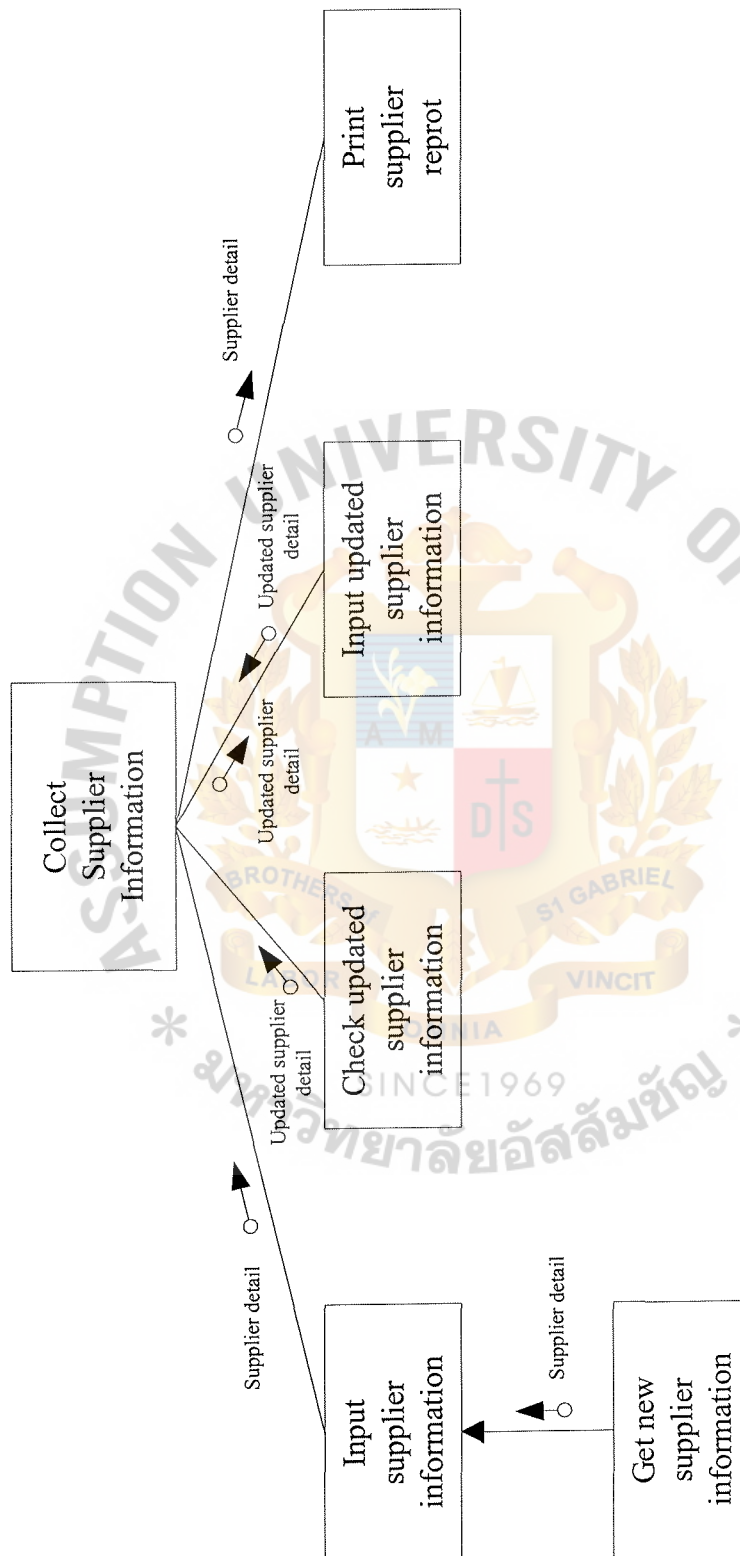


Figure C.2. Structure Chart of Process Collect Supplier Information.

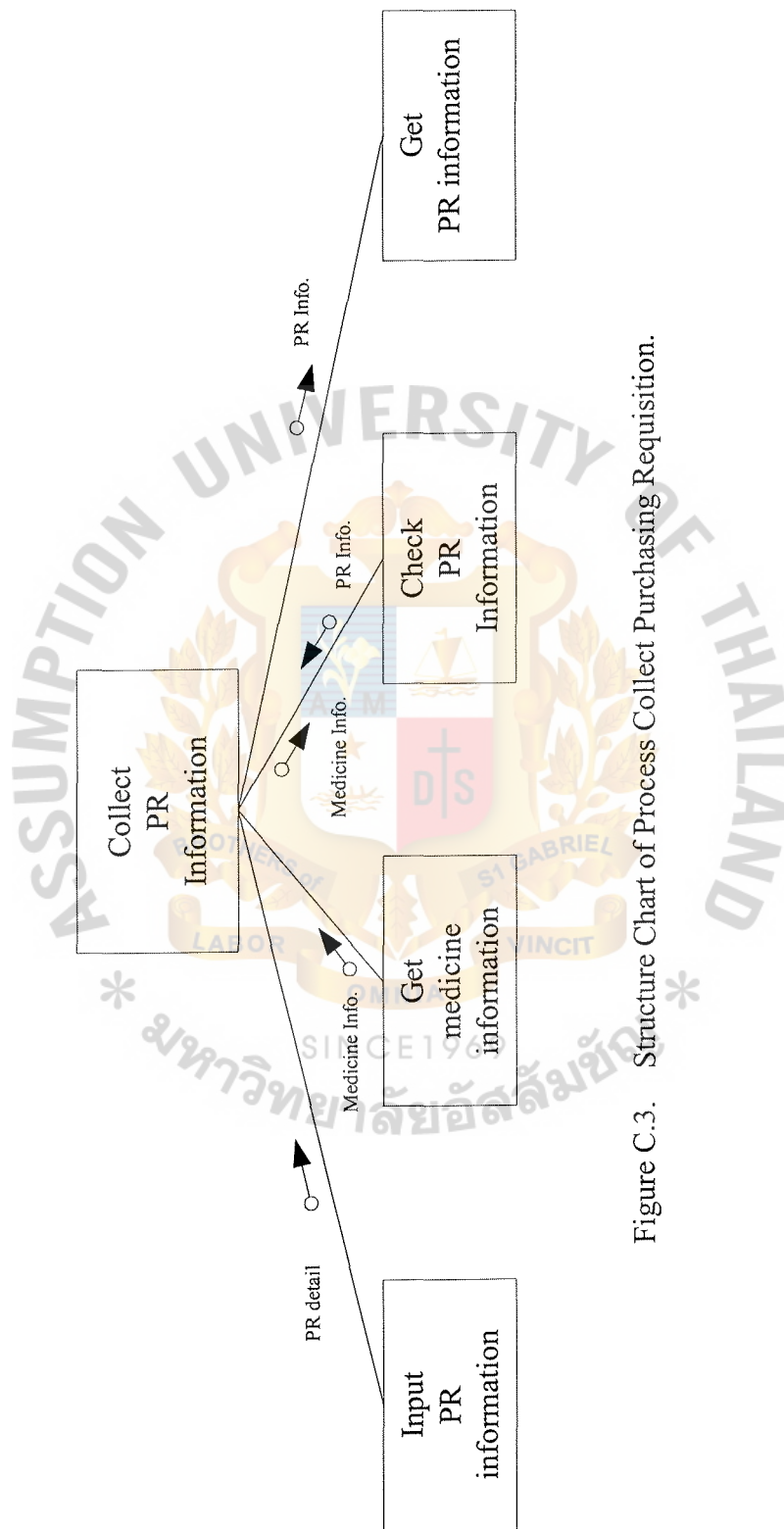


Figure C.3. Structure Chart of Process Collect Purchasing Requisition.

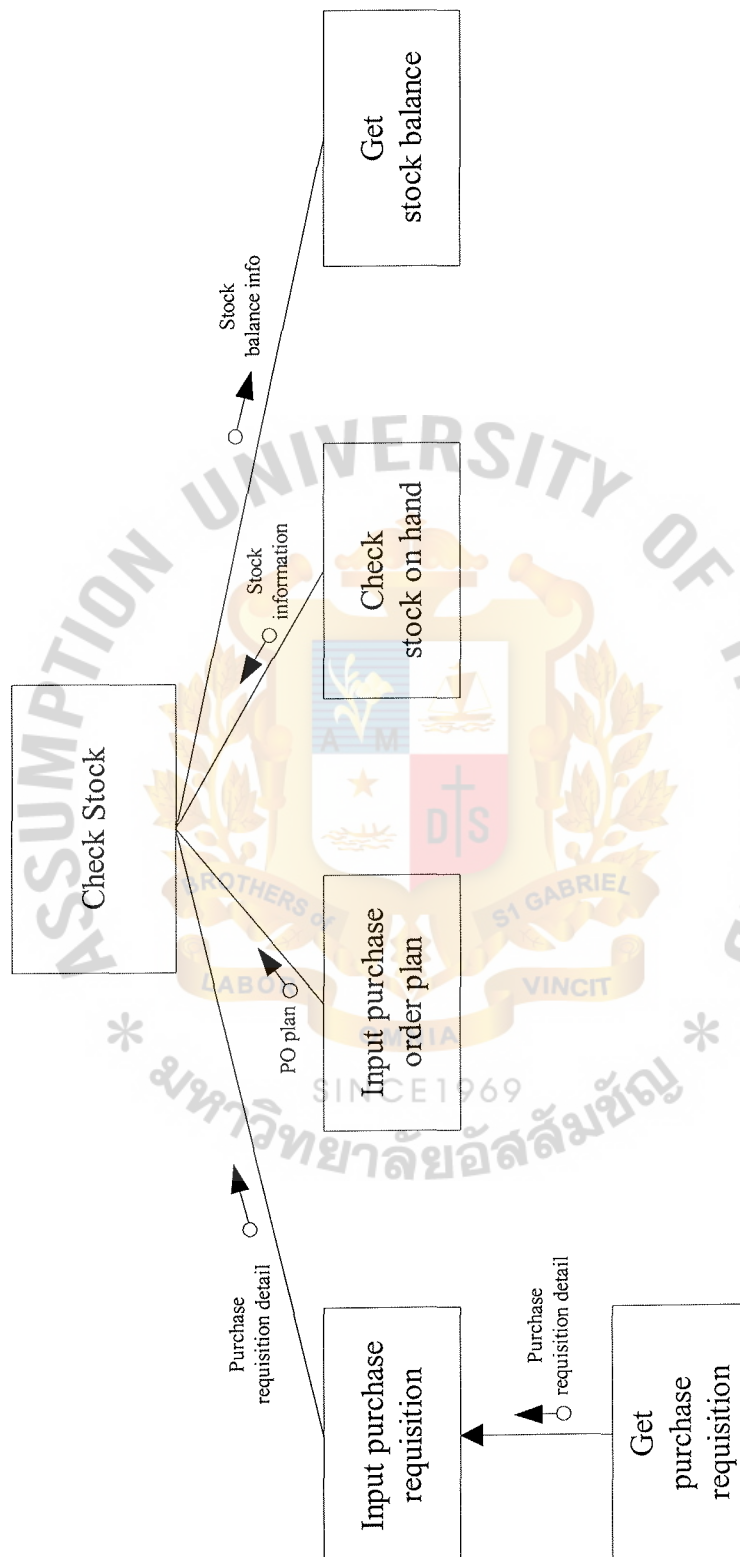


Figure C.4. Structure Chart of Process Check Stock.

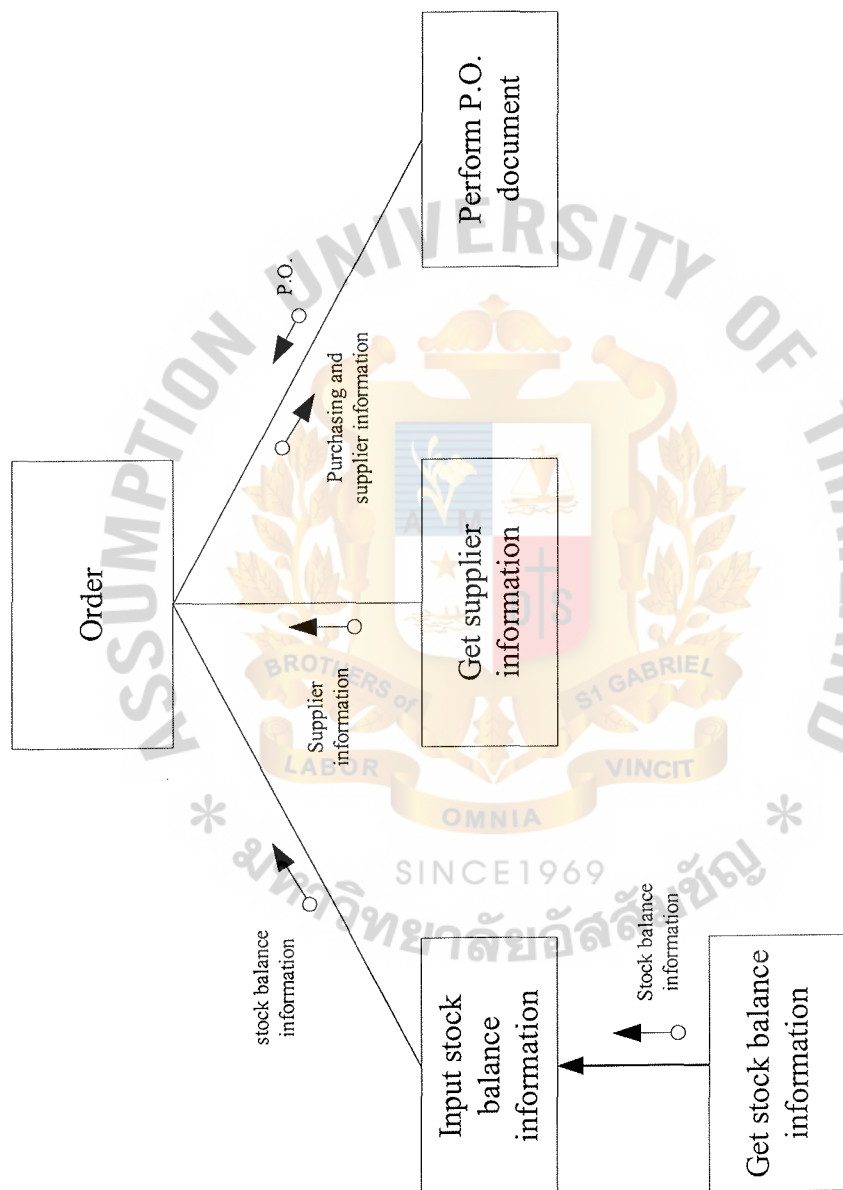


Figure C.5. Structure Chart of Process Order.

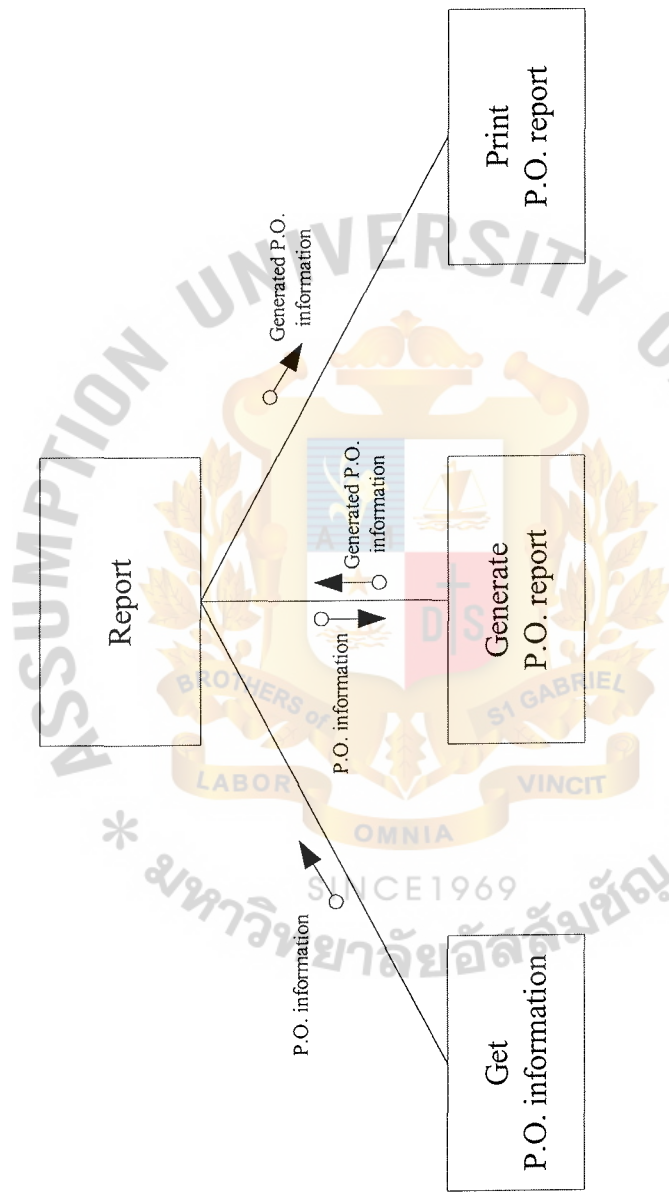


Figure C.6. Structure Chart of Process Report.



APPENDIX D

PROCESS SPECIFICATION

Table D.1. Process Specification of Process 1.1.1.

Items	Description
Process Number:	1.1.1
Name:	Get New Medicine Information
Input:	Medicine detail
Output:	Medicine information
Process Description:	(1) Contact supplier to get new medicine information (2) Get new medicine information
Attachment:	Supplier

Table D.2. Process Specification of Process 1.1.2.

Items	Description
Process Number:	1.1.2
Name:	Input medicine information
Input:	Medicine information
Output:	Medicine information
Process Description:	(1) Record these information in to Data Store 1 (2) Share information to other department (3) Mail or Telephone to Sales Department to get new information
Attachment:	(1) Sales Department (2) Data Store 1 (3) Supplier

Table D.3. Process Specification of Process 1.2.1.

Items	Description
Process Number:	1.2.1
Name:	Get Updated Medicine Information
Input:	Updated medicine detail
Output:	Updated medicine detail
Process Description:	(1) Contact supplier to get updated supplier information. (2) Get updated supplier information
Attachment:	Supplier

Table D.4. Process Specification of Process 1.2.2.

Items	Description
Process Number:	1.2.2
Name:	Check Medicine Information
Input:	(1) Updated medicine detail (2) Medicine information
Output:	Checked medicine information
Process Description:	Check updated medicine information and medicine information.
Attachment:	Data Store 1

Table D.5. Process Specification of Process 1.2.3.

Items	Description
Process Number:	1.2.3
Name:	Update Medicine Information
Input:	Checked medicine information
Output:	Updated medicine information
Process Description:	(1) Enter updated medicine information to medicine information database (2) Share information to other departments
Attachment:	Data Store 1

Table D.6. Process Specification of Process 2.1.1.

Items	Description
Process Number:	2.1.1
Name:	Get New Supplier Information
Input:	Supplier detail
Output:	Supplier information
Process Description:	(1) Contact supplier to get new supplier information (2) Get new supplier information
Attachment:	Supplier

Table D.7. Process Specification of Process 2.1.2.

Items	Description
Process Number:	2.1.2
Name:	Input Supplier Information
Input:	Supplier information
Output:	Supplier information
Process Description:	(1) Record these information in to Data Store 2. (2) Share information to other department
Attachment:	Data Store 2

Table D.8. Process Specification of Process 2.2.1.

Items	Description
Process Number:	2.2.1
Name:	Get Updated Supplier Information
Input:	Updated supplier information
Output:	Updated supplier information
Process Description:	(2) Contact supplier to get updated medicine information. (2) Get updated medicine information
Attachment:	Supplier

Table D.9. Process Specification of Process 2.2.2.

Items	Description
Process Number:	2.2.2
Name:	Check Supplier Information
Input:	(3) Updated supplier detail (4) Supplier information
Output:	Checked supplier information
Process Description:	Check updated supplier information and old supplier information.
Attachment:	Data Store 2

Table D.10. Process Specification of Process 2.2.3.

Items	Description
Process Number:	2.2.3
Name:	Update Supplier Information
Input:	Checked supplier information
Output:	Updated supplier information
Process Description:	(3) Enter updated medicine information to supplier information database (4) Share information to other departments
Attachment:	Data Store 2

Table D.11. Process Specification of Process 3.1.

Items	Description
Process Number:	3.1
Name:	Get Purchasing Requisition
Input:	Purchasing requisition detail
Output:	Get purchasing requisition information from Sale Department.
Process Description:	(1) Receive purchasing requisition from Sales Department. (2) Check quantity of purchasing requisition.
Attachment:	Sales Department

Table D.12. Process Specification of Process 3.2.

Items	Description
Process Number:	3.2
Name:	Input Purchasing Requisition
Input:	Purchasing requisition information
Output:	Purchasing requisition information
Process Description:	(1) Input purchasing requisition (2) Share information to other department
Attachment:	Data Store 3

Table D.13. Process Specification of Process 4.1.

Items	Description
Process Number:	4.1
Name:	Check Quantity on Hand
Input:	(1) Purchasing requisition (2) Stock balance information
Output:	Unavailable stock information
Process Description:	Check quantity of medicine in purchasing requisition with stock transaction database
Attachment:	(1) Data Store 3 (2) Data Store 4

Table D.14. Process Specification of Process 4.2.

Items	Description
Process Number:	4.2
Name:	Calculate Amount Needed
Input:	Stock on order information
Output:	Order information
Process Description:	(1) System will check the quantity of medicine needed from the stock transaction database. (2) Required quantity on hand
Attachment:	-

Table D.15. Process Specification of Process 5.1.

Items	Description
Process Number:	5.1
Name:	Get Purchase Order
Input:	(1) Stock on order information (2) Medicine information (3) Supplier information
Output:	Purchase order information
Process Description:	The system will classify the medicine that want to order by supplier.
Attachment:	(1) Data Store 1 (2) Data Store 2

Table D.16. Process Specification of Process 5.2.

Items	Description
Process Number:	5.2
Name:	Create Purchase Order Document
Input:	Purchase Order information
Output:	Purchase Order
Process Description:	(1) Create purchase order to send to supplier (2) Check overall information and correct information
Attachment:	(1) Supplier (2) Data Store 5

Table D.17. Process Specification of Process 6.1.

Items	Description
Process Number:	6.1
Name:	Generate Report
Input:	Purchase Order information
Output:	Summary Purchase Order report
Process Description:	At the end of every months, Purchasing Department has to perform report to manager (1) Check purchase order information (2) Create purchasing detail report
Attachment:	(1) Data Store 5

Table D.18. Process Specification of Process 6.2.

Items	Description
Process Number:	6.2
Name:	Print Report
Input:	Summary Purchase Order report
Output:	Report
Process Description:	(1) Check overall report information (2) Send Purchase Order report to manager
Attachment:	Manager



APPENDIX E
ENTITY RELATIONSHIP DIAGRAM

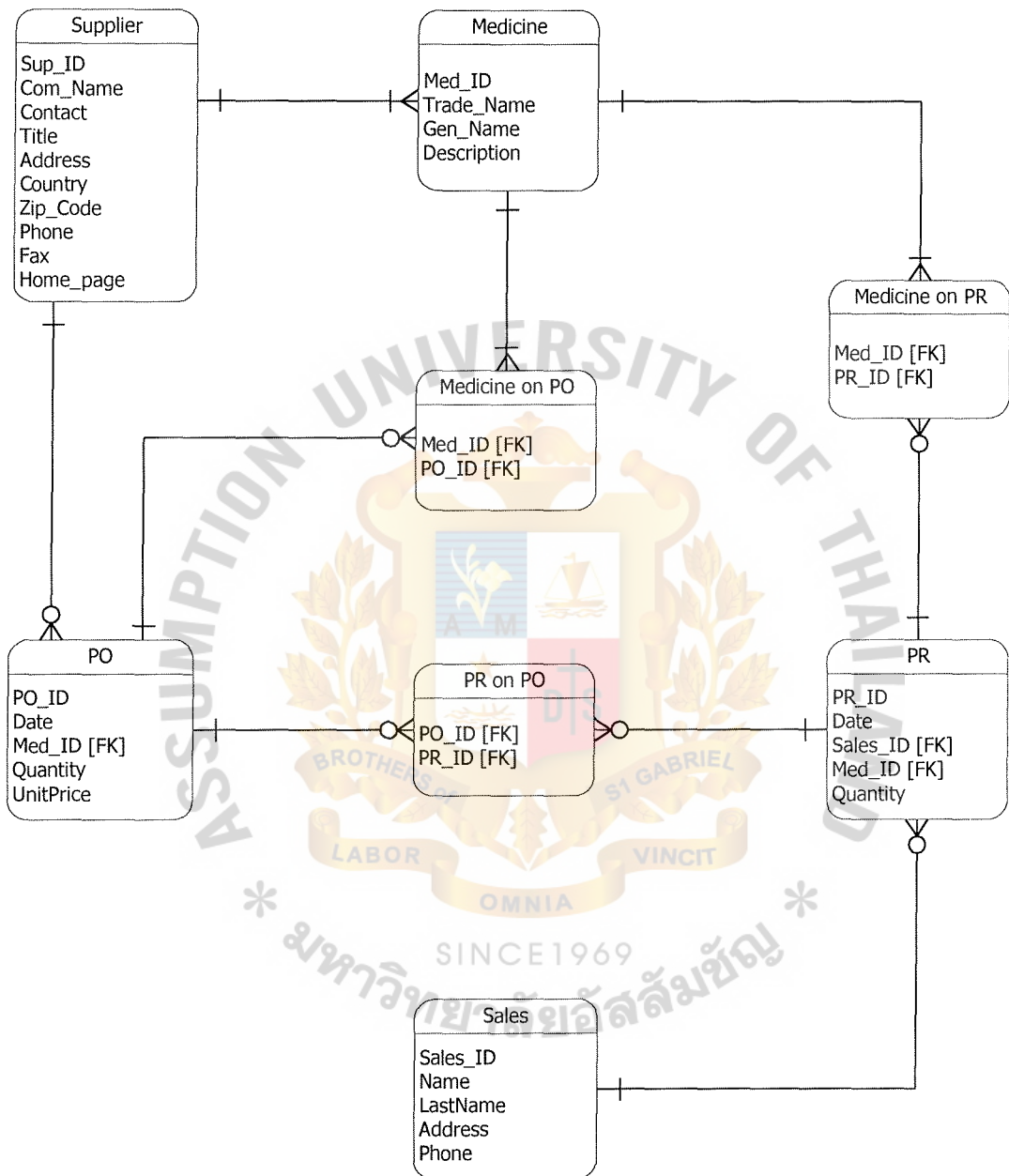


Figure E.1. Entity Relationship Diagram of Purchasing Information System.



APPENDIX F
DATA DICTIONARY

Table F.1. Data Dictionary of Medicine Information.

Field Name	Field Type	Length	Description	Remark
Med_ID	Number	6	The key number of Medicine	Primary key
Trade_Name	Text	100	Trade name of Medicine	
Gen_Name	Text	100	Generic name of Medicine	
Description	Text	1000	Description of Medicine	
UnitPrice	Number	6	Price per unit of Medicine	
Unit_Stock	Number	20	The amount of Medicine in the stock.	
Unit_Order	Number	20	The amount of Medicine on order.	
Reoder	Number	20	The level of amount of Medicine in the stock that has to reorder if the stock reach this level.	

Table F.2. Data Dictionary of Supplier Information.

Field Name	Field Type	Length	Description	Remark
Sup_ID	Number	6	The key number of Supplier.	Primary key
Com_Name	Text	100	The company name of Supplier	
Contact	Text	100	Contact person's name	
Title	Text	100	Position of contact person	
Address	Text	200	Address of Supplier	
Country	Text	100	Country of Supplier	
Zip_Code	Number	10	Postal code of address of Supplier	
Phone	Number	20	Phone number of contact person	
Fax	Number	20	Fax number of Supplier	
Hone_Page	Text	100	Home page of Supplier	

Table F.3. Data Dictionary of Purchase Order.

Field Name	Field Type	Length	Description	Remark
PO_ID	Number	6	The key number of Purchase Order.	Primary key
Date	Number	10	Date of Purchase Order.	
Med_ID	Number	6	The key number of Medicine	Foreign key
Quantity	Number	20	Quantity of Medicine on Purchase Order.	
UnitPrice	Number	6	Price per unit of Medicine	

Table F.4. Data Dictionary of Purchasing Requisition.

Field Name	Field Type	Length	Description	Remark
PR_ID	Number	6	The key number of Purchasing Requisition	Primary key
Date	Number	10	Date of Purchasing Requisition	
Sales_ID	Number	6	The key number of Sales person	Foreign key
Med_ID	Number	6	The key number of Medicine	Foreign key
Quantity	Number	20	Quantity of Medicine on Purchasing Requisition	



APPENDIX G
FEASIBILITY ANALYSIS

FEASIBILITY ANALYSIS

In the proposed system, after completing user requirement, the feasibility analysis has to be done in order to make a decision. We identify in 3 possible alternative candidate solutions. The comparison of 3 alternative candidate solutions is in the tabular matrix. They comprise of:

- (1) Completed Candidate Matrix which the characteristics of each candidate is show. In order to obtain an effective Purchasing Information System, the alternative candidate solutions of the user requirements are defined during the system analysis. The amount of information describing the characteristics of any candidate solution may become overwhelming. A matrix is a useful tools for effectively capturing, organizing and communication the characteristics for candidate solutions. Three candidate solutions of the proposed system are demonstrated by using a completed candidate matrix as shown in Table F.1.
- (2) Feasibility Analysis Matrix is view in each candidate based on 4 feasibility criteria: operational feasibility, technical feasibility, economic feasibility, and schedule feasibility. This matrix is considered complements the candidate system matrix with an analysis and ranking of the candidate system – feasibility analysis matrix. It is shown Table F.2, the columns of the matrix correspond to the same candidate solutions as show in Table F.1, whereas the rows contain the feasibility assessment notes for each candidate.

The feasibility analysis is performed on each individual candidate without regard to the feasibility of other candidates in order to evaluate the alternative candidate solution according to their economic, operational, technical, and schedule feasibility.

After complete the feasibility analysis, we decide to select the candidate 3 because it produce better result than other candidates. The main purpose of this target system is to fully support the user required functionality and system owner satisfaction.



Table G.1. Candidate System Matrix

Characteristics	Candidate 1	Candidate 2	Candidate 3
<u>Portion of System Computerized</u> Brief description of that portion of the system that would be computerized in this candidate.	Software Solution would be purchased and customized to satisfy member services required functionally.	Hire freelance program for programming the system according to analyzed system proposal.	The program development would be built by in-house IT according to the business requirements.
<u>Benefit</u> Brief description of the business benefits that would be realized for this candidate.	Implemented quickly because of purchasing solution.	Fully support user required business process for the company.	Fully support user required business process for the company.
<u>Server and Workstations</u> A description of the servers and workstations needed to support this candidate.	Server: Intel Pentium 4 at 2 GHz PC: Intel Pentium III at 750 MHz	Server: Intel Pentium 4 at 2 GHz PC: Intel Pentium III at 750 MHz	Server: Intel Pentium 4 at 2 GHz PC: Intel Pentium III at 750 MHz
<u>Software Tools Needed</u> Software tools needed to design and build the candidate (e.g., database management system, emulators, operating system, languages, etc). Not generally applicable if applications software packages are to be purchased.	MS Visual Basic C++	MS Visual Basic 6.0	MS Access
<u>Application Software</u> A description of the software to be purchased, built, accessed, or some combination of this techniques.	Custom Solution	Custom Solution	Custom Solution
<u>Method of Data Processing</u> Generally some combination of on-line, batch, deferred batch, remote batch, and real-time.	Client/Server	Client/Server	Client/Server
<u>Output Devices and Implication</u> A description of output devices that would be used, special output requirements (e.g., network, preprint forms, etc.), and output considerations (e.g., timing of actual inputs)	Epson LQ2170i HP LaserJet	Epson LQ2170i HP LaserJet	Epson LQ2170i HP LaserJet
<u>Input Devices and Implication</u> A description of input methods to be used, input devices (e.g., keyboard, mouse, etc.), special input requirement (e.g., new or revised forms from which data would be input), and input considerations (e.g., timing of actual inputs)	Digital camera & Scanner Keyboard & Mouse	Keyboard & Mouse	Keyboard & Mouse
<u>Storage Devices and Implication</u> 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 data would be organized.	MS SQL Server DBMS with 100 GB capabilities.	MS SQL Server DBMS With 100 GB capabilities.	MS SQL Server DBMS With 100 GB capabilities.

Table G.2. Feasibility Analysis Matrix.

Feasibility Criteria	Wt.	Candidate 1	Candidate 2	Candidate 3
<p>Operational Feasibility</p> <p>Functionality. A description of to what degree the candidate would benefit the organization and how well the system would work.</p> <p>Political. A description of how well received this solution would be from both user management, user, and organization perspective.</p>	30%	<p>Only support current business process would have to be modified to take advantage of software package.</p> <p>Score: 85</p>	<p>Fully support the user requirement and business process.</p> <p>Score: 90</p>	<p>Fully support the user requirement, business process and client functionally.</p> <p>Score: 95</p>
<p>Technical Feasibility</p> <p>Technology. An assessment of the maturity, availability (or ability to acquire), and desirability of the computer technology needed to support this candidate.</p>	30%	<p>Current software package is available in the market for a while. Maturity of product is a risk.</p> <p>Score: 70</p>	<p>MS Visual Basic 6.0 is mature technology based on version</p> <p>Score: 75</p>	<p>MS Access is widely used in the market. Programmer are user are required a little expertise.</p> <p>Score: 85</p>
<p>Economic Feasibility</p> <p>Cost to develop (Baht):</p> <p>Payback period :</p> <p>Net present value (Baht):</p> <p>Detailed calculation:</p>	30%	<p>Approximately 411,000</p> <p>Approximately 3.2 years</p> <p>Approximately 477,807.40</p> <p>See Appendix F</p> <p>Score: 80</p>	<p>Approximately 361,000</p> <p>Approximately 3 years</p> <p>Approximately 527,807.40</p> <p>See Appendix F</p> <p>Score: 80</p>	<p>Approximately 211,000</p> <p>Approximately 3.1 years</p> <p>Approximately 366,797.40</p> <p>See Appendix F</p> <p>Score: 90</p>
<p>Schedule Feasibility</p> <p>An assessment of how long the solution will take to design and implement.</p>	10%	<p>Less than 4 months</p> <p>Score: 90</p>	<p>5 months</p> <p>Score: 75</p>	<p>4 months</p> <p>Score: 80</p>
Ranking	100%	79.5	81	89

Table G.3. Estimated Costs and Benefits of Candidate 1, Baht.

Cost items	Years					
	0	1	2	3	4	5
Fixed Cost						
Hardware Cost:						
Server Cost 1 @ 120,000	120,000.00	-	-	-	-	-
PC Cost 2 @ 35,000	70,000.00	-	-	-	-	-
Printer 1 @ 13,000	13,000.00	-	-	-	-	-
UPS 1.5 KVA 1 @ 55,000	55,000.00	-	-	-	-	-
Total Hardware Cost	258,000.00	-	-	-	-	-
Software Cost:						
Windows 2000 Server 1 unit	30,000.00	-	-	-	-	-
MS SQL Server 1 unit	18,000.00	-	-	-	-	-
MS Office XP 2 units	20,000.00	-	-	-	-	-
Total Software Cost	68,000.00	-	-	-	-	-
Implementation Cost:						
Network Cost	10,000.00	-	-	-	-	-
Software Development Cost	300,000.00	-	-	-	-	-
Training Cost	10,000.00	-	-	-	-	-
Set up Cost	25,000.00	-	-	-	-	-
Total implementation Cost	345,000.00	-	-	-	-	-
Maintenance Cost	-	60,000.00	60,000.00	60,000.00	60,000.00	60,000.00
Total Fixed Cost	671,000.00	60,000.00	60,000.00	60,000.00	60,000.00	60,000.00
Operation Cost						
Salary Cost:						
Manager 1 @ 23,000	-	23,000.00	25,300.00	27,830.00	30,613.00	33,674.30
Staffs 2 @ 12,000	-	24,000.00	26,400.00	29,040.00	31,944.00	35,138.40
Total Annual Salary Cost	-	564,000.00	620,400.00	682,440.00	750,684.00	825,752.40
Office Supplies & Miscellaneous Cost:						
Stationary Per Annual	-	8,000.00	8,800.00	9,680.00	10,648.00	11,712.80
Paper Per Annual	-	7,500.00	8,250.00	9,075.00	9,982.50	10,980.75
Utility Per Annual	-	8,000.00	8,800.00	9,680.00	10,648.00	11,712.80
Miscellaneous Per Annual	-	6,000.00	6,600.00	7,260.00	7,986.00	8,784.60
Total Annual Office Supplies & Miscellaneous Cost	-	29,500.00	32,450.00	35,695.00	39,264.50	43,190.95
Total Annual Operation Cost		593,500.00	652,850.00	718,135.00	789,948.50	868,943.35
Total Cost	671,000.00	653,500.00	712,850.00	778,135.00	849,948.50	928,943.35
Benefits						
1. Saving Salary		192,000.00	211,200.00	232,320.00	255,552.00	281,107.20
2. Reduce Office Supplies & Miscellaneous		8,000.00	8,800.00	9,680.00	10,648.00	11,712.80
3. Opportunity cost & Intangible Benefit		600,000.00	700,000.00	800,000.00	900,000.00	1,000,000.00
Total Benefit :		800,000.00	920,000.00	1,042,000.00	1,166,200.00	1,292,820.00

Table G.4. Payback Analysis of Candidate 1 Baht.

Cost Items	Years					
	0	1	2	3	4	5
Development Cost:	-671,000.00					
Operation and Maintenance Cost:	-	-653,500.00	-712,850.00	-778,135.00	-849,948.00	-928,943.00
Discount factors for 8%:	1.00	0.926	0.857	0.794	0.735	0.681
Time adjusted costs(adjusted to present value):	-671,000.00	-605,141.00	-610,912.45	-617,839.19	-624,711.78	-632,610.18
cumulative time-adjusted costs over lifetime:	-671,000.00	-1,276,141.00	-1,887,053.45	-2,504,892.64	-3,129,604.42	-3,762,214.60
Benefit derived from operation of new system:	-	800,000.00	920,000.00	1,040,000.00	1,166,200.00	1,292,820.00
Discount factors for 8%:	1.00	0.926	0.857	0.794	0.735	0.681
Time adjusted cost (adjusted to present value):	-	740,800.00	788,440.00	825,760.00	857,157.00	880,410.42
Cumulative time adjusted benefit life time:	-	740,800.00	1,529,240.00	2,355,000.00	3,212,157.00	4,092,567.42
Cumulative lifetime time-adjusted cost + benefit:	-671,000.00	-535,341.00	-357,813.45	-149,892.64	82,552.58	330,352.82
NPV:						330,352.82

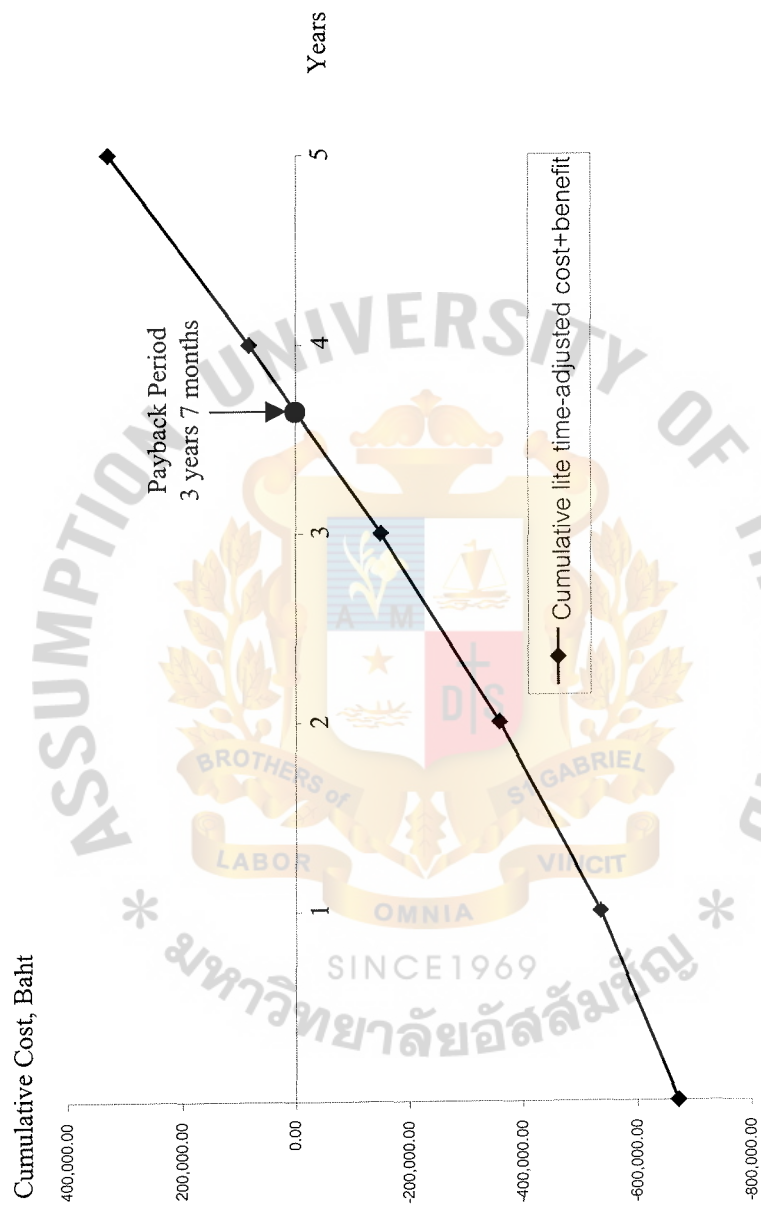


Figure G.1. Payback Analysis of Candidate 1.

Table G.5. Estimated Costs and Benefits of Candidate 2, Baht.

Cost items	Years					
	0	1	2	3	4	5
Fixed Cost						
Hardware Cost:						
Server Cost 1 @ 120,000	120,000.00	-	-	-	-	-
PC Cost 2 @ 35,000	70,000.00	-	-	-	-	-
Printer 1 @ 13,000	13,000.00	-	-	-	-	-
UPS 1.5 KVA 1 @ 55,000	55,000.00	-	-	-	-	-
Total Hardware Cost	258,000.00	-	-	-	-	-
Software Cost:						
Windows 2000 Server 1 unit	30,000.00	-	-	-	-	-
MS SQL Server 1 unit	18,000.00	-	-	-	-	-
MS Office XP 2 units	20,000.00	-	-	-	-	-
Total Software Cost	68,000.00	-	-	-	-	-
Implementation Cost:						
Network Cost	10,000.00	-	-	-	-	-
Software Development Cost	150,000.00	-	-	-	-	-
Training Cost	10,000.00	-	-	-	-	-
Set up Cost	25,000.00	-	-	-	-	-
Total implementation Cost	195,000.00	-	-	-	-	-
Maintenance Cost	-	60,000.00	60,000.00	60,000.00	60,000.00	60,000.00
Total Fixed Cost	521,000.00	60,000.00	60,000.00	60,000.00	60,000.00	60,000.00
Operation Cost						
Salary Cost:						
Manager 1 @ 23,000	-	23,000.00	25,300.00	27,830.00	30,613.00	33,674.30
Staffs 2 @ 12,000	-	24,000.00	26,400.00	29,040.00	31,944.00	35,138.40
Total Annual Salary Cost	-	564,000.00	620,400.00	682,440.00	750,684.00	825,752.40
Office Supplies & Miscellaneous Cost:						
Stationary Per Annual	-	8,000.00	8,800.00	9,680.00	10,648.00	11,712.80
Paper Per Annual	-	7,500.00	8,250.00	9,075.00	9,982.50	10,980.75
Utility Per Annual	-	8,000.00	8,800.00	9,680.00	10,648.00	11,712.80
Miscellaneous Per Annual	-	6,000.00	6,600.00	7,260.00	7,986.00	8,784.60
Total Annual Office Supplies & Miscellaneous Cost	-	29,500.00	32,450.00	35,695.00	39,264.50	43,190.95
Total Annual Operation Cost		593,500.00	652,850.00	718,135.00	789,948.50	868,943.35
Total Cost	521,000.00	653,500.00	712,850.00	778,135.00	849,948.50	928,943.35
Benefits						
1. Saving Salary		192,000.00	211,200.00	232,320.00	255,552.00	281,107.20
2. Reduce Office Supplies & Miscellaneous		8,000.00	8,800.00	9,680.00	10,648.00	11,712.80
3. Opportunity cost & Intangible Benefit		600,000.00	700,000.00	800,000.00	900,000.00	1,000,000.00
Total Benefit :		800,000.00	920,000.00	1,042,000.00	1,166,200.00	1,292,820.00

Table G.6. Payback Analysis of Candidate 2, Baht.

Cost Items	Years					
	0	1	2	3	4	5
Development Cost:	-521,000.00					
Operation and Maintenance Cost:	-	-653,500.00	-712,850.00	-778,135.00	-849,948.00	-928,943.00
Discount factors for 8%:	1.00	0.926	0.857	0.794	0.735	0.681
Time adjusted costs(adjusted to present value):	-521,000.00	-605,141.00	-610,912.45	-617,839.19	-624,711.78	-632,610.18
cumulative time-adjusted costs over lifetime:	-521,000.00	-1,126,141.00	-1,737,053.45	-2,354,892.64	-2,979,604.42	-3,612,214.60
Benefit derived from operation of new system:	-	800,000.00	920,000.00	1,040,000.00	1,166,200.00	1,292,820.00
Discount factors for 8%:	1.00	0.926	0.857	0.794	0.735	0.681
Time adjusted cost (adjusted to present value):	-	740,800.00	788,440.00	825,760.00	857,157.00	880,410.42
Cumulative time adjusted benefit life time:	-	740,800.00	1,529,240.00	2,355,000.00	3,212,157.00	4,092,567.42
Cumulative lifetime time-adjusted cost + benefit:	-521,000.00	-385,341.00	-207,813.45	107.36	232,552.58	480,352.82
NPV:						480,352.82

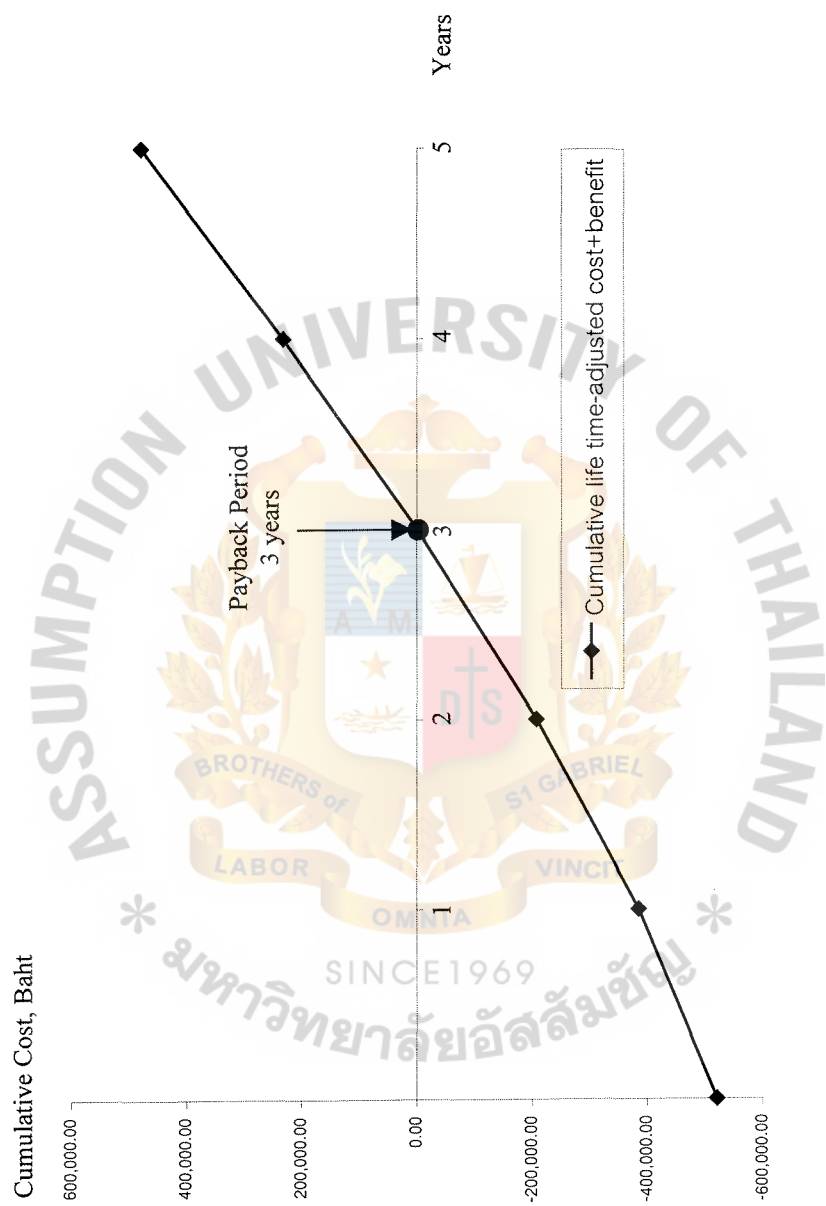


Figure G.2. Payback Analysis of Candidate 2.

Table G.7. Estimated Costs and Benefits of Candidate 3, Baht.

Cost items	Years					
	0	1	2	3	4	5
Fixed Cost						
Hardware Cost:						
Server Cost 1 @ 120,000	120,000.00	-	-	-	-	-
PC Cost 2 @ 35,000	70,000.00	-	-	-	-	-
Printer 1 @ 13,000	13,000.00	-	-	-	-	-
UPS 1.5 KVA 1 @ 55,000	55,000.00	-	-	-	-	-
Total Hardware Cost	258,000.00	-	-	-	-	-
Software Cost:						
Windows 2000 Server 1 unit	30,000.00	-	-	-	-	-
MS SQL Server 1 unit	18,000.00	-	-	-	-	-
MS Office XP 2 units	20,000.00	-	-	-	-	-
Total Software Cost	68,000.00	-	-	-	-	-
Implementation Cost:						
Network Cost	10,000.00	-	-	-	-	-
Software Development Cost	75,000.00	-	-	-	-	-
Training Cost	10,000.00	-	-	-	-	-
Set up Cost	25,000.00	-	-	-	-	-
Total implementation Cost	120,000.00	-	-	-	-	-
Maintenance Cost	-	60,000.00	60,000.00	60,000.00	60,000.00	60,000.00
Total Fixed Cost	446,000.00	60,000.00	60,000.00	60,000.00	60,000.00	60,000.00
Operation Cost						
Salary Cost:						
Manager 1 @ 23,000	-	23,000.00	25,300.00	27,830.00	30,613.00	33,674.30
Staffs 2 @ 12,000	-	24,000.00	26,400.00	29,040.00	31,944.00	35,138.40
Total Annual Salary Cost	-	564,000.00	620,400.00	682,440.00	750,684.00	825,752.40
Office Supplies & Miscellaneous Cost:						
Stationary Per Annual	-	8,000.00	8,800.00	9,680.00	10,648.00	11,712.80
Paper Per Annual	-	7,500.00	8,250.00	9,075.00	9,982.50	10,980.75
Utility Per Annual	-	8,000.00	8,800.00	9,680.00	10,648.00	11,712.80
Miscellaneous Per Annual	-	6,000.00	6,600.00	7,260.00	7,986.00	8,784.60
Total Annual Office Supplies & Miscellaneous Cost	-	29,500.00	32,450.00	35,695.00	39,264.50	43,190.95
Total Annual Operation Cost		593,500.00	652,850.00	718,135.00	789,948.50	868,943.35
Total Cost	446,000.00	653,500.00	712,850.00	778,135.00	849,948.50	928,943.35
Benefits						
1. Saving Salary		192,000.00	211,200.00	232,320.00	255,552.00	281,107.20
2. Reduce Office Supplies & Miscellaneous		8,000.00	8,800.00	9,680.00	10,648.00	11,712.80
3. Opportunity cost & Intangible Benefit		600,000.00	700,000.00	800,000.00	900,000.00	1,000,000.00
Total Benefit :		800,000.00	920,000.00	1,042,000.00	1,166,200.00	1,292,820.00

Table G.8. Payback Analysis of Candidate 3, Baht.

Cost Items	Years					
	0	1	2	3	4	5
Development Cost:	-446,000.00					
Operatio and Maintenance Cost:	-	-653,500.00	-712,850.00	-778,135.00	-849,948.00	-928,943.00
Discount factors for 8%:	1.00	0.926	0.857	0.794	0.735	0.681
Time adjusted costs(adjusted to present value):	-446,000.00	-605,141.00	-610,912.45	-617,839.19	-624,711.78	-632,610.18
cumulative time-adjusted costs over lifetime:	-446,000.00	-1,051,141.00	-1,662,053.45	-2,279,892.64	-2,904,604.42	-3,537,214.60
Benefit derived from operation of new system:	-	800,000.00	920,000.00	1,040,000.00	1,166,200.00	1,292,820.00
Discount factors for 8%:	1.00	0.926	0.857	0.794	0.735	0.681
Time adjusted cost (adjusted to present value):	-	740,800.00	788,440.00	825,760.00	857,157.00	880,410.42
Cumulative time adjusted benefit life time:	-	740,800.00	1,529,240.00	2,355,000.00	3,212,157.00	4,092,567.42
Cumulative lifetime time-adjusted cost + benefit:	-446,000.00	-310,341.00	-132,813.45	75,107.36	307,552.58	555,352.82
NPV:						555,352.82

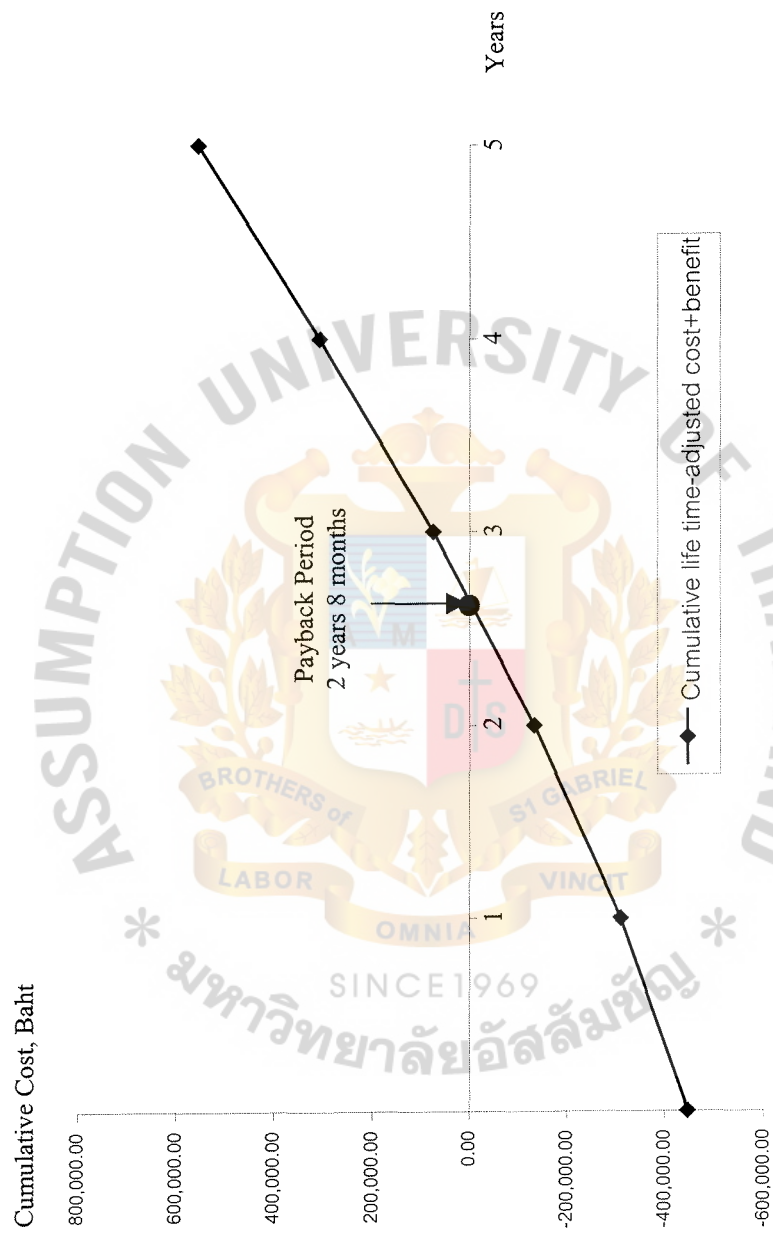



Figure G.3. Payback Analysis of Candidate 3.



APPENDIX H
INTERFACE

Login : Form




Inter Medical Co., Ltd.

Login

Enter your ID and password to login

User ID :

Password :

Record:  1 of 1

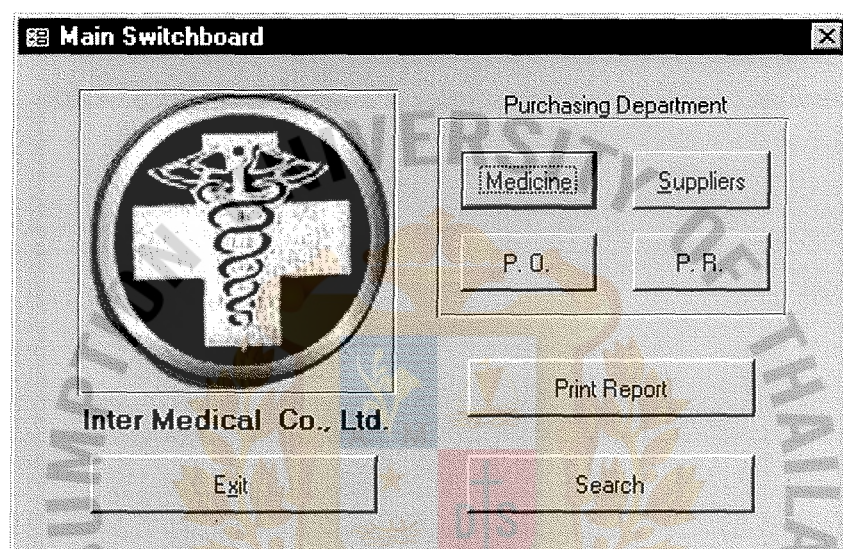


Figure H.2. Main Menu Screen Interface.

Medicine Preview Medicine list

Medicine ID: 000001

Trade Name: Cordarone

Generic Name: Amiodarone hydrochloride

Description: Amiodarone hydrochloride 200 mg.

Supplier: Sanofi-synthelabo

Quantity Per Unit: 12 boxes x 50 tablets

Unit Price: 20

Units In Stock: 200

Units On Order: 0

Reorder Level: 50

Add Delete Update Exit

Record: 1 of 1

Figure H.3. Medicine Information Screen Interface.

Suppliers

Supplier ID: 001

Company Name: OLIC Limited

Contact Name: Ms. Olin Squant **Title:** Sales Manager

Address: 34, Boon Leat Terrace

City: -

Post Code: 1198866 **Country:** Singapore

Phone: - **Fax:** -

Home Page: www.olic.com

Add **Delete** **Update** **Exit**

Record: 1 of 1

Figure H.4. Supplier Information Screen Interface.

Purchase Order

Purchase Order: Preview Stock list

PO. ID.: 00012

PO. Date: 12 June 2003 Required Date: 19 June 2003

Supplier ID.: OLIC Limited

	MedicineID	MedicineName	Quantity	UnitPrice	Total
▶	000012	Ismo	200	15	3000
	000016	Cordarone	50	5	250
	000025	Zestril	250	1	250
*					

Record: 1 of 3

Add Delete Update Exit

Record: 1 of 3

Figure H.5. Purchase Order Screen Interface.

Purchase Requisition

Purchase Requisition:

PR. ID.: 00025

PR. Date: 10 June 2003 Required Date: 20 June 2003

Sale ID.: Somchai

MedicineID	MedicineName	Quantity
000052	Dulcolax	10
000012	Ismo	50
000015	Capoten	25
000025	Zestril	100
*		

Record: 1 of 4

Add Delete Update Exit

Record: 1 of 4

Figure H.6. Purchasing Requisition Screen Interface.

Search

Search by :

☒ Medicine ☐ P. O.

☐ Supplier ☐ P. R.

Input ID or name of category that you want to search.

ID :

Name :

Figure H.7. Search Screen Interface.

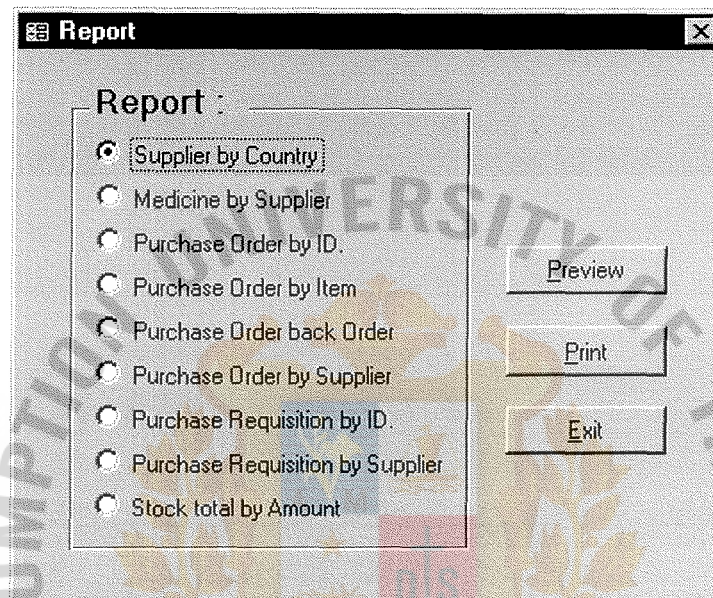


Figure H.8. Report Screen Interface.





Inter Medical Co., Ltd.

Vat Group Building 5th Floor, Rama 9, Suanluang, Bangkok. 10900
Phone: 662-7183333 Fax:: 662-7189335

SUPPLIER SUMMARY REPORT

Printed on: 7/12/03

By City: Bangkok

Supplier ID	Supplier Name	Contact Person	Title	Address	Phone	Fax	Home Page
000005	หจก. เลิศสิ่งแห่งสังกรรม	อริสา หิรัญ	Sales	922 ถ.สุขุมวิท 50 พระโขนง เขตคลองเตย กทม 10250	02-9829560-4	02-5746405	www.lertsin.com
000009	บ.เมเรียล จำกัด	ศุภชัย ต้นบุญ	Sales	อาคารวิบูลย์ธานี 1 ถ.พระราม 4 เขตคลองเตย กทม 10100	02-6613377	02-6613377	www.merial.com
000010	บ.พีพีคอร์ก จำกัด	กนกวรรณ บุญชัย	Sales	67 สุขุมวิท 62 พระโขนง กรุงเทพ 10250	02-3111911-3	02-3111911-3	www.vatgroup.com
000012	แสงชัยคำปะนี้	ศักดิ์ชัย วิวัฒนา	Sales	148/5 ถ.นางลิ้นจี่ทุ่งมหาเมฆ กรุงเทพ	02-2662503-5	02-2662503-5	
000013	บ.บีแอลเอช เทรคคิงจำกัด	สิทธิศักดิ์ วรรณกาญจน์	Sales	27/2-3 ถ.วิทย์เพ็ญเลิศ กทม	02-253178-81	02-253178-81	
000017	บ.สยามฟาร์มาซูติคอล จำกัด	จิราพร สุวรรณโชติ	Sales	171/1 ซ.โชคชัย ถ.วิภาวดีรังสิต ลาดยาว จตุจักร กทม	02-2716540	02-2716540	www.phama.com

Total : 6 Suppliers

Figure I.1. Supplier Summary Report.



Inter Medical Co., Ltd.

Vat Group Building 5th Floor, Rama 9, Suanluang, Bangkok. 10900
Phone: 662-7183333 Fax: 662-7189335

MEDICINE SUMMARY REPORT

Printed on: 7/12/03

Med ID.	Trade Name	Generic Name	Description	By : Supplier	Quantity per Unit	Status
---------	------------	--------------	-------------	---------------	-------------------	--------

Supplier ID : 000001
Supplier Name : Olalic Co.,Ltd.

000002 Semi-Euglucon 2
000003 Semi-Euglucon 4
000004 Semi-Euglucon 6
000005 Semi-Euglucon 12
000006 Semi-Euglucon 24
Total : 7 items

Ecolicine
Ecolicine
colicine
Ecolicine
Ecolicine

Ecolicine 2 mg.per tablet
Ecolicine 4 mg.per tablet
Ecolicine 6 mg.per tablet
Ecolicine 12 mg.per tablet
Ecolicine 24 mg.per tablet

20 boxes x 200 tablets
20 boxes x 200 tablets
20 boxes x 200 tablets
20 boxes x 200 tablets
20 boxes x 200 tablets

continued
continued
continued
continued
discontinued

Supplier ID : 000002
Supplier Name : Sofani Co.,Ltd.

000007 Retin-A 0.01%
000008 Retin-A 0.25%
Total : 2 items

Tretinoin
Tretinoin

Tretinoin 0.01%
Tretinoin 0.25%

12 boxes x 10 tubes
12 boxes x 10 tubes

continued
continued

Figure I.2. Medicine Summary Report



Inter Medical Co., Ltd.

VAT Group Building 5th Floor, Rama 9, Suanluang, Bangkok. 10900
Phone: 662-7183333 Fax:: 662-7189335

PURCHASE ORDER SUMMARY REPORT

Printed on: 14/07/03

By: PO.ID. During 16/05/03-31/05/03

Med_ID	Trade_Name	Quantity	UnitPrice	Total
PO. ID: 52				
PO. Date: 17/05/03		Supplier ID: 000015		
		Supplier Name: Diethelm		
000011	Capoten	100	100.00	10,000.00
000012	Ismo	500	620.00	310,000.00
000015	Colchicine	200	400.00	80,000.00
		Total	1,120.00	400,000.00
PO. ID: 53				
PO. Date: 20/05/03		Supplier ID: 000052		
		Supplier Name: Olic Limited		
000205	Xandose	250	1,050.00	262,500.00
000207	Paracap	600	100.00	60,000.00
		Total	1,150.00	322,500.00
PO. ID: 54				
PO. Date: 22/05/03		Supplier ID: 000015		
		Supplier Name: Diethelm		
000011	Capoten	100	100.00	10,000.00
000015	Colchicine	200	400.00	80,000.00
		Total	500.00	90,000.00
Total		PO : 3	Grand Total	812,500.00
		Supplier : 2		
		Medicine : 5		

Figure I.3. Purchase Order Summary Report.



Inter Medical Co., Ltd.

VAT Group Building 5th Floor, Rama 9, Suanluang, Bangkok. 10900
Phone: 662-7183333 Fax: 662-7189335

PURCHASE ORDER SUMMARY REPORT

Printed on: 12/07/03

By: Medicine ID

Med_ID	Trade_Name	PO. ID.	PO. Date	Quantity	UnitPrice	Total
Supplier ID: 000015						
Supplier Name: Diethelm						
000011	Capoten	11/03	11/01/03	200	100.00	20,000.00
		32/03	20/02/03	100	100.00	10,000.00
		35/03	29/04/03	400	100.00	40,000.00
		40/03	10/05/03	500	100.00	50,000.00
		77/03	01/07/03	200	125.00	25,000.00
Total				1,400		145,000.00
000012	Ismo	11/03	11/01/03	100	650.00	65,000.00
		32/03	20/02/03	200	650.00	130,000.00
		35/03	29/04/03	250	650.00	162,500.00
		40/03	10/05/03	400	650.00	260,000.00
		77/03	01/07/03	100	650.00	65,000.00
Total				1,500		682,500.00
Supplier ID: 00070						
Supplier Name: Unichem						
000200	Aspent-M	9/03	29/04/03	500	150.00	7,000.00
		14/03	10/05/03	200	150.00	30,000.00
		19/03	01/07/03	400	150.00	60,000.00
Total				1,100		165,000.00

Figure I.4. Purchase Order Summary Report.



Inter Medical Co., Ltd.

VAT Group Building 5th Floor, Rama 9, Suanluang, Bangkok. 10900
Phone: 662-7183333 Fax:: 662-7189335

PURCHASE ORDER SUMMARY REPORT

Printed on: 07/12/03

By: Supplier

PO.ID.	PO. Date	Med_ID.	Trade Name	Quantity	UnitPrice	Total
Supplier ID: 000015						
Supplier Name: Diethelm						
11/03	11/01/03	000011	Capoten	100	100.00	10,000.00
		000012	Ismo	500	620.00	310,000.00
		000015	Colchicine	200	400.00	80,000.00
13/03	13/01/03	000011	Capoten	150	100.00	15,000.00
		000012	Ismo	50	620.00	31,000.00
		000015	Colchicine	800	400.00	320,000.00
17/03	25/01/03	000012	Ismo	100	620.00	62,000.00
		000015	Colchicine	600	400.00	240,000.00
		000018	Sara	400	100.00	40,000.00
Total	PO. 3	Grand Total			1,108,000.00	
	Medicine 4					
Supplier ID: 000052						
Supplier Name: Olic Limited						
23/03	12/01/03	000205	Xandose	800	1,000.00	800,000.00
51/03	05/06/03	000205	Xandose	250	1,050.00	262,500.00
		000207	Paracap	600	100.00	60,000.00
Total	PO. 2	Grand Total			2,230,500.00	
	Medicine 2					

Figure I.5. Purchase Order Summary Report.



Inter Medical Co., Ltd.

VAT Group Building 5th Floor, Rama 9, Suanluang, Bangkok. 10900
Phone: 662-7183333 Fax:: 662-7189335

BACK ORDER SUMMARY REPORT

Printed on: 12/07/03

By: Supplier

Med_ID	Trade_Name	PO. ID.	PO. Date	Quantity
Supplier ID: 000015				
Supplier Name: Diethelm				
000011	Capoten	11/03	11/01/03	200
000011	Capoten	32/03	25/02/03	100
000012	Ismo	11/03	11/01/03	500
000015	Colchicine	11/03	11/01/03	200
Supplier ID: 000052				
Supplier Name: Olic Limited				
000152	Xandase	13/03	12/01/03	200
000152	Xandase	42/03	26/02/03	500
Supplier ID: 00070				
Supplier Name: Unichem				
000200	Aspent-M	9/03	10/01/03	500
000200	Aspent-M	14/03	12/01/03	200
Supplier ID: 00079				
Supplier Name: Zeneca Limited				
000251	Zestril	52/03	16/06/03	400
Total				
				Supplier
				Medicine
				PO.

Figure I.6. Back Order Summary Report.



Inter Medical Co., Ltd.

VAT Group Building 5th Floor, Rama 9, Suanluang, Bangkok. 10900
Phone: 662-7183333 Fax:: 662-7189335

PURCHASING REQUISITION SUMMARY REPORT

Printed on: 10/03/03

By: Supplier

Med ID.	TradeName	Req. Date.	PR. ID.	PR. Date	Quantity	Status
Supplier ID: 000015						
Supplier Name: Diethelm						
000011	Capoten	13/03/03	12/03	11/01/03	200	PO.20/03
		13/03/03	32/03	10/02/03	100	PO.20/03
		14/03/03	23/03	01/02/03	500	Hold
		14/03/03	22/03	01/02/03	200	Hold
		15/03/03	52/03	01/03/03	150	Hold
		15/03/03	54/03	03/03/03	300	Hold
		Total		Process	300	
		Hold	1150			
000012	Ismo	13/03/03	32/03	11/01/03	100	PO.20/03
		13/03/03	14/03	10/02/03	200	PO.20/03
		14/03/03	23/03	01/03/03	250	Hold
		15/03/03	52/03	03/03/03	100	Hold
		Total		Process	300	
		Hold	350			
Supplier ID: 00070						
Supplier Name: Unichem						
000200	Aspent-M	15/03/03	09/03	10/02/03	500	PO. 12/03
		18/03/03	19/03	22/02/03	400	Hold
		Total	Process	500		
			Hold	400		

Figure I.7. Purchasing Requisition Summary Report.



Inter Medical Co., Ltd.

VAT Group Building 5th Floor, Rama 9, Suanluang, Bangkok. 10900

Phone: 662-7183333 Fax:: 662-7189335

STOCK SUMMARY REPORT

Printed on 14/07/03

By : Medicine Amount

Med_ID	Trade_Name	Quantity	PR.	PO	Reorder	Suggest
000014	Paracap	10,012	10,000	3,000	5,000	1,988
000203	Mentol	9,858	15,000	-	5,000	10,142
000158	Ivomec	9,700	-	-	5,000	-
000605	Nontril	9,638	-	-	5,000	-
000013	Stepzil	4,500	7,000	-	5,000	7,500
000318	Semi-Uglucon	4,445	5,000	2,000	5,000	3,555
000514	Dulcolex	4,300	-	-	2,000	-
000023	Predon	1,800	-	1,000	2,000	-
000024	Laxatone	2,331	-	-	1,000	-
000054	Alserine	2,217	-	-	1,000	-
000107	Cefazillin	2,216	4,000	-	1,000	2,784
000187	Neo-hesna	2,200	5,000	1,000	1,000	2,800
000251	Dexoph	1,900	-	-	1,000	-
000412	Nembutal	1,898	-	-	5,000	3,102
000333	Sterile ampicilin	1,889	-	-	5,000	3,111
000055	Tonophosphan solution	1,835	-	-	2,000	165
000041	Chloramphenicol	1,837	-	-	5,000	3,163
000061	Virbamec	1,715	-	-	1,000	-
000174	Immiticide	1,614	-	-	5,000	3,386
000076	Ismo	1,500	1,800	2,000	2,000	300
000514	Sara	1,498	5,000	2,000	5,000	6,502
000123	Bluphen	1,456	5,000	-	1,000	4,544
000080	Retin A	1,421	2,000	2,000	1,000	-

Total : 22 items

Figure I.8. Stock Summary Report.

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