A Services Information System for Harbour Department

by

Mr. Surapong   Somrang

A Final Report of the Three - Credit Course
CE 6998 Project

Submitted in Partial Fulfillment
of the Requirements for the Degree of
Master of Science
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Project Title   A Services Information System for Harbour Department

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Academic Year   July 2000

The Graduate School of Assumption University has approved this final report of the three-credit course, CE 6998 PROJECT, submitted in partial fulfillment of the requirements for the degree of Master of Science in Computer and Engineering Management.

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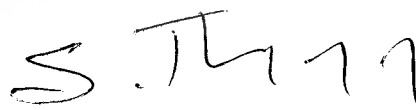   Advisor   Chairman

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ABSTRACT

This project examines the design and implementation of the office of seaman in Harbour Department. The objective of this project is to improve the quality of service, security and efficiency within the office of seaman.

The gathering of information is the first process in this project. The information gathered in this project includes current form, working procedure, problems and requirements. After gathering all the information, the new system is designed to match the requirements. This new system performs single point of service; all individuals contact only one office to request for all the services. This will decrease all the confusion within the office of seaman. Besides, the most important in this project is to improve data security because the seaman book and the agreement and crew list of Thai vessel are important evidence. The current seaman book has no faking protection such as histogram wrapping, or special ink printer. The report generator is important for supporting management for improving the quality of service within the office of seaman. The report will include list of requests from individuals and the entire statistic that can be used for decision support.

This project also includes hardware and cost of implement project for 5 years. The result shows that breakeven point is at year 4. Therefore, the office of seaman should implement this computer system to improve efficiency and quality of service.

ACKNOWLEDGEMENTS

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I. INTRODUCTION

1.1 Description of the Project

In the current economic situation, the way to survive of an organization is to increase the serviceability toward the customers and reduce the cost. Therefore, Information Technology (IT) is a factor which can help to reach business objective.

This project aims at the information technology implementation in the government organization, by studying the site reference at the office of seaman section of Harbour Department.

The study of this project compares the current workflow of the office of seaman with the new information technology that is designed to increase the reliability, accuracy and punctuality.

1.2 Project Background

In the present day, computer plays an important role in the information system of many organizations. The organization has to collect data and calculate them, as they are the information for decision making. The office of seaman is a sample of the organization that realizes the new paradigm that supports management and operation in the organization. Therefore, I choose to study current workflow of the office of seaman and give some comments for implementing information technology.

Now the information of the office of seaman is stored in the form of paper, which uses huge space for storing. The staff use the floor of the building to store all the registration forms, copies of the seaman book and other documents of outside individuals. It is also time consuming to search the information they need. For these reasons, the office of seaman is a good example to study for planning and implementing the information technology to improve the serviceability, reliability and accuracy.

1.3 Project Objective

The objectives of this project are:

(a) To study and analyze the implementation of information technology and information system in the office of seaman.

(b) To study and analyze the process of issuing the seaman book.

(c) To study, analyze, compare and evaluate the implementation of information technology in the government organization.

(d) To study the possibility of information system implementation in the harbour department.

(e) To design information system and computer center to make harbour department meet the following objectives:

    (1) Security of data

    (2) Accuracy of data

    (3) Decrease of delay of each activity

    (4) Decrease of data redundancy in the harbour department

(f) To redesign working process within the harbour department to serve the need of the public.

1.4 Scope of the Project

This project focuses on the implementation of information technology from the site reference of the office of seaman in the process of issuing the seaman book, medical fitness certification and issuing agreement and crew List of Thai vessel. The project includes:

(a) Defining information problem within the harbour department.

(b) Taking the economic figures to consider project feasibility

(c)   Designing a new computerized information system which includes Data Flow Diagram, Program Structure, Database Design and Hardware Configuration to reduce the problems of the harbour department.

1.5   Project Plan

The project plan outline is as follows:

(1)   Problem Definition is the process that includes the interview of the staff to define the current problems in the seaman department.

(2)   Design Data Flow Diagram includes drawing current data flow diagram, new data flow diagram and creating process specification.

(3)   Design Program Structure includes designing program structure, module speciation for the seaman department

(4)   Design Database includes designing new database and data dictionary.

(5)   Design Program Interface

(6)   Feasibility Analysis includes designing computer system to estimate all the cost that must be used in this project compared with the benefit that we will get from implementing this project

ID	Task Name	Start Date	End Date	1999				
				May	June	July	August	September
1	Problem Definition & Feasibility Analysis	1/5/42	31/5/42	▉				
2	Design Data Flow Diagram	1/6/42	29/6/42		▉			
3	Design Program Structure	24/6/42	16/7/42			▉		
4	Design Database	17/7/42	6/8/42				▉	
5	Design Program Interface	7/8/42	24/8/42				▉	
6	Design Implementation Plan & Project Feasibility Analysis	25/8/42	16/9/42					▉

Figure 1.1.   Project Plan.

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II. OVERVIEW OF HARBOUR DEPARTMENT

AND CURRENT SYSTEM ANALYSIS

2.1 Responsibility

(1) Development and implementation of measures for navigation safety, including maritime search and rescue system within Thailand waters and Contiguous Zone (24 nautical miles from the baseline)

(2) Dredging and maintenance of river and coastal channels, installation and maintenance of navigation aids.

(3) Enforcement of navigation lows, control of construction and activities that may encroach on waterway or obstruct navigation.

(4) Inspection of ship's conditions, engines, electric and other equipment for the purpose of issuing or renewing ship license, examination and issuance of certificate of competency on marine engineering.

(5) Issuance and annual renewal of license for motor-ships and non motor-ships in accordance with the Navigation in Thai Waters Act and Thai Vessels Act, registration of ships and legal deeds for ownership protection.

(6) Guiding sea-going vessels of specific size in and out of the port limits where piloting is compulsory or shifting the sea-going vessels within that areas.

(7) Water transport development planning and implementation such as port development

(8) Seafarers' training in accordance with international convention and standard including upgrading and refreshing course for in service seafarers.

(9) Survey and drawing of maps for navigation.

(10) Prevention of marine pollution e.g. oil spill response.

2.2 Functions

The Harbor Department is under the Ministry of Transport and Communications. The Director-General directs it with assistance from 3 Deputy Director-Generals. The responsibilities of the department cover both inland waterways and maritime activities such as navigation control, ship registration, ship survey, pilotage, dredging and maintenance of navigation channels, seafarers' training, certification and development of port infrastructure and facilities.

2.3 Organization

The Harbor Department is organized into 13 divisions, 7 regional offices and 24 branches; a director heads each division. The diagram of the divisions of the Harbor Department is shown in Figure 2.1 and the branches of Harbor Department are shown in Figure 2.2.

Responsibilities of each division can be summarized as follows:

(1)   Technical Division

    (a)   Marine environment protection

    (b)   Water transport development planning

    (c)   Civil and marine engineering works

    (d)   Water transport data collection and processing

    (e)   Foreign affairs and international conventions

(2)   Survey & Chart Production Division

    (a)   Hydrographic surveys

    (b)   Hydrological surveys

    (c)   Production of navigation charts

(3)   Coastal Dredging & Maintenance Division

    (a)   Dredging of coastal channels

(b)   Installation & maintenance of aids to navigation

(4)   River Dredging & Maintenance Division

    (a)   Dredging of river navigation channels

    (b)   Installation & maintenance of aids to navigation

(5)   Ship Survey Division

    (a)   Ship survey

    (b)   Ship plan approval

    (c)   Examination and certification of competency for seamen (Engineer Department)

    (d)   Port state control inspections

(6)   Ship Registration Division

    (a)   Ship registration service

    (b)   Ship licensing

    (c)   Endorsement of a mortgage

(7)   Water Transport Control Division

    (a)   Facilitation and safety of inland & maritime navigation

    (b)   Issuance of vessels' port clearance

    (c)   Examination and certification of competency for seamen (Deck Department)

    (d)   Control of construction encroaching on water ways or seas e.g. piers

(8)   Pilot Division

    (a)   Provision of pilotage services

    (b)   Issuance of pilot license

    (c)   Maritime safety communications

(9)   Merchant Marine Training Center

      (a)   Provision of seamen's training at official and rating levels

(10)   Finance Division

      (a)   Financial management

      (b)   Supplies procurement

      (c)   Property and services

      (d)   Operation and maintenance of vehicles

(11)   Office of the Secretary

      (a)   Public relations

      (b)   Staff training

      (c)   Personnel management

      (d)   General administration

(12)   Office of Seamen

      (a)   Crews' employment

      (b)   Issuance of seaman book

(13)   Office of Legal Affairs

      (a)   Drafting and revising law/regulation

      (b)   Civil liability matters

      (c)   Drafting and checking contracts

      (d)   Other legal matters

For this project the business process under study is the office of seaman, which mostly contacts the individuals and easily implements information system to improve efficiency.

Harbour Department

Harbour Department

- Technical division
- Coastal Dredging & Maintenance Division
- Survey & Chart Production Division
- Ship Registration Division
- Water Transport Control Division
- Pilot Division
- Office Of Seaman
- Office Of The Secretary
- Office of Legal Affairs
- Ship Survey Division
- River Dredging & Maintenance Division
- Merchant Marine Traning Center
- Finance Division

Figure 2.1. Organization Chart of Harbour Department.

Harbour Department

Deputy Director General — Director General — Deputy Director General — Deputy Director General — Deputy Director General

- Office of Secretary
- River Dredging and maintenance Div.
- Coastal Dredging and Maintenance Div.
- Finance Div.
- Ship Survey Div.

- Ship Registeration Div.
- Water Transport Inspection Div.
- Pilot Div.
- Survey and Map Production Div.
- Technical Div.

- Merchant Marine Training Centre
- Office of Law
- Office of Seaman
- Office of Environment

- Reginal Harbour Office 1
- Reginal Harbour Office 2
- Reginal Harbour Office 3
- Reginal Harbour Office 4
- Reginal Harbour Office 5
- Reginal Harbour Office 6
- Reginal Harbour Office 7

Figure 2.2. Office of Harbour Department.

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2.4 Manpower

In 1996, the number of the department's manpower is 2,180 comprising 1,179 civil servants; 923 permanent and 78 temporary employees.

2.5 Location

The Head Quarter of the Harbor Department is located at 1278 Yotha Rd., Talard Noi, Samphanthawong, Bangkok.

2.6 Regional Harbor Office

    (1)   Regional Harbor Office I (Nakhon Sawan)

        (a)   Chiang Mai Branch

    (2)   Regional Harbor Office II (Ayutthaya)

        (a)   Suphan Buri Branch

    (3)   Regional Harbor Office III (Samut Songkhram)

        (a)   Samut Sakhon Branch

        (b)   Kanchanaburi Branch

        (c)   Petchaburi Branch

        (d)   Prachuap Khiri Khan Branch

    (4)   Regional Harbor Office IV (Songkhala)

        (a)   Chumphon Branch

        (b)   Surat Thani Branch

        (c)   Nakhon Si Thammarat Branch

        (d)   Pattani Branch

        (e)   Narathiwat Branch

    (5)   Regional Harbor Office V (Trang)

        (a)   Ranong Branch

        (b)   Phangnga Branch

(c)   Krabi Branch

(d)   Satun Branch

(e)   Phuket Branch

(6)   Regional Harbor Office VI (Chachoengsao)

    (a)   Chon Buri Branch

    (b)   Rayong Branch

    (c)   Chanthaburi Branch

    (d)   Trat Branch

(7)   Regional Harbor Office VII (Nong Khai)

    (a)   Ubon Ratchathani Branch

    (b)   Nakhon Ratchasima Branch

(8)   Samut Prakarn Branch (Directly under Harbor Department's Headquarter)

(9)   Nontaburi-Patumthani Branch (Directly under Water Transport Control Division)

2.7   Dredging Center

(1)   Coastal Dredging Center

    (a)   Coastal Dredging Center I (Trang)

    (b)   Coastal Dredging Center II (Songkhla)

    (c)   Coastal Dredging Center III (Chantaburi)

    (d)   Coastal Dredging Center IV (Surathani)

(2)   River Dredging Center

    (a)   River Dredging Center I (Ayuthaya)

    (b)   River Dredging Center II (Nakhon Sawan)

    (c)   River Dredging Center III (Chiang Mai)

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2.8   Current Process in Office of Seaman

After we study the process in the office of seaman, we decide to analyze only the office of seaman which is the department that usually contacts the public. Implementing Information Technology will help the office of seaman work with efficiency and accuracy. Therefore, the public will be satisfied with the service from the office of seaman. The major processes of the office of seaman are as follows:

(1)   Issuing Seaman Book

    (a)   Receive and issue licenses

    (b)   Issue duty bill

    (c)   Issue seaman book

    (d)   Renew seaman book

    (e)   Issue substitution of seaman book

    (f)   Performance Record

(2)   Agreement of Crew List of Thai Vessel

    (a)   Receive and issue petition

    (b)   Issue duty bill

    (c)   Issue Agreement of Crew List of Thai Vessel

    (d)   Renew Agreement of Crew List of Thai Vessel

(3)   Medical Fitness Certification

    (a)   Receive and issue petition

    (b)   Issue duty bill

    (c)   Issue Medical Fitness Certification

    (d)   Correction of Medical Fitness Certification

2.9 Current System in Office of Seaman

At present, the Harbour Department already has a database server and uses it for storing all data including the seaman book, vessel registration, agreement and crew list for Thai vessel and medical health certification. Although they have computer system, the computer system is used only for the internal computer department. Other departments can't access, input and view the data, all data can access only by the computer department officials. Moreover, the current software doesn't have good user interface, report module; therefore, the data that stored in the database isn't used for any purpose. The current computer system is as follows:

Current System in Computer Department

(1)   Server 1 Unit

   (a)   Intel Pentium Pro

   (b)   128 MB RAM

   (c)   4 GB Hard Disk

(2)   Personal Computer 8 Units

   (a)   Intel Pentium 120

   (b)   16 MB RAM

   (c)   1.2 GB Hard Disk

(3)   Network Equipment 1 Unit

   (a)   24 Port 10 Mbps Hub

(4)   Line Printer 600 lpms 1 Unit

(5)   Laser Printer HP Laser Jet 2 Unit

Current System in Seaman Book Department

(1)   Personal Computer 4 Units

   (a)   Intel Pentium 120

(b)   16 MB RAM

(c)   1.2 GB Hard Disk

(2)   Laser Printer HP Laser Jet 2 Unit

2.10 Current Work Flow in the Office of Seaman

Currently, the office of seaman is working in processing the request of seaman book, agreement of crew list of Thai vessel, medical fitness certification. All the processes from receiving the request must be finished within 3 days. The activities are diagramed in Figure 2.2: Context Diagram, and the detail of each process is described below.

Seaman Book

(1)   Step of Issuing New Seaman Book

Those who want to request the new seaman book have to fill the information forms: korr-ror.1, korr-ror.3, kor.1 with evidence required and send them to the official. After the official receives the petition, the process will be as follows:

(a)   Check the completeness of the filled petition form

(b)   Check the individual's qualification to meet the ministerial regulation requirement. After that, the official will check the required evidence.

(c)   Request the computer department for the previous request of this individual. If not found in the database, the process will continue, otherwise that individual will be forward to step 5.3

(d)   Record the request in korr-ror1 book

(e)   Issue the bill of duty for 500 bath to pay at the financial department.

(f)   The official will have that individual sign the seaman book.

(g)   Fill the individual's information in the new seaman book.

(h)   Issue Seaman Identification Number using xx-yy-zzzzz format in registration book.

   (1)   XX means year

   (2)   YY means Identification Number of Office that issues this seaman book.

   (3)   ZZZZZ means seaman number

   (4)   For Fishing Vessel this identification will follow by F at the end of Identification Number

(i)   After finishing the above process, the Director of the office of seaman will sign on the seaman book and then wrap with secure plastic.

(j)   The office of seaman will collect all the ก.1 forms and send them to the computer department to key the data into the database.

These activities are diagramed in Figures 2.3, 2.4 and Appendix A.

(2)   Process of Issuing Renewed Seaman Book

   Those who want to renew the seaman book have to fill the information into kor.5 (ก.5) form and prepare the evidence required and send them to the official. After the official receives the petition, the process will be as follows:

(a)   Check the completeness of filled petition form and make a copy of the Identity Card with signature.

(b)   Check the previous seaman book with the data in the petition form

(c)   Record the job number of renewal in the transaction book with requested date.

(d)   Issue the bill to the individual to pay for the duty at the financial department

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(e)   The official finds the previous korr-ror3 of this individual in the document room, add renewal record in the form and change valid date in the previous seaman book.

(f)   If the previous seaman book must be changed, the official will fill ค.2 form to issue new the seaman book with the previous identification number and following step 5.1.5 to 5.1.7 for issuing new the seaman book.

(g)   Collect all the evidence and forms with the seaman book and send them to the Director of the office of seaman to sign.

(h)   After the Director of the office of seaman signs the seaman books, the seaman books will be sent back to the individual. In the case of change, the official wraps the seaman book with secure plastic and sends it back to the individual.

(i)   The office of seaman will collect all the Korr.1 forms and send them to the computer department to key the data into the database

These activities are diagramed in Figures 2.3, 2.4 and Appendix A.

(3)   Process of Issuing Substitution of Seaman Book

In the case that the crew loses or damages his/her seaman book and wants to get substitution book, he/she must fill kor.5 form and submit to official at the office of seaman. The official will follow the process as follows:

(a)   Receive the petition form and check the completeness of the petition form and evidence

(b)   Fill in the transaction list

(c) Issue the bill of 500 Bahts to the individual to pay for the duty at the financial department

(d) Search the previous korr-ror3 of this individual in the document room and add record of issuing substitution seaman book.

(e) The individual is given the new blank seaman book to sign on, and fill the seaman information following data in previous korr-ror3 form.

(f) Stamp substitution in the new seaman book.

(g) Collect all the documents and the seaman books and send them to the Director of the office of seaman to sign on.

(h) Wrap the new seaman books with secure plastic and give them back to the individuals.

(i) Announce cancellation of the previous seaman book, which is lost or damaged.

These activities are diagramed in Figures 2.3, 2.4 and Appendix A.

(4) Process of Changing Record in Seaman Book

Those who want to change information in the seaman book must fill in the kor.5 form with Identity Card Number and the required evidence and submit them to the official of the office of seaman to follow the steps as follows:

(a) Receive the petition form and check the completeness of the petition form and evidence

(b) Fill in the transaction list

(c) Issue the bill to the individual to pay for the duty at the financial department

(d) The official searches the previous korr-ror3 of this individual in the document room and changes record in korr-ror3 form and stamps "Record Change" and fills korr-ror2 form.

(e) Change the record in the seaman book

(f) Collect all the documents and the seaman books and send them to the Director of the office of seaman to sign

(g) Send the seaman books back to the individuals

(h) The office of seaman will collect the kor.2 forms and send them to the computer department to key the data into the database

These activities are diagramed in Figures 2.3, 2.4 and Appendix A.

Agreement and Crew List of Thai Vessel

(5) Issuing New Agreement and Crew List of Thai Vessel Book

Those who want to get new agreement and crew list of Thai vessel book must fill in the petition form and submit it to the official at the office of seaman. Then the official will follow the steps as follows:

(a) The individual fills in the book at page 1, 2.

(b) The individual fills in the blank No. 1, 2, 3, 4, 5, 6, 8, 9, 10, 13 and 14 of all seamen in that vessel.

(c) The individual fills in employ list and vessel owner in all seaman books except date and place of employment.

(d) The official will check all the seaman books and all the seamen of that vessel must sign in Agreement and Crew List of Thai Vessel

(e) The official will find all the korr-ror3 form of all seamen in that vessel in the document room and fill the employ record in all seaman books.

(f)   The official checks all the information that seaman fills in the Agreement and Crew List of Thai Vessel Book.

(g)   The official checks the total number of seamen and the size of the vessel following the ministry regulation.

(h)   The official stamps on blank no. 12 and signs for all seamen in Agreement and Crew List of Thai Vessel Book

(i)   The official collects all the documents and evidence into the document room.

These activities are diagramed in Figures 2.3, 2.4 and Appendix A.

(6)   Renew or Change Agreement and Crew List of Thai Vessel Book

Those who want to renew or change the information in agreement and crew list of Thai vessel book must have the petition form with 3 copies and fill all the crew in the petition form and send them to the official of the office of seaman. The official will follow the process as follows:

(a)   Check all the evidence and the seaman books

(b)   Stamp "Alteration" on the second page of Agreement and Crew List of Thai Vessel Book and change the validate time.

(c)   In the case of changing crew, the individual must fill the new crew list in Agreement and Crew List of Thai Vessel following steps 6.1.2 to 6.1.9

(d)   The individual has to fill in blank no. 16, 17 and 18 of crew who resigned.

(e)   The official collects all the evidence and documents into the document room.

These activities are diagramed in Figures 2.3, 2.4 and Appendix A.

Medical Fitness Certification

(7)   Issuing Medical Fitness Certification

Those who want to receive Medical Fitness Certification have to buy Medical Fitness Certification request form and test following the list in the form at hospital. After getting the result from testing, they have to fill in the petition form and send it with the result to the official. After the official gets the result, he will follow the processes as follows:

(a)   Update transaction list

(b)   Compare the result following the requirement in Ministry Regulation

(c)   If the result doesn't meet the requirement in Ministry Regulation, the official rejects the request.

(d)   If the result meets the requirement, the official writes the information into the blank certification.

(e)   The official sends the certification to the Director of the office of seaman to sign on.

(f)   The official sends the certification to the individual.

These activities are diagramed in Figures 2.3, 2.4 and Appendix A.

From the description of the data flow above, we can draw the context data flow diagram that has 2 external entities – Individual and Management and Office of Seaman process as the following diagram
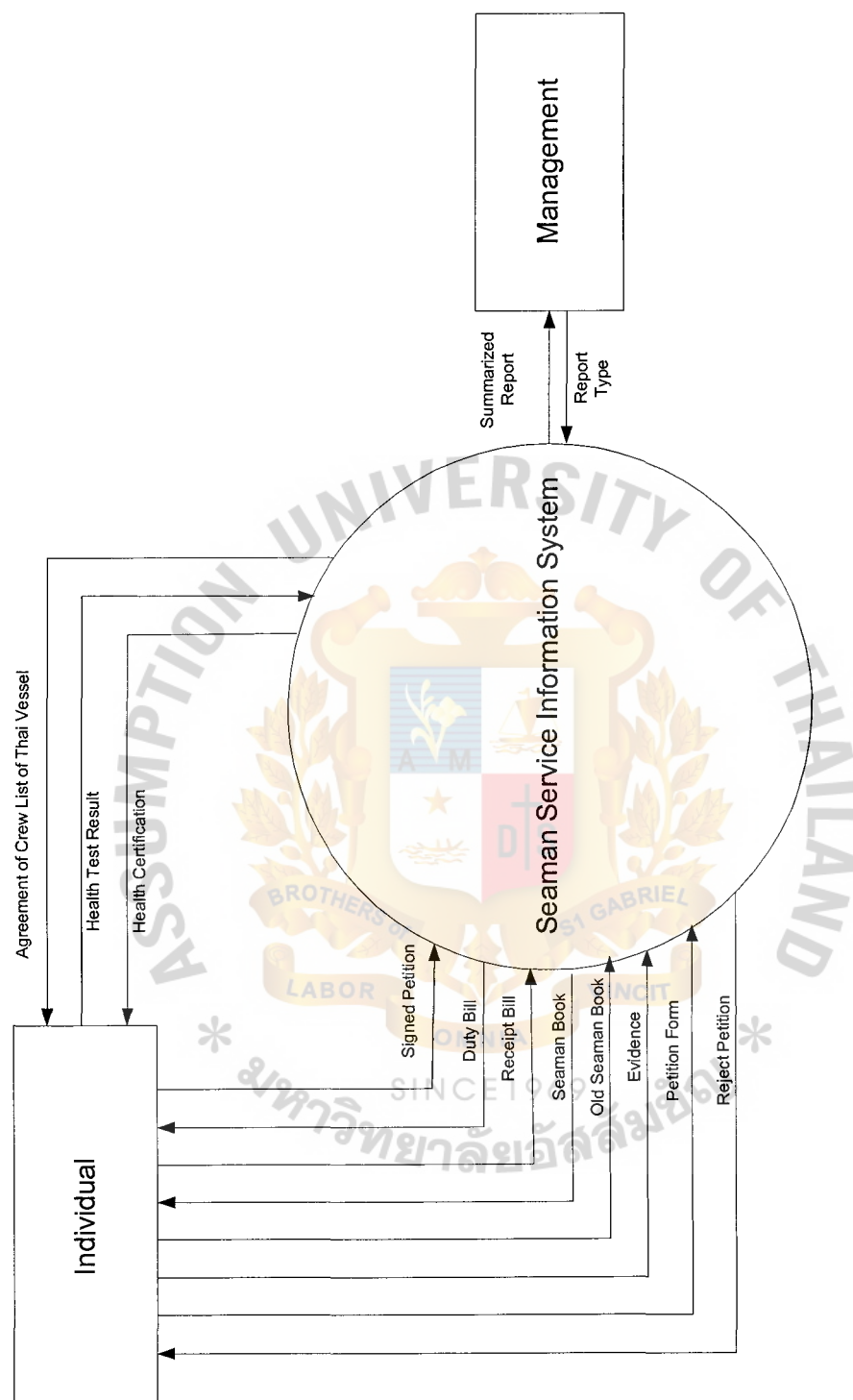
Figure 2.3. Context Diagram.

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Figure 2.4.   Level 0 Data Flow.

2.11 Problem Definition

After we study the workflow of the office of seaman, we found that there are some problems caused by the current workflow. These will cause inconvenience to the individuals who contact the office of seaman. It is also hard for management to track the progress of each activity. The problems can be classified as follows:

(a)   The individual must contact many points in the office of seaman to finish all the requests.

(b)   Some of the data must be duplicated from other divisions in the Harbour Department because there is no Centralized Data Management System within the Harbour Department

(c)   All activities can process slowly because the required documents are stored in the document room which is hard to search and store the data

(d)   No tracking process in the office of seaman; the individuals cannot know the progress of their requests

(e)   The reports must be generated manually in many types of forms. The staff must use more time to generate the reports and the reports may be inaccurate.

(f)   There is no security applied to all the activities, external organizations can easily make an illegal seaman book, Health Certification and Agreement and Crew List of Thai Vessel

2.12 Requirement Specification

Functional Requirement

(a)   Implement "One Stop Service" process into the office of seaman

(b)   Make the data in the Harbour Department centralized, so all the sections in the Harbour Department will get the same accurate data.

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(c) Develop software to help the official retrieve the accurate data and minimize working time.

(d) Implement Management Information System to help the manager in decision-making.

(e) Implement security for seaman book, Agreement and Crew List of Thai Vessel and Health Certification.

Non-Functional Requirement

(a) Improve computer skill of the official staff.

(b) Decrease response time for the individual.

(c) Improve accuracy of the reports for decision support.

(d) Make people contact the office of seaman easily.
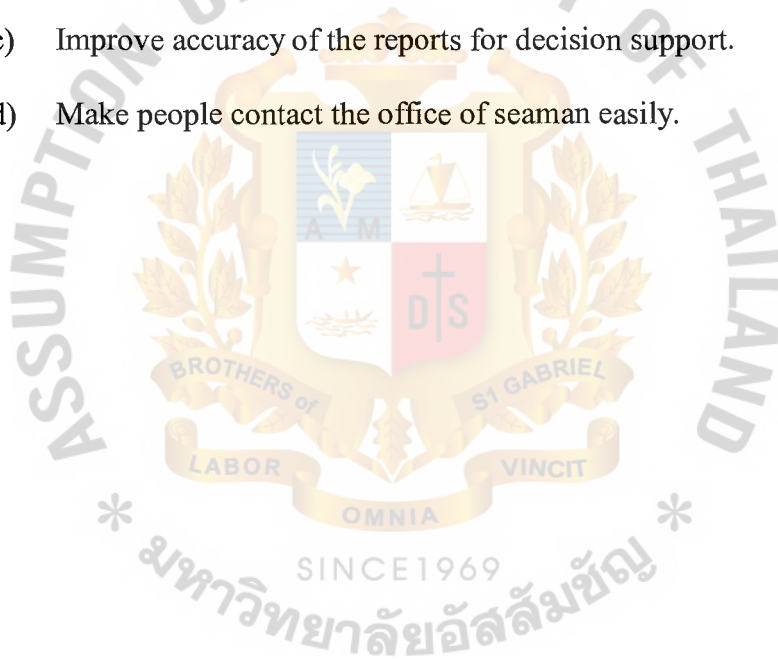
III. SYSTEM DESIGN

3.1 Design Rationales

System design is very important for improving the efficiency of the office of seaman. Designing a new system for government is a very difficult job because of many rules and regulations. Therefore, we have to be careful to design the new system that still follows the ministry regulations and can improve the quality of service. In the design step, we need to work closely with the government officials; they can suggest and improve the processes that we designed.

The Detailed Design can be separated into 4 parts as follows:

(1) Data Flow Diagram: This will include DFD Diagram of all activities of the office of seaman.

(2) Program Structure: This section contains the program structure chart which uses the information from the Data Flow Diagram in the previous part and Module Specifications which contain the detail of each module.

(3) Database Design: This contains the Logical Record Structure, relational database design. This part uses information from E-R Diagram of analysis step.

(4) Interface Design: This contains the screen for users to do data entry and the reports generated by the new system.

3.2 Data Flow Diagram

New workflow in the office of seaman is designed to help the individuals contact the office of seaman easily and use Information Technology to help the officials at the office of seaman work efficiently.

Using the concept of One-Stop-Service to help the individuals contact only one point but it can help all the jobs done without any confusion. Using computerized concept to help faster search information related to the individuals' job and reduce human error. Therefore, the workflow of the office of seaman will be as follows:

Seaman Book

    (1)   Process of Issuing New Seaman Book

        Those who want to request the new seaman book have to fill the information forms: korr-ror3, korr-ror3, Kor.1 with evidence required and send them to the information official. After the information official receives the petition form, the process will be as follows:

    (a)   The information official checks the completeness of the filled petition form and gets 500 bahts for duty and issues receipt bill to the individual.

    (b)   The information official sends all the petitions and evidence to the Seaman Book Section.

    (c)   The official of Seaman Book Section checks the individual's qualification to meet the ministerial regulation requirement.

    (d)   The official of Seaman Book Section checks the previous request of this individual from his/her own computer. If he cannot find it in the database the process will continue, otherwise that individual will be forwarded to step 6.3.

    (e)   The request is stored in Transaction Table automatically.

    (f)   The official has that individual sign the seaman book.

    (g)   The official takes the individual photo and stores it into database.

    (h)   The seaman book will be printed out from the database.

(i) Seaman Identification Number uses xx-yy-zzzzz format and automatic set by computer to reduce human error.

(j) After finishing the step above, the official of Seaman Book Section will send the seaman book to the Director of the office of seaman to sign on the seaman book and then wrap it with secure plastic.

(k) Petition form will be scanned into database, original petition form will be saved into the document room.

(2) Process of Issuing Renewed Seaman Book

Those who want to renew the seaman book have to fill the information into kor.5 form and prepare the evidence required and send them to the information official. After the information official receives the petition, the process will be as follows:

(a) The information official checks the completeness of the filled petition form and makes a copy of Identity Card with signature.

(b) If the previous seaman book has to be changed, the official will fill Korr.2 form to issue the new seaman book with the previous identification number.

(c) Get duty from the individual and issue the receipt bill to the individual.

(d) Send all evidence and the seaman book to Seaman Book Section.

(e) The official of the Seaman Book Section checks the previous seaman book with the data in the petition form.

(f) Key in the requested statement into the database, transaction tables will automatically be updated.

(g) The official finds the previous korr-ror3 of this individual in the database, add renews record and changes valid date in the database.

(h) Send the seaman book to the Director of the office of seaman to sign.

(i) After the Director of the office of seaman signs the seaman book, it will be sent back to the individual. In the case of change, the official wraps the seaman book with secure plastic and send it back to the individual.

(j) The office of seaman will collect all the korr.1 forms and scan into the database.

(3) Process of Issuing Substitution of Seaman Book

In the case that the crew loses or damages his/her seaman book and wants to get substitution book, he/she must fill kor.5 form and submit to the information official. The official will follow the process as follows:

(a) Receive the petition form and check the completeness of the petition form and evidence.

(b) Get 500 Bahts from the individual and issue the receipt bill.

(c) Send all petition forms and evidence to Seaman Book Section.

(d) The official of seaman book section fills the petition form in the database; the computer automatically generates transaction list.

(e) Official finds the previous korr-ror3 of this individual in the database and adds the record of issuing substitution seaman book.

(f) Print seaman information by getting the data from the database and give the individual the new blank seaman book to sign on.

(g) Stamp "Substitution" in the new seaman book.

(h) Send the seaman book to the Director of the office of seaman to sign on.

(i) Wrap the new seaman book with secure plastic and send it back to the individual.

(j) Announce cancellation of the previous seaman book that is lost or damaged.

(4) Process of Changing Record in Seaman Book

Those who want to change information in the seaman book have to fill in the kor.5 form with Identity Card Number and the required evidence, and submit them to the information official to follow the process as follows:

(a) The information official receives the petition form and checks the completeness of the petition form and evidence.

(b) Get duty from the individual and issue the receipt bill.

(c) Send all petition forms and evidence to Seaman Book Section.

(d) The official of Seaman Book Section keys in the petition to the database, transaction list will automatically be added.

(e) The official finds the previous korr-ror3 of this individual in the database, changes the record in korr-ror3 form in the database and stamps "Record Change" in the original korr-ror3 form. Fill korr-ror3 form.

(f) Print out new record in the seaman book.

(g) Send the seaman book to the Director of the office of seaman to sign on.

(h) Send the seaman book back to the individual. The official of seaman collects the korr.2 form and stores into the document room.

Agreement and Crew List of Thai Vessel

(5)   Issuing New Agreement and Crew List of Thai Vessel Book

Those who want to get new agreement and crew list of Thai vessel book have to fill in the petition form and submit it to the information official. Then the information official will follow the steps as follows:

(a)   The information official receives the petition form and checks the completeness of the petition form and evidence.

(b)   Send all petition forms and evidence to Seaman Book Section.

(c)   Key in the necessary data from the petition into the database, print information in page 1 and 2 and print the data of seaman who works in this vessel in blank No. 1, 2, 3, 4, 5, 6, 8, 9, 10, 13 and 14.

(d)   Update the information of working in vessel in all the seaman books of the crew who work in this vessel.

(e)   Find all the korr-ror3 forms of all seamen in that vessel in the database and update the employment record in all seaman books.

(f)   Check all the seaman books and all the crew of that vessel must sign in Agreement and Crew List of Thai Vessel.

(g)   Check the total number of seamen whether it meets the minimum requirement of ministry regulation.

(h)   Stamp on blank no. 12 and sign for all seamen in Agreement and Crew List of Thai Vessel Book.

(i)   Collect all the documents and evidence into the document room.

(6)   Renew or Change Agreement and Crew List of Thai Vessel Book

Those who want to renew or change the information in Agreement and Crew List of Thai Vessel book have to fill the petition form, make copies of them, and send them to the information official. The information official will follow the process as follows:

(a)   Check all the evidence and the seaman books.

(b)   Send all the evidence and the petition form to the official.

(c)   Stamp "Alteration" at the second page of Agreement and Crew List of Thai Vessel Book and change the validate time in Agreement and Crew List of Thai Vessel Book and the database.

(d)   In the case of changing crew, the individual must give the official the new crew list. The official will print the new crew list in Agreement and Crew List of Thai Vessel and following steps 6.5.2 to 6.5.9.

(e)   The individual has to fill in blank No. 16, 17 and 18 of the crew who resigned.

(f)   Official collects all the evidence and documents into the document room.

Medical Fitness Certification

(7)   Issuing Medical Fitness Certification

Those who want to receive Medical Fitness Certification have to buy Medical Fitness Certification request form and test following the list in the form at hospital. After getting the result from testing, they have to fill in the petition form and send it with the result to the official. After the official gets the result, he will follow the process as follows:

(a)   Key in the information from the petition form into the database.

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(b)   Computer automatically updates transaction list.

(c)   Computer compares the result from testing with the requirement of ministry regulation.

(d)   If the result doesn't meet the requirement of the ministry regulation, the computer displays the result that doesn't meet the requirement.

(e)   If the result meets the requirement, the computer prints the certification.

(f)   The official sends the certification to the Director of the office of seaman to sign on.

(g)   The official sends the certification to the individual.
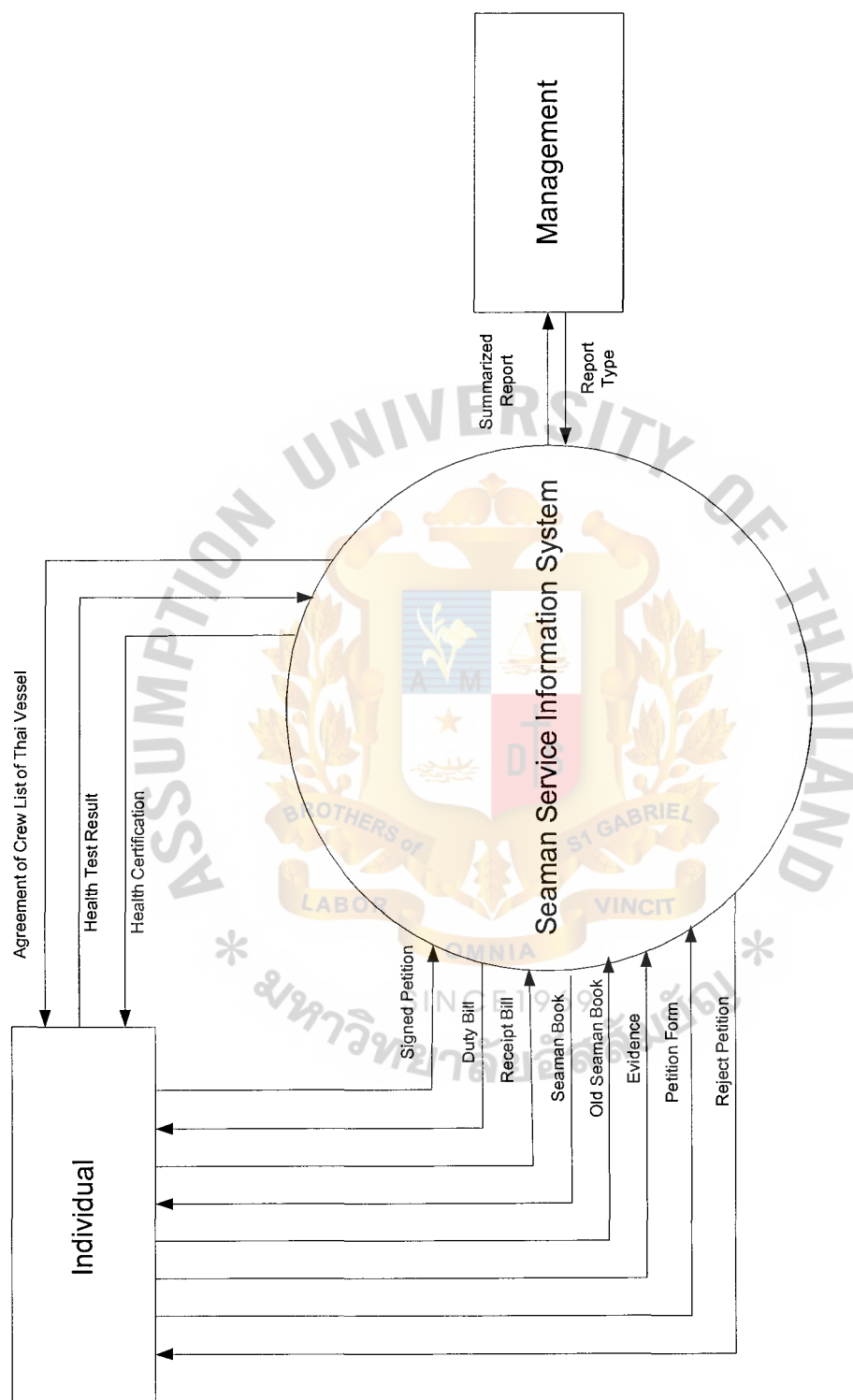
Figure 3.1. Context Diagram.

33
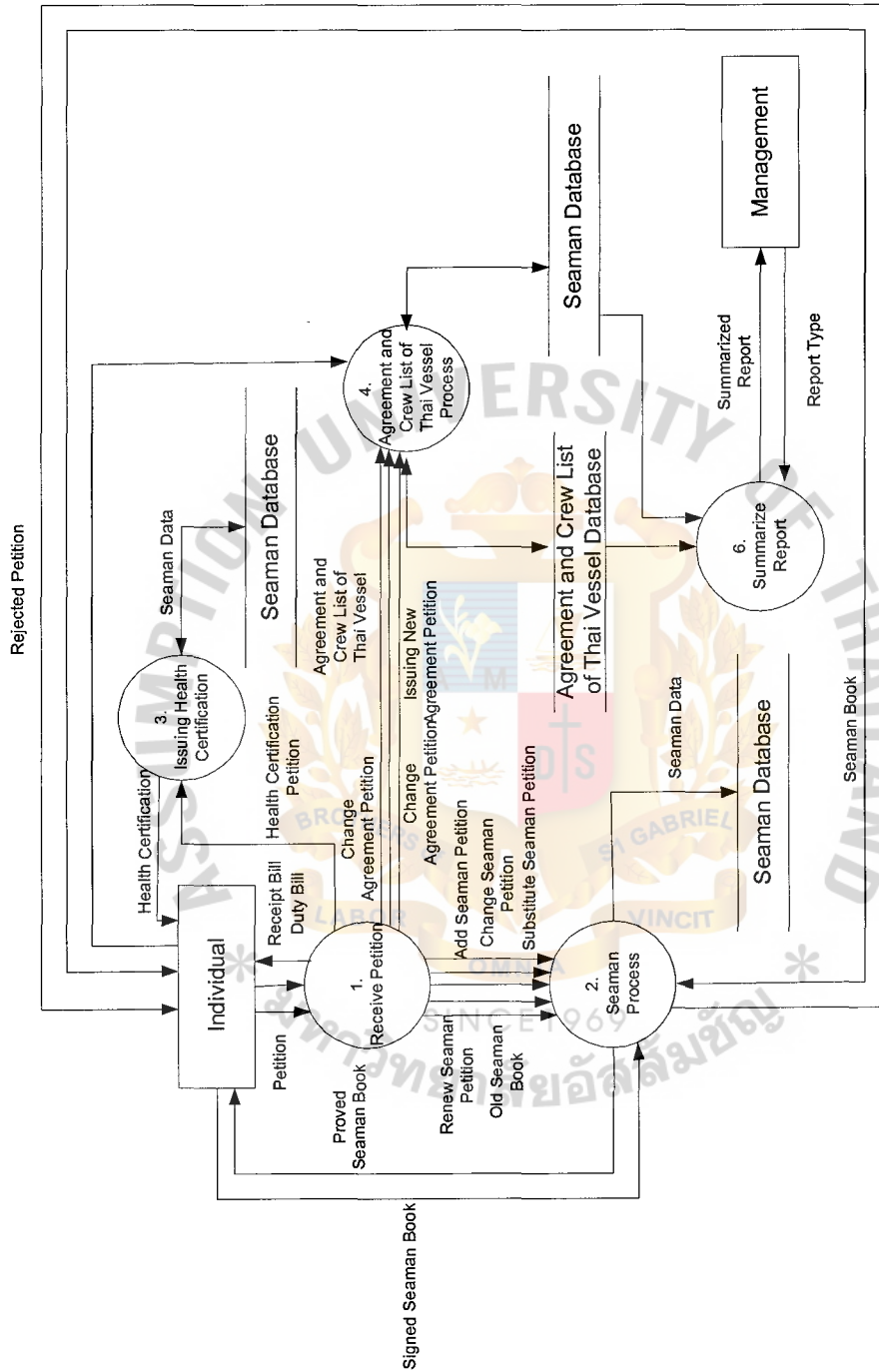
Figure 3.2. Data Flow Level 0.

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3.3 Program Structure

From the data flow diagram, we can separate the whole program into a number of modules. Each module will perform only one task to make it easy to understand. The main program will consist of 9 modules as the following:

(a)   Get Petition Form

(b)   Check Seaman Book Applicant

(c)   Check Medical Fitness Result

(d)   Print Seaman Book

(e)   Print Agreement and Crew List of Thai Vessel

(f)   Print Medical Fitness Certification

(g)   Change Seaman Book Information

(h)   Change Agreement and Crew List of Thai Vessel Information

(i)   Print Report

The module will consist of a list of activities that will be detailed in the Section 3.4, and the program structure chart will look like the Figure 3.3.

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Figure 3.3.   Program Structure Chart.

3.4 Database Design

From the detail in the petition form, evidence, seaman book, Certification, Agreement, Crew List of Thai Vessel and the requirement of the office of seaman, the entity that must be stored in the database will include:

(a) Vessel

(b) Owner of Vessel

(c) Transaction List

(d) Crew Database

(e) Medical Fitness Certification

(f) Medician Center

The tables and attributes can be diagramed as in Figure 3.4: Entity Relationship Diagram. The relationship between tables in the database is showed in Figure 3.5: Relationship between Database Tables.

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Figure 3.4. Entity Relationship Diagram.

Medical fitness Certification Table
Certificate No
Place Of Issue ID
Seaman ID
Valid Until
Surname
First name
Middle Name (S)
Sex
Age
Weight
Date of Examination
Epilepsy of attacks
Kidney Disease
Venereal Disease
Seizures
Narcotics History
Tuberculosis
Diabetes
Hypertension
Gastro-intestinal infectious disease
Ovesity
Heart
Chronic respiratory disorder
Chronic dental and digestive system proble
Skin disease
Muscular-skeletal
Cancer
Right Eye Uncorrected
Left Eye Uncorrected
Both Eyes Uncorrected
Right Eye corrected
Left Eye corrected
Both Eyes corrected
Ishihara Book
Holmes Latern
Color Vision Status
Hearing Right
Hearing Left
Blood Pressure Systolic
Blood Pressure Diastolic
Blood Pressure Status
Comment
Examining Physician Name
Examining Physician License Number
Medical Center ID

Crew Table
Seaman ID
Thai Surname
Thai First Name
Thai Middle name (s)
Nationality
Citizenship
Religion
Identification Card No
Vessel ID
Married
First Name In English
Surname In English
Middle Name In English
Domicile
Birthday
Eye Color
Hair Color
Height
Blemish
Residence Registration
Urgently Contract Place
Highest Education
Certification from Harbour
Purpose of request
Evidence
Picture

Transaction Table
Transaction ID
Seaman ID
Type of Job
Date of Perform
Response Official
Comment

Vessel Table
Vessel ID
Vessel Name (Thai)
Vessel Name (English)
Owner Group
Vessel Material
Navigation Zone
Vessel Purpose
Vessel Length
Vessel Depth
Vessel Size
Vessel Width
Owner ID
Vessel Status

Vessel owner Table
Owner ID
Owner Name (Thai)
Owner Name (English)
Address

Medical Center Table
Medical Center ID
Medical Center Name
Medical Center Address
Medical Center Telephone
Medical Center Fax

Figure 3.5.   Relationship between Database Tables.

3.5 Output Design

There are 2 types of summary report:

(a) Transaction Report grouped by Type of Job and Seaman ID. This Report can generate upon selected seaman ID or within specific period date. These reports help management tracking error or mistake in the seaman process. Transaction Report include:

 (1) Seaman Book Transaction List Report

 (2) Agreement and Crew List of Thai Vessel Transaction List Report

 (3) Health Certification Transaction List Report

 The figures of reports are shown in Appendix F, Figures F.1 to F.3.

(b) Statistic Report grouped by Year and Type of Job. This report can help management to monitor the output from the office of seaman separated by year of performance and type of job. The output from the office of seaman can be used for evaluating performance and workload within the office of seaman.

 The figures of reports are shown in Appendix F, Figure F.4.

3.6   Hardware Configuration

The new information requires new database server, personal computer, printer and network equipment. The following figure shows network configuration and computer system.

Figure 3.6.   Network Configuration.

Table 3.1 shows the equipment required in implementing information system within the office of seaman. The specification of the equipment is showed in Appendix G.

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Table 3.1. Cost Estimate.

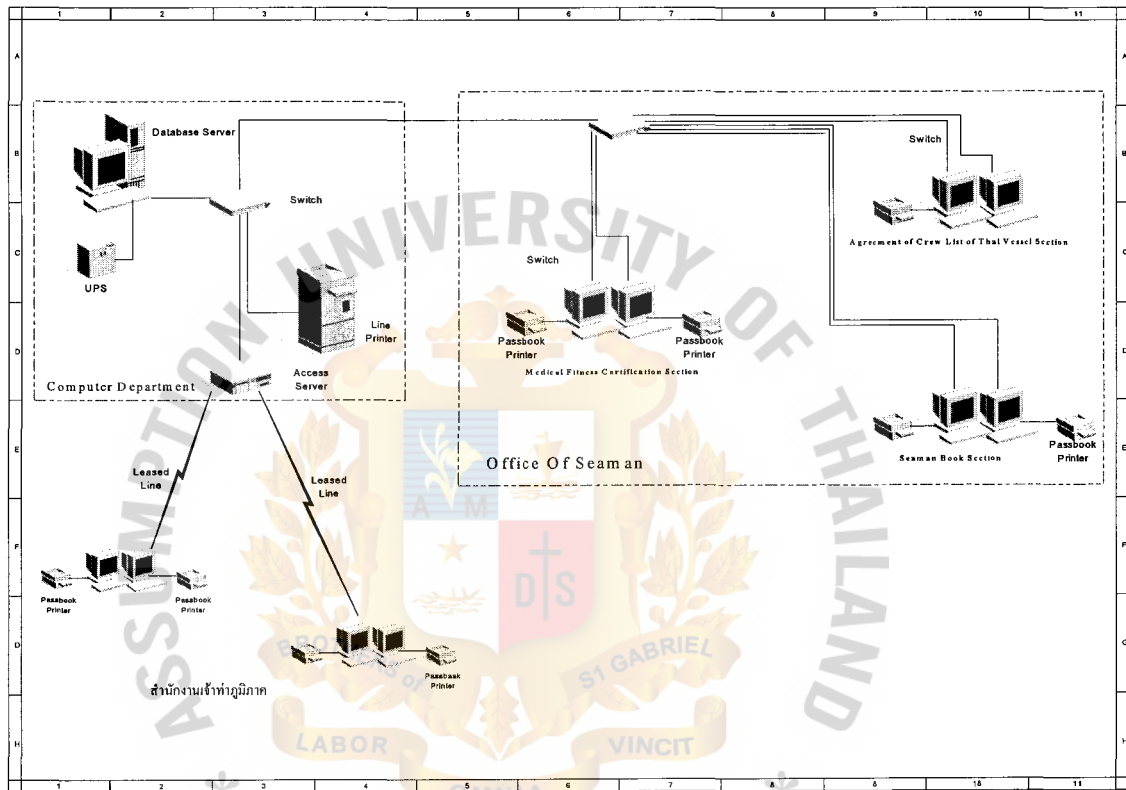| Item	Description	Quantity	Unit Price	Total Price
1	(Database Server	1	2,081,297.62	2,081,297.62
	- 2 CPU 400 MHz 2 MB Cache			
	- 512 MB Main Memory			
	- 45 GB Internal Disk			
	- 17" Monitor			
2	Personal Computer	13	41,300.00	536,900.00
3	Network Interface Card	13	850.00	11,050.00
4	Juke Box	1	891,200.00	891,200.00
	- 270 GB 52 Slots 2 Drives			
5	Laser Printer	2	34,800.00	69,600.00
6	Dot matrix	2	27,500.00	55,000.00
7	Line Printer	1	430,000.00	430,000.00
8	Passbook Printer	6	60,000.00	360,000.00
9	Switch	2	148,400.00	296,800.00
10	Cabling	24	2,000.00	48,000.00
11	UPS 5 KVA	1	120,000.00	120,000.00
12	UPS 800 VA	13	6,200.00	80,600.00
13	Computer Table	13	3,000.00	39,000.00
14	Peripheral Table	4	1,500.00	6,000.00
15	Installation Cost			
	15.1 Furniture	1	1,000,000.00	1,000,000.00
	15.2 Training			
	- Solaris Administration	4	20,000.00	80,000.00
	- Database Administration	4	20,000.00	80,000.00
	- Backup Recovery	4	20,000.00	80,000.00
	- Performance Tuning	4	20,000.00	80,000.00
16	Consumable equipment			
	16.1 Passbook Ink	12	800.00	9,600.00
	16.2 Laser Ink	4	2,500.00	10,000.00
	16.3 Dot Matrix Ink	4	800.00	3,200.00
17	Tape Backup	7	1,500.00	10,500.00
		Grand Total Hardware Cost		6,578,747.62

Software

Item	Description	Quantity	Unit Price	Total Price
1	Office of Seaman Software	1	2,350,000.00	2,350,000.00
2	Database Management System	15	60,000.00	900,000.00
		Grand Total Software Cost		3,250,000.00

Grand Total   9,828,747.62

3.7 Project Scheduling

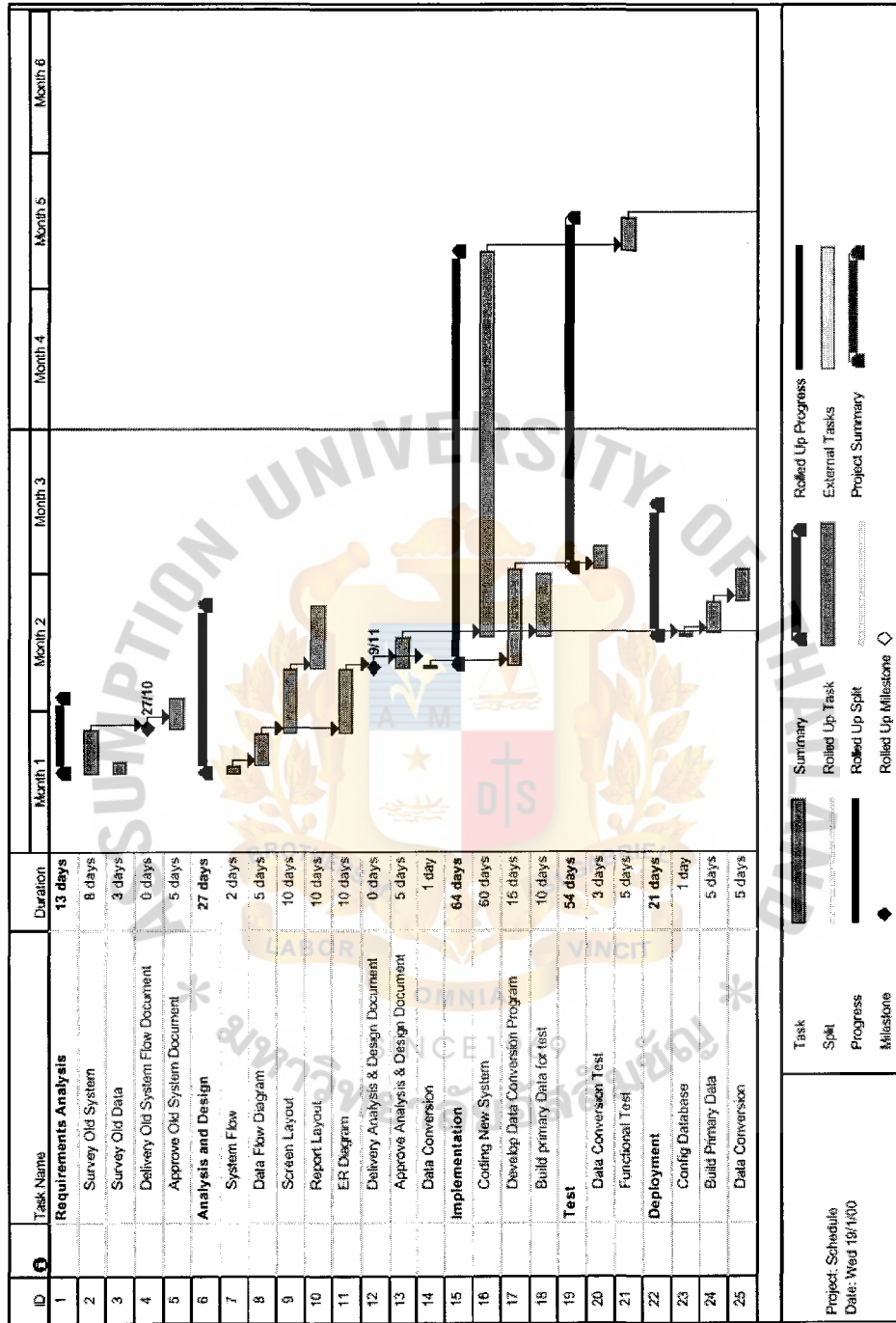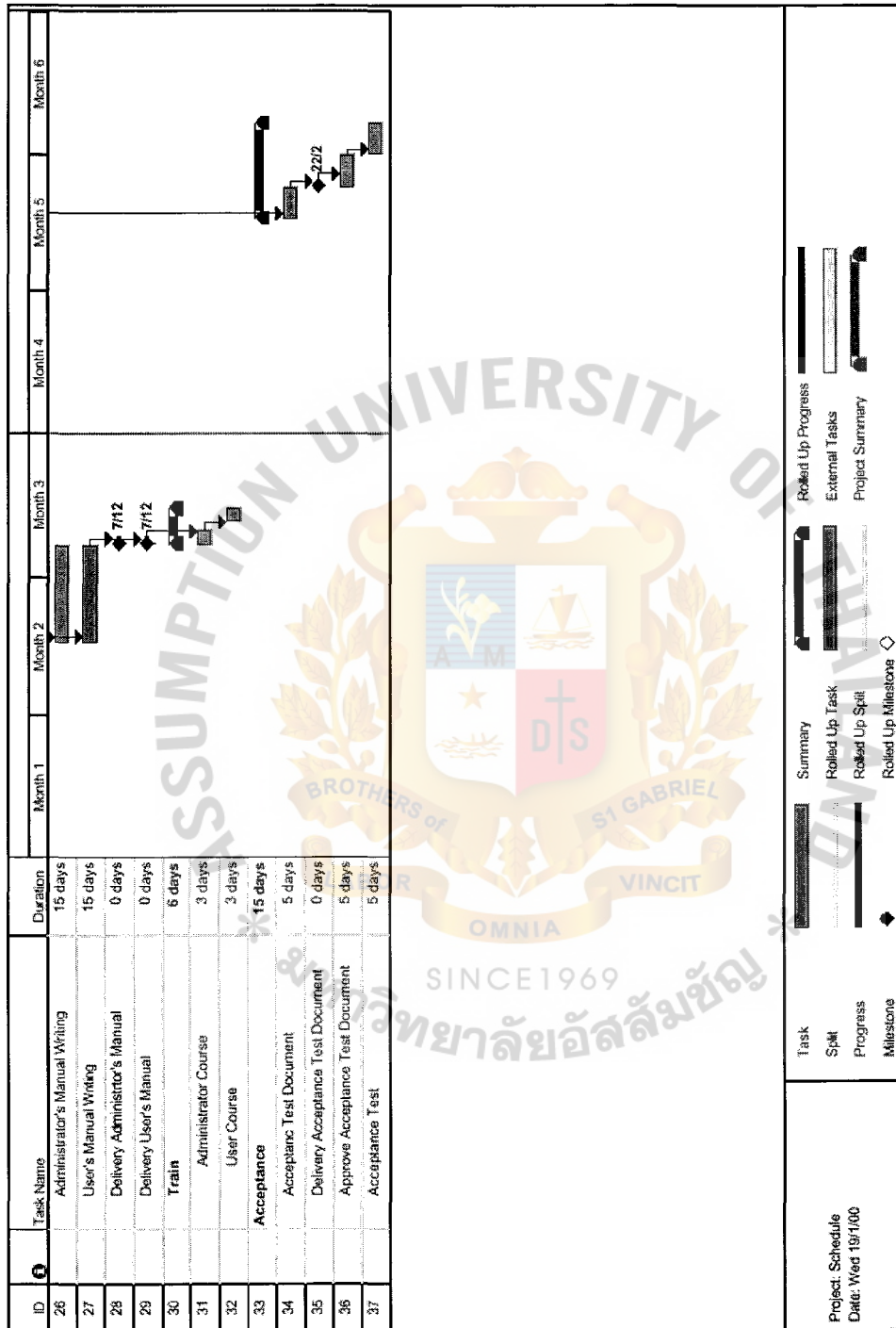| ID	ⓘ	Task Name	Duration
1		**Requirements Analysis**	**13 days**
2		Survey Old System	8 days
3		Survey Old Data	3 days
4		Delivery Old System Flow Document	0 days
5		Approve Old System Document	5 days
6		**Analysis and Design**	**27 days**
7		System Flow	2 days
8		Data Flow Diagram	5 days
9		Screen Layout	10 days
10		Report Layout	10 days
11		ER Diagram	10 days
12		Delivery Analysis & Design Document	0 days
13		Approve Analysis & Design Document	5 days
14		Data Conversion	1 day
15		**Implementation**	**64 days**
16		Coding New System	60 days
17		Develop Data Conversion Program	15 days
18		Build primary Data for test	10 days
19		**Test**	**54 days**
20		Data Conversion Test	3 days
21		Functional Test	5 days
22		**Deployment**	**21 days**
23		Config Database	1 day
24		Build Primary Data	5 days
25		Data Conversion	5 days

Figure 3.6.   Project Scheduling.

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Figure 3.6. Project Scheduling. (Continued)

3.8 Feasibility Analysis

Table 3.2. Feasibility Analysis.

Cost - Benefit Analysis Table

Harbour Department Cost-Benefit Analysis

Input Section

Estimated Costs		Estimated Benefits	
Hardware	฿6,578,747.62	Reduced Time Consuming Process	฿2,500,000.00
Software	฿3,250,000.00	Assumptions	
Consultant (10% of Project)	฿982,874.76	Discount Rate:	10%
Training	฿500,000.00	Sensitivity Factor (Cost)	1.1
Maintenance	฿200,000.00	Sensitivity Factor (Benefits)	0.9
		Annual Change in Prod. Costs	7%
		Annual Change in Benefits	5%

Calculations/Output Sections

Costs	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Development Costs						
Hardware	฿6,578,747.62					
Software	฿3,250,000.00					
Consultant	฿982,874.76					
Training	฿500,000.00					
Total Development Costs	฿11,311,622.38					
Production Costs						
Network Support Personnel		฿250,000.00	฿267,500.00	฿286,225.00	฿306,260.75	฿327,699.00
Maintenance/Upgrades		฿200,000.00	฿214,000.00	฿228,980.00	฿245,008.60	฿262,159.20
Annual Production Costs		฿450,000.00	฿481,500.00	฿515,205.00	฿551,269.35	฿589,858.20
(Present Value)		฿495,000.00	฿582,615.00	฿685,737.86	฿807,113.46	฿949,972.54
Accumulated Cost (Development and Production Present)	฿11,806,622.38	฿12,389,237.38	฿13,074,975.24	฿13,882,088.69	฿14,832,061.23	
Benefits						
Reduced Time Consuming Process		฿2,000,000.00	฿2,100,000.00	฿2,205,000.00	฿2,315,250.00	฿2,431,012.50
(Present Value)		฿2,200,000.00	฿2,541,000.00	฿2,934,855.00	฿3,389,757.53	฿3,915,169.94
Reduce Hiring Cost		฿500,000.00	฿525,000.00	฿551,250.00	฿578,812.50	฿607,753.13
(Present Value)		฿550,000.00	฿635,250.00	฿733,713.75	฿847,439.38	฿978,792.49
Accumulated Benefits		฿2,750,000.00	฿5,926,250.00	฿9,594,818.75	฿13,832,015.66	฿18,725,978.08
Present Value of Accumulated Gain or (Loss)	-฿9,056,622.38	-฿6,462,987.38	-฿3,480,156.49	-฿50,073.04	฿3,893,916.85	
Benefit/Cost Ratio						1.262533763

From Table 3.2. the cost of project implementation can be separated into 4 parts as follows:

(1) Hardware

(2) Software

(3) Consultant

(4) Training

(5) Maintenance

The benefit from implementing this project comes from time consuming reduction and hiring cost reduction. The time consuming reduction can be calculated from the number of vessel that register in foreign country and the number of seamen that register in the regional offices multiply with cost of register. After implementing this information system the seamen or vessel's owners will register at Harbour Department because the registration process can perform as fast as in foreign country and they can get more convenience. The benefit can be estimated to be around 2,500,000 Bahts. The benefit/cost ratio can be calculated about 1.26. The benefit/cost ratio shows that the Harbour Department should implement this information technology.
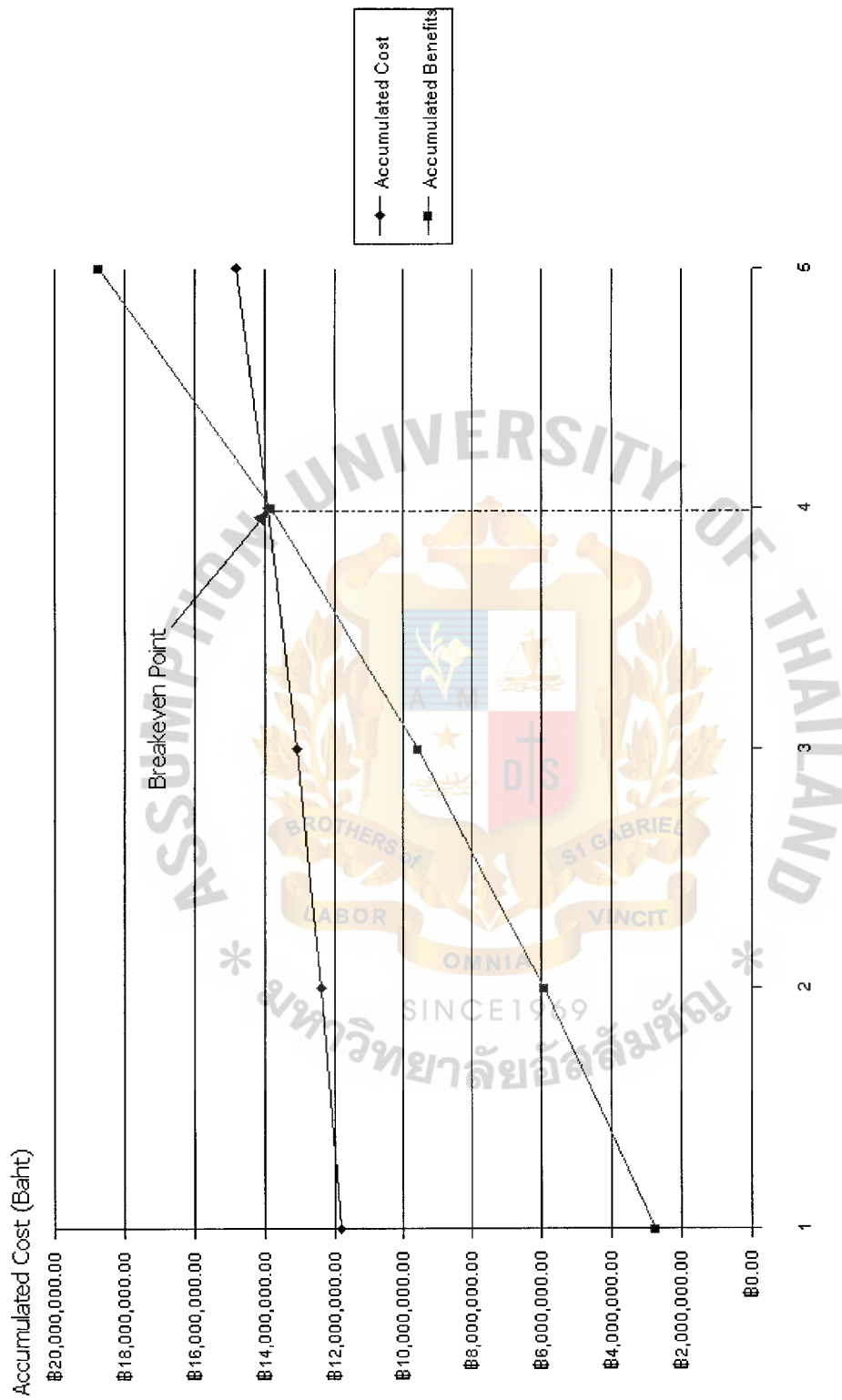
Figure 3.7.   Breakeven Point.

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IV. CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

Services Information System for Harbour Department is the project that studies the possibility of information system implementation within the office of seaman in the Harbour Department. Currently, the Harbour Department has to work manually with a lot of data. Therefore, the Harbour Department has many problems as follows:

(a) The individual must contact many points in the office of seaman to finish all the requests.

(b) Some of the data must be duplicated from other divisions in the Harbour Department.

(c) All activities can process slowly because the required documents are stored in the document room which is hard to search and store the data.

(d) No tracking process in the office of seaman; the individuals cannot know the progress of their requests.

(e) The reports must be generated manually in many types of forms. The staff must use more time to generate the reports and the reports may be inaccurate.

(f) There is no security applied to all the activities, external organizations can easily make an illegal seaman book, Health Certification and Agreement and Crew List of Thai Vessel.

The Service Information System for Harbour Department project follows steps as follows:

(a) Study current dataflow.

(b) Design new dataflow.

(c)   Design database which will be used by all offices in the Harbour Department.

(d)   Design computer hardware

(e)   Estimate cost for implementing the system

(f)   Study feasibility analysis

From the study, the office of seaman should implement the information system because the office of seaman will gain the profit from having opportunity to service more seamen and reduce time consuming from working with a lot of document. Although the cost of computer hardware and software is more than 9 million bath, the feasibility analysis shows that the breakeven point is at year four. Therefore, this project can help the Harbour Department make decision for implementing information system within the office of seaman.

4.2   Recommendations

After studying the information from the Office of Seaman, the Office of Seaman should improve the information system to improve efficiency, data accuracy and security. The centralized data must be collected because the data collected at the Computer Department will be the most updated. All the divisions must use and get the data from the Computer Department because the division that has the most up to date data will update the centralized data.

The Office of Seaman should implement data security to prevent external organization from making illegal seaman book. The seaman book is an important document; it can be used for identify seaman in foreign country. Therefore, the Office of Seaman should use special ink, watermark or other technique to create the seaman book.

From the result of benefit/cost ratio, the Office of Seaman should implement the information system because the ratio is greater than 1. The implementation of information technology will help the Office of Seaman to decrease delay from working with document, improve data security, decrease data redundancy and improve data accuracy.

APPENDIX   A

CURRENT DATA FLOW DIAGRAM
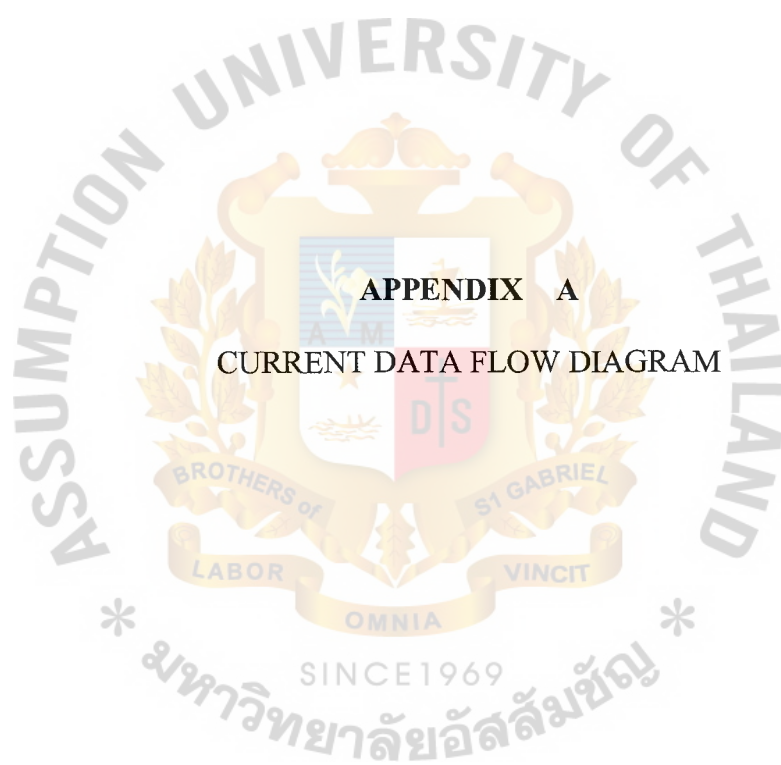
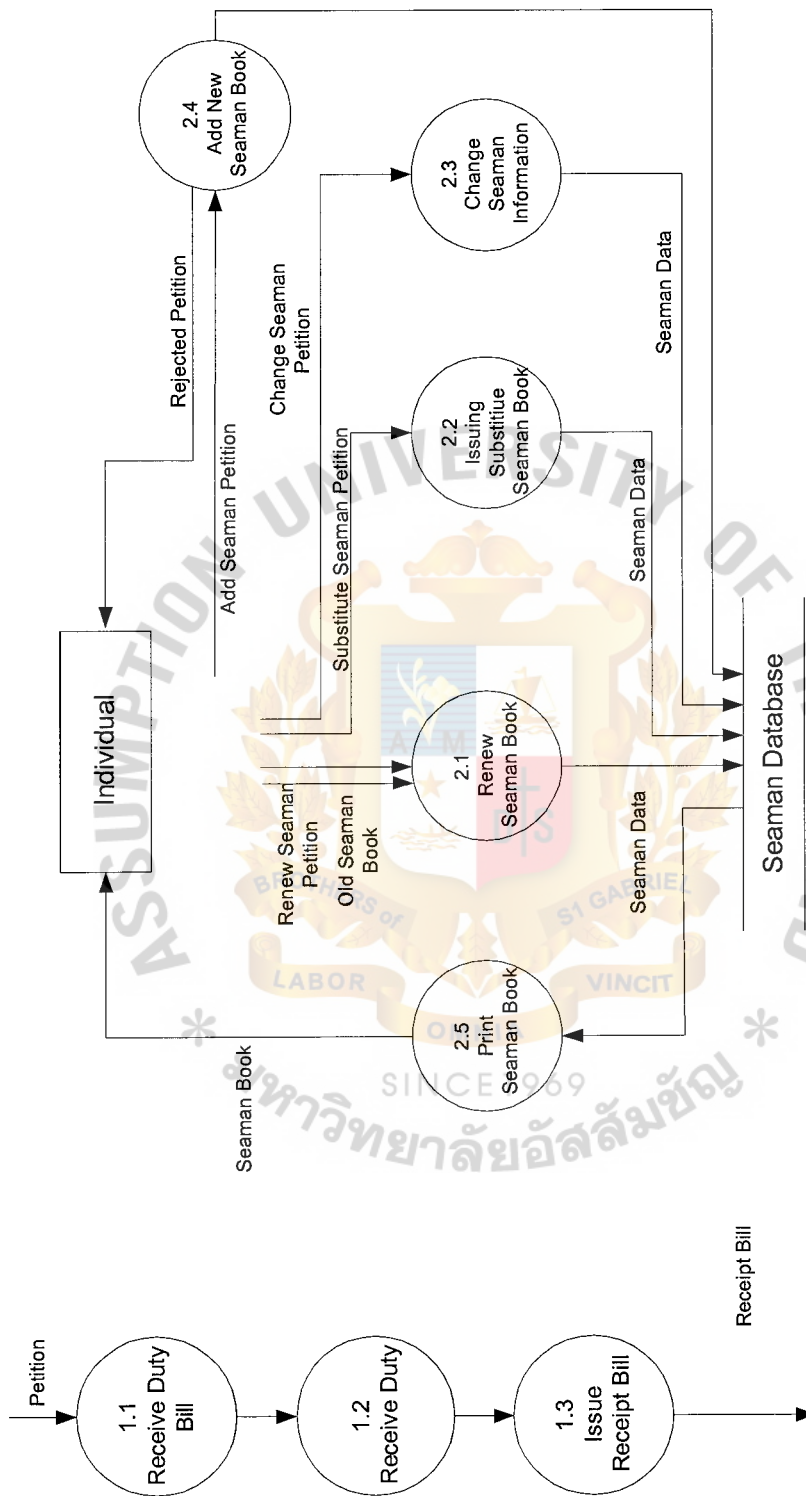Figure A.1.   Data Flow Level 1.
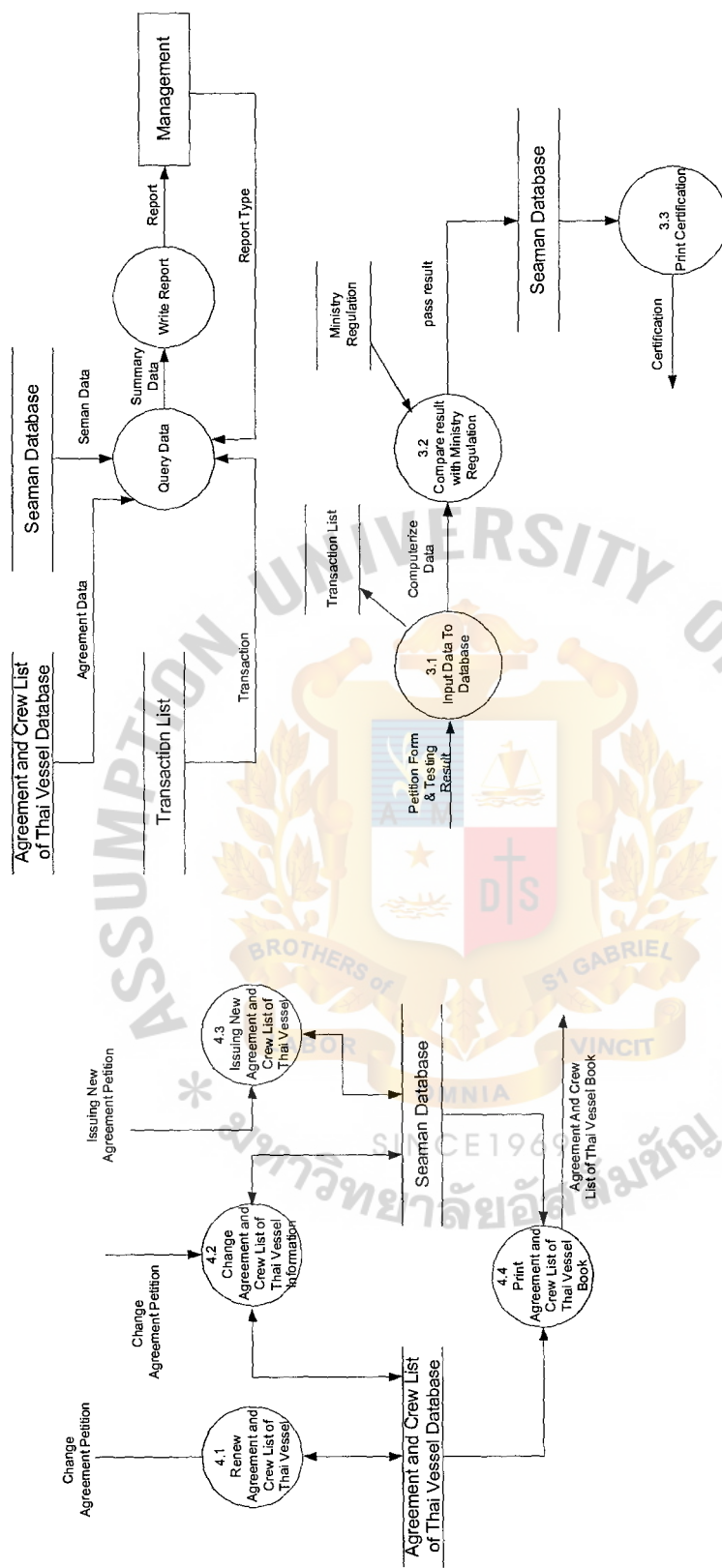
Figure A.2. Data Flow Level 1.

53
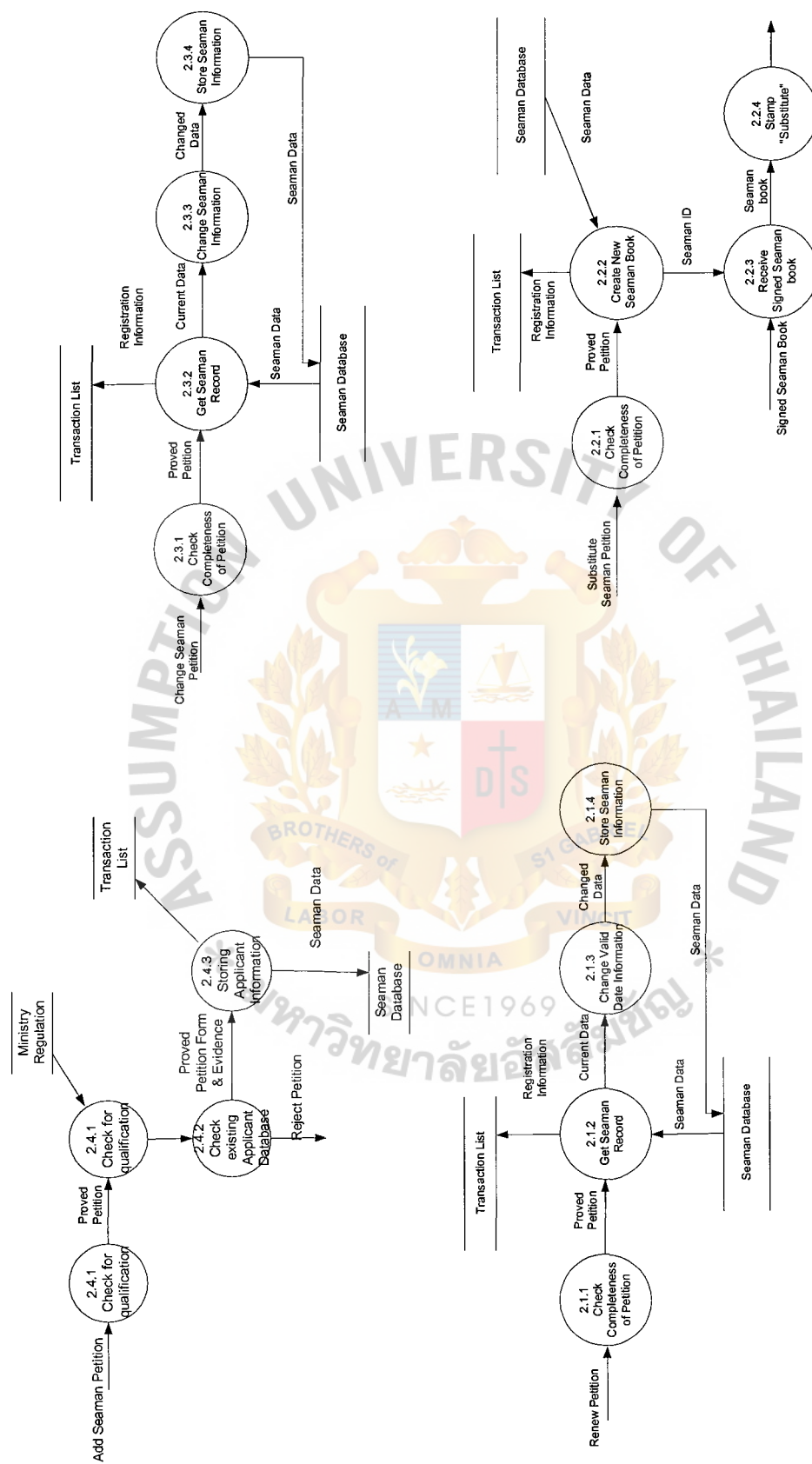
Figure A.3. Data Flow Level 2.

54

Figure A.4. Data Flow Level 2.

55

APPENDIX   B

NEW DATA FLOW DIAGRAM
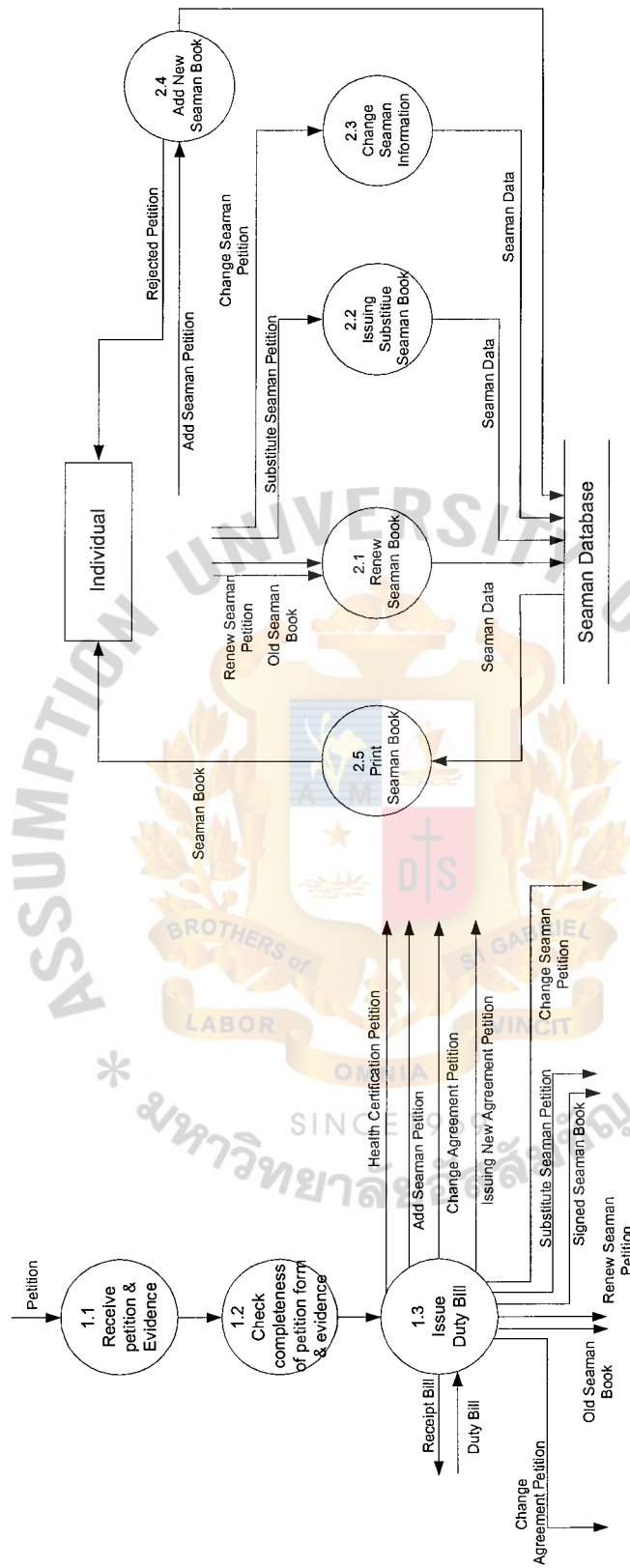
Figure B.1.   Data Flow Level 1.
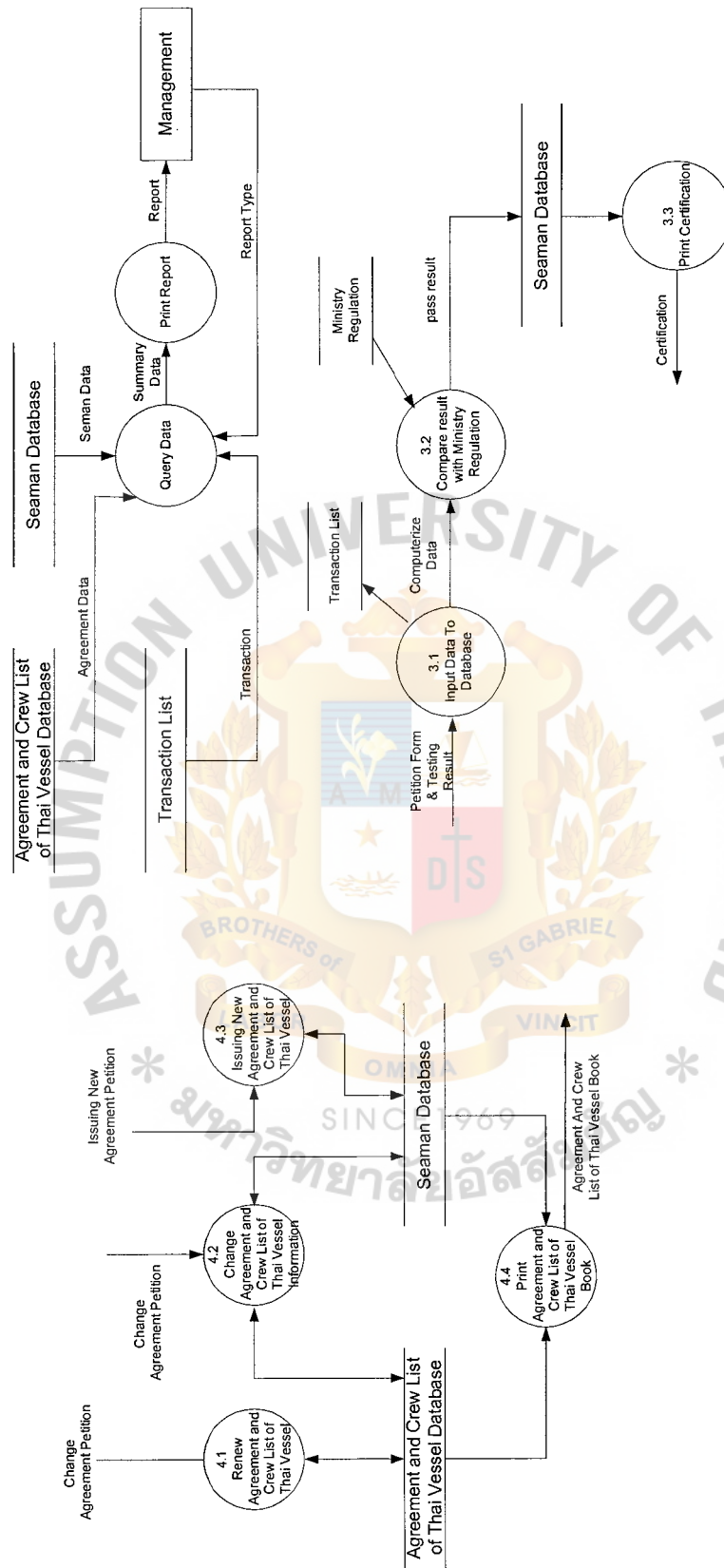
Figure B.2.   Data Flow Level 1.

58
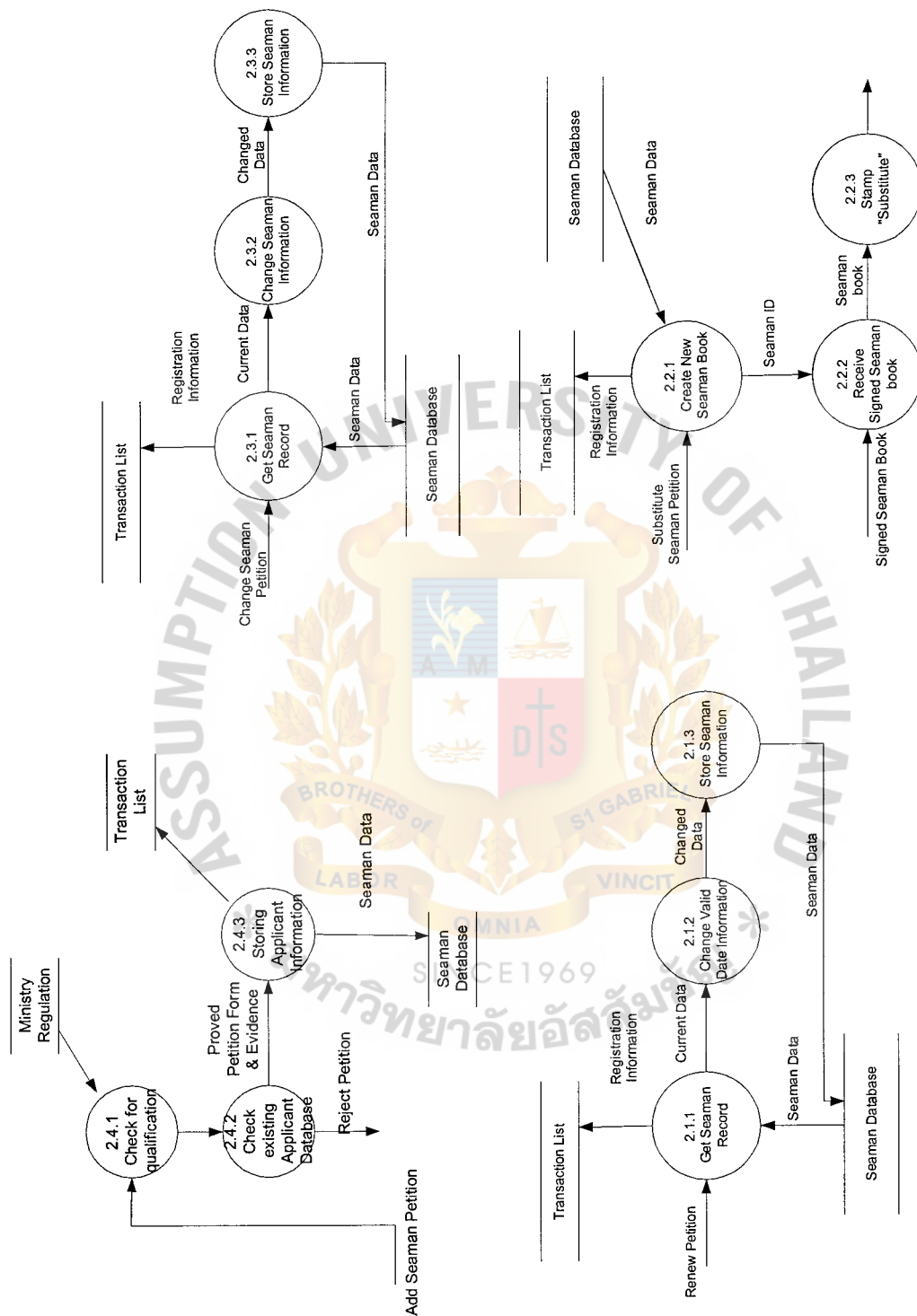
Figure B.3.   Data Flow Level 2.

59

Figure B.4. Data Flow Level 2.

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APPENDIX C

PROCESS SPECIFICATION

PROCESS SPECIFICATION

Process 1 Receive Petition

Do Get Petition

Do Check Completeness of Petition and evidence

    Unit Petition and Evidence is Valid or Operation Canceled

If Valid Petition and Evidence

    Do Issue Duty Bill

        If Valid Receipt Bill

           Do Classify Petition Type

      END IF

END IF

Process 2 Seaman Process

IF Petition = Renew Seaman Petition

    Do Renew Seaman Book

    Store Seaman Data

End IF

IF Petition = Issue Seaman Petition

    Do Issuing Seaman Book

    If Not Qualify

        Store Seaman Data

    End IF

    Store Seaman Data

End IF

IF Petition = Substitute Seaman Petition

    Do Substitute Seaman Book

    Store Seaman Data

End IF

IF Petition = Change Seaman Petition

    Do Change Seaman Book

    Store Seaman Data

End IF

Do Print Seaman Book

Process 3 Issuing Health Certification

If Petition = Request Health Certification

    Do Input Data To Database

    Do Store Transaction List

    Do Compare Health Test Result With Ministry Regulation

    If Qualify

        Store Data To Seaman Database

    End IF

    If Not Qualify

        Reject Petition With Reject Reason

    End IF

    Do Print Certification

END IF

Process 4 Agreement And Crew List Process

If Petition = Change Agreement Petition

    DO Change Agreement And Crew List of Thai Vessel Information

    Store Changed Data To Agreement And Crew List of Thai Vessel Database

    Store Changed Data To Seaman Database

End IF

If Petition = Renew Agreement Petition

    DO Renew Agreement And Crew List of Thai Vessel Information

    Change Valid Date To Agreement And Crew List of Thai Vessel Database

End IF

If Petition = Issuing New Agreement And Crew List of Thai Vessel Petition

    DO Issuing New Agreement And Crew List of Thai Vessel Information

    Store Data To Agreement And Crew List of Thai Vessel Database

    Store Data To Seaman Database

End IF

Process 5 Summarize Report

Get Data From Agreement and Crew List of Thai Vessel Database

Get Data From Seaman Database

Get Data From Transaction List

Do Query Data From Database

Do Print Report

Process 4.1.1 Check Agreement and Crew List of Thai Vessel Data

Check Number of Crew in Vessel

Check Qualification of Seaman in each position

If Crew List of Thai Vessel is Qualify

      Stamped Agreement and Crew List of Thai Vessel

End IF

If Crew List of Thai Vessel not qualify

      Reject The Petition with Reason

End IF

Process 4.1.2 Change Agreement and Crew List of Thai Vessel Validation Date

Change Validation Date

Store New Validation Data to Agreement and Crew List of Thai Vessel Database

Process 4.2.1 Update Seaman Book

If Change = Add Seaman To Vessel

      Change Seaman's Vessel ID = Petition's Vessel ID

End IF

IF Change = Remove Seaman From Vessel

      Change Seaman's Vessel ID = "0"

End IF

Do Store Transaction List

Process 4.2.2 Check Agreement and Crew List of Thai Vessel Data

Check Number of Crew in Vessel

Check Qualification of Seaman in each position

If Crew List of Thai Vessel is Qualify

      Stamped Agreement and Crew List of Thai Vessel

End IF

If Crew List of Thai Vessel not qualify

      Reject The Petition with Reason

End IF

Process 4.2.3 Change Agreement and Crew List of Thai Vessel Data

If Change = Change Vessel Information

      Update Vessel Database

END IF

Process 4.3.1 Update Seaman Book

Do While not end of Crew List

      Change Seaman's Vessel ID = Petition's Vessel ID

End DO

Do Store Transaction List

Process 4.3.2 Check Agreement and Crew List of Thai Vessel Data

Check Number of Crew in Vessel

Check Qualification of Seaman in each position

If Crew List of Thai Vessel is Qualify

Stamped Agreement and Crew List of Thai Vessel

End IF

If Crew List of Thai Vessel not qualify

Reject The Petition with Reason

End IF

Process 4.3.3 Input New Agreement and Crew List of Thai Vessel Data

Update Vessel Table

Update Vessel Owner Table

Process 2.4.1 Check For Qualification

Check Individual with Ministry Regulation

If Individual not match to Ministry Regulation

Reject Petition

END IF

Process 2.4.2 Check Existing Applicant Database

Get Seaman Database

Query Identification Card No in Seaman Database

If Search Result = Found

Reject Petition

End IF

Process 2.4.3 Storing Application Information

Create New Record in Seaman Database

Generate New Seaman ID

Store New Seaman Information to Database

Do Store Transaction List

Process 2.1.1 Get Seaman Record

Get Seaman ID from Petition

Query Seaman ID Database for Individual's Seaman ID

Get Seaman Record

Process 2.1.2 Change Valid Date Information

Change Validation date to 1 year from today

Process 2.1.3 Store Seaman Information

Update Validation Data to Seaman Database

Close Seaman Database

Process 2.2.1 Create new Seaman Book

Get Individual's Seaman ID

Get Seaman Data from Seaman Database

Print New Seaman Book

Do Store Transaction List

Process 2.2.2 Receive Signed Seaman Book

Check Completeness of Seaman Book

Process 2.3.1 Get Seaman Record

Get Individual's Seaman ID

Get Seaman Data from Seaman Database

Do Store Transaction List

Process 2.3.2 Change Seaman Information

Get New Seaman Data From Petition

Change Current Seaman Information
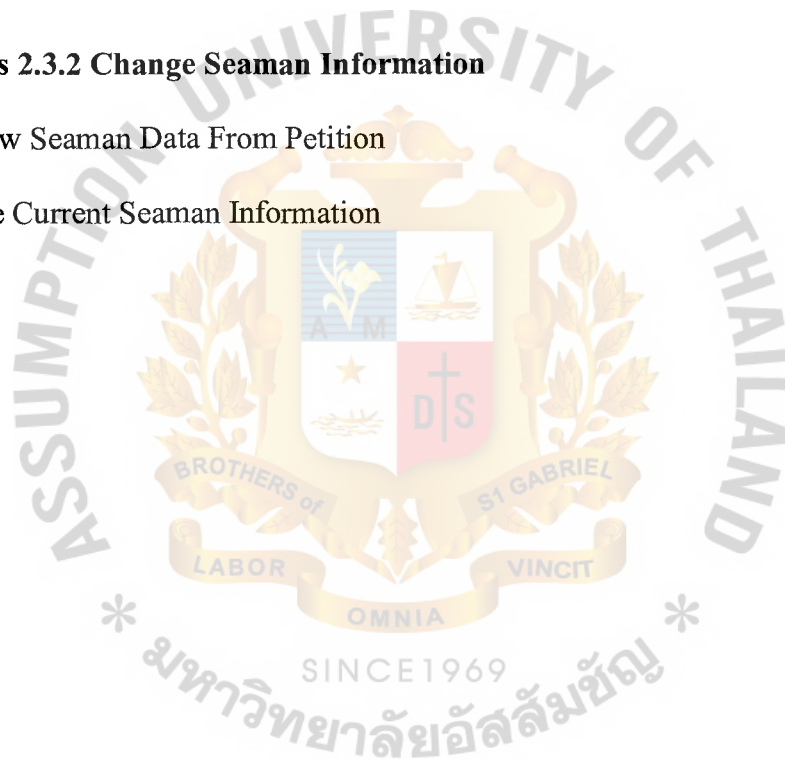
APPENDIX   D

MODULE SPECIFICATION

MODULE SPECIFICATION

Check Completeness of Petition

BEGIN

    DO WHILE not end of petition

        IF there are blank that did't filled and can't null

        GOTO reject petition

    END DO

    Check for required evidence

    IF required Evidence don't complete

        GO to reject petition

    Update Check Status to Complete

    GOTO END

    : Reject petition

        Print reason of reject

END

Issue Receipt Bill

BEGIN

GET Latest Duty Bill ID

    IF Petition Request = New Seaman Book THEN Cost = 500

    IF Petition Request = Change Seaman Book THEN Cost = 150

    IF Petition Request = Renew Seaman Book THEN Cost = 300

    IF Petition Request = Substitute Seaman Book THEN Cost = 300

    IF Petition Request = New Crew List Book THEN Cost = 1000

IF Petition Request = Change Crew List Book THEN Cost = 250

IF Petition Request = Renew Crew List Book THEN Cost = 750

IF Petition Request = New Certification THEN Cost = 250

Print Receipt Bill

END

Check for Qualification

BEGIN

GET Ministry Regulation Database

DO WHILE not end of petition

compare filled value with Ministry Regulation

IF filled value not better than ministry regulation THEN go to reject petition

END DO

Update Status to qualify

Go to END

: Reject petition

Print reason of reject

END

Check for existing Database

BEGIN

GET Seaman database

GET Individual's Identification Card ID

DO UNTIL end of Database

GET Seaman record

        IF Record's Identification Card ID equal to Individual's Identification Card

ID THEN

        Go to Reject Petition

END DO

Update Status to Complete

: Reject petition

        Print reason of reject

END

STORE Applicant Information

BEGIN

        Put Seaman Information to Seaman Database

        GET Last Transaction ID

        Current Transaction ID equal to Last Transaction List + 1

        Transaction Name = "Seaman Book Process"

        STORE Transaction Information to Transaction List

END

Taking Applicant Photo

BEGIN

        GET Applicant Photo

        Name photo = Applicant's Identification Card ID

        STORE Photo to Seaman Record where Identification Card ID = Applicant's

Identification Card ID

END

Change Seaman Book Information

BEGIN

    GET Seaman Record where Identification Card ID = Individual's Identification

    Card ID

    Change Data field with New Data

    STORE Seaman Record

END

Input Data To Database

BEGIN

    Initial Agreement and Crew List of Thai Vessel record to Agreement and Crew

    List of Thai Vessel Database

    DO WHILE Available Seaman

    Add Seaman ID to Agreement and Crew List Database

    Put Today Date as Date of Agreement

    END DO

    Current Transaction ID equal to Last Transaction List + 1

    Transaction Name = "Agreement and Crew List of Thai Vessel"

    STORE Transaction Information to Transaction List

END

Update Seaman Book

BEGIN

    DO WHILE Not End of Seaman in Agreement and Crew List of Thai Vessel

Put Name of Vessel, Registration No., Gross Ton of Vessel, Date of
Engagement, Position, Type of Vessel to Seaman Database

END DO

END

Check Agreement and Crew List of Thai Vessel

BEGIN

GET ministry Regulation

Compare Ministry Regulation with Agreement and Crew List of Thai Vessel

IF Agreement and Crew List of Thai Vessel do not meet Ministry Regulation

Standard THEN

List Not Meet Condition

Print Not Meet Condition

END

Change Data of Agreement and Crew List of Thai Vessel

BEGIN

GET Agreement and Crew List of Thai Vessel Record

IF Change Seaman Information THEN

IF Add Seaman THEN

Add Seaman ID to Agreement and Crew List Database

Put Today Date as Date of Agreement

END IF

IF Remove Seaman THEN

Delete Seaman ID From Agreement and Crew List Database

Put Today Date as Date of Discharge

END IF

END IF

IF Change Vessel Information THEN

Update Vessel Information To Agreement and Crew List Database

END IF

END

Change Agreement and Crew List Database Valid Date

BEGIN

GET Agreement and Crew List of Thai Vessel Record

SET Date of Licensed TO Today Date

STORE Agreement and Crew List of Thai Vessel Record

END

Check Result to Ministry Regulation

BEGIN

GET ministry Regulation

Compare Ministry Regulation with Test Result

IF Test Result do not meet Ministry Regulation Standard THEN

List Not Meet Condition

Print Not Meet Condition

END

APPENDIX E

DATABASE DESIGN

RELATIONAL DATABASE DESIGN

Table E.1.   Medical Fitness Certification Table.

Name	Null?	Type
Certificate No.	No	CHAR (6)
Place Of Issue ID	No	CHAR (4)
Valid Until	No	DATE
Surname	No	CHAR (20)
First name	No	CHAR (20)
Middle Name (S)	No	CHAR (20)
Sex	No	CHAR (4)
Age	No	NUM (3)
Weight	No	NUM (3)
Date of Examination	No	DATE
Epilepsy of attacks	No	Boolean
Kidney Disease	No	Boolean
Venereal Disease	No	Boolean
Seizures	No	Boolean
Narcotics History	No	Boolean
Tuberculosis	No	Boolean
Diabetes	No	Boolean
Hypertension	No	Boolean
Gastro-intestinal infectious disease	No	Boolean
Ovesity	No	Boolean
Heart	No	Boolean

Table E.1.   Medical Fitness Certification Table. (Continued)

Name	Null?	Type
Chronic respiratory disorder	No	Boolean
Chronic dental and digestive system problem	No	Boolean
Skin disease	No	Boolean
Muscular-skeletal	No	Boolean
Cancer	No	Boolean
Right Eye Uncorrected	No	INT (3)
Left Eye Uncorrected	No	INT (3)
Both Eyes Uncorrected	No	INT (3)
Right Eye corrected	No	INT (3)
Left Eye corrected	No	INT (3)
Both Eyes corrected	No	INT (3)
Ishihara Book	No	Boolean
Holmes Latern	No	Boolean
Color Vision Status	No	Boolean
Hearing Right	No	INT (3)
Hearing Left	No	INT (3)
Blood Pressure Systolic	No	INT (3)
Blood Pressure Diastolic	No	INT (3)
Blood Pressure Status	No	Boolean
Comment	No	String
Examining Physician Name	No	CHAR (40)

Table E.1.   Medical Fitness Certification Table. (Continued)

Name	Null?	Type
Examining Physician License Number	No	CHAR (8)
Medical Center ID	No	CHAR (8)

Table E.2.   Crew Table.

Name	Null?	Type
Seaman ID	No	INT (9)
Thai Surname	No	CHAR (20)
Thai First name	No	CHAR (20)
Thai Middle Name (S)	No	CHAR (20)
Nationality	No	CHAR (10)
Citizenship	No	CHAR (10)
Religion	No	CHAR (10)
Identification Card No.	No	INT (13)
Married	No	Boolean
English Surname	No	CHAR (20)
English First Name	No	CHAR (20)
English Middle Name	No	CHAR (20)
Domicile	No	CHAR (40)
Birthday	No	DATE
Eye Color	No	CHAR (10)
Hair Color	No	CHAR (10)
Height	No	INT (3)

Table E.2. Crew Table. (Continued)

Name	Null?	Type
Blemish	No	CHAR (10)
Residence Registration	No	CHAR (10)
Urgently Contract Place	No	CHAR (40)
Highest Education	No	CHAR (10)
Certification from Harbour	No	CHAR (10)
Purpose of request	No	CHAR (40)
Evidence	No	CHAR (10)
Picture	No	PICTURE

Table E.3. Medical Center Table.

Name	Null?	Type
Medical Center ID	No	INT (8)
Medical Center Name	No	CHAR (20)
Medical Center Address	No	CHAR (40)
Medical Center Telephone	No	CHAR (15)
Medical Center Fax	No	CHAR (15)

Table E.4. Transaction Table.

Name	Null?	Type
Transaction ID	No	INT (10)
Type of Job	No	INT (3)
Date of Perform	No	DATE
Response Official	No	CHAR (40)

Table E.5. Vessel Table.

Name	Null?	Type
Vessel ID	No	INT (9)
Vessel Name (Thai)	No	CHAR (20)
Vessel Name (English)	No	CHAR (20)
Owner Group	No	INT (3)
Vessel Material	No	CHAR (10)
Vessel Type	No	CHAR (10)
Navigation Zone	No	CHAR (10)
Vessel Purpose	No	CHAR (10)
Vessel Length	No	INT (3)
Vessel Depth	No	INT (3)
Vessel Size	No	INT (3)
Vessel Width	No	INT (3)
Owner ID	No	INT (9)
Vessel Status	No	INT (3)

Table E.6. Vessel Owner Table.

Name	Null?	Type
Owner ID	No	INT (9)
Owner Name (Thai)	No	CHAR (20)
Owner Name (English)	No	CHAR (20)
Address	No	CHAR (40)

DATA DICTIONARY

Agreement and Crew List of Thai Vessel =

Seaman Data + Vessel Data + Vessel Owner Data

Vessel Data =

Vessel ID + Vessel Name (Thai) + Vessel Name (English) + Owner Group + Vessel Material + Vessel Type + Navigation Zone + Vessel Purpose + Vessel Length + Vessel Depth + Vessel Size + Vessel Width + Owner ID + Vessel Status

Vessel Owner Data =

Owner ID + Owner Name (Thai) + Owner Name (English) + Address

Health Certification =

Certificate No. + Place Of Issue ID + Valid Until + Surname + First name + Middle + Name (S) + Sex + Age + Weight + Date of Examination + Epilepsy of attacks + Kidney Disease + Venereal Disease + Seizures + Narcotics History + Tuberculosis + Diabetes + Hypertension + Gastro-intestinal infectious disease + Ovesity + Heart + Chronic respiratory disorder + Chronic dental and digestive system problem + Skin disease + Muscular-skeletal + Cancer + Right Eye Uncorrected + Left Eye Uncorrected + Both Eyes Uncorrected + Right Eye corrected + Left Eye corrected + Both Eyes corrected + Ishihara Book + Holmes Latern + Color Vision Status + Hearing Right + Hearing Left + Blood Pressure Systolic + Blood Pressure Diastolic + Blood Pressure Status +

Comment + Examining Physician Name + Examining + Physician License Number + Medical Center ID

Medical Center =

Medical Center ID + Medical Center Name + Medical Center Address + Medical Center Telephone + Medical Center Fax

Health Test Result =

Epilepsy of attacks + Kidney Disease + Venereal Disease + Seizures + Narcotics History + Tuberculosis + Diabetes + Hypertension + Gastro-intestinal infectious disease + Ovesity + Heart + Chronic respiratory disorder + Chronic dental and digestive system problem + Skin disease + Muscular-skeletal + Cancer + Right Eye Uncorrected + Left Eye Uncorrected + Both Eyes Uncorrected + Right Eye corrected + Left Eye corrected + Both Eyes corrected + Ishihara Book + Holmes Latern + Color Vision Status + Hearing Right + Hearing Left + Blood Pressure Systolic + Blood Pressure Diastolic + Blood Pressure Status + Comment + Examining Physician Name + Examining + Physician License Number

Duty Bill =

Transaction ID + Type of Job + Date of Perform + Duty

Receipt Bill =

Transaction ID + Duty + Receipt ID

Petition Form =

[Add Seaman Petition| Change Seaman Petition| Substitute Seaman Petition| Renew Seaman Petition| Add Agreement and Crew List of Thai Vessel Petition| Change Agreement and Crew List of Thai Vessel Petition| Renew Agreement and Crew List of Thai Vessel Petition| Issuing Certification Petition]

Rejected Petition = Petition Form + Reject Reason

Summarized Report = [Transaction Report | Statistic Report]

Add Seaman Petition =

korr-ror.1 + korr-ror.3 + kor.1 + [Employment Evidence | Work Experience Evidence | Training Evidence] + [Identification Card | Passport]

Change Seaman Petition = kor.5 + [Employment Evidence | Work Experience Evidence | Training Evidence] + [Identification Card | Passport]

Substitute Seaman Petition = kor.5 + [Employment Evidence | Work Experience Evidence | Training Evidence] + [Identification Card | Passport]

Renew Seaman Petition = kor.5 + [Employment Evidence | Work Experience Evidence | Training Evidence] + [Identification Card | Passport]

Add Agreement and Crew List of Thai Vessel Petition = Kor. 5 + Crew's Seaman Book + [Identification Card | Passport]

Change Agreement and Crew List of Thai Vessel Petition = Kor. 5 + Crew's Seaman Book + [Identification Card | Passport]

Renew Agreement and Crew List of Thai Vessel Petition = Kor. 5 + Crew's Seaman Book + [Identification Card | Passport]

Issuing Certification Petition = korr-ror.3 + Identification Card + Health Test Result

Health Test Result = Test Result + Medical Center Information

Seaman Data =

    Seaman ID + Thai Surname + Thai First name + Thai Middle Name (S) + Nationality + Citizenship + Religion + Identification Card No. + Married + English Surname + English First Name + English Middle Name + Domicile + Birthday + Eye Color + Hair Color + Height + Blemish + Residence Registration + Urgently Contract Place + Highest Education + Certification from Harbour + Purpose of request + Evidence + Picture

Registration Information =

    Transaction ID + Type of Job + Date of Perform + Response Official

APPENDIX F

REPORT

Seaman Book Transaction List Report

Owner ID	05-25-00025		
Thai Surname	Mr. Mondop	**Thai First Name**	Saetong

Date of Perform	Type of Job	Response Official
10/9/98	Change Record in Seaman Book	Suchat
21/2/99	Renew Seaman Book	Pranee

Owner ID	07-22-00154		
Thai Surname	Mr. Surapong	**Thai First Name**	Somrang

Date of Perform	Type of Job	Response Official
10/9/98	Request New Seaman Book	Pranee
21/2/99	Change Record in Seaman Book	Suchat
17/10/99	Change Record in Seaman Book	Suchat

Figure F.1.   Seaman Book Transaction List Report.

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Medical Fitness Certification Transaction List Report

Date of Perform	Seaman ID	Thai First Name	Thai Surname	Response
17/1/2000	05-25-00025	Mr. Mondop	Saengtong	Suchat
20/2/2000	07-22-00154	Mr. Surapong	Somrang	Pranee
24/6/2000	08-17-00252	Ms. Tharinee	Thienrikid	Pranee

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Figure F.2.   Medical Fitness Certification Transaction List Report.

Agreement And Crew List of Thai Vessel
Transaction List Report

Vessel Owner ID   11-05-00024

Thai Surname   Mr. Kampol   **Thai First Name**   Tanapanyawarakun

Date of Perform	Type of Job	Response Official
11/2/98	Change Record in Agreement and Crew List of Thai Vessel	Suchat
25/2/99	Renew Agreement and Crew List of Thai Vessel	Pranee

Vessel Owner ID   25-07-00036

Thai Surname   Mr. Nantarat   **Thai First Name**   Boonwirotrit

Date of Perform	Type of Job	Response Official
11/8/99	Request New Agreement and Crew List of Thai Vessel	Pranee
11/3/00	Change Record in Agreement and Crew List of Thai Vessel	Suchat
16/6/00	Change Record Agreement and Crew List of Thai Vessel	Suchat

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Figure F.3.   Agreement and Crew List of Thai Vessel Transaction List Report.

Office Of Seaman Statistic

Date of Perform by : January 2000

Type of Job   *Seaman Book*

Activity	Amount Of Transaction
Add New Record	350
Change Record	236
Substitution	52
Renew Book	250

Type of Job   *Agreement And Crew List Of Thai Vessel*

Activity	Amount Of Transaction
Add New Record	462
Change Record	256
Renew Book	276

Type of Job   *Medical Fitness Certification*

Activity	Amount Of Transaction
Add New Record	424

Figure F.4.   Office of Seaman Statistic Report.

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APPENDIX   G

HARDWARE SPECIFICATION

HARDWARE SPECIFICATION

1.   Database Server

1.1   At least 2 Units of CPU with the following specification

1.1.1 CPU using 64 bits RISC architecture

1.1.2 At least 400 MHz clock speed

1.1.3 Cache memory at least 4 MB

1.2   Memory

1.2.1 Memory is ECC type

1.2.2 At least 512 MB

1.3   I/O Interface

1.3.1 At least one Fast Ethernet 10/100 Mbps Network Interface card

1.3.2 At least Serial Port

1.3.3 At least 2 PCI slots

1.4   Disk Drive

1.4.1 At least 45 GB of hard disk using UltraSCSI Interface

1.4.2 At least one CD-ROM with 32x speed

1.4.3 At least 1 Tape Backup with 12 MB capacity

1.5   Monitor with 17 inch diameter

1.6   Using Unix Operating System unlimited user licensed

1.7   Fully support year 2000 problem

2. Personal Computer

   2.1 CPU

      2.1.1 At least Intel Pentium III

      2.1.2 Clock speed not least than 450 MHz

   2.2 Memory

      2.2.1 SDRAM Type not least than 64 Megabytes

      2.2.2 Can expand up to 384 Megabytes

   2.3 Storage Unit

      2.3.1 Hard disk with at least 6.4 GB capacity

      2.3.2 Floppy Disk

      2.3.3 CD-ROM 24X

   2.4 Display Unit

      2.4.1 At least 15 inches Monitor

   2.5 Expansion Slot

      2.5.1 At least 1 ISA, 2 PCI

   2.6 At least one Fast Ethernet 10/100 Mbps Network Interface card

3. Juke Box

   3.1 Using Magneto Optical Disk with 5.2 GB capacity per disk

   3.2 Can use with MO disk up to 52 disk or 270 GB capacity

   3.3 Using SCSI-2 Interface to connect to Database Server

4. Laser Printer

   4.1 Speed at least 10 page per minute

   4.2 Resolution not least than 1200x1200 dpi

   4.3 Can print on paper A4, Letter, Legal, Executive, A5 size size

   4.4 Connect to computer using Parallel port

4.5 Can connect to network directly using print server card

5. Dot Matrix Printer

5.1 24 Pin dot matrix printer

5.2 Resolution up to 360 x 360 dpi

5.3 Speed not least than 300 cps

5.4 Can connect to computer using Bi-Direction Parallel port

5.5 Has High Capacity Document Feeder

6. Line Printer

6.1 Speed not least than 1400 lpm

6.2 Product noise not more than 55 DBA

6.3 Has Built-in 2 Interface (Parallel, Serial)

6.4 Can print Barcode

6.5 Can print on 6 layers paper

7. Switch

7.1 Has 10/100BaseTX with RJ-45 interface not least than 24 port

7.2 Has 2 port Fast Ethernet (FX) Uplink Module

7.3 Can store MAC Address up to 1K Address

7.4 Has LED to indicate Physical Status, Operational Status, Primary Power, Secondary Power and Temperature status

7.5 Has LED to indicate Link Integrity, Activity status per port

8. UTP Cable

8.1 UTP Category 5 24 AWG

8.2 Support speed up to 100 Mbps

8.3 Support TIA/EIA-568A standard

9.   UPS 5 KVA

9.1   True On-line UPS

9.2   Support 220 Vac ±20% input voltage

9.3   Output voltage not error more than 220 Vac ± 1%

9.4   Support overload at 150% not least than 30 seconds

9.5   Backup time not least than 15 minutes

APPENDIX   H

INTERFACE DESIGN

INTERFACE DESIGN

Figure H.1.   Add New Seaman Book Screen.

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Figure H.2.   Print Seaman Book Screen.

Figure H.3.   Input Petition Information Screen.

Figure H.4.   Print Agreement and Crew List of Thai Vessel Book Screen.

Figure H.5.   Print Certification Screen.

APPENDIX   I

EXAMPLE OF PETITION FORM AND OTHER DOCUMENT

Figure I.1.   Kor-1 Form.

แบบ ก. ๕

เลขที่ 42

กรมเจ้าท่า

คำร้องเรื่อง_____

เขียนที่_____

วันที่_____เดือน_____พ.ศ.

ข้าพเจ้า_____นามสกุล_____

สัญชาติ_____อายุ____ปี อยู่บ้านเลขที่____หมู่ที่____ถนน____

ตำบล/แขวง_____อำเภอ/เขต_____จังหวัด_____โทร.

ขอยื่นคำร้องดังต่อไปนี้_____

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(ราคา ๑ บาท)

Figure I.2.   Kor –5 Form.

แบบ คร. ๑

คำร้องขอมีหนังสือคนประจำเรือ

ลำดับรับสมัครที่................................

เขียนที่.................................วันที่..........เดือน.................พ.ศ...........

ข้าพเจ้า.................................สัญชาติ.........เชื้อชาติ............ศาสนา............

บัตรประจำตัวประชาชนเลขที่ □-□□□□-□□□□□-□□-□ สถานภาพสมรส □ โสด □ สมรส □ อื่นๆ

หนังสือเดินทางเลขที่ / PASSPORT NUMBER*.................................

ชื่อและสกุล (ภาษาอังกฤษตัวพิมพ์) □□□□□□□□□□□□□□□□□□□□□□□□□

เกิดที่จังหวัด.................................เมื่อ.................พ.ศ...........อายุ............ปี

สีตา.............สีผม.............สูง.............เมตร ตำหนิ.................

ที่อยู่ตามสำเนาทะเบียนบ้านเลขที่..............หมู่ที่.........ตรอก/ซอย...........ถนน..........

ตำบล/แขวง.................................อำเภอ/เขต.................จังหวัด............

รหัสไปรษณีย์ □□□□□ โทรศัพท์.................................

สถานที่ติดต่อเร่งด่วน เลขที่..............หมู่ที่.........ตรอก/ซอย...........ถนน..........

ตำบล/แขวง.................อำเภอ/เขต.................จังหวัด............

รหัสไปรษณีย์ □□□□□ โทรศัพท์.................................

การศึกษาสูงสุดที่ได้รับ.................................

ประกาศนียบัตรแสดงความรู้ความสามารถผู้ทำการในเรือที่ได้รับจากกรมเจ้าท่า.................

มีความประสงค์ขอ มีหนังสือคนประจำเรือ
    □ สำหรับเรือประมง
    □ สำหรับเรือที่มิใช่เรือประมง

โดยมีหลักฐานประกอบการสมัคร คือ □ หลักฐานการจ้างงาน □ หลักฐานการผ่านงานเรือประมง □ หลักฐานการฝึกอบรม

ข้าพเจ้าขอรับรองว่าไม่เคยเป็นผู้มีหนังสือคนประจำเรือตามที่ร้องขอมาก่อน หากตรวจพบว่าข้าพเจ้าเคยมีหนังสือคนประจำเรือ
อยู่ก่อนแล้ว กรมเจ้าท่ามีสิทธิระงับไม่ออกหนังสือคนประจำเรือให้แก่ข้าพเจ้าได้ และ
ข้าพเจ้าจะไม่เรียกร้องสิทธิใดๆ รวมทั้งยินยอมให้ริบเงินต่างๆ ที่ข้าพเจ้าได้ชำระไว้แล้ว
เป็นรายได้แผ่นดิน

ข้าพเจ้าขอรับรองว่าข้อความข้างต้นทั้งหมดเป็นความจริง

┌─────────────┐
│   │
│   │
│ ภาพถ่าย   │
│ ขนาด ๒ นิ้ว │
│   │
│   │
└─────────────┘

....
(ลายมือชื่อผู้ขอสมัคร)

* ใช้สำหรับผู้มี PASSPORT หรือชาวต่างประเทศ

Figure I.3.   Korr-ror 1 Form.

Figure I.4.   Korr-ror –3 Form.

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