



e-Document Filing & Sharing System of Rene Philippe & Partners Ltd.

by

Ms. Anchulee Lertprasertsak

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

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

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Approve.

Dr. T. Brongt + R

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Project Title                    e-Document Filing & Sharing System of  
Rene Philippe & Partners Ltd.

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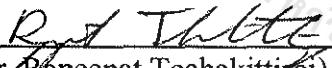
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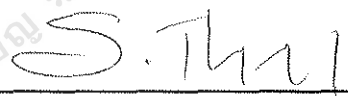
The Graduate School of Assumption University has approved this final report of the three-credit course, CS 6998 System Development Project, submitted in partial fulfillment of the requirements for the degree of Master of Science in Computer Information Systems.

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## ABSTRACT

Rene Philippe & Partners Ltd. is a Thai Law Firm with a foreign management providing all types of legal services mostly to foreign clients regardless of nationality of clients, nature of clients (organization or individual), languages, etc.

On the daily basis activities, lawyers are involved with tedious processes of managing documents such as preparing various types of documents for submitting to the government offices related to the assigned matters, placing both hard copies and soft copies of documents into the right locations, and also searching for the documents they need to complete their tasks.

Currently, the approach to the mentioned processes is manually done without any supportive system. It is inevitably difficult to locate and retrieve the documents and information in a timely fashion since they have been stored in such unorganized locations. This incurs high operating costs, takes long response times, causes redundant documents and information, lost documents, and too much time being spent on administrative activities.

To solve those problems, a new computerized system is proposed. The new system employs dynamic web-based concept using MySQL as a Database Management System (DBMS), Hypertext Markup Language (HTML), SQL, PHP and JavaScript. The system helps recording client information and matter requests, filing various types of documents in organized locations, and enables the lawyers to locate and retrieve those documents and information via a secure login system.



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## **I. INTRODUCTION**

### **1.1 Background of Project**

This project is developed to support the document filing system of Rene Philippe & Partners Ltd. It helps organizing documents and information into the right locations, transforming documents and information into valuable and instantly retrievable resources, and enabling documents and information sharing via the internet.

Currently, document filing system of the company is done by the lawyers in the manual fashion. For each matter, it involves various types of documents that the lawyers need to work with and it is very time consuming for them to search the documents or a piece of information. Moreover, to reduce time for searching, the lawyers came up with their own methods by separately keeping documents and information in their own personal files. However, it turns out that this method has caused another problem of high documents and information redundancy without each of them knowing it. It has also increased the difficulty of knowing which versions of document and information they have are the most updated. Due to the manual system, common problems such as lost and damaged paper documents are unavoidable.

These problems have become more and more unbearable as the company has grown. The company has to be responsible for high operating costs which seem to be constantly increasing as the company welcomes more clients.

Therefore, the project intends to provide a solution for document filing and sharing in a systematic way so that the lawyers can efficiently locate, retrieve and share documents and information as company resources. It would eventually allow the company to reduce the costs related to manual system, increase staff productivity and finally increase profits of the company.

## **1.2 Objectives of the Project**

Objectives of the e-Document Filing & Sharing System are as follows:

- (1) To maximize the productivity of the company by minimizing response time and time spent on administrative activities.
- (2) To provide well organized documents and information that is stored in a proper database from which the lawyers can easily locate, access and retrieve documents and information.
- (3) To provide a web-based application that facilitates day to day activities of the company.
- (4) To provide a user friendly interface for the lawyers so that they can easily record and retrieve documents and information.
- (5) Allow the lawyers to access the online e-Document Filing & Sharing System from anywhere at anytime with a secure login process.
- (6) To reduce documents and information redundancy problems by using documents and information sharing system.
- (7) To reduce costs and problems from paper storage.
- (8) To allow flexibility of information system expansion in the future.

## **1.3 Scope of the Project**

This project focuses on the entire document filing process of the company. The main functions that support operational level of the company include managing client account and client folder, managing matter request and matter folder related to the particular client, filing matter files into related matter folder and managing knowledge and electronic form to serve as company resources. The project also supports management level of the company by providing the function that is responsible for generating various types of customized summary report.



#### **1.4 Deliverables**

- (1) Project report which consists of existing system analysis, proposed system, system design, and project implementation.
- (2) Web-based application of e-Document Filing & Sharing System.
- (3) Training of using web-based application to the lawyers.

#### **1.5 Project Plan**

See Figure 1.1.



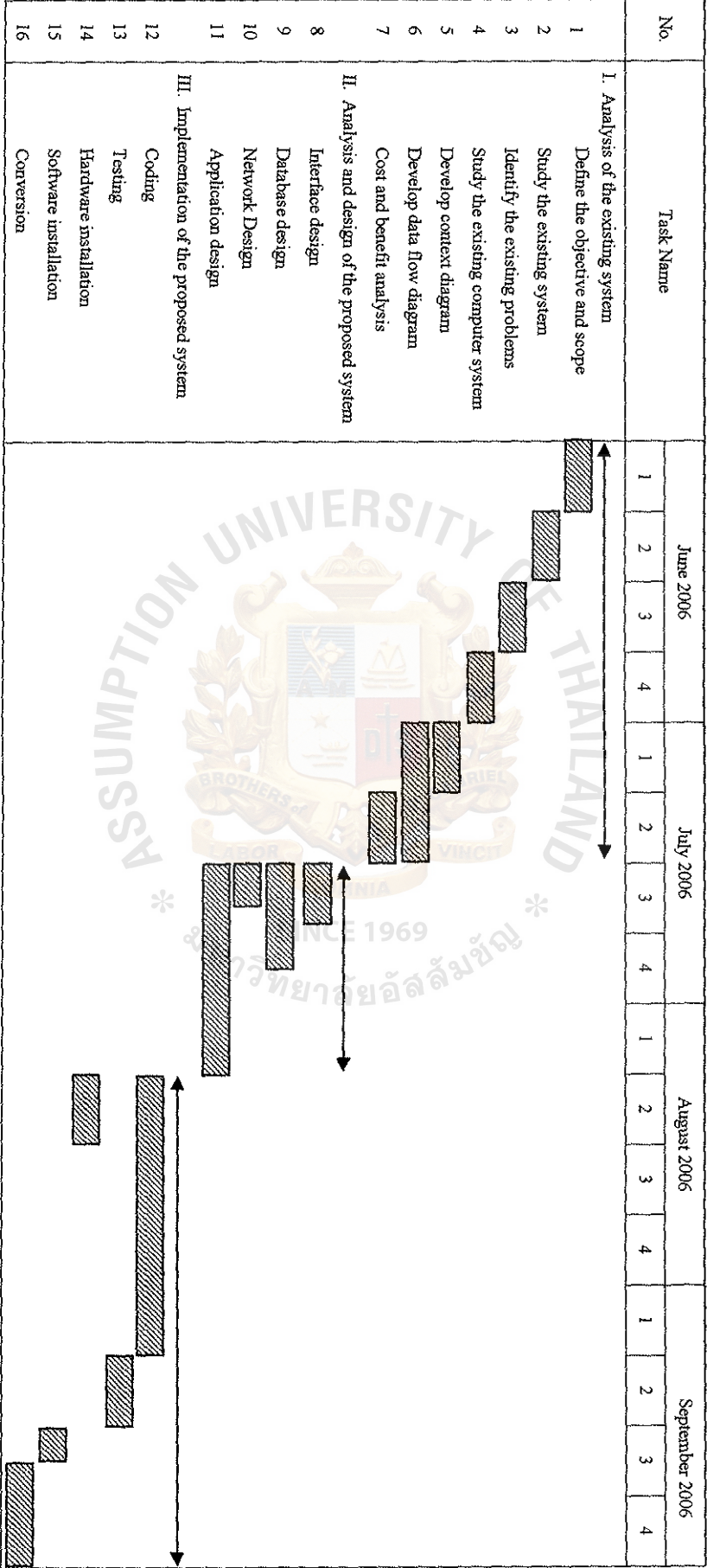


Figure 1.1. Project Plan.

## **II. THE EXISTING SYSTEM**

### **2.1 Background of the Organization**

Rene Philippe & Partners Ltd. has been established since year 2000 by Mr. Rene-Philippe, managing partner and lawyer, who is currently solely managing the company.

The company provides all types of legal services and its clients-based are foreigners. These legal activities oblige many corresponding government offices to be involved in daily operations. Legal services provided by the company can be categorized as follows:

- Corporate and commercial services such as tax ID card and VAT application, licenses and compliance.
- Arbitration, mediation and litigation.
- Labor services such as visa and work permit.
- Private client services such as marriage, divorce and pre-marriage agreement.
- Intellectual property services such as trademark registration, patent registration and copyright.

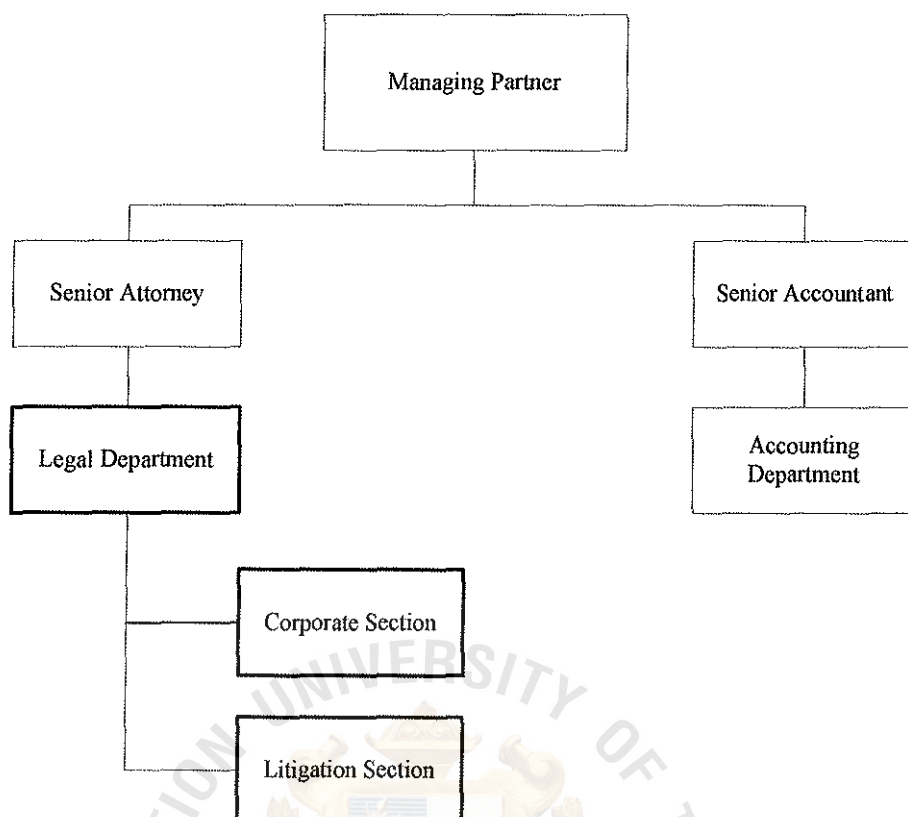


Figure 2.1. Organization Chart.

This project focuses on the legal department which is divided into two sections. Corporate section, where the lawyers are responsible for corporate related matters. Litigation section, where the lawyers are responsible for litigation related cases. Legal services provided by the company oblige many corresponding government offices to be involved in daily operations and most of the clients are interested in corporate services.

For each type of matters, there exist certain steps of processes, lists of required documents, and particular timelines and/or deadlines that the lawyers must follow respectively. Once the matters have been assigned, the lawyers have to prepare various types of documents in Thai language with English language translation as the company's clients are foreigners thus, English translation is a must. The lawyers also

have to follow up with the documents they submitted to the government office until the process is done. In addition, for some matters several lawyers might have to intervene.

At the step of document preparation, the lawyers need to know what kinds of documents are needed for the matter. They will search for the list of required documents, sometimes in the file cabinets and sometimes in their computer local drives. After they have got the lists, they have to write contents inside documents and the contents must be exactly how the related government office has stated. To prevent mistaken contents, government offices normally have some electronic forms of application etc. available for downloading from their websites. Each lawyer separately downloads electronic forms and saves it inside the computer's local drives for re-using in the future. However, some forms are not available on the website, so the lawyers have to collect them from the government offices each time they pay a visit and then keep paper forms inside the file cabinet for re-using in future. Whenever the lawyers need some forms, they have to go search either in their computer local drives or in the file cabinet. Nevertheless, some forms are not available in both the website as well as in the government offices. The lawyers solve this problem by separately creating their own templates and save it in their computer local drives for further use, please note that each template created by the lawyers hardly has the same formats.

Once the lawyers have prepared the documents, they will print them out and submit them to the government offices. After government offices have verified submitted documents, they will either return the results or rejected the requests. If the lawyers got rejections, they will either re-submit the documents or find other solutions to get the job done. If the lawyers get results back, they will then return them to the clients who made the requests.

## **2.2 Existing Business Operations**

Although, each lawyer is equipped with a desktop computer and every computer is connected to the wireless network (WLAN), all peripheral devices are entirely installed such as printers, scanners and etc. However, the approach for handling the matters and routine activities is still manually done without any supportive systems. Operational processes related to corporate section in legal department are summarized as follows.

### **(1) Place a matter request**

Normally, a client would place matter requests directly to the senior lawyer by setting up the meeting to discuss the details of the matters. Those matter requests have been done verbally without having any official matter request forms to fill in and/or any information is recorded except for some short notes and client's business card for further contact. After the meeting, the senior lawyer will summarize the details of requested matters and send the minutes of the meeting to the client. Later on, a senior lawyer would assign the matters to the appropriate lawyers along with the details of the matters.

### **(2) Gather documents and information related to the matters**

Once the lawyers have been assigned new matters, they would gather documents and information needed to do their tasks from various resources such as client information, matter information, list of required documents needed for the particular matters and some forms. For client and matter information, the lawyers might have to give a call and ask for the documents and information they needed. If this is an existing client, the lawyers might go through file cabinet or search in their computers for ever



recorded old document files and information of a particular client. For the list of required documents and forms, the lawyers would go through the same things by venturing to the file cabinet and their computers. If they are not found somewhere in the company resources, then the lawyers might visit government offices' website and download those available information and electronic forms or send someone to collect those information and paper forms at the government offices and keep them as the company resources for further use.

(3) Prepare documents needed for the requested matters

After the lawyers gather the needed documents and information they need in order to complete the requested matters. They will prepare documents according to the list of required documents and print them out for the clients to give a verified signature. They will save soft copies of prepared documents in the computers and for printed out versions, they will keep the copies of those documents in the file cabinet for further use as company resources. After the clients have given a verified signature on the documents, then the lawyers will submit prepared documents to the corresponding government offices for application verifications.

(4) Submit returns of requested mater to the clients

Government offices could return two results from document submissions which are either approval or rejection. If they rejected it, then the lawyers would either re-prepare documents as the government offices suggested or find another solution for the requested matter. If they granted approval, the lawyers will verbally inform the accountant that the matters are done for further processes of accounting section such as preparing

invoices, following up account receivables and issuing receipts which however, those processes of accounting section are not concerned with the legal section. The lawyers then submit returns of requested matters to the clients along with some personal documents that the lawyers borrowed from the clients at the beginning of the process such as original passport and original work permit. The lawyers will eventually keep the copies of those returns of requested matters in the file cabinet and/or in the computer.

All mentioned processes can be described in figure forms of the existing document filing and sharing system. The following figures are context diagram and data flow diagram of the existing system, to simplify the concept of the system.

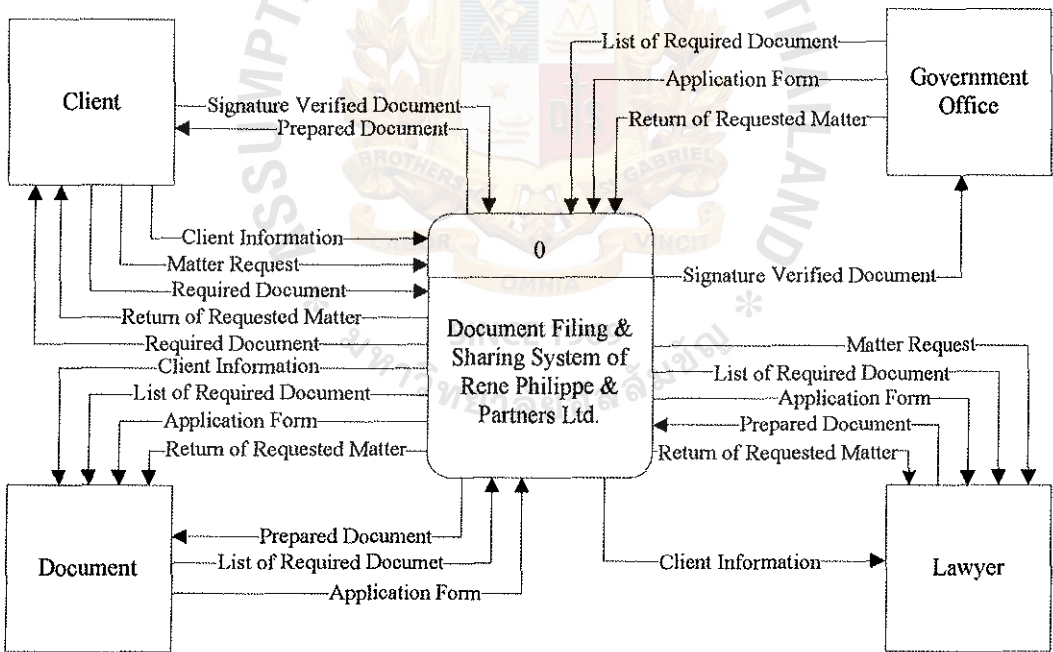


Figure 2.2. Context Diagram of Existing Document Filing & Sharing System.

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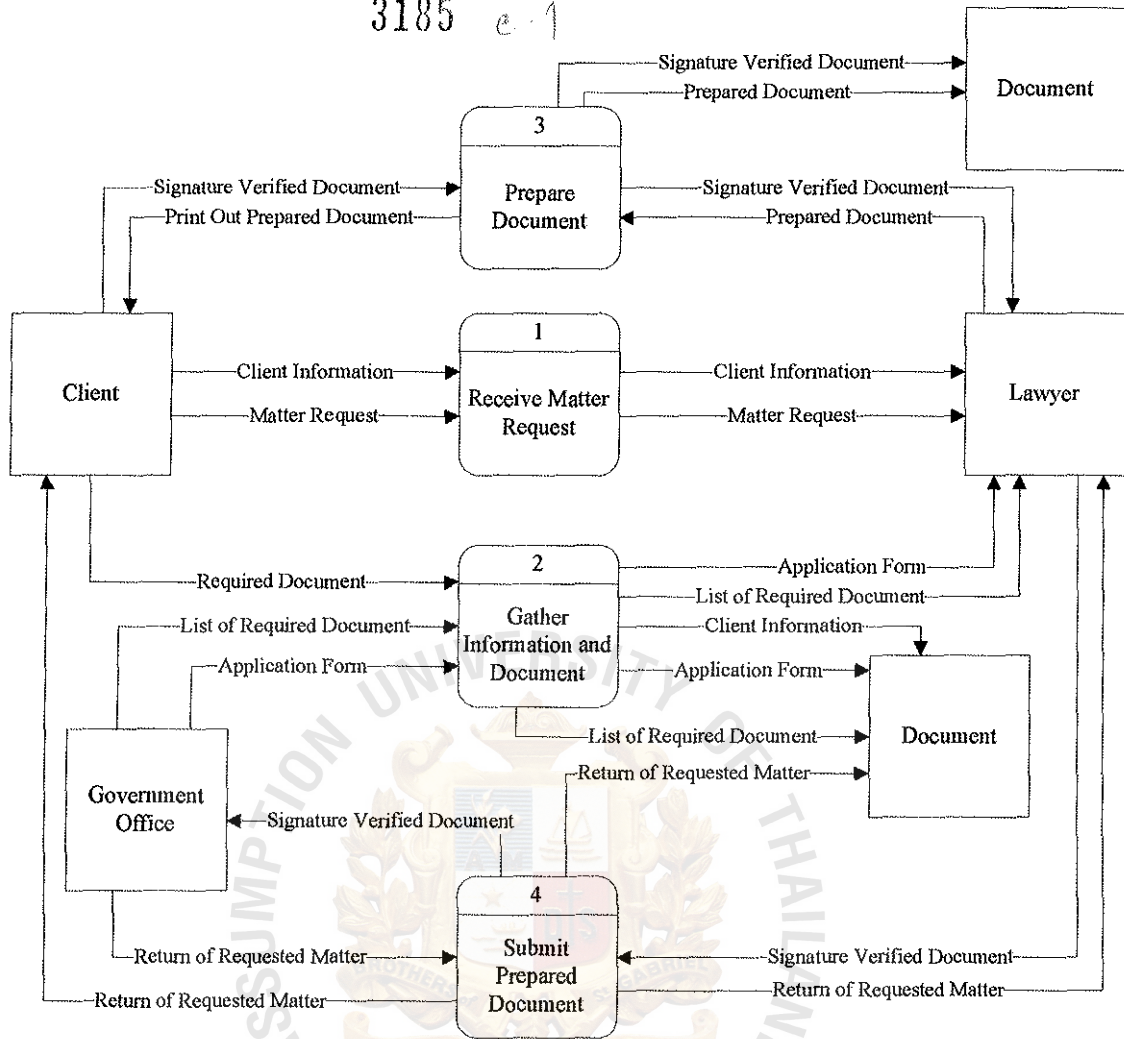


Figure 2.3. Data Flow Diagram Level 0 of Existing Document Filing & Sharing System.

### **2.3 Existing Problems and Areas for Improvement**

Focusing on the corporate section in legal department, the existing problems can be described as follows.

(1) Difficulties of locating documents and accessing information.

Documents and information needed for requested matters are kept in unorganized locations such as lawyer's personal files, lawyer's computer local drives, and in the file cabinet and sometimes those documents and information are misplaced. The lawyers cannot locate those documents and information in a timely fashion. It results in too much time spent on administrative activities.

(2) Difficulty of identifying the most updated documents and information.

All lawyers separately keep documents and information with themselves and modify those documents and information without each of them noticing and it is quite difficult to know which ones are the most updated versions. This could result in redundant work in the same jobs because if they have done some changes in the old versions of documents, then they might have to re-do them again in the updated versions.

(3) High document and information redundancy.

Same copies of documents and same pieces of information have been kept in multiple locations. This creates high maintenance costs and too much use of space to keep paper documents as the volume of documents and information are constantly increasing. Moreover, it also creates some difficulties of backing up document files and information since they have been kept everywhere.

(4) Inefficient client response.

This is an effect of documents and information disorganization. Clients occasionally have some questions about requested matters during the process. Unfortunately, lawyers cannot be more responsive to the clients because they have spent too much time in finding information to answer the questions. Sometimes, the lawyers have made promises to complete requested matters in a short period of time but the times for preparing documents are hardly predictable. Thus there is no guarantee that the requested matters will be done within the time the lawyers promised. In order to maintain the reputation of the company, the lawyers have to urgently get the matters done which results in job overload for the lawyers.

(5) Unable to manipulate information in order to support management and decision making.

In every certain period of time, the managing partner of the company needs to know some information related to clients and matters for financial analysis. Since information has been stored in such scattered locations, it is really difficult to gather such information in order to produce useful reports for supporting management and efficient decision making of the company.

(6) Possible data entry errors.

Recording client information and matter request information are manually done without any supportive system to check the correctness of such entries. These result in untrustworthy information which will later flow inside the company.

The problem, opportunity and directive analysis is tabulated in Table 2.1, which shows the urgency of the problem, priority of the problem and the visibility of the degree of solution that is proposed.

Table 2.1. Problem, Opportunities or Directive Analysis.

| Brief Statements of Problem, Opportunity, or Directive                                 | Urgency | Visibility | Priority | Proposed Solution  |
|--|---------|------------|----------|--|
| 1. Difficulties of locating documents and accessing information                        | High    | High       | 1        | New development of searching documents and information feature |
| 2. Difficulty of identifying the most updated documents and information                | Medium  | High       | 2        | New development  |
| 3. High documents and information redundancy   | High    | High       | 1        | New development of documents and information sharing           |
| 4. Inefficient client response   | Medium  | Medium     | 3        | New development  |
| 5. Unable to manipulate information in order to support management and decision making | Medium  | Medium     | 3        | New development of unified database system                     |
| 6. Possible data entry errors  | Low     | Low        | 4        | New development that can verifies the entries.                 |



### **III. THE PROPOSED SYSTEM**

#### **3.1 Requirement Analysis**

After studying the existing conditions of legal activities and its processes, many processes need to be computerized. All the problems are identified, and the following are the requirements of the proposed system.

(1) Functional requirements

- (a) New system should keep client and related matter information.
- (b) New system should automatically create client folder and name it after client id when a new client account is created.
- (c) New system should automatically create matter folder under its related client folder and name the folder after matter number when a new matter is added to the system.
- (d) New system should allow uploading of matter files into their previously created matter folder and allow downloading those files.
- (e) New system should allow deleting of matter files and automatically remove those files from the system when given a delete command.
- (f) New system should allow uploading and downloading of knowledge files and form files.
- (g) New system should allow deleting of knowledge files and form files by automatically remove those files from the system when given a delete command.
- (h) New system should generate various types of summary reports based on report requirements submission.
- (i) New system should prevent incorrect inputs.

(2) Non-Functional requirements

- (a) New system should have a uniform user friendly interface.
- (b) New system should be easy to use.
- (c) New system should be easy for backing up various types of files.
- (d) New system should be economical to use.

After analyzing the requirements of the new system, the objectives were set to guide as a quantitative standard for achievement. The following table, Table 3.1, represents the problem, its causes, the objective of the proposed system and the constraint that would obstruct the objectives to be met.



Table 3.1. Problem, Opportunity, Objective, and Constraint.

| Cause and Effect Analysis   |   | System Improvement Objectives  |  |
|---|---|--|--|
| Problems  | Causes and Effects  | System Objectives  | System Constraints   |
| 1. Incomplete clients and matters information sent to the lawyers.      | 1. Matter requests are verbally done. Missing of information is occasionally happened.  | 1. Create standard forms for required information of clients and related matters.  | 1. Required information may be changed depending on business nature.   |
| 2. Unacceptable time consuming for searching documents and information. | 1. Disorganization of document and information causing difficulty of locating them.<br>2. Lawyers have to ask for the location of documents and information.  | 1. Create search tools vary from different types of document and information.<br>2. Reduce times for searching by 90%.   | None.  |
| 3. High redundancy of documents and information.                        | 1. Lawyers separately keep documents and information in various locations causing high maintenance costs and too much use of spaces.<br>2. Documents and information in scattered locations causing difficulty of backing up. | 1. Create a centralized location where documents and information can be shared.<br>2. Create categorized folders to store the files which are easy for backing up. | 1. The company still need to keep some documents as original paper forms such as title deeds, affidavit and etc. |
| 4. Unable to manipulate the data for analyzing.                         | Paper form is suitable for reading only.  | 1. Create a standard database and keep data in digital form.   | None.  |

## 3.2 System Analysis

### 3.2.1 Data Modeling

Data model is used to describe concerned business data that will be included in the system. It mainly concentrates on the relationship of all data and is viewed as a static picture of the system. Once the picture of all related data is presented, system scope would be clearly understood.

After interviewing with the system owner and lawyers many times, the data that is to be included can be concluded. The data entities of the proposed system are Client, Corporate, Individual, Matter, Matter File, Category, Knowledge, Form and User.

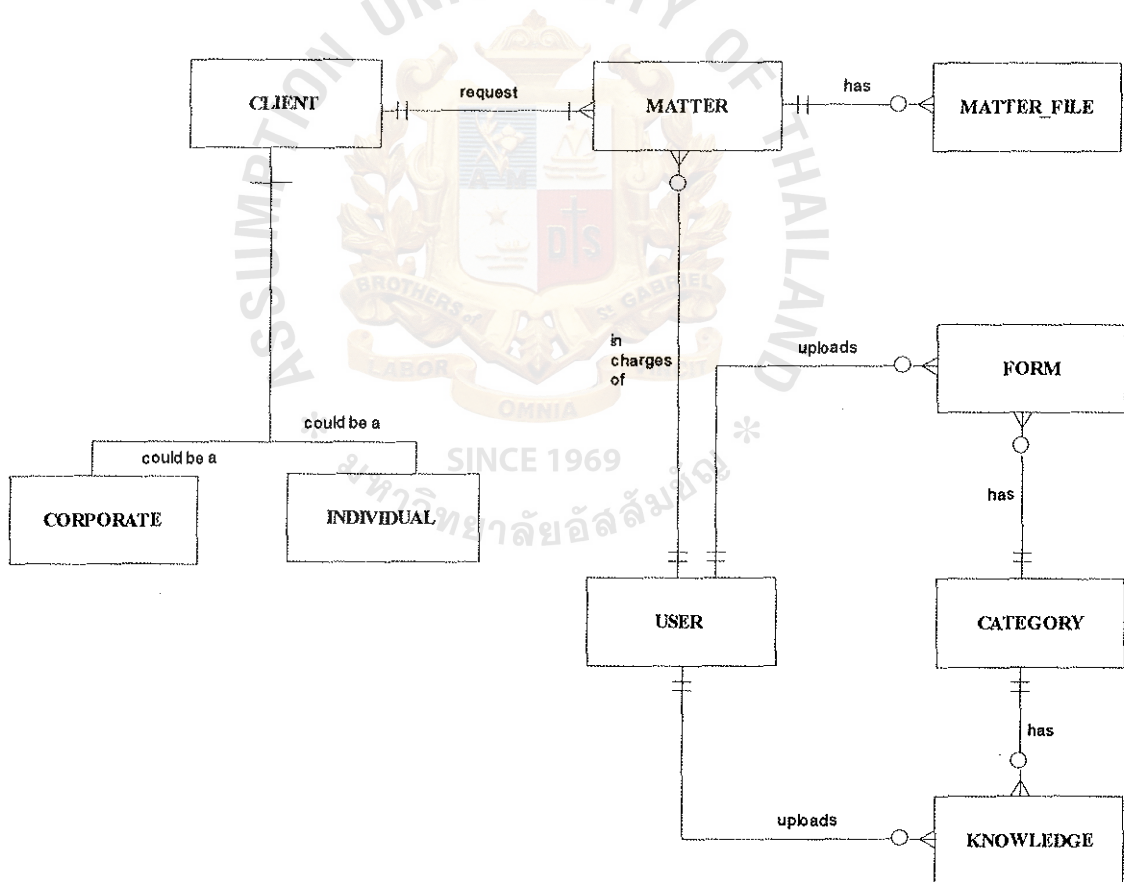


Figure 3.1. Context Entity Relationship Diagram (ERD) of the Proposed System.

Other types of entity relationship diagram are shown in Appendix A. There are two diagrams, which are Key-Based Entity Relationship diagram and Fully Attributed Entity Relationship diagram. Key-Based Entity Relationship diagram is similar to the context ERD, previously shown, but it will show the unique identity attributes of each entity that is called the primary key. This is the requirement of the relational database concept. For Fully Attributed Entity Relationship diagram, it is also similar to the context ERD but instead of showing only the primary key like key based ERD, it shows all the attributes related to each entity. It is to show all the related data corresponding to each entity, so that the system scope will be clearer.

### 3.2.2 Process Modeling

While data modeling emphasizes on organizing and documenting the system's data, process modeling rather aims on organizing and documenting the structure and flow of the data. Logical process modeling specifies what system does rather than how system does like physical process modeling. Thus, it is clearly understood for both system analyst's perspective and the business owner's perspective. Context data flow diagram is the preliminary of process model that shows the brief scope of the system against the outside. After the processes of existing system have been described, the relevant external parties, external data stores and input/output of the proposed system, they are now can be summarized in Figure 3.2. The context diagram of proposed system will be look similar to the existing system, the manual; however, in deeper details it will be different and will be described next.

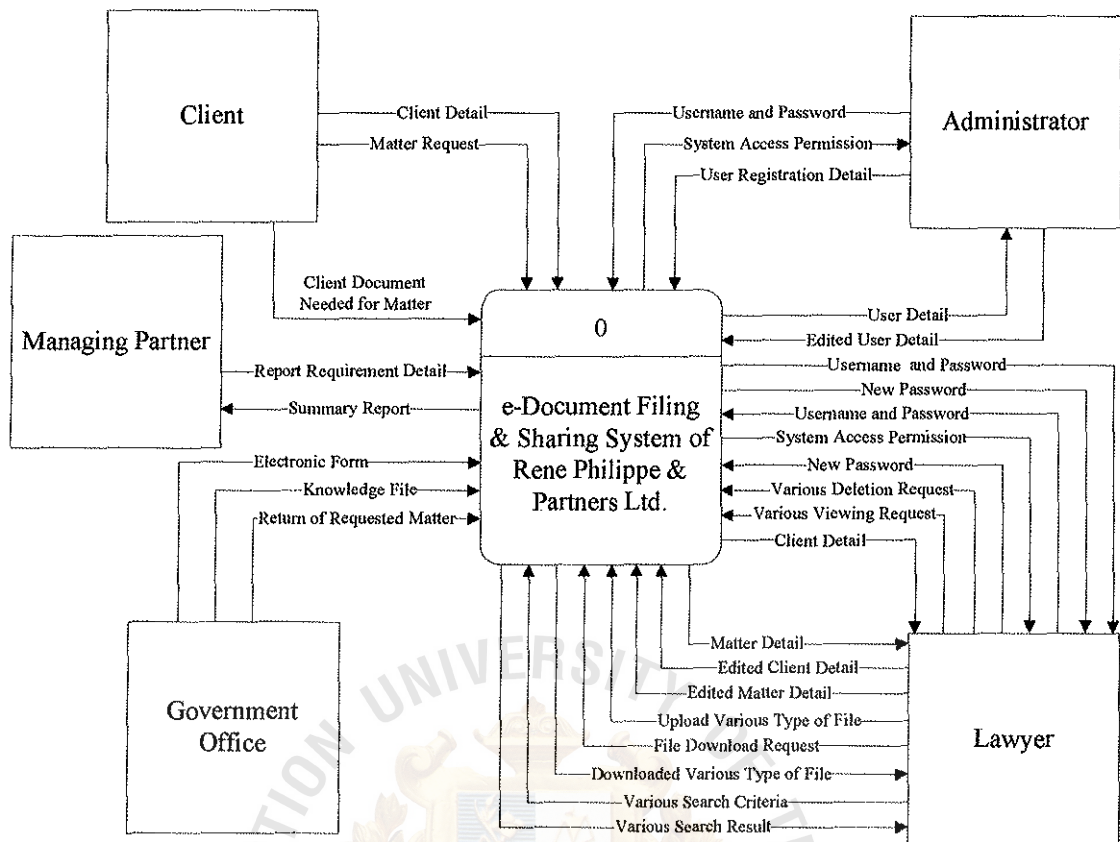


Figure 3.2. Context Diagram of Proposed System.

By viewing from another perspective, the inside of the system structure can be viewed by using a Functional decomposition diagram. In functional decomposition, related functions can be categorized into groups so that it can be orderly managed, maintained, and developed. The proposed system is categorized into nine functions, which are System administrator subsystem, Login subsystem, Client information subsystem, Matter information subsystem, Matter file subsystem, Knowledge base subsystem, Form subsystem, User information subsystem and Report subsystem. Each of subsystems can be broken down into lower level processes. Each process represents a rough process which can also be further broken down into even lower level processes.



Other lower level processes are shown in Appendix B. The functional decomposition diagram of the proposed system is shown in Figure 3.3.

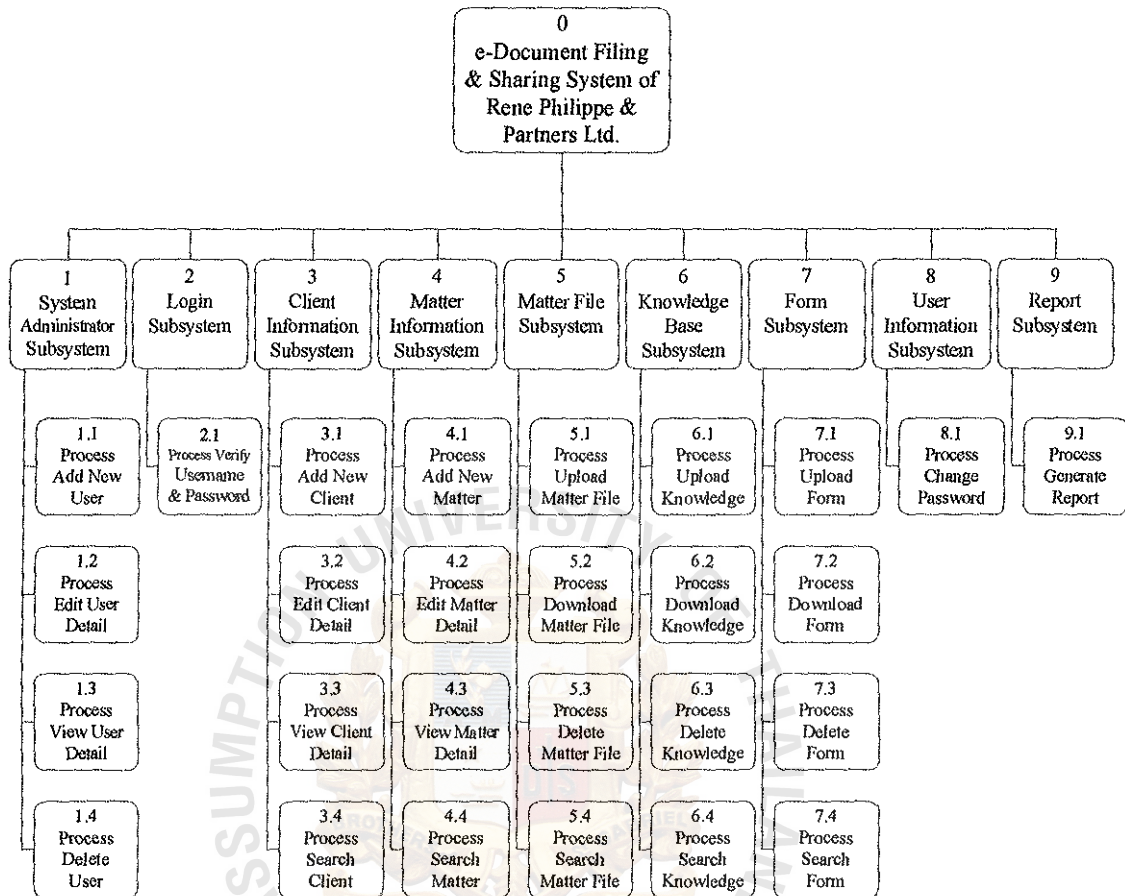


Figure 3.3. Functional Decomposition Diagram of Proposed System.

The characteristic of each subsystem will be discussed for better understanding of what the system does and what its scope is.

#### (1) System administrator subsystem

This area is concerned with managing users in the system. There are 4 processes inside including; add new user, edit user detail, view user detail and delete existing user. In order to access and use facilities in the system, on the account of maintaining system security, the administrator is the only

one who has the permission to make a new user registration. After the user is registered, the system will automatically send an email to the user based on a given email address to inform username and password for accessing the system. The administrator also has the rights to change password of the user if the current password seems to be no longer secure, after the password has been changed, the system will also send an email to inform the new password to the user. The administrator has the permission to view user detail and also delete the user if the particular user is no longer authorized to access the system.

(2) Login subsystem

This area is concerned with maintaining system security by preventing unauthorized access to the system. There is 1 process including verification of username and password. To use the facilities in the system, the user needs username and password previously given by the administrator via an email. The system will verify access permission from login detail. If it is verified as administrator login, the system will grant the access permission to both admin tools and user tools. If it is verified as normal user login, the system will grant access permission to only user tools. In addition, if somebody has tried to access the system without any permission, the system will also record IP address and log in the date and time of the hacker.

(3) Client information subsystem

This area is concerned with managing client information for further use within the company as company resources. There are 4 processes including add new client, edit client detail, view client detail, and search

client. This is the core of the system and client information subsystem is managing the first stage of document filing. Client is the main source of information and also the main financial resources of the company. Once a new client account is created, the system will automatically create a new folder named after client id on the server in order to reserve some spaces for later added matters which are related to the particular client. Client detail may be changed from time to time due to many reasons. The lawyer can update client details by selecting an available edit command. On the daily basis activities, client details are occasionally used for various purposes. The lawyer can easily select a view command in order to see and print out client detail via internet explorer. In addition, it is even faster for the lawyer to manipulate client using enhanced search tool. For the clients, once they are added into the system they cannot be deleted. Deleting a client could cause ripple effects to all matters belong to the particular clients.

(4) Matter information subsystem

This area is concerned with managing matter information related to a particular client. There are 4 processes including add new matter, edit matter detail, view matter detail and search matter. It is a normal logic that one client can request many matters. After the client has made a matter request, a new matter is added into the system by the lawyer who responsible for the requested matter. After the new matter is added, at the same time the system also automatically creates a matter folder named after the matter number. This matter folder will be placed under its related client folder which was previously created in order to reserve some spaces for

new added matter files related to this particular matter. Each matter can be updated and viewed using available edit and view commands. Times spent on manipulating matter can also be incredibly reduced by enhanced search tool. Just like the management of clients, matters are not allowed to be deleted from the system once they have been added. Deleting matters could also cause ripple effect to the matter files belong to the particular matters.

(5) Matter file subsystem

This area is concerned with managing digital files related to the particular matter. There are 4 processes including upload new matter file, download matter file, delete matter file and search matter file. This is the core of e-Document Filing & Sharing system which relatively works with client information subsystem and matter information subsystem. As having had mentioned before, the lawyers have to work with various types of documents in order to complete the tasks of requested matters. This subsystem enables digital files to be shared among the lawyers within the company. With this document sharing feature, it effectively eliminates the problem of file redundancy caused by manual system. For each of requested matters, the lawyers need to prepare various types of documents. After the lawyer have finished with a document preparation, this prepared document would be immediately added into related matter by uploading the document using an available add tool. The system would then automatically move this uploaded document into the related matter folder. The earlier creation of client and matter folders is to serve this main purpose of accommodating matter files related to the particular matter. Second purpose is to serve the process of file backing up; it would be much easier for file

backing up when the files are kept in the categorized folders. The lawyers are allowed to work with those files by downloading them into their computer local drives using a search tool, making changes to the downloaded file, deleting the old file on the server and then re-uploading it as an updated version. Another feature of this subsystem is that when the delete command is selected, the system will automatically locate the selected file and remove it from the system in order to preserve the space of the server for new files to be added later on.

(6) Knowledge base subsystem

This area is concerned with managing knowledge files which are occasionally used as knowledge base within the company. There are 4 processes including upload new knowledge file, download knowledge file, delete knowledge file and search knowledge file. Legal services involve with tedious steps and information of document submission that the lawyers have to follow respectively. It is such a waste of time for the lawyers having to do the research each time they have been assigned with new matters. Therefore, this subsystem is conceived to serve as a knowledge base of the company. New knowledge files can be added by selecting the category of the files and uploading them into the system using add tool. The system then automatically moves the uploaded knowledge file into knowledge folder which is originally attached to the system. The lawyers can now search for the knowledge they need for document submission in a timely fashion using search tool and retrieve knowledge by downloading knowledge file. The lawyer can also delete knowledge files if they are on longer updated and re-upload the new version of knowledge files.

(7) Form subsystem

This area is concerned with managing electronic forms which are occasionally used for different types of matters within the company. There are 4 processes including upload new form, download form, delete form and search form. For each type of matters, government offices usually request that any submission of documents are supposed to use forms available at the corresponding government offices which the lawyers have to follow this inquiry respectively, the example of the forms such as various application forms, affidavit and etc. Most of electronic forms and paper forms are already existed in the company because the lawyer have collected them since forever but the problem is that they are kept in scattered locations which cause some difficulties of locating them in a timely fashion. Therefore, form subsystem is conceived. The lawyers can add electronic forms by uploading them into the system. The system then automatically moves these uploaded forms into the form folder which is originally attached to the system. The lawyers can retrieve those forms using search tool and downloading them. The lawyers can also delete those forms from the system if they are no longer updated and re-load the updated versions.

(8) User information subsystem

This area is concerned with managing personal user information. There is 1 process including change password. Normally, user registration can only be done by administrator of the system and the system will automatically send an email based on a given email address to inform username and password to the user. In the case that password is not



practical to the user. The user has full rights to change the password using an available change password form. The system will retrieve the user's personal details according to the login detail. These personal details will be different in each computer depending on which one the user has logged into. The user then can make changes of user details and password which will be effectively valid the next time for the user to login.

(9) Report subsystem

This area is concerned with generating summary report related to matter request and the lawyer who is in charge. There is 1 process including generating report. This subsystem serves management level by manipulating data recorded in the system to produce useful reports for supporting efficient decision making of managing partner. Summary report would be generated based on report requirements that were submitted by using generate summary report form. Report requirements that managing partner could select from generate summary report form consists of lawyers who are in charge, matter status and report period. In addition, those report requirements could be cross selected.

The following figure, Figure 3.4, shows level 0 Data flow diagram of proposed system.

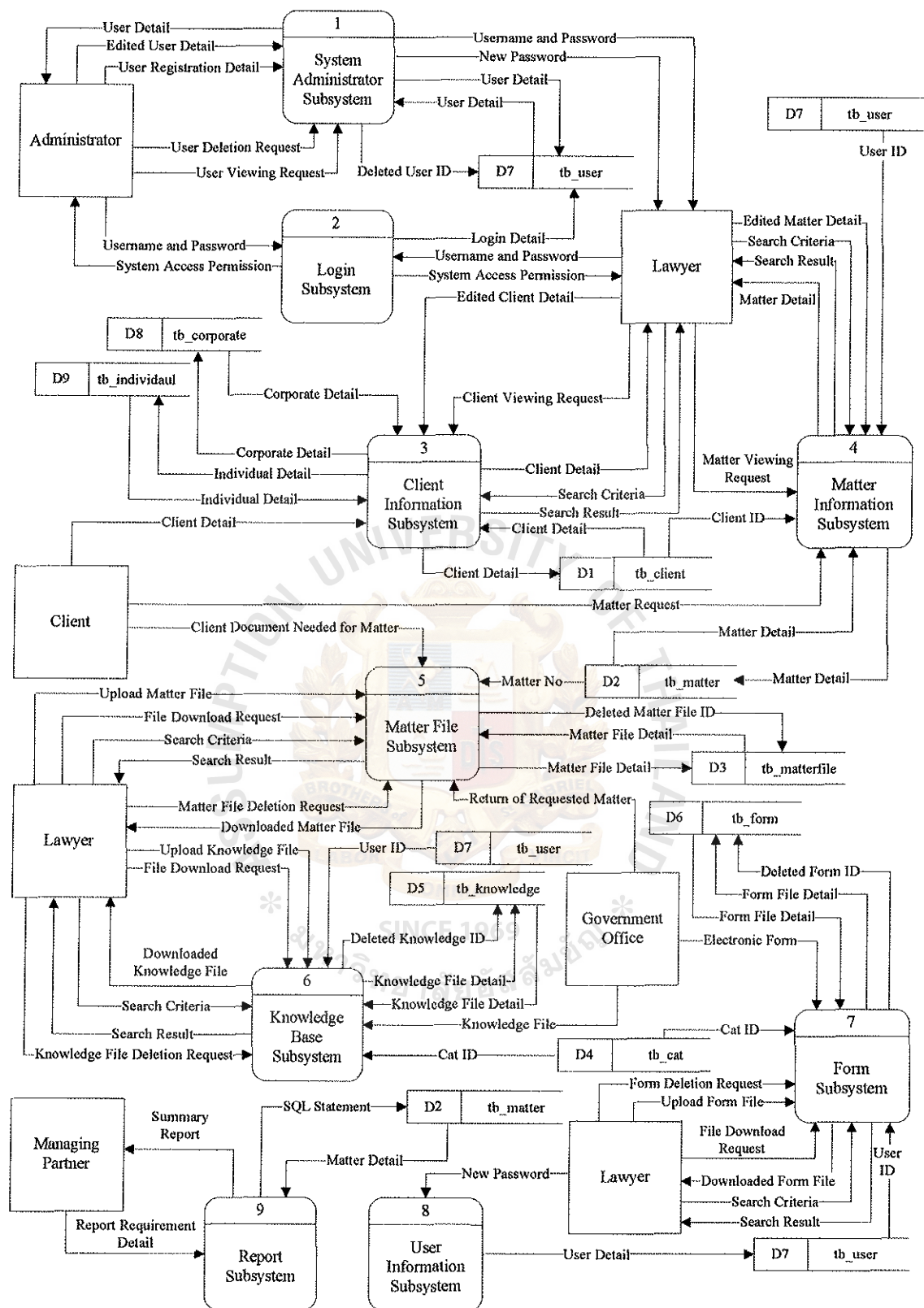


Figure 3.4. Level 0 - Data Flow Diagram of Proposed System.

### 3.3 System Design

As mentioned earlier in the system analysis part, the concept of system analysis focuses on what the system does, and is not concerned on how the system does. But in this topic, system design, the main concept of design is about how system does. It is not merely the information flowing from one to another or to be processed. Taking into consideration the 3 candidate solutions, they will be discussed next.

#### 3.3.1 Candidate Solution Analysis

- (1) Candidate 1: Outsourcing to Soupcon Co., Ltd. using MS Visual InterDev and MS SQL Server

Because experienced programmers and their agency broadly know MS Visual InterDev, the application can be developed in more valid and verifiable manner. By outsourcing, it provides company to keep some room for other developments even production itself, as it takes less time to be considered in too many details. Such experienced agency that realizes the limitation and a lot of knowledgeable people in specific programming field allow the company's staff to be less concerned. For database management system or DBMS, MS SQL Server 2000 Standard Edition is selected.

- (2) Candidate 2: In-house development by MS Visual InterDev and MS SQL Server

This candidate is exactly the same as candidate 1. The only difference is that the system will be developed by in-house developers. The advantage is cost saving in the long run and having fully control of the developed system. The disadvantage is that in-house developers do not have coding experience in MS Visual InterDev they need training before developing the system.

(3) Candidate 3: In-house development using PHP and MySQL

Using PHP which is a powerful server-side scripting language to create dynamic and interactive web-application and it is easy to learn and develop. PHP stands for PHP Hypertext Preprocessor; it is an open source script, widely used, free, efficient alternative to competitors, especially suited for web development and can be embedded directly into the HTML code. PHP is usually used in conjunction with MySQL and Apache web server which are also open source software and it allows exponentially expansion in web-base development. It runs identically on almost any platform using the same code base. Since the company already possesses the necessary technical expertise in PHP programming which will enable the company to have fully control of the developed system as well as cost saving. Thus the company would like develop the system by itself as a two-tier client/server computing.

To simplify the comparison between these three candidates, the Candidate System Matrix is used and is shown in Table 3.2.

Table 3.2. Candidate System Matrix.

| Characteristics   | Candidate 1   | Candidate 2  | Candidate 3  |
|---|---|--|--|
| <u>Portion of System Computerized</u><br>Brief description of that portion of the system that would be computerized in the candidate  | Corporate section operations in relation to matter requests       | Same as candidate 1  | Same as candidate 1  |
| <u>Benefits</u><br>Brief description of the business that would be realized for the candidate   | Plentiful of programmers to maintain the application              | High cost for developer training at the beginning but low cost for maintenance in the long run | Low cost application development with fully controls of the system           |
| <u>Servers and Workstations</u><br>A description of the servers and workstation needed to support the candidate.  | Pentium M Processor 760 for Server and Celeron II 2.0 for client. | Pentium M Processor 760 for Server and Celeron II 2.0 for client.                              | Pentium M Processor 760 for Server and Celeron II 2.0 for client.            |
| <u>Software Tools Needed</u><br>Software tools needed to design and build the candidate (e.g., database management system, emulators, operating systems, languages, etc.). Not generally applicable if application software packages are to be purchased.                         | Windows XP Professional, MS Visual InterDev, MS SQL Server 2000   | Same as candidate 1  | Window XP Professional, PHP 4.3.6, Apache HTTP Server, MySQL Database Server |
| <u>Application Software</u><br>A description of the software to be purchased, built, accessed, or some combination of these techniques.   | Contracted solution   | Custom solution  | Same as candidate 2  |
| <u>Method of Data Processing</u><br>Generally some combination of: on-line, batch, deferred batch, and remote batch, real-time.   | Two-tier Client/Server  | Same as candidate 1  | Same as candidate 1  |
| <u>Output Devices and Implications</u><br>A description of output devices that would be used, special output requirements and output considerations   | (1) Web browser<br>(2) HP Laser                                   | Same as candidate 1  | Same as candidate 1  |
| <u>Input Devices and Implications</u><br>A description of input methods to be used input devices (e.g., keyboard, mouse, etc.), special input requirements (e.g., new or revised forms from which data would be input), and input considerations (e.g., timing of actual inputs). | Keyboard & mouse  | Same as candidate 1  | Same as candidate 1  |
| <u>Storage Devices and Implications</u><br>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 2000 with 80 GB capacity                            | Same as candidate 1  | MySQL with 80 GB capacity  |

### 3.3.2 Feasibility Analysis

After the requirement and the alternative solutions are known, we then take them to analyze and find the best solution for the company. The system owner decides each feasibility importance by giving weights. Operational feasibility got 35%, technical feasibility got 20%, economic feasibility got 25%, and schedule feasibility got 20%. The total is 100%.

#### (1) Operational feasibility

Operational feasibility performs measurement of how well the solution will work in the organization. It also performs measurement of how the users feel about the system or project. In conclusion, every alternative is now worth for solving the problem. But with usability analysis, it is the most outstanding than any other alternative, which is candidate 3. For ease of learning, using and satisfaction. Also, the fashionable look of the operating system, WindowsXP, yields satisfaction to the user.

#### (2) Technical feasibility

Technical feasibility performs measurement of the practicality of a specific technical solution and the availability of technical resources expertise. It is quite obvious that PHP programming is quite new compared to MS Visual InterDev. The company already possesses the necessary technical expertise in PHP programming. That is why candidate 3 becomes the top rank. Comparing candidate 1 and 2 in this issue gives a little bit different result. Because using MS Visual InterDev requires personnel equipped with MS Visual InterDev knowledge is not existed in the



company. Therefore, the company needs to acquire such personnel in order to maintain the system.

(3) Economic feasibility

Economic feasibility seems to be another great concern to the company. It performs measurement of the cost-effectiveness of a solution. Candidate 3 seems to outweigh others by open source software features which include PHP, Apache web server and especially database management system like MySQL. The software costs from other two candidates are quite high. However, the weight on the development kit is lesser.

(4) Schedule feasibility

Schedule feasibility performs measurement of how reasonable the project timetable is. Candidate 1 definitely gives a satisfactory result as it is a professional outsourcing company which is equipped with trained personnel who have quite a lot of experience in programming and have necessary developing equipments at hand. They tend to work for many projects at the same time. Thus, to schedule reasonable project timetable is not the problem for them.

Table 3.3. Feasibility Analysis Matrix.

| Feasibility Criteria   | Wt.  | Candidate 1  | Candidate 2   | Candidate 3   |
|--|------|--|---|---|
| <u>Operational Feasibility</u><br><br>Functionality. A description of to what degree the candidate would benefit the organization and how well the system would work.<br><br>Political. A description of how well received this solution would be by user management, user, and organization perspective.                      | 35%  | Fully support user requirements.<br>Outsourcing understands user practice against interaction with the system well, but some specific business operations are hardly understood.<br><br>Score: 85        | Fully support user requirements because all relevant users and managing partner would participate in the development as it is an in-house development.<br><br>Score: 90 | Fully support user requirements because all relevant users and managing partner would participate in the development as it is an in-house development.<br><br>Score: 90 |
| <u>Technical Feasibility</u><br><br>Technology. An assessment of the maturity, availability (or ability to acquire), and desirability of the components necessary needed to support the candidate.<br><br>Expertise. An assessment of the technical expertise needed to develop, integrate, and maintain the candidate system. | 20%  | Require some training for system administrator to be able to maintain and preliminarily solve some problems. However, with reliable agency, application would have great verifiability.<br><br>Score: 90 | Require fully training for system administrator to be able to develop the system and maintain the system after development is done.<br><br>Score: 80                    | No training is required as the company already possesses necessary technical expertise.<br><br>Score: 95  |
| <u>Economic Feasibility</u><br><br>Cost of development<br><br>Payback period<br><br>Net present value<br><br>Detailed calculation  | 25%  | Approximately 709,890 Baht<br><br>Approximately 3 Year 7 Month<br><br>Approximately 670,581 Baht<br><br>See Appendix I<br><br>Score: 80  | Approximately 594,890 Baht<br><br>Approximately 3 Year 3 Month<br><br>Approximately 785,581 Baht<br><br>See Appendix I<br><br>Score: 85                                 | Approximately 452,500 Baht<br><br>Approximately 2 Year 11 Month<br><br>Approximately 955,517 Baht<br><br>See Appendix I<br><br>Score: 80                                |
| <u>Schedule Feasibility</u><br><br>An assessment of how long the solution will take to design and implement  | 20%  | Approximately 2 Months<br><br>Score: 90  | Approximately 4 Months<br><br>Score: 70   | Approximately 3 Months<br><br>Score: 80   |
| Ranking  | 100% | 85.75  | 82.75   | 89  |

### 3.3.3 System Architecture

Technologies being developed are decided in the following 4 components and they are data, process, interface, and network architecture.

#### (1) Data Architecture

The database is designed to provide efficient capability in data accessing, minimize data redundancy. The relational database is very suitable for the proposed system. All data should reside in a server with MySQL as the open source database management system which is widely used, fast performance, high reliability, ease of use. MySQL is very suitable for a new generation of application such as PHP and it could run on most of the platforms.

#### (2) Process Architecture

The proposed system is a web-based application which means that it could be accessed from anywhere via web browser. Graphic software is required to develop the user interfaces and Adobe Photoshop is very suitable for creating graphics. Macromedia Dreamweaver is also a reasonable HTML editor in assembling all the contents to generate HTML pages. EditPlus is a widely used code editor in inserting script languages that allow communication between user and database via web pages.

#### (3) Interface Architecture

User friendly interface concept would be applied in the proposed system in order to communicate with the database and facilitate routine operations of the company. User interface is designed to support user in inputting, retrieving and manipulating information and documents.

#### (4) Network Architecture

Proposed system uses two-tier client/server architecture. It consists of a database server, client, and wireless local area network (WLAN). Database server is responsible for hosting the shared database and also executes all data manipulation commands such as insert, update and delete. Client acts as presentation logic, it is responsible for displaying results from application logic which refers to HTML and PHP on the screen, verifying correctness of input data before sending to the database server. Wireless local area network (WLAN) is responsible for connecting client, database server and other clients within the company.

##### 3.3.4 Structure Design

Designing a program as a top-down hierarchy of modules is the concept to simplify the development of a program. The benefit in breaking up the program is it is easy to implement and maintain. The data flow diagram of the proposed system is the basic input to this topic. Structure chart is a part of the structure design, which is intended to document the pictorial system models to allow the developer to understand the interaction between modules. Newer technology of event-driven or object-oriented drives the necessity of structure design down. Structure chart of proposed system is shown in Appendix C.

##### 3.3.5 Process Specification

Process specification is used to give the definition of what the system does for transforming inputs into outputs. Process specification is tabulated in Appendix D. It is simplified to review, showing the inputs, outputs and process details of each process. Thus, it is a good reference for developer of the system for better understanding the details of each process.

### 3.3.6 Data Dictionary

In the process side, there is process specification. Also, in database side, there is data dictionary. Data dictionary is a good reference for specification of each component in the database. It includes the data type of each attribute in all tables. Thus, it is very useful for data administration. The data dictionary is tabulated in Appendix F.

### 3.3.7 Database Design

The data modeling in the previous section is regarded as logical data modeling by using logical entity relationship diagram (logical ERD). But, for actual design of the database, more specific database details are needed. The physical entity relationship diagram (physical ERD) is named for this. Physical ERD is another similar form of logical ERD, but it contains business vocabulary for easy understanding of the technical name of each attribute and shows its data type. To summarize all the data specification or data type of every attribute, it is shown in a table form in Appendix E.

### 3.3.8 Input Design

To design the input interfaces, it requires information from data flow diagram and ERD. These system inputs are represented as the data flows that connect external entities to process, and process to process. The selected attributes are reviewed to define the appropriate caption or label that clearly identifies these attributes appearing on the input screen. The input designs include user registration form screen, system login screen, client data entry form screen, matter data entry form screen, matter file entry form screen, knowledge file entry form screen, form file entry form screen, change password form screen and generate summary report form screen. Input control is also applied to ensure that the data entry correctness to prevent the system from accidental and intentional errors, abuse and fraud inputs. Input design screens and other user interface designs of the proposed system are shown in Appendix G.



### 3.3.9 Output Design

The output design is the consequent part from the input design. Opposite of the input design, output design uses the data flows that are directed from a process out to external entity. Mainly, the output design depends on the output requirements of external entities. There are 3 summary reports designed to support management level of the company which includes summary report on account of lawyer in chare, summary report on account of matter status and summary report on account of matter entry period. The sample reports designs are shown in Appendix H.

### 3.4 Hardware and Software Requirement

In the existing computer system, each lawyer is equipped with a computer but it is quite obsolete. Each computer is also connected to a wireless local area network. The proposed system requires new sets of computer system and a new server. The sever specifications are shown in Table 3.4 and Table 3.5.

Table 3.4. Server Specification.

| Device                   | Specification                      |
|--------------------------|------------------------------------|
| Processor type and speed | Intel Pentium IV 2.4 GHz or higher |
| Cache memory             | 512 KB                             |
| Primary memory           | DDR-RAM 512 MB or higher           |
| Hard drive capacity      | 80 GB ATA-133 or higher            |
| CD-ROM Drive (X)         | IDE CD-RW drive 48X or higher      |
| Network adapter          | Ethernet 10/100 Mbps               |
| Display adapter          | SVGA 4X or higher                  |
| Floppy drive             | 3.5" 1.44 MB                       |
| Display monitor          | CRT 15"                            |
| UPS                      | 500 VA                             |



Table 3.5. Server Software Specification.

| Software                | Specification                           |
|-------------------------|---|
| Operating system        | Microsoft Windows XP Professional (OEM) |
| Database server manager | MySQL                                   |
| Application Server      | PHP                                     |

For client machine, new 6 client machines required for each lawyer and they are supposed to be installed in corporate section of legal department. At the client machine, hardware performance is not required as high as of the server but the specifications must be high enough to run WindowsXP and Microsoft Office 2003. The specifications of hardware and software of client machine are shown in Tables 3.6 and 3.7, respectively.

Table 3.6. Client PC Specification.

| Device                   | Specification                          |
|--------------------------|--|
| Processor type and speed | Intel Pentium Celeron II 2.0 or higher |
| Cache memory             | 256 KB                                 |
| Primary memory           | DDR-RAM 256 MB or higher               |
| Hard drive capacity      | 40 GB ATA-133 or higher                |
| CD-ROM Drive (X)         | IDE CD-RW drive 48X or higher          |
| Network adapter          | Ethernet 10/100 Mbps                   |
| Display adapter          | SVGA 4X or higher                      |
| Floppy drive             | 3.5" 1.44 MB                           |
| Display monitor          | CRT 15"                                |

Table 3.7. Client Software Specification.

| Software         | Specification                          |
|------------------|--|
| Operating system | Microsoft WindowsXP Professional (OEM) |

For network configuration, the configuration shows how the system is assembled and how they interconnect to each other. The configuration is very simple and it is shown in Table 3.8 and Figure 3.5 respectively.

Table 3.8. Network Peripheral Specification.

| Network Peripheral    | Specification        |
|-----------------------|----------------------|
| Wireless Access Point | 802.11g, 54 Mbps     |
| Interconnection       | Ethernet 10/100 Mbps |
| Wiring and cable      | None                 |

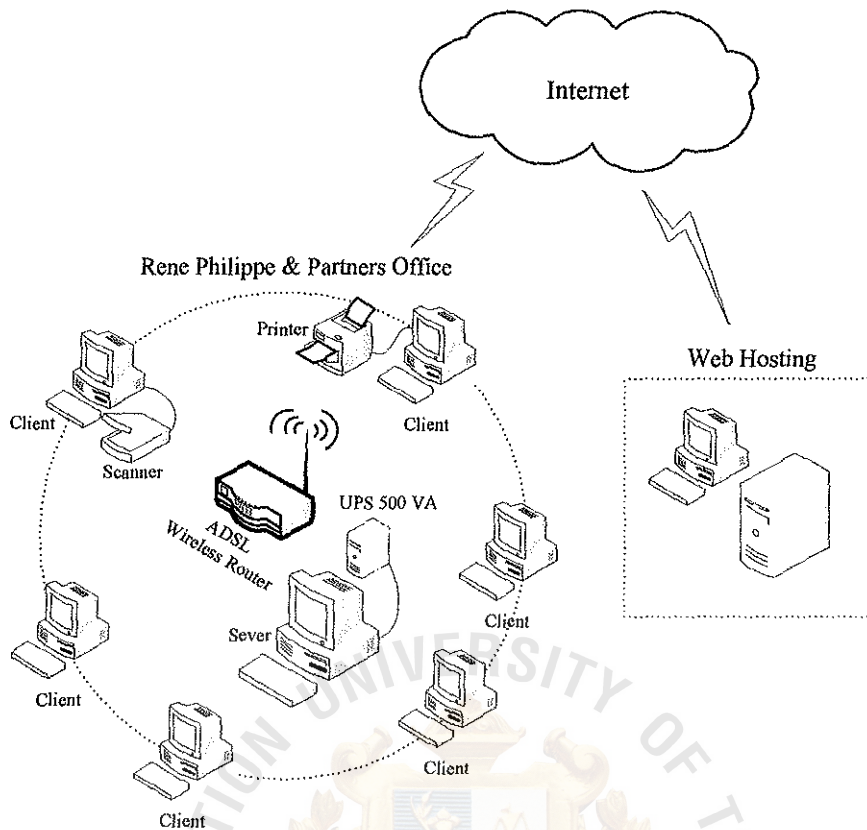


Figure 3.5. Network Configuration of Proposed System.

### 3.5 Security and Controls

With current security standard, the proposed system should apply the following security and control polices to prevent harmful unauthorized access and alteration to the system.

#### (1) Identification

System administrator is the only person allowed to make a new user registration on the account of system security. After user registration is done, the user will be granted a unique username along with the password via email. The user will later use this login detail as an identifier to access the system.

## (2) Authentication

The password used for logging in to the system will be applied to ensure authentication of the user. Once the user has logged in to the system, he or she has the rights to change the password and personal details he or she desired in order to maintain personal privacy of his or her own. All users must also keep their passwords secretly to prevent unauthorized persons to use their passwords to enter the system and cause the unauthorized alteration to the system.

## (3) Authorization

Based on areas of usage, the authority level would be granted along with the identification. There are two sets of functions, one for system administrator which referred as admin tools and another one for users which referred as user tools. For system administrator authority, he or she is allowed to make a new user registration. For user authority, the user allows to manipulate client detail, matter detail, matter file, knowledge file, form file and generate summary reports based on report requirements given the user. The users are allowed to change the password and personal details of their own but are not allowed to change other users' details and access system administrator tools.

## (4) Backup and Recovery

To cope with uncovered incidents, the system should be backed up biweekly. Procedure of backing up and recovery of the system should be created so that the operating time is least. System administrator would be responsible for this task. The backup file should be separately kept from operating location in order to secure it from physical disaster.

### 3.6 Cost-Benefit Analysis

This appraisal takes money into account whether it is worth to make the system, or not. In the preliminary analysis, it is too rough analysis but this part gets real details to make the decision. The costs of both the existing system and proposed system are estimated. Then, benefits from the proposed system are estimated. In conclusion, break-even analysis and payback period are taken to finalize the decision.

#### 3.6.1 Cost

##### (1) Existing system

It is a manual system in processing document filing system, major spending is on personnel. It requires 2 senior lawyers, 5 lawyers and 2 administrative officers. The manual system tends to use more paper because the lawyers keep documents in paper form and put them in the file cabinet. Also the stationary and miscellaneous costs seem to be relatively high due to the manual document filing system. The cost of the existing system is tabulated in Table 3.9.

Table 3.9. Cost of Manual System, Baht.

| Cost Item   | Year 1           | Year 2           | Year 3           | Year 4           | Year 5           |
|---|------------------|------------------|------------------|------------------|------------------|
| <b>Development cost:</b>                              |                  |                  |                  |                  |                  |
| Hardware cost:  |                  |                  |                  |                  |                  |
| 0Server (@90,000)                                     | -                | -                | -                | -                | -                |
| 0Client (@22,500)                                     | -                | -                | -                | -                | -                |
| 0Wireless access point (@4,500)                       | -                | -                | -                | -                | -                |
| 0UPS (@5,500)   | -                | -                | -                | -                | -                |
| 0Wireless card (@2,500)                               | -                | -                | -                | -                | -                |
| <b>Total Hardware Cost:</b>                           | -                | -                | -                | -                | -                |
| Software cost:  |                  |                  |                  |                  |                  |
| 0Server operating system                              | -                | -                | -                | -                | -                |
| 0Client operating system (@5,000)                     | -                | -                | -                | -                | -                |
| 0Database management system                           | -                | -                | -                | -                | -                |
| 0Software development environment                     | -                | -                | -                | -                | -                |
| <b>Total Software Cost:</b>                           | -                | -                | -                | -                | -                |
| Personnel:  |                  |                  |                  |                  |                  |
| 0System analyst (3 month @ 30,000 baht)               | -                | -                | -                | -                | -                |
| 0Programmer (3 month @ 20,000 baht)                   | -                | -                | -                | -                | -                |
| 0Database specialist (1.5 month @ 20,000 baht)        | -                | -                | -                | -                | -                |
| 0Network specialist (1.5 month @ 20,000 baht)         | -                | -                | -                | -                | -                |
| <b>Total Personnel Cost</b>                           | -                | -                | -                | -                | -                |
| Implementation Cost:                                  |                  |                  |                  |                  |                  |
| Training cost   | -                | -                | -                | -                | -                |
| Setup cost  | -                | -                | -                | -                | -                |
| <b>Total Implementation Cost:</b>                     | -                | -                | -                | -                | -                |
| <b>Total Development Cost:</b>                        | -                | -                | -                | -                | -                |
| <b>Operating Cost (Annual):</b>                       |                  |                  |                  |                  |                  |
| User:   |                  |                  |                  |                  |                  |
| 2Senior lawyer (33,500 baht / month / person)         | 804,000          | 844,200          | 886,410          | 930,731          | 977,267          |
| 5Lawyer (12,000 baht / month / person)                | 720,000          | 756,000          | 793,800          | 832,440          | 874,062          |
| 2Administrative officer (7,000 baht / month / person) | 168,000          | 176,400          | 185,220          | 194,481          | 204,205          |
| <b>Total Software Cost:</b>                           | <b>1,692,000</b> | <b>1,776,600</b> | <b>1,865,430</b> | <b>1,957,612</b> | <b>2,055,534</b> |
| System Support:                                       |                  |                  |                  |                  |                  |
| 0Programmer (22,500 baht / month)                     | -                | -                | -                | -                | -                |
| 0Database administrator (19,500 baht / month)         | -                | -                | -                | -                | -                |
| 0Network administrator (19,500 baht / month)          | 234,000          | 245,700          | 257,985          | 270,884          | 284,428          |
| <b>Total system support cost:</b>                     | <b>234,000</b>   | <b>245,700</b>   | <b>257,985</b>   | <b>270,884</b>   | <b>284,428</b>   |
| Office Supplies & Miscellaneous Cost:                 |                  |                  |                  |                  |                  |
| Stationary (4,000 baht / month)                       | 48,000           | 50,400           | 52,920           | 55,566           | 58,344           |
| Paper (3,500 baht / month)                            | 42,000           | 46,200           | 50,820           | 55,902           | 61,492           |
| Utility (5,000 baht / month)                          | 60,000           | 66,000           | 72,600           | 79,860           | 87,846           |
| Miscellaneous expense (5,000 baht / month)            | 60,000           | 60,000           | 60,000           | 60,000           | 60,000           |
| <b>Total supplies cost:</b>                           | <b>210,000</b>   | <b>222,600</b>   | <b>236,340</b>   | <b>251,328</b>   | <b>267,682</b>   |
| Maintenance cost:                                     |                  |                  |                  |                  |                  |
| Hardware maintenance                                  | -                | -                | -                | -                | -                |
| Software maintenance                                  | -                | -                | -                | -                | -                |
| <b>Total maintenance cost:</b>                        | -                | -                | -                | -                | -                |
| <b>Total Operating Cost (Annual):</b>                 | <b>2,136,000</b> | <b>2,244,900</b> | <b>2,359,755</b> | <b>2,479,824</b> | <b>2,607,644</b> |
| <b>Total Cost:</b>                                    | <b>2,136,000</b> | <b>2,244,900</b> | <b>2,359,755</b> | <b>2,479,824</b> | <b>2,607,644</b> |



Table 3.9 can be summarized into Table 3.10. Table 3.10 shows the five-year accumulated cost of the manual system. The increments of each year are noticeable and they are quite different because of the necessity of improvement in personnel salary. Average increment is projected as 5% each year and also there are some increments in office supplies each year.

Table 3.10. Five-year Accumulated Cost of Manual System, Baht.

| Year | Total Manual Cost | Accumulated Manual Cost |
|------|-------------------|-------------------------|
| 1    | 2,136,000         | 2,136,000               |
| 2    | 2,244,900         | 4,380,900               |
| 3    | 2,359,755         | 6,740,655               |
| 4    | 2,479,824         | 9,220,479               |
| 5    | 2,607,644         | 11,828,123              |

## (2) Proposed System

The structure of the proposed system seems to be different from the manual cost because it requires a huge investment at the beginning. The company pays for a lump sum amount as the cost of acquiring and the whole payment has to be made in one time. Derived from candidate 3, the total cost of the system is 452,500 baht. The hardware cost is 55%, software cost is 14%, personnel who develops the system is 26% and implement cost is 3%. The price for the software is minimal since most of used software is open source. The company already has people who have technical expertise in PHP programming that is why personnel and implementation costs are not so high. The cost of the proposed system is shown in Table 3.11.

Table 3.11. Cost of Proposed System, Baht.

| Cost Item   | Year 1           | Year 2           | Year 3           | Year 4           | Year 5           |
|---|------------------|------------------|------------------|------------------|------------------|
| <b>Development cost:</b>                              |                  |                  |                  |                  |                  |
| Hardware cost:  |                  |                  |                  |                  |                  |
| 1Server (@90,000)                                     | 90,000           | -                | -                | -                | -                |
| 6Client (@22,500)                                     | 135,000          | -                | -                | -                | -                |
| 1Wireless access point (@4,500)                       | 4,500            | -                | -                | -                | -                |
| 1UPS (@5,500)   | 5,500            | -                | -                | -                | -                |
| 7Wireless card (@2,500)                               | 17,500           | -                | -                | -                | -                |
| <b>Total Hardware Cost:</b>                           | <b>252,500</b>   | -                | -                | -                | -                |
| Software cost:  |                  |                  |                  |                  |                  |
| 1Server operating system                              | 5,000            | -                | -                | -                | -                |
| 6Client operating system (@5,000)                     | 60,000           | -                | -                | -                | -                |
| 1Database management system                           | -                | -                | -                | -                | -                |
| 0Software development environment                     | -                | -                | -                | -                | -                |
| <b>Total Software Cost:</b>                           | <b>65,000</b>    | -                | -                | -                | -                |
| Personnel:  |                  |                  |                  |                  |                  |
| 1System analyst (3 month @ 30,000 baht)               | 90,000           | -                | -                | -                | -                |
| 0Programmer (3 month @ 20,000 baht)                   | -                | -                | -                | -                | -                |
| 0.5Database specialist (1.5 month @ 20,000 baht)      | 15,000           | -                | -                | -                | -                |
| 0.5Network specialist (1.5 month @ 20,000 baht)       | 15,000           | -                | -                | -                | -                |
| <b>Total Personnel Cost</b>                           | <b>120,000</b>   | -                | -                | -                | -                |
| Implementation Cost:                                  |                  |                  |                  |                  |                  |
| Training cost   | 10,000           | -                | -                | -                | -                |
| Setup cost  | 5,000            | -                | -                | -                | -                |
| <b>Total Implementation Cost:</b>                     | <b>15,000</b>    | -                | -                | -                | -                |
| <b>Total Development Cost:</b>                        | <b>452,500</b>   | -                | -                | -                | -                |
| <b>Operating Cost (Annual):</b>                       |                  |                  |                  |                  |                  |
| User:   |                  |                  |                  |                  |                  |
| 2Senior lawyer (33,500 baht / month / person)         | 804,000          | 844,200          | 886,410          | 930,731          | 977,267          |
| 4Lawyer (12,000 baht / month / person)                | 576,000          | 604,800          | 635,040          | 666,792          | 700,132          |
| 1Administrative officer (7,000 baht / month / person) | 84,000           | 88,200           | 92,610           | 97,240           | 102,102          |
| <b>Total Software Cost:</b>                           | <b>1,464,000</b> | <b>1,537,200</b> | <b>1,614,060</b> | <b>1,694,763</b> | <b>1,779,501</b> |
| System Support:                                       |                  |                  |                  |                  |                  |
| 0.33Programmer (25,000 baht / month)                  | 99,000           | 103,950          | 109,147          | 114,604          | 120,334          |
| 0.33Database administrator (25,000 baht / month)      | 99,000           | 103,950          | 109,147          | 114,604          | 120,334          |
| 0.33Network administrator (25,000 baht / month)       | 99,000           | 103,950          | 109,147          | 114,604          | 120,334          |
| <b>Total system support cost:</b>                     | <b>297,000</b>   | <b>311,850</b>   | <b>327,441</b>   | <b>343,812</b>   | <b>361,002</b>   |
| Office Supplies & Miscellaneous Cost:                 |                  |                  |                  |                  |                  |
| Stationary (2,000 baht / month)                       | 24,000           | 25,200           | 26,460           | 27,783           | 29,172           |
| Paper (2,500 baht / month)                            | 30,000           | 33,000           | 36,300           | 39,930           | 43,923           |
| Utility (5,000 baht / month)                          | 60,000           | 66,000           | 72,600           | 79,860           | 87,846           |
| Miscellaneous expense (2,000 baht / month)            | 24,000           | 24,000           | 24,000           | 24,000           | 24,000           |
| <b>Total supplies cost:</b>                           | <b>138,000</b>   | <b>148,200</b>   | <b>159,360</b>   | <b>171,573</b>   | <b>184,941</b>   |
| Maintenance cost:                                     |                  |                  |                  |                  |                  |
| Hardware maintenance                                  | 3,500            | 4,025            | 4,629            | 5,323            | 6,122            |
| Software maintenance                                  | -                | -                | -                | -                | -                |
| <b>Total maintenance cost:</b>                        | <b>3,500</b>     | <b>4,025</b>     | <b>4,629</b>     | <b>5,323</b>     | <b>6,122</b>     |
| <b>Total Operating Cost (Annual):</b>                 | <b>1,902,500</b> | <b>2,001,275</b> | <b>2,105,490</b> | <b>2,215,471</b> | <b>2,311,566</b> |
| <b>Total Cost:</b>                                    | <b>2,355,000</b> | <b>2,001,275</b> | <b>2,105,490</b> | <b>2,215,471</b> | <b>2,311,566</b> |

Table 3.11 can be summarized into Table 3.12. Table 3.12 shows the five-year accumulated cost of the proposed system. Like manual system, the increase of each year can be noticed and it came from the necessity of improvement of personnel salary. The average increase of each year is also projected at 5%.

Table 3.12. Five-year Accumulated Cost of the Proposed System in Baht.

| Year | Total Proposed Cost | Accumulated Proposed Cost |
|------|---------------------|---------------------------|
| 1    | 2,355,000           | 2,355,000                 |
| 2    | 2,001,275           | 4,356,275                 |
| 3    | 2,105,490           | 6,461,765                 |
| 4    | 2,215,471           | 8,677,236                 |
| 5    | 2,311,566           | 10,988,802                |

### (3) Comparison between Manual and Proposed System

The comparison of both system costs during 5 years is shown in Table 3.13. The cost of the manual system starts to be more expensive in the second year. However, the benefit also has to be taken into consideration.

Table 3.13. Five-year Comparison Accumulated Cost of Both Systems in Baht.

| Year | Accumulated Manual Cost | Accumulated Proposed Cost |
|------|-------------------------|---------------------------|
| 1    | 2,136,000               | 2,355,000                 |
| 2    | 4,380,900               | 4,356,275                 |
| 3    | 6,740,655               | 6,461,765                 |
| 4    | 9,220,479               | 8,677,236                 |
| 5    | 11,828,123              | 10,988,802                |

### 3.6.2 Benefit

The major benefits derived from the proposed system can be categorized into 4 areas as follows. The figures of benefit are shown in Table 3.14.

#### (1) Employment Reduction

After reviewing the workload of employees with the new system, a number of employees could be reduced as workload has been decreased. However, two senior lawyers should be retained since they are the heads of corporate section and litigation section.

#### (2) Office Supplies & Miscellaneous Saving

Office supplies can be obviously reduced from the manual system, which emphasizes on paper work. The more there is paper work, the more stationary and paper are used. Here, the saving is not significant and it is just a minor saving.

#### (3) Increasing Staff Productivity

This has the most influence to the benefit of the proposed system. The new system helps the lawyers to work faster and easier by using the functions equipped with the system which will eventually reduce the workload on the lawyers. It will give the significant results in increasing the time for the lawyers to work on other billable activities.

#### (4) Reducing Hours Lost for Searching Information

In the manual system, the lawyers spent too much times on looking for documents and information needed for their tasks. With the new system, this problem is completely eliminated by using the search tools of the system. The company no longer has to be responsible for the intangible expenses caused by non-billable too much times spending of the lawyers.

Table 3.14. Benefit of Proposed System, Baht.

| Benefit Item  | Year 1           | Year 2           | Year 3           | Year 4           | Year 5           |
|---|------------------|------------------|------------------|------------------|------------------|
| Employment reduction  |                  |                  |                  |                  |                  |
| 1 Lawyer (12,000 baht / month)  | 144,000          | 151,200          | 158,760          | 166,698          | 175,033          |
| 1 Administrative officer (7,000 baht per month)   | 252,000          | 264,600          | 277,830          | 291,722          | 306,308          |
| Office supplies & miscellaneous saving  |                  |                  |                  |                  |                  |
| Stationary (2,000 baht / month)   | 24,000           | 25,200           | 26,460           | 27,783           | 29,172           |
| Paper (1,000 baht / month)  | 12,000           | 13,200           | 14,520           | 15,972           | 17,569           |
| Miscellaneous expense (3,000 baht / month)  | 36,000           | 36,000           | 36,000           | 36,000           | 36,000           |
| Increasing staff productivity (80,000 baht / month)   | 960,000          | 1,104,082        | 1,269,789        | 1,460,336        | 1,679,512        |
| Reducing 3 hours lost just looking for information<br>(average cost 108 baht / hour / person) | 544,320          | 571,536          | 600,113          | 630,119          | 661,625          |
| <b>Total benefit</b>  | <b>1,972,320</b> | <b>2,165,818</b> | <b>2,383,472</b> | <b>2,628,630</b> | <b>2,905,219</b> |

The benefit from Table 3.14 can be summarized into five-year accumulated benefit of the proposed system in Table 3.15 as follows.

Table 3.15. Five-year Accumulated Benefit of Proposed Systems, Baht.

| Year | Total Proposed Benefit | Accumulated Proposed Benefit |
|------|------------------------|------------------------------|
| 1    | 1,972,320              | 1,972,320                    |
| 2    | 2,165,818              | 4,138,138                    |
| 3    | 2,383,472              | 6,521,610                    |
| 4    | 2,628,630              | 9,150,240                    |
| 5    | 2,905,219              | 12,055,459                   |

### 3.6.3 Break-Even Analysis

In break-even analysis, the data is taken from the cost analysis. Derived from the cost of manual system and proposed system, accumulated costs of both systems are used for comparing, and the data shows that the break-even point is at 11 months, where both costs intersect. It gives quite a satisfactory result. The graph of break-even analysis is shown in Figure 3.6.

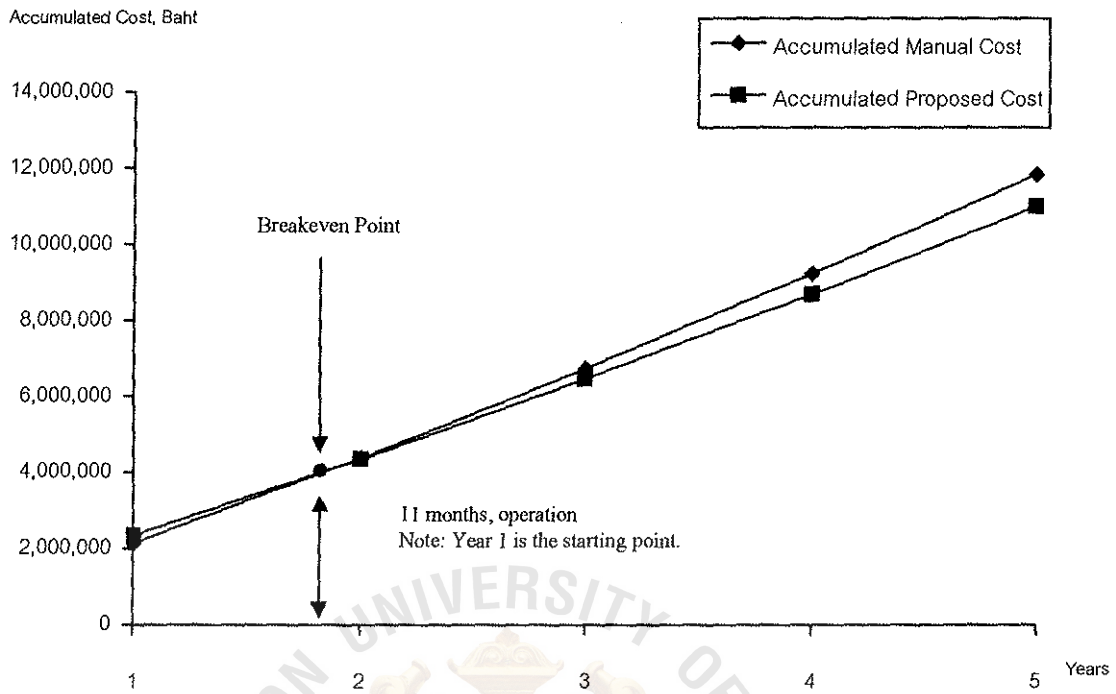


Figure 3.6. Break-Even Analysis.

#### 3.6.4 Payback Analysis

Unlike the break-even analysis, payback analysis takes both cost and benefits of the proposed system into consideration. Payback period means the length of time that the benefit will cover net-zero to the cost. As the calculation has been done in the part of feasibility analysis the result is also mentioned in Appendix J. The cost and benefit will be revalued back to the Year 0 to generalize different cash flows structure. 2% saving deposit rate is used as a revalue rate, which represents a risk free rate. For third candidate, the selected one, we have a payback period at 2 years. It also provides a satisfactory result.



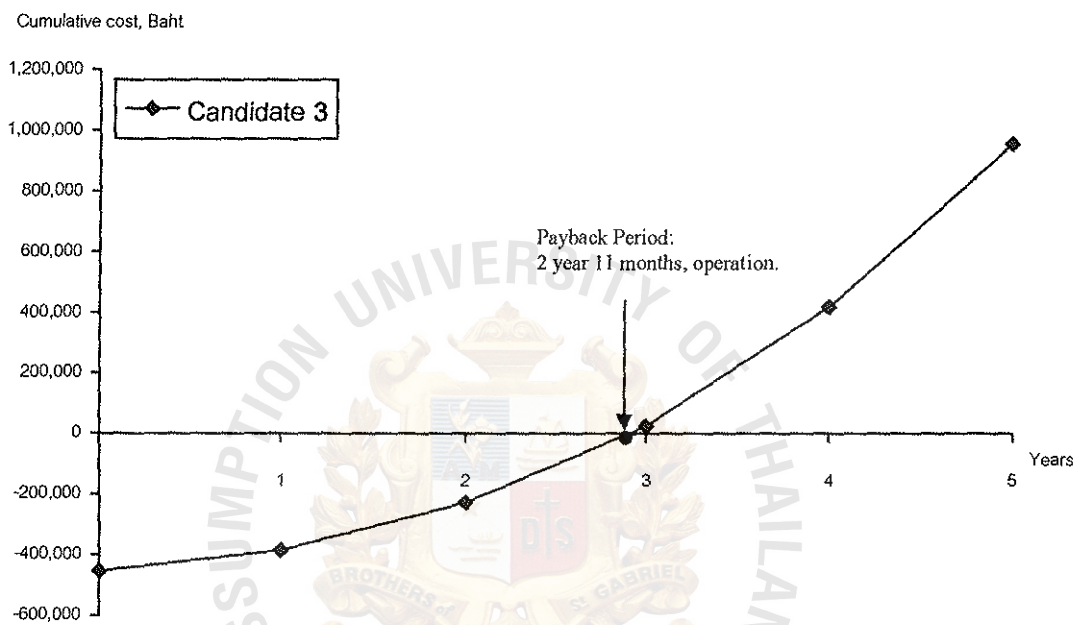


Figure 3.7.E Payback Analysis.

## IV. PROJECT IMPLEMENTATION

### 4.1 Overview of Project Implementation

The project implementation can be described in two phases as construction phase and implementation phase.

#### (1) Construction phase

Construction phase is mainly concerned with the solid development of the system. It starts from building the network, creating the database, installing software and then writing the program. Acquiring hardware, software license and building the network can be started together and it needs one week. Creating database and installing software can be done subsequently new application design is started right away. Since the processes of analysis and design have been done, only 4 weeks are needed as specified in the schedule to create the new application.

#### (2) Implementation phase

Implementation phase is mainly concerned with other preliminary steps before real conversion occurs. It starts from system testing, the final one, preparing the conversion, training the user and eventually converting the system. Black box testing is used. Various samples of different types of input should be simulated and used in the test for desirable output from the system. In preparing the conversion, the company would create a contingency plan in case of failure of the new system. To be able to run the operation smoothly at the beginning, user should be aware of the old system that should be immediately applied whenever unpredictable events happen. Training for the user should not take too much time because user involved

is necessary in analysis and design; thus they usually help and learn the system at the same time. Conversion method will be next discussed as a main topic.

## **4.2 Conversion**

The company would take risk by implementing abrupt cutover conversion. Running parallel conversion is estimated to be too overwhelming for the user. The user definitely can process the ongoing tasks without having much interruption when the system halts. System failure is expected to be unavoidable at an early stage. However, to compensate, the cost of abrupt cutover is nearly zero.

## **4.3 System Maintenance**

The purpose of system maintenance is to cope with system error after the proposed system has been implemented. During operation, undiscovered errors can appear; thus the need for fixing the errors is required. Also, the need for testing after fixing is required to keep the standard of prior application. Besides fixing the errors, other maintenance is required to optimize the system performance over time. After using the system for a long period, performance tuning may be needed. The database should be tuned once a year to accelerate its access time.

## **V. CONCLUSIONS AND RECOMMENDATIONS**

### **5.1 Conclusions**

E-Document Filing & Sharing System of Rene Philippe & Partners is supposed to facilitate routine activities of Corporate Section in the Legal Department. The system helps the lawyers recording client and matter information into standardized formats and retrieving information they need to complete their tasks. The system allows the lawyers to record and retrieve categorized knowledge information and categorized electronic forms used in various types of matters as company resources. The system aids the lawyers in filing various types of documents into the right locations and retrieving those documents in a timely fashion. Moreover, the system enables sharing of information and documents among the lawyers. The lawyers can access the system anywhere and at anytime via the secure login system as it is a web-based application. The lawyers can now work faster, more efficiently, and be more responsive to the clients using all the user tools within the system to support their activities. With the new system, the company can ensure that all those problems induced from manual system are eliminated such as disorganization of documents and information, high redundancy of documents and information and high costs for maintaining those documents and information. Finally, the new system serves the management level in supporting decision making by allowing the managing partner to generate various types of customized summary reports via the generate summary report form.

According to the cost-benefit analysis, the proposed system will meet the break-even point with the manual system at around 11 months. Nevertheless, considering the payback period, the company receives many benefits from the proposed system and results in 2 years 11 months payback period.

Comparing the processing time using manual system and the proposed system, it gives satisfaction to the system owner. Table 5.1 shows the comparison.

Table 5.1. Achievement of Proposed System.

| Process                   | Existing System | Proposed System |
|---------------------------|-----------------|-----------------|
| Client inquiry response   | 45 minutes      | 2 minutes       |
| Matter inquiry response   | 45 minutes      | 2 minutes       |
| Retrieve matter file      | 45 minutes      | 2 minutes       |
| Retrieve knowledge        | 30 minutes      | 2 minutes       |
| Retrieve electronic form  | 25 minutes      | 2 minutes       |
| Summary report generation | 4 hours         | 10 minutes      |

(1) Client inquiry response

In the existing system, the lawyer takes time to find client information in order to complete the requested matter and sometimes to answer inquiries from the senior lawyer, managing partner, client and even other lawyers. With the new system, it is very fast to find specific client information and respond to client inquiry which takes only 2 minutes or lesser.

(2) Matter inquiry response

Matter information is also occasionally asked by senior lawyer, managing partner and even client himself such as matter status, who is responsible for the matter and etc. It is so much faster with the new system in order to retrieve matter information and response to the enquiry which takes only 2 minutes or lesser.

(3) Retrieve matter file

Documents related to specific matter are frequently needed for updating the contents inside. To retrieve documents in the manual way, the lawyer has to look through computer drive. With the new system, the lawyer uses the search tool for locating the specific matter files and downloads them for modification and re-uploads them into the right matter folder. The time spent for locating, retrieving and filing those document files are dramatically reduced from approximately 45 minutes to 2 minutes. This results in increasing time for the lawyers to work on other tasks which means that the productivity of the lawyer is also increased.

(4) Retrieve knowledge

Once a matter has been requested, the lawyer would be assigned to be responsible for the matter. In order to complete the requested matter, the lawyer needs to prepare various types of documents and submits those documents to the corresponding government office. However, before starting the process of document preparation, the lawyer needs to know information related to specific matter such as required documents, government fees, applicant qualification, details of government office's procedures, submission period and etc. Mentioned information is normally called matter knowledge. In the manual system, the lawyer has to look for matter knowledge sometimes in the file cabinet, website, and computer. With the new system, the lawyer can look for such matter knowledge via user friendly interface. Matter knowledge is also categorized into different types of matters and a search tool helps in faster location of the matter. The new system also allows incoming matter knowledge to be added into the



system and retrieve them for reading or modifying when they are no longer updated. Time spent for retrieving those matter knowledge files are also reduced from 30 minutes to 2 minutes.

(5) Retrieve electronic form related to matter

Just like retrieving knowledge file, the time spent for retrieving electronic forms related to specific matter are also dramatically reduced from 25 minutes to 2 minutes using the same method of retrieving.

(6) Retrieve electronic form related to matter

In the manual system, generating summary report consumes at least 4 hours which is considerably too much time because the all information needed for the report is in scattered locations. The lawyer needs to gather information related to the matter from many sources, verify correctness of information and rearrange verified information into a predefined format before printing. This time-consuming process for generating summary report can be dramatically improved through the report generation feature embedded in the proposed system. Summary report can be automatically generated based on report requirements selected by the managing partner via a user friendly interface.

It is obvious that the response time of the proposed system is so much faster than that of the manual system. All processes reach predefined objectives of the project; especially, it yields so much satisfaction to the company stakeholders.

## **5.2 Recommendations**

It has been a revelation that the major role of information system application in business is to provide effective support of a company's strategies for gaining a competitive advantage. Information system expands products, services, and overall capabilities which provide the company major advantage over the competitive forces it faces in the market.

This project is an example of applying information system in some business processes. Currently, the proposed system is involved with only corporate section in documents filing and documents sharing. In the future, litigation section should be the next one for improving as its overall activities are quite the same as that of the corporate section which may cost less investment and resource. This system can also expand the scope to cover the billing system as some information has already been recorded such as client information and matter request information. The application should be developed using the same programming language on account of system compatible issues. However, the database server should be changed in order to handle more traffic and larger database. Finally, the network security should also be improved by implementing firewall and employing SSL (Secure Sockets Layer) in order to prevent unauthorized access and protect information from interception over the internet.



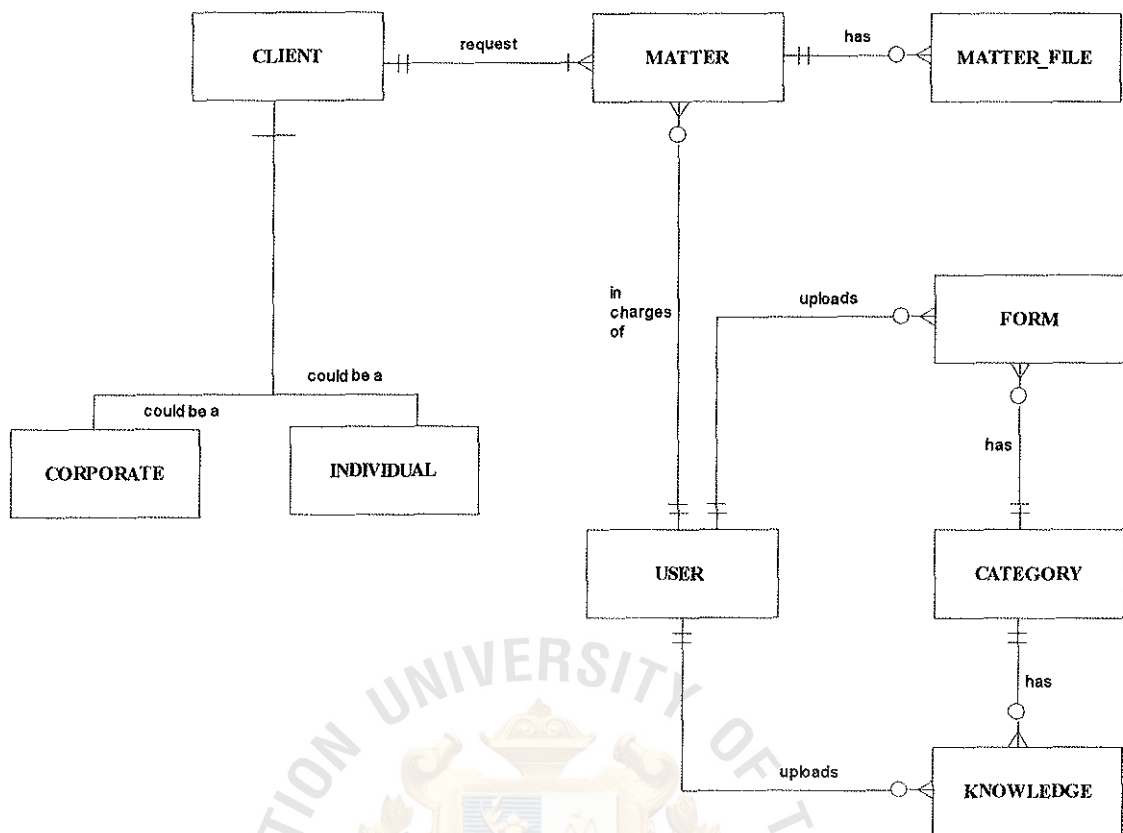


Figure A.1. Context Entity Relationship Diagram.

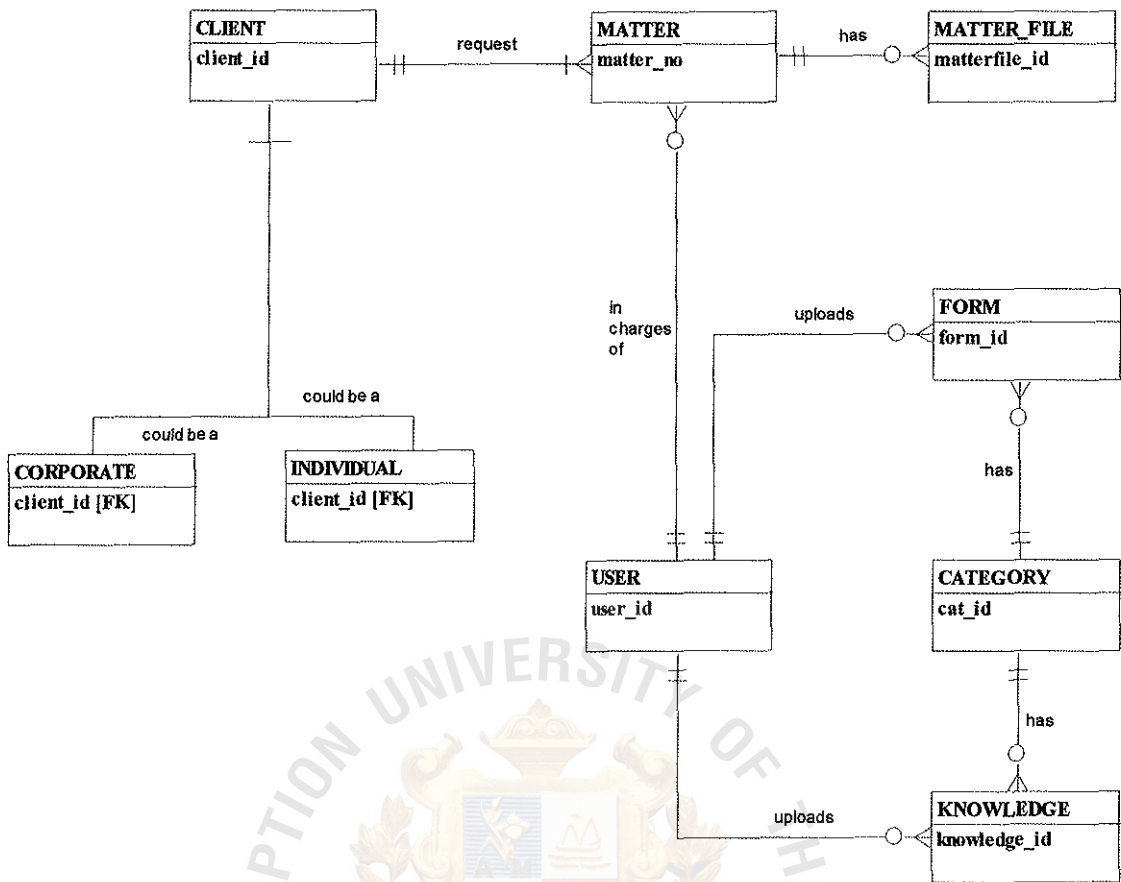


Figure A.2. Key-Based Entity Relationship Diagram.

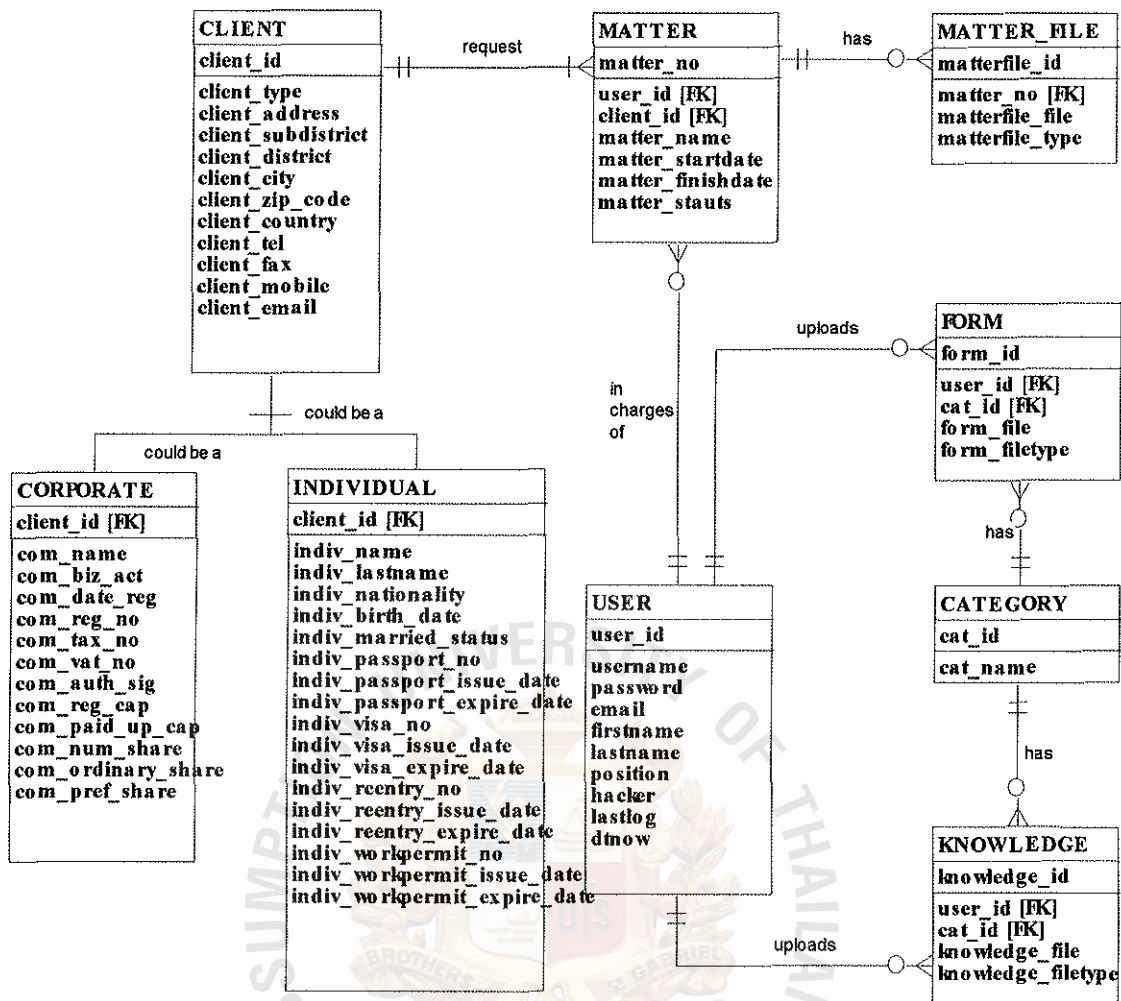
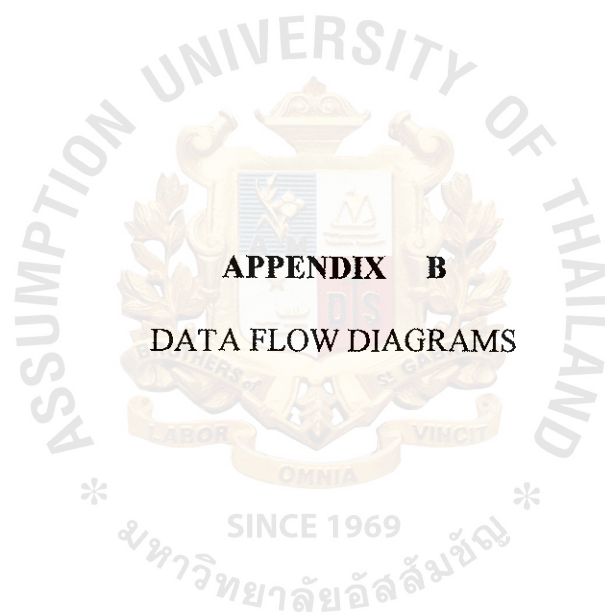


Figure A.3. Fully Attributed Entity Relationship Diagram.





## **APPENDIX B**

### **DATA FLOW DIAGRAMS**

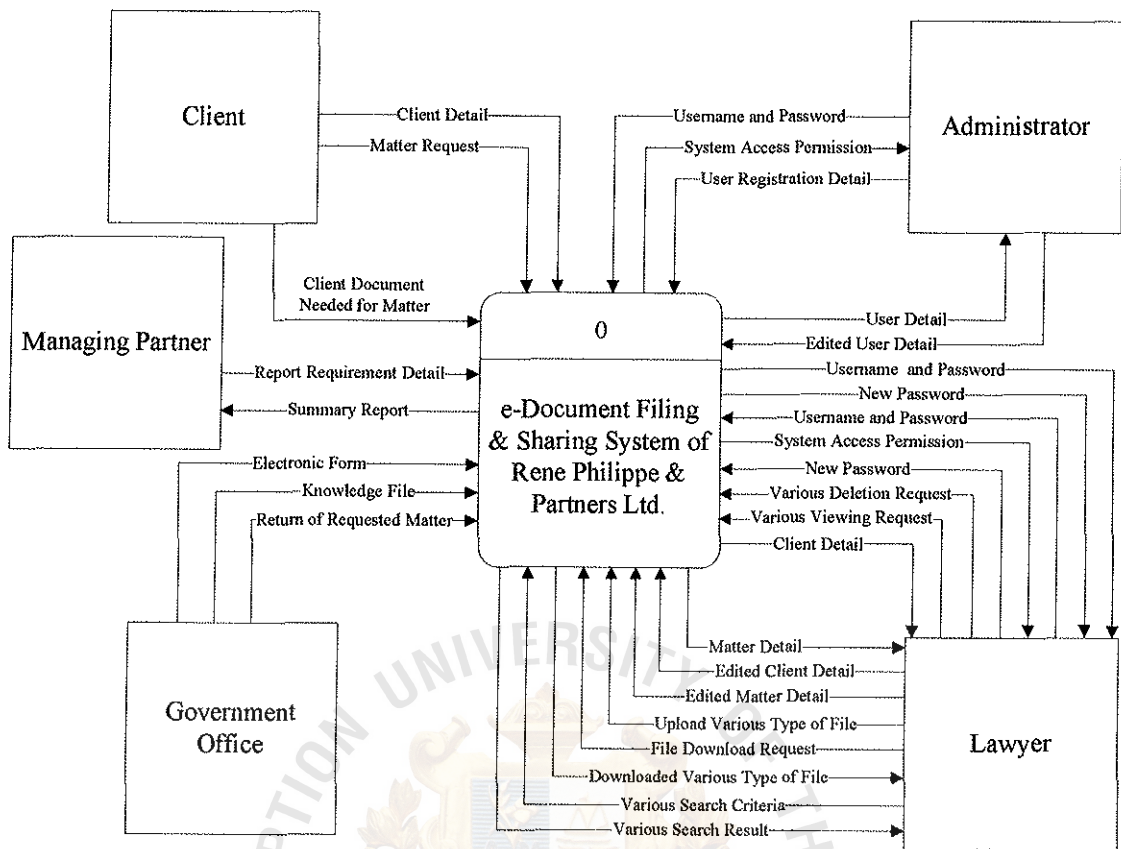


Figure B.1. Context Diagram of Proposed System.

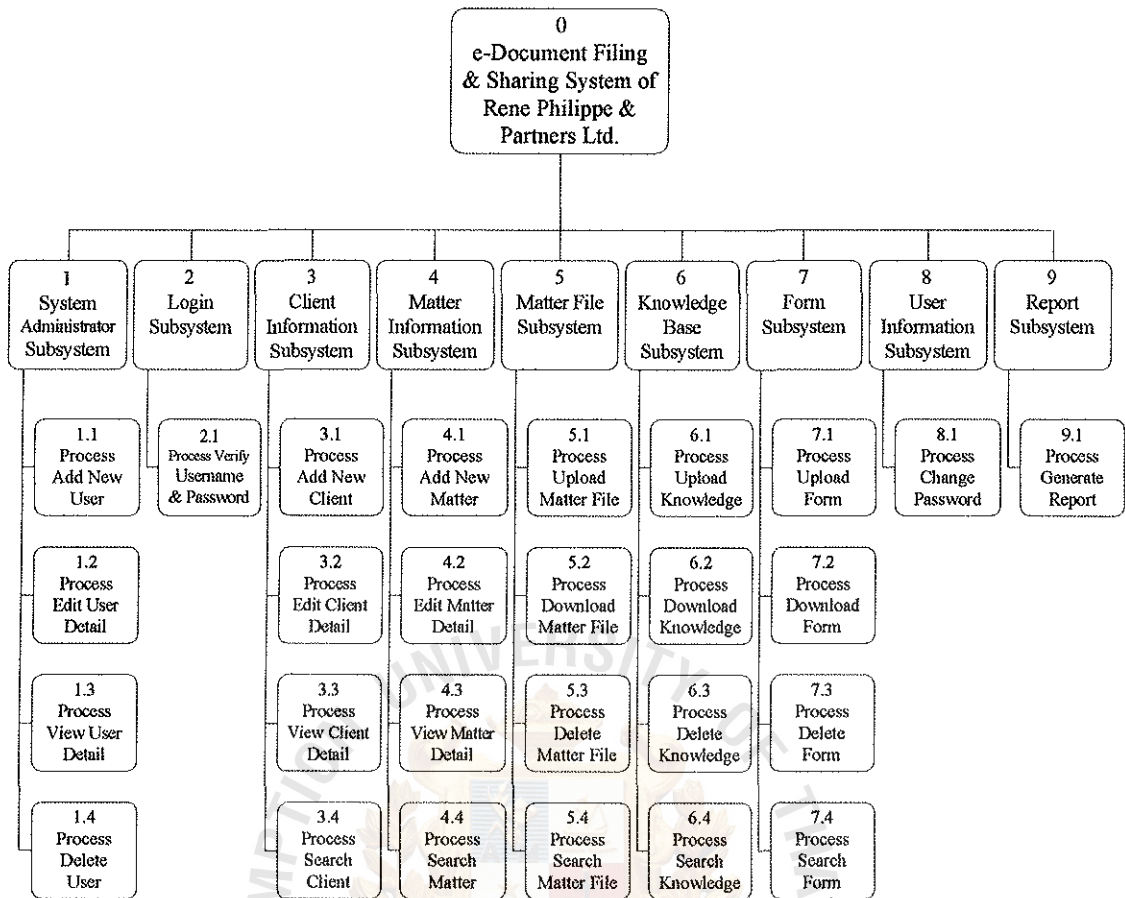


Figure B.2. Functional Decomposition Diagram.

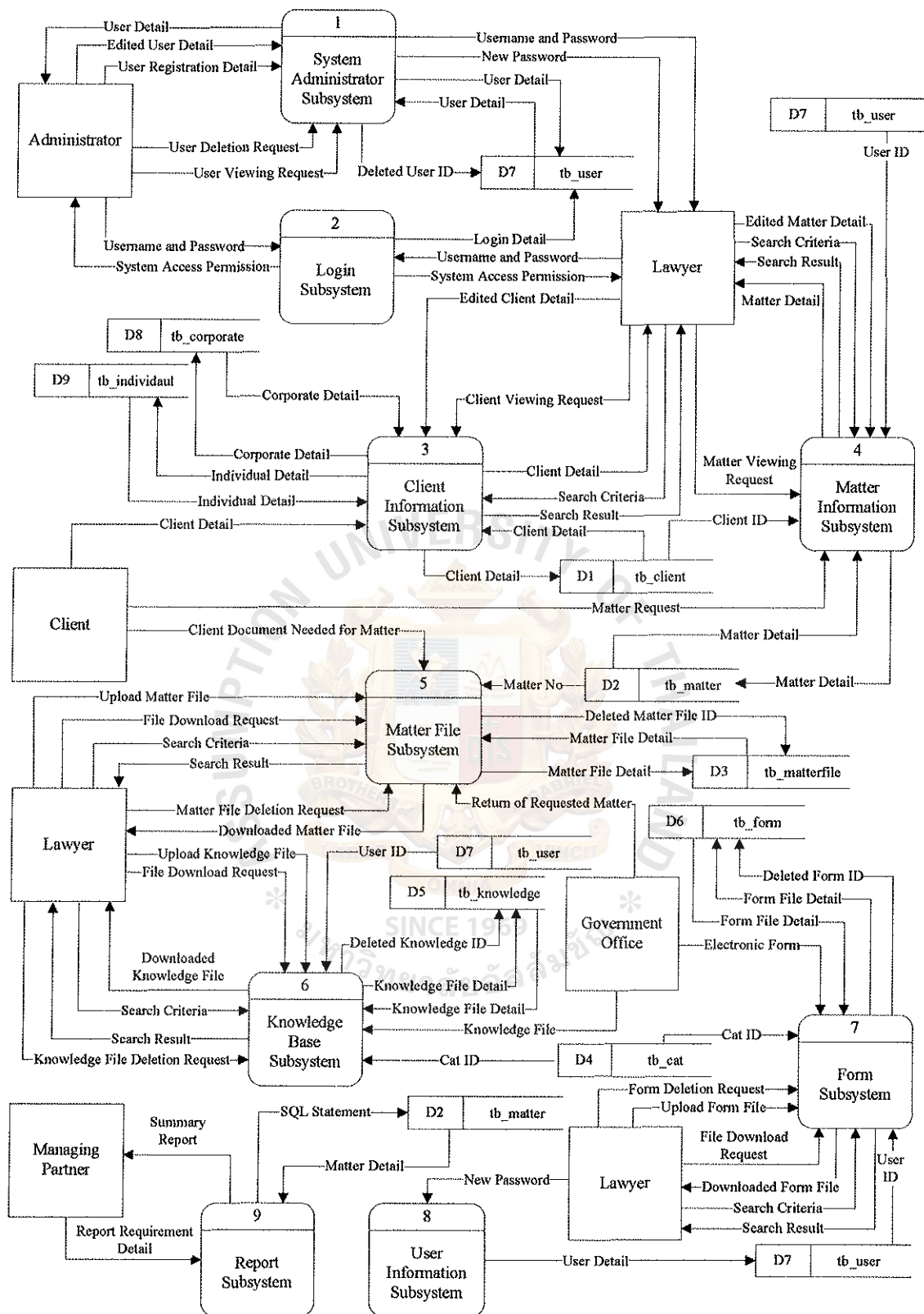


Figure B.3. Level 0 Data Flow Diagram of e-Document Filing & Sharing System.

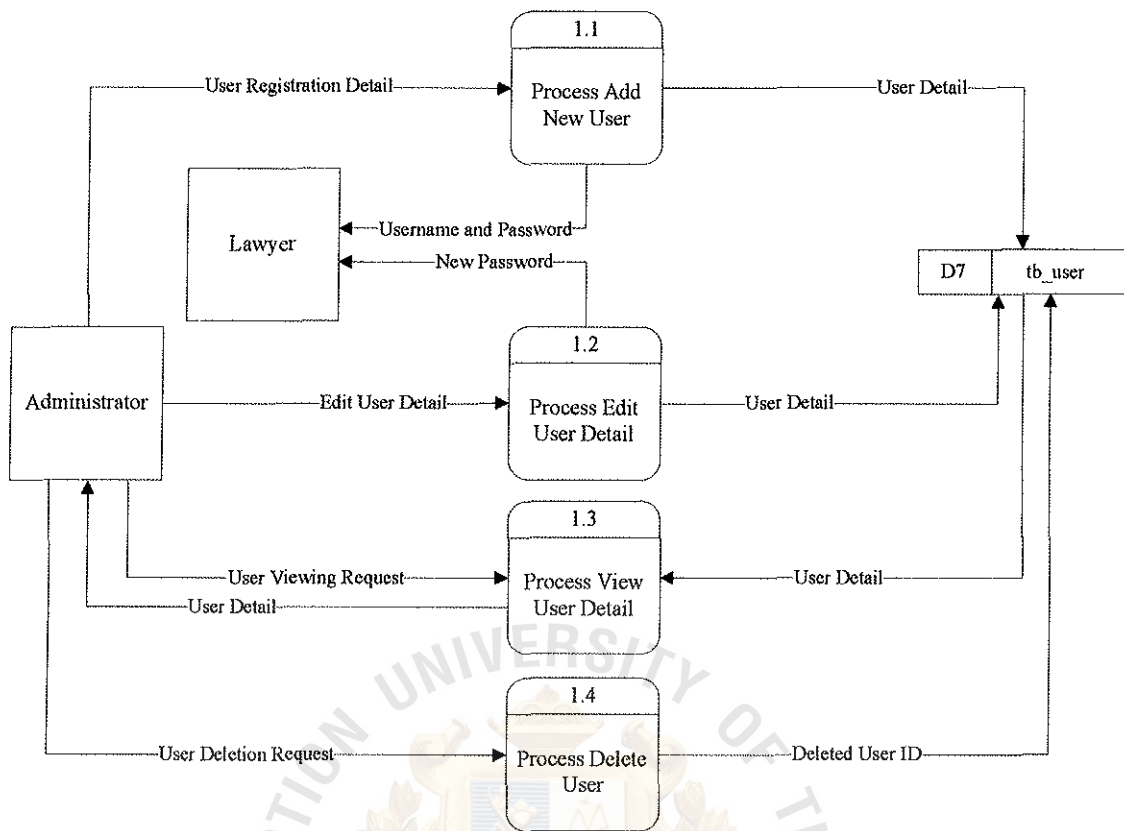


Figure B.4. Level 1 Data Flow Diagram of 1 System Administrator Subsystem.

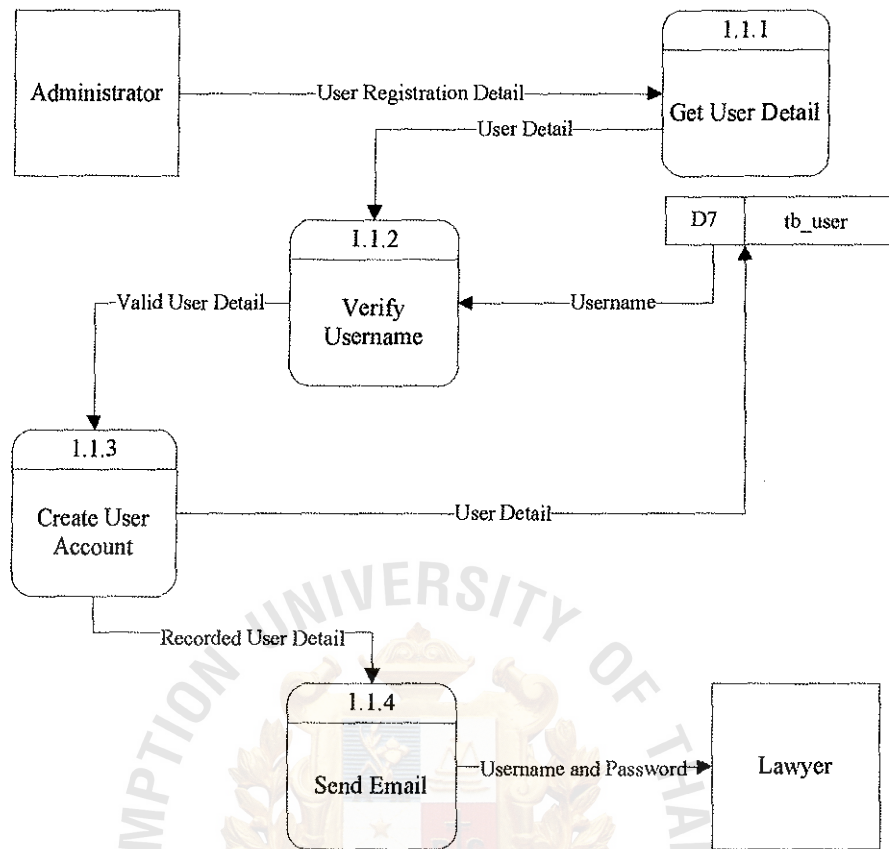


Figure B.5. Level 2 Data Flow Diagram of 1.1 Process Add New User.



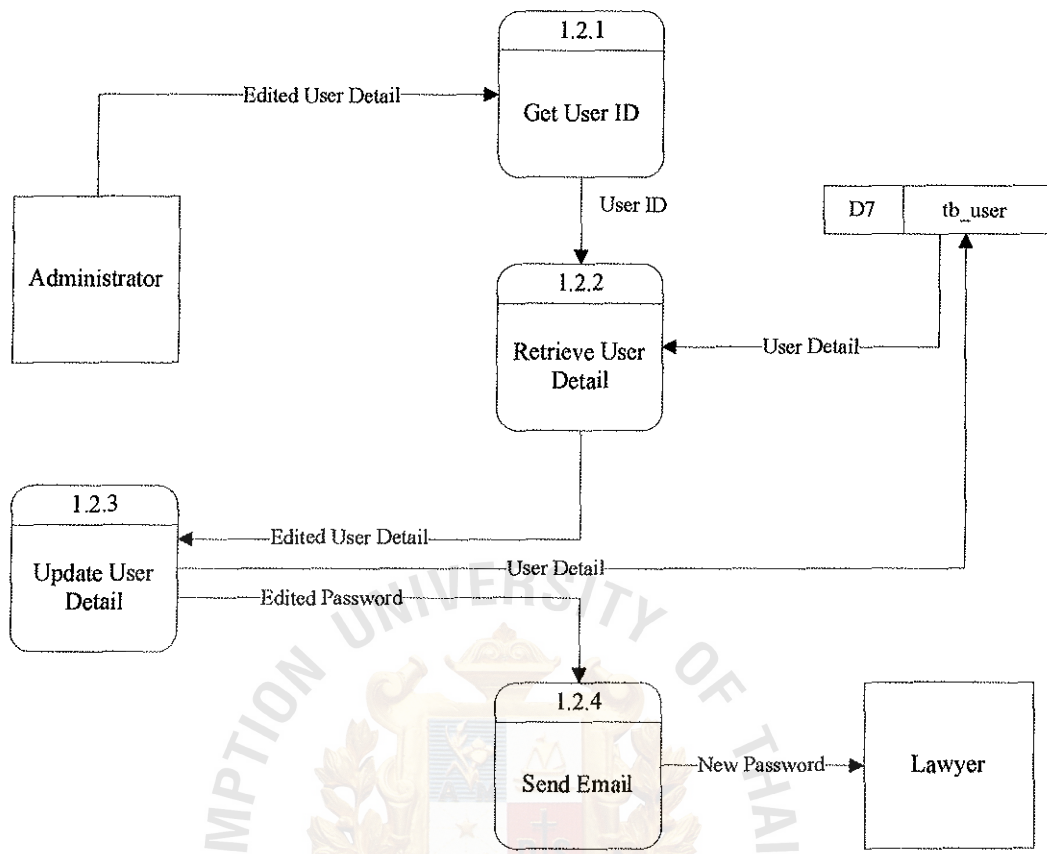


Figure B.6. Level 2 Data Flow Diagram of 1.2 Process Edit User Detail.

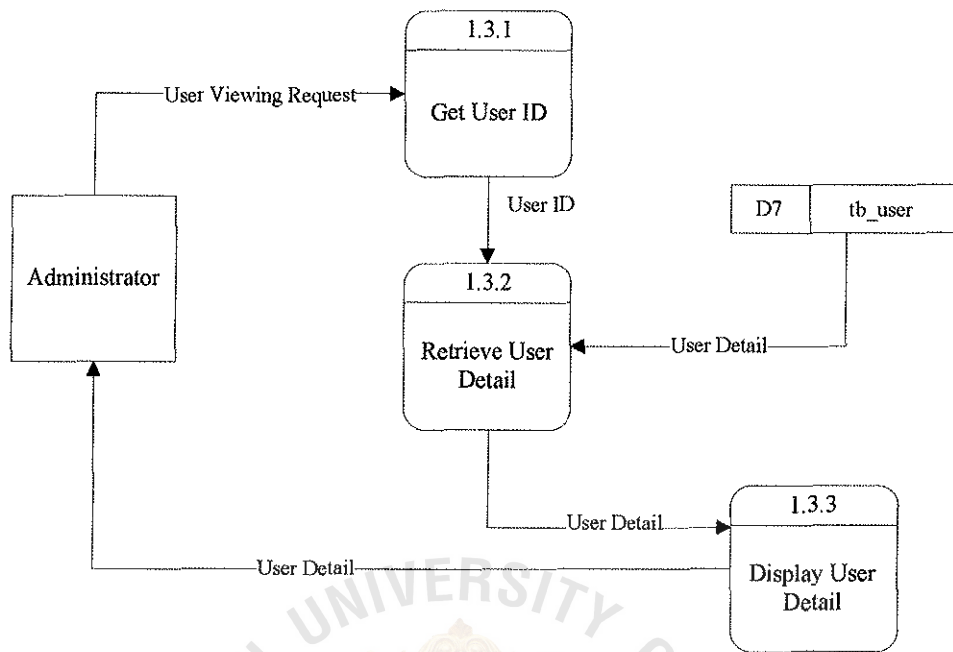


Figure B.7. Level 2 Data Flow Diagram of 1.3 Process View User Detail.

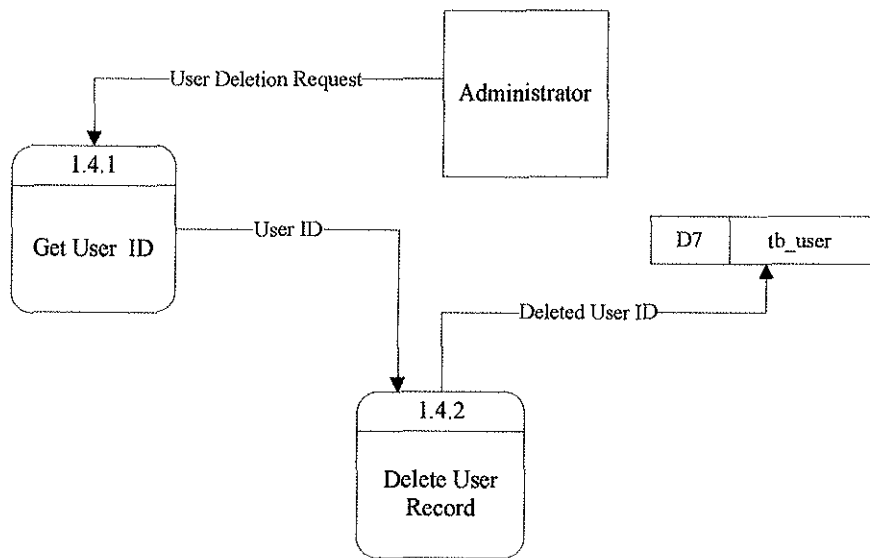


Figure B.8. Level 2 Data Flow Diagram of 1.4 Process Delete User.

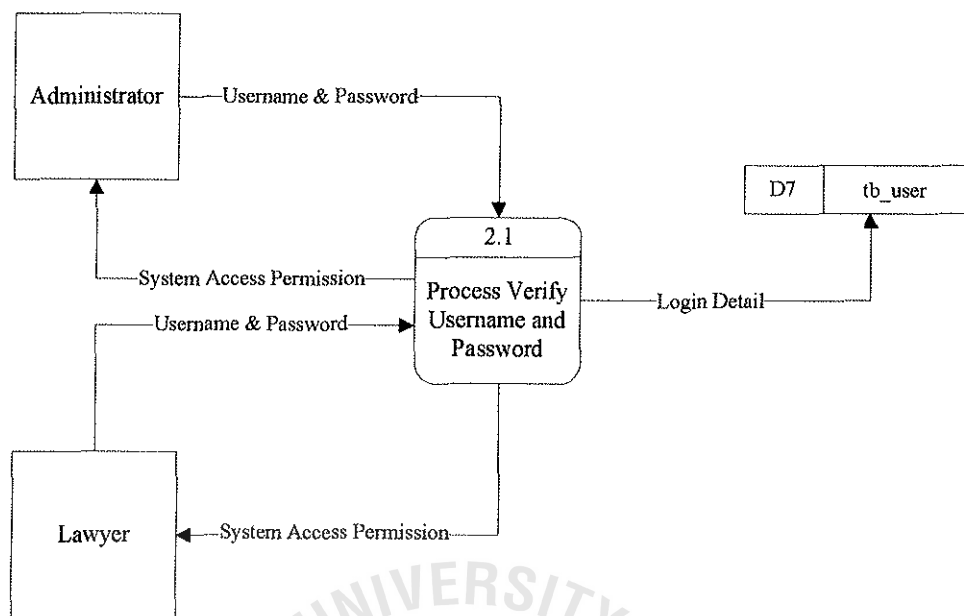


Figure B.9. Level 1 Data Flow Diagram of 2 Login Subsystem.

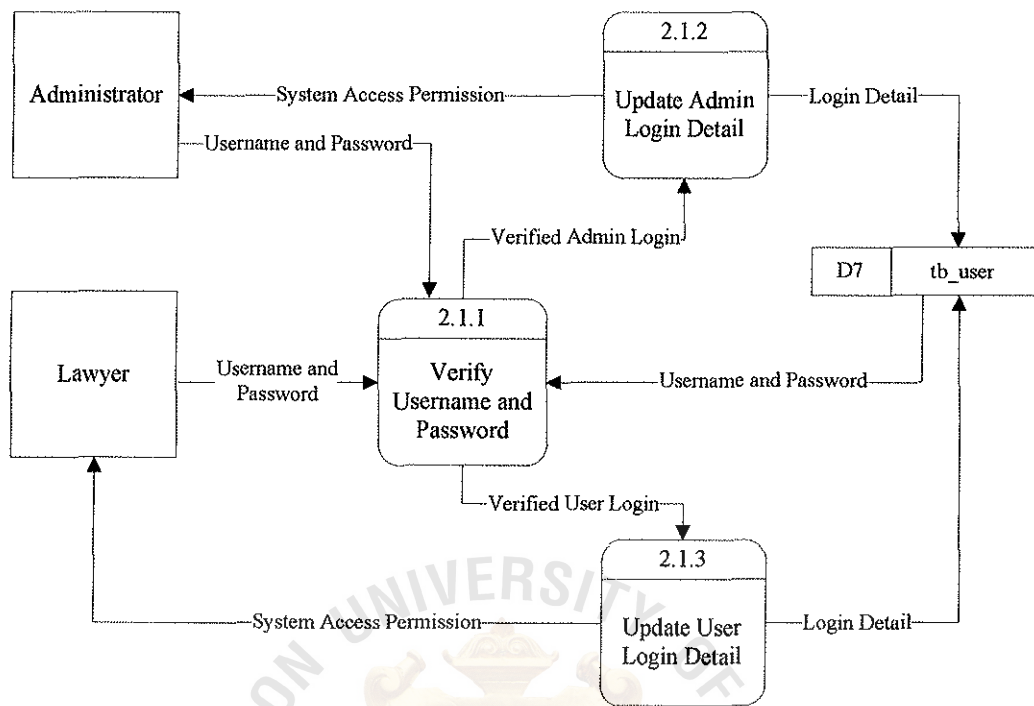


Figure B.10. Level 2 Data Flow Diagram of 2.1 Process Verify Username and Password.

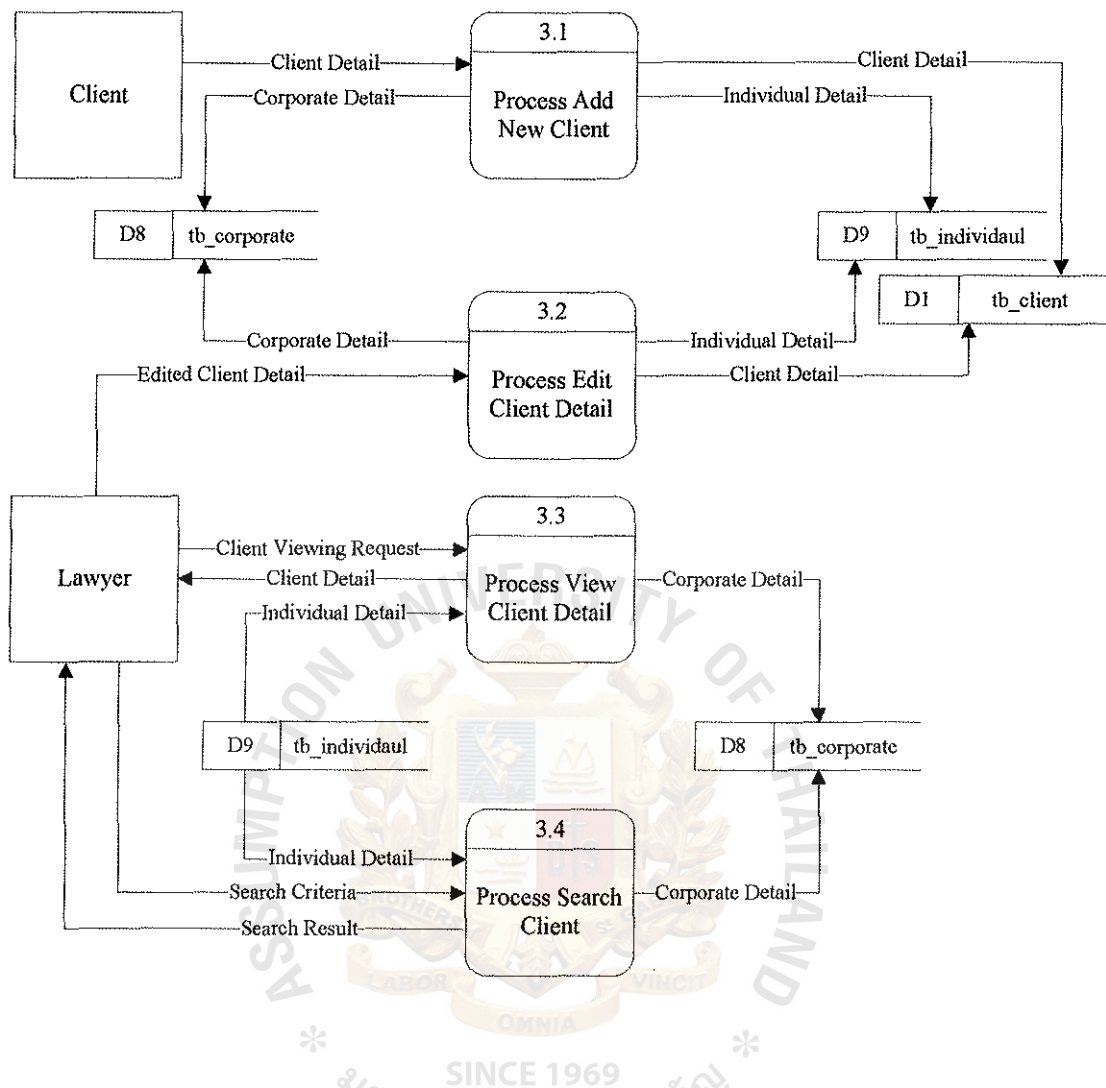


Figure B.11. Level 1 Data Flow Diagram of 3 Client Information Subsystem.



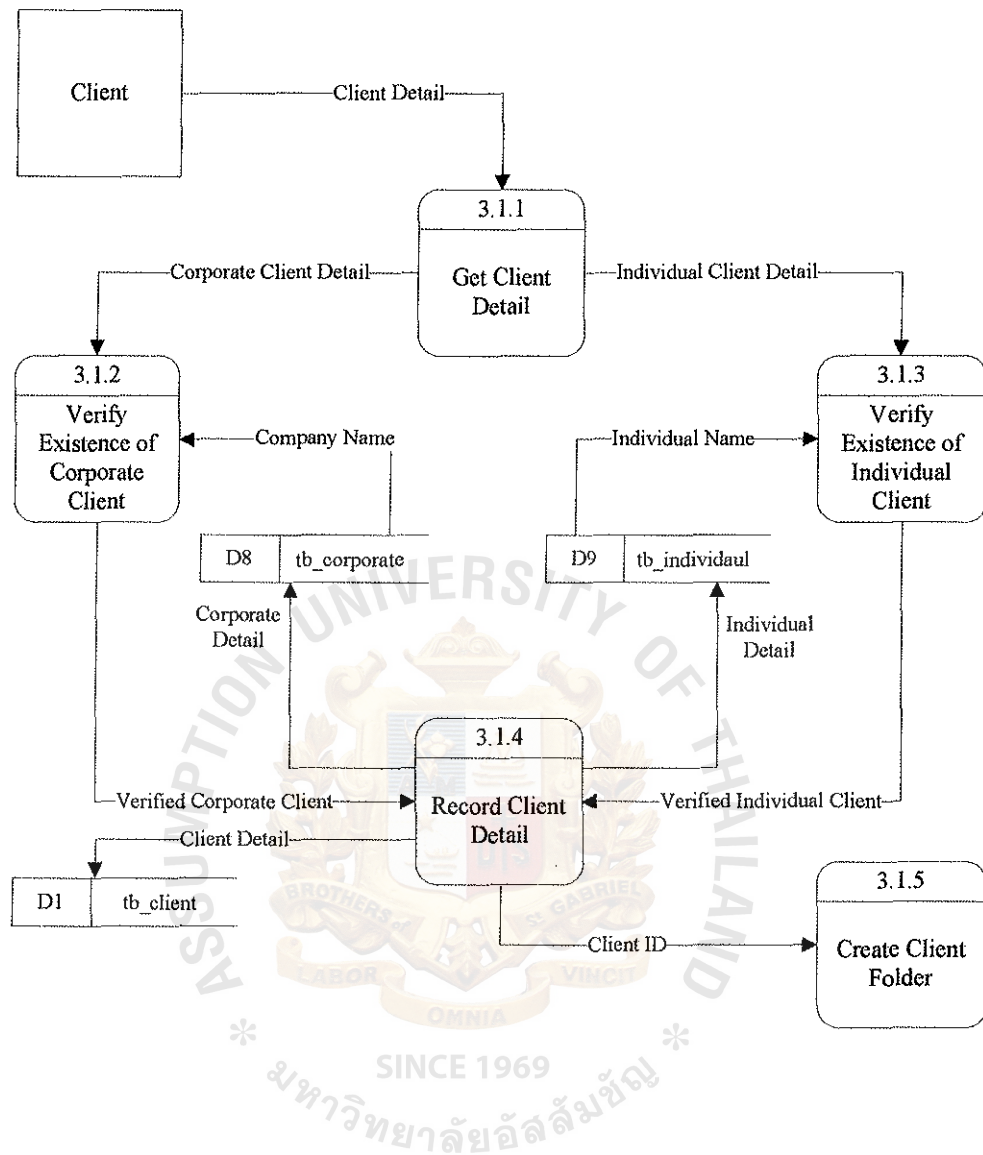


Figure B.12. Level 2 Data Flow Diagram of 3.1 Process Add New Client.

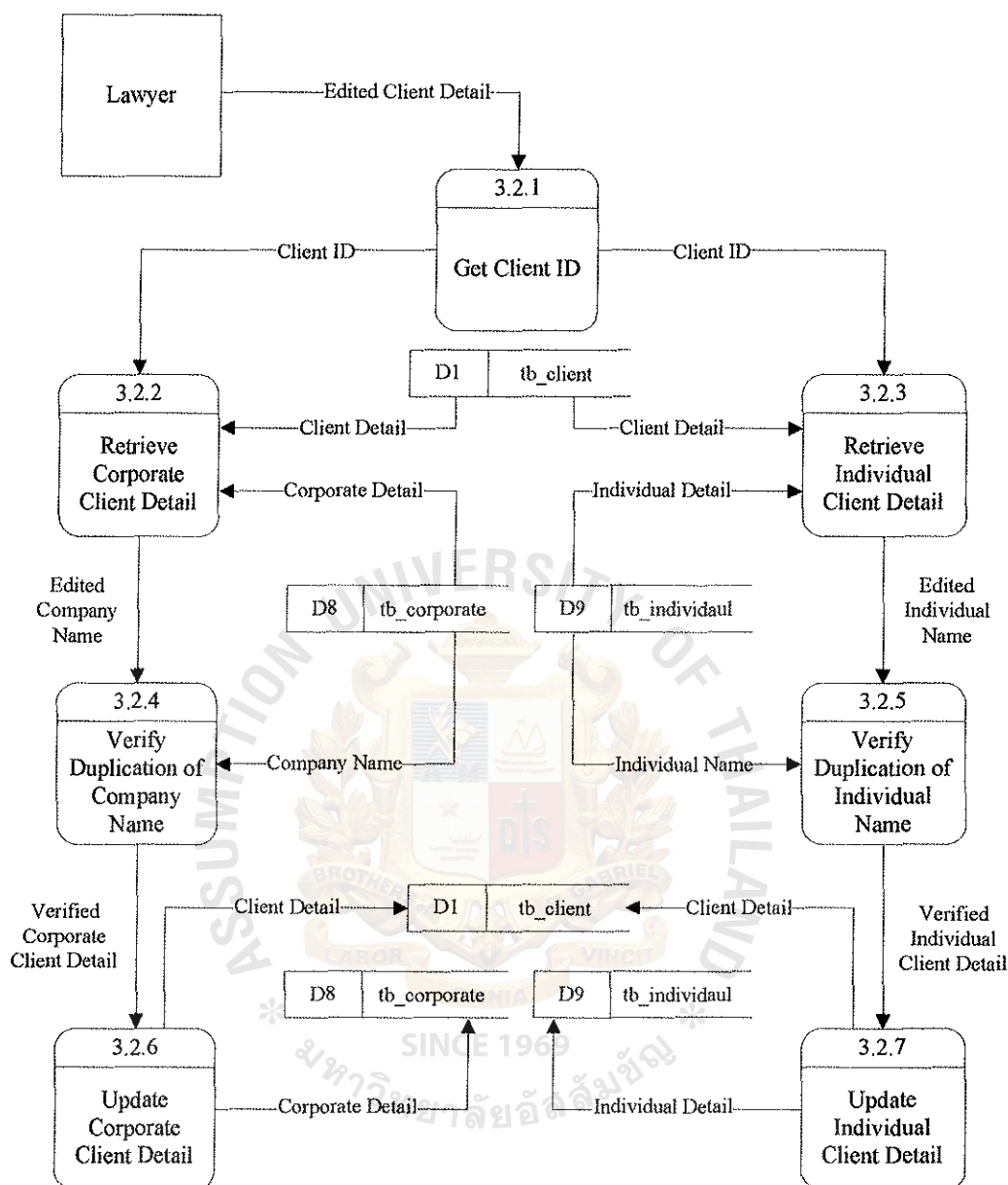


Figure B.13. Level 2 Data Flow Diagram of 3.2 Process Edit Client Detail.

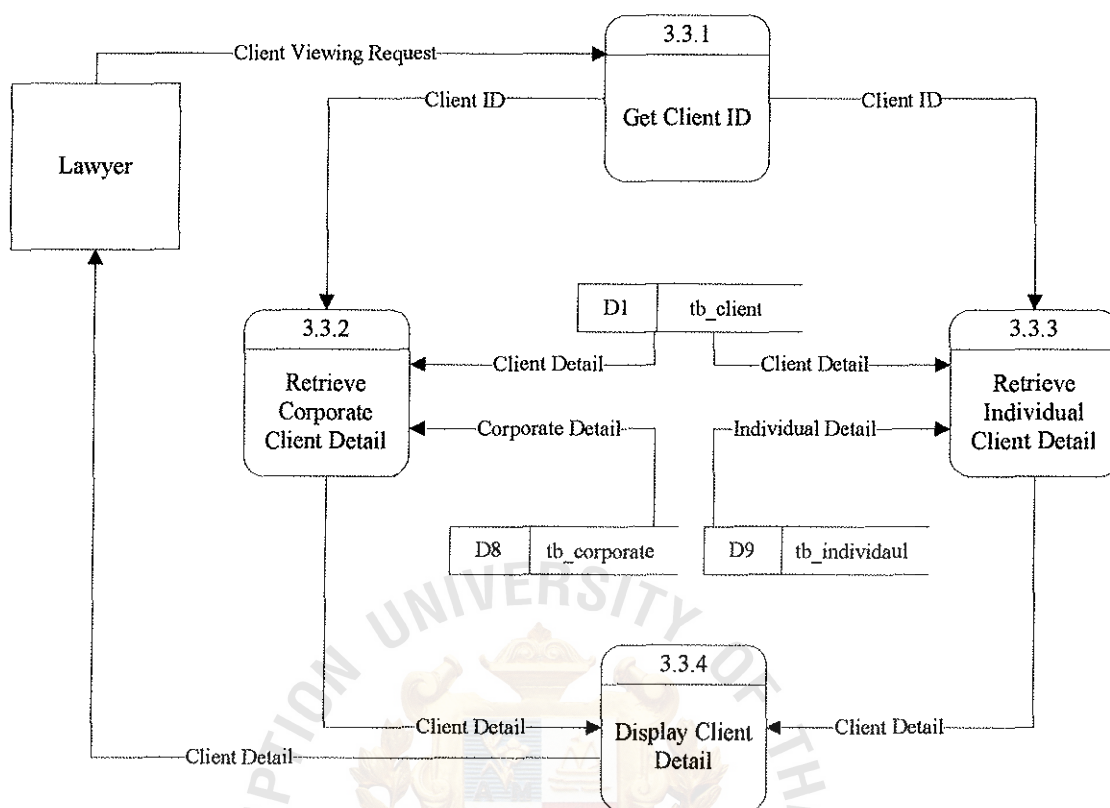


Figure B.14. Level 2 Data Flow Diagram of 3.3 Process View Client Detail.

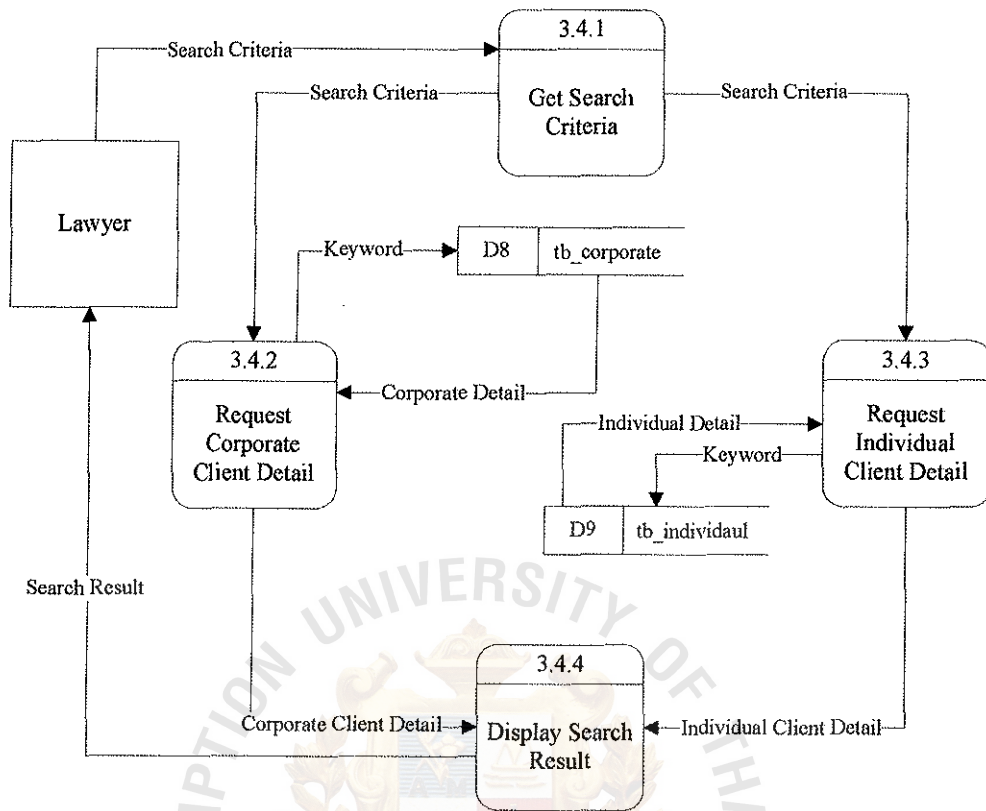


Figure B.15. Level 2 Data Flow Diagram of 3.4 Process Search Client.

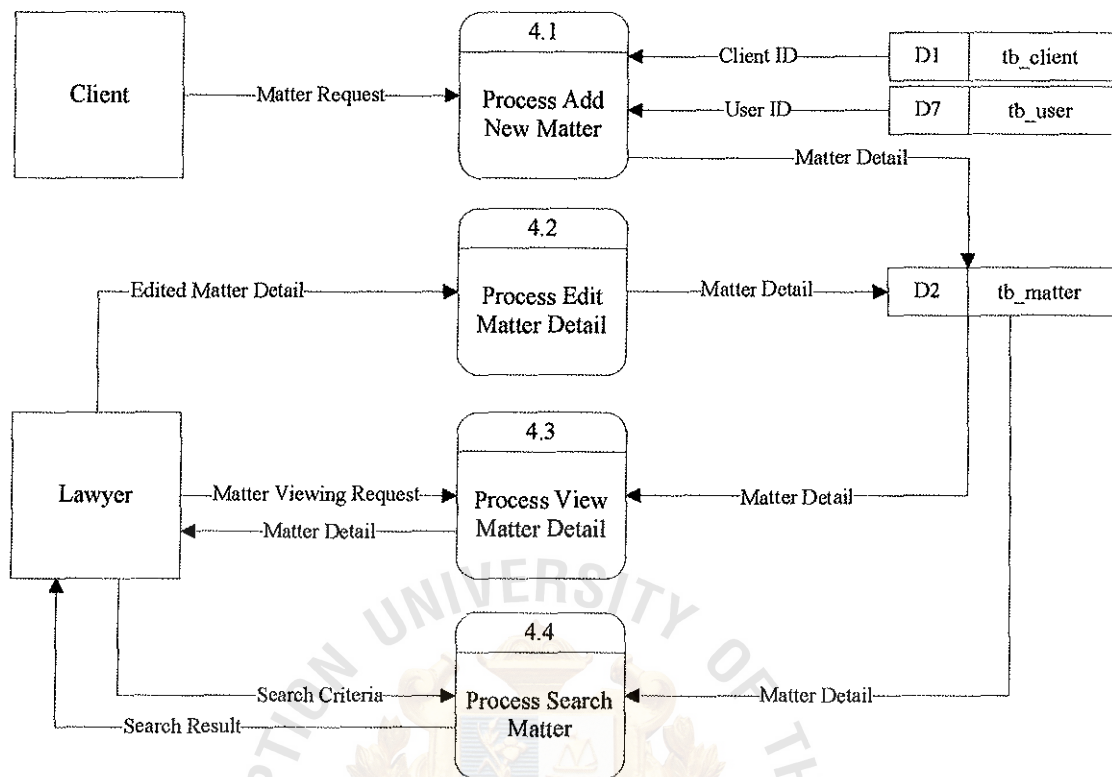


Figure B.16. Level 1 Data Flow Diagram of 4 Matter Information Subsystem.

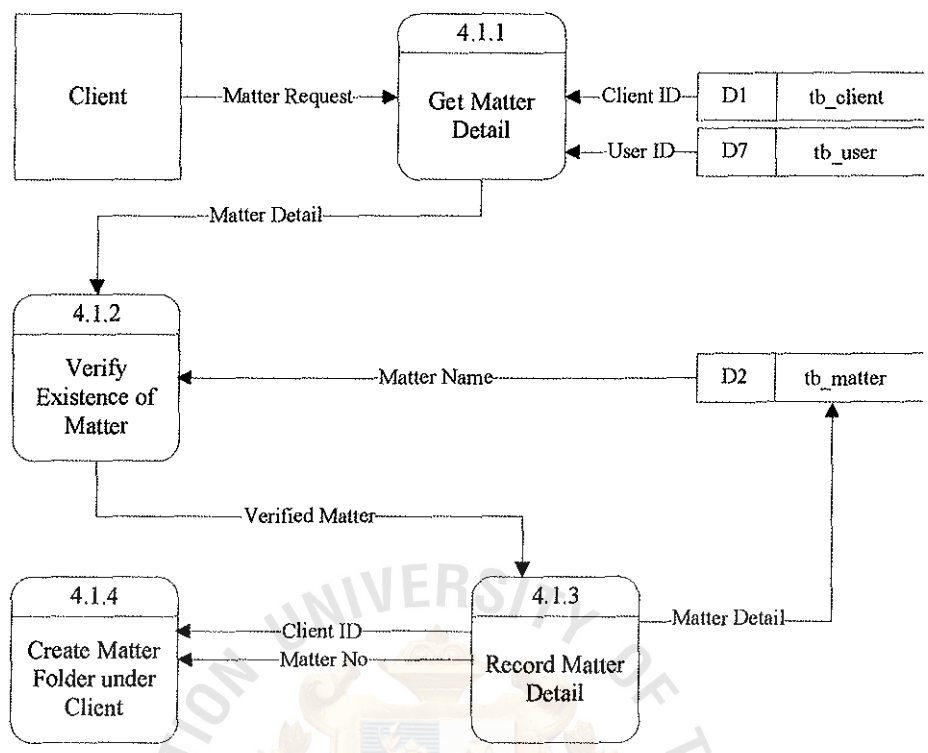


Figure B.17. Level 2 Data Flow Diagram of 4.1 Process Add New Matter.



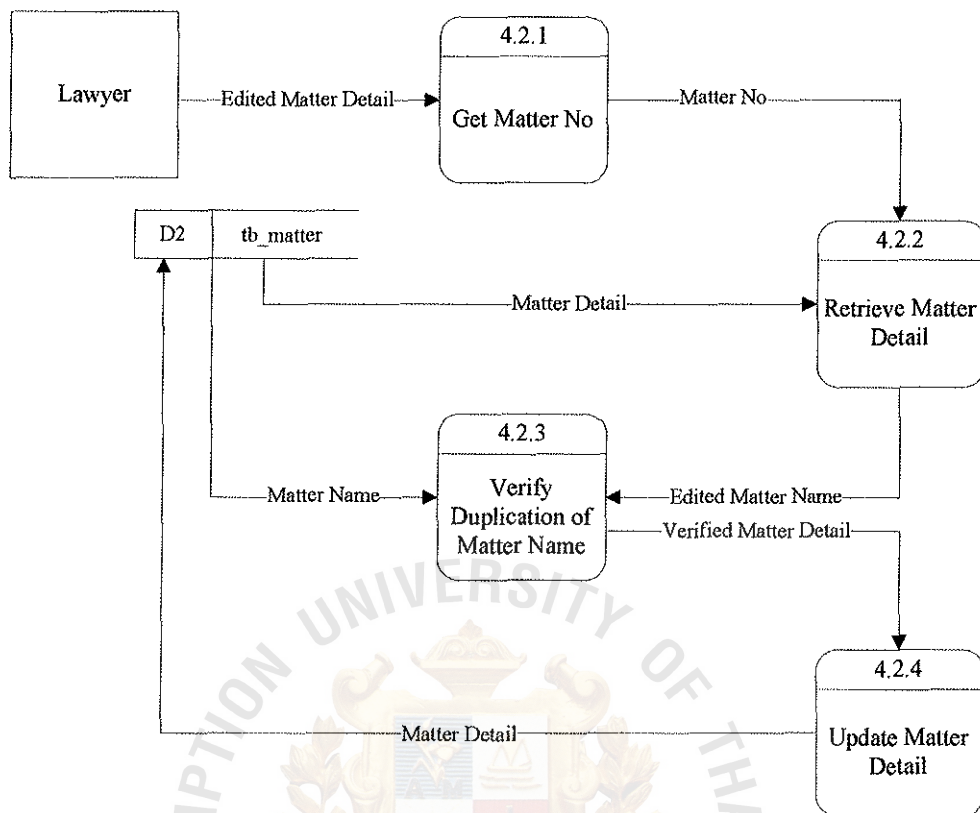


Figure B.18. Level 2 Data Flow Diagram of 4.2 Process Edit Matter Detail.

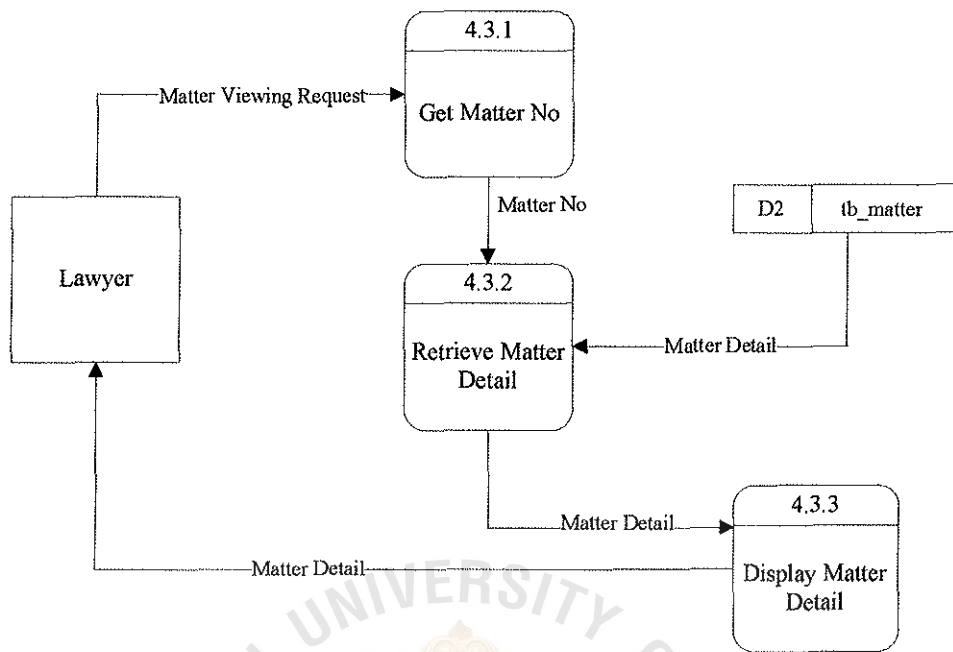


Figure B.19. Level 2 Data Flow Diagram of 4.3 Process View Matter Detail.

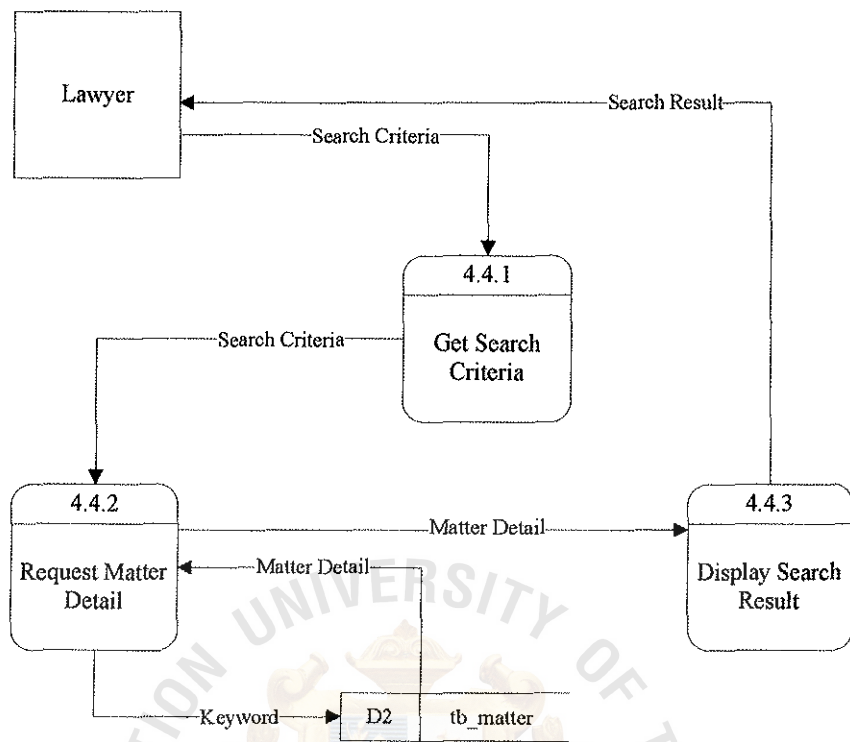


Figure B.20. Level 2 Data Flow Diagram of 4.4 Process Search Matter.

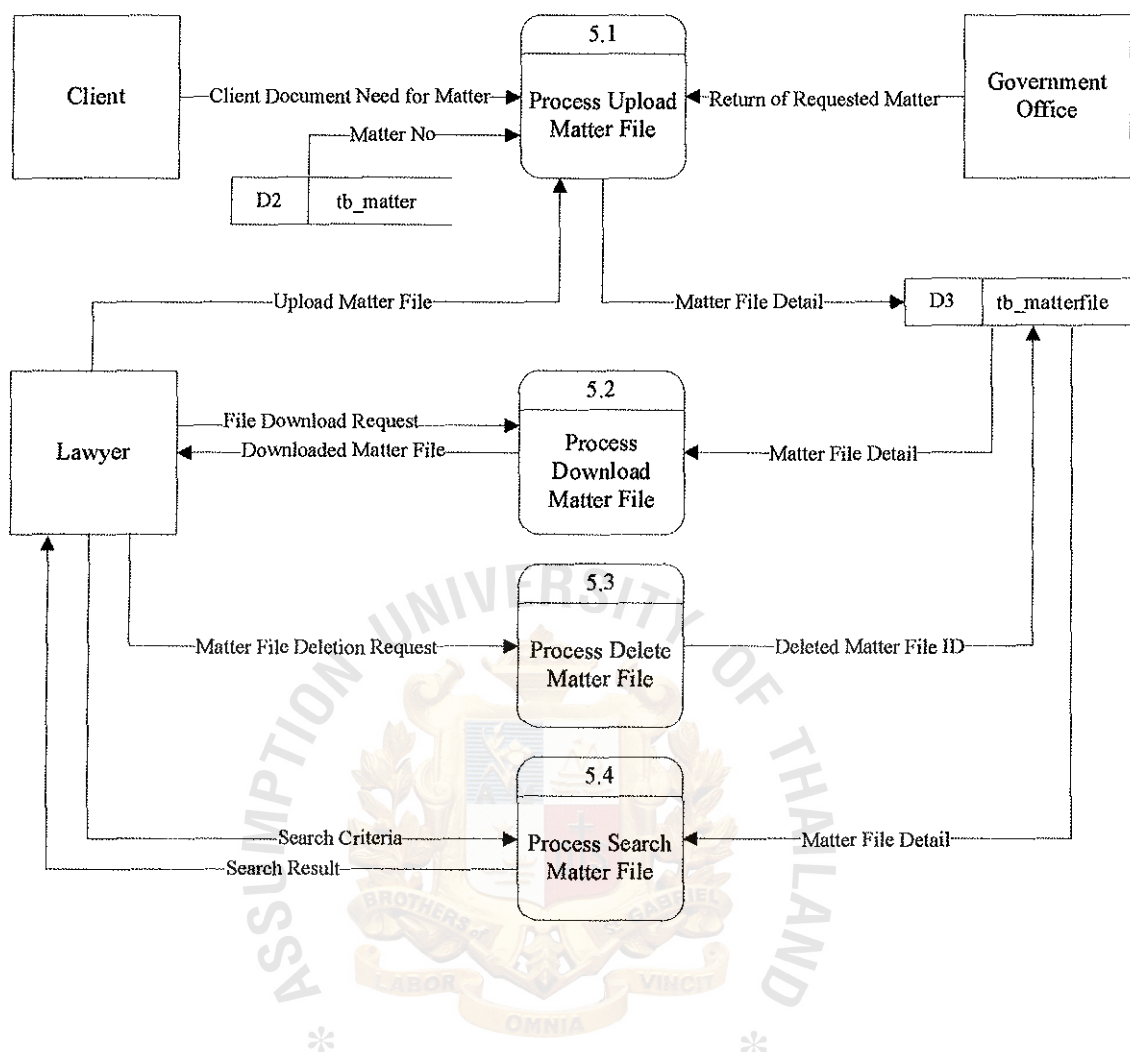


Figure B.21. Level 1 Data Flow Diagram of 5 Matter File Subsystem.

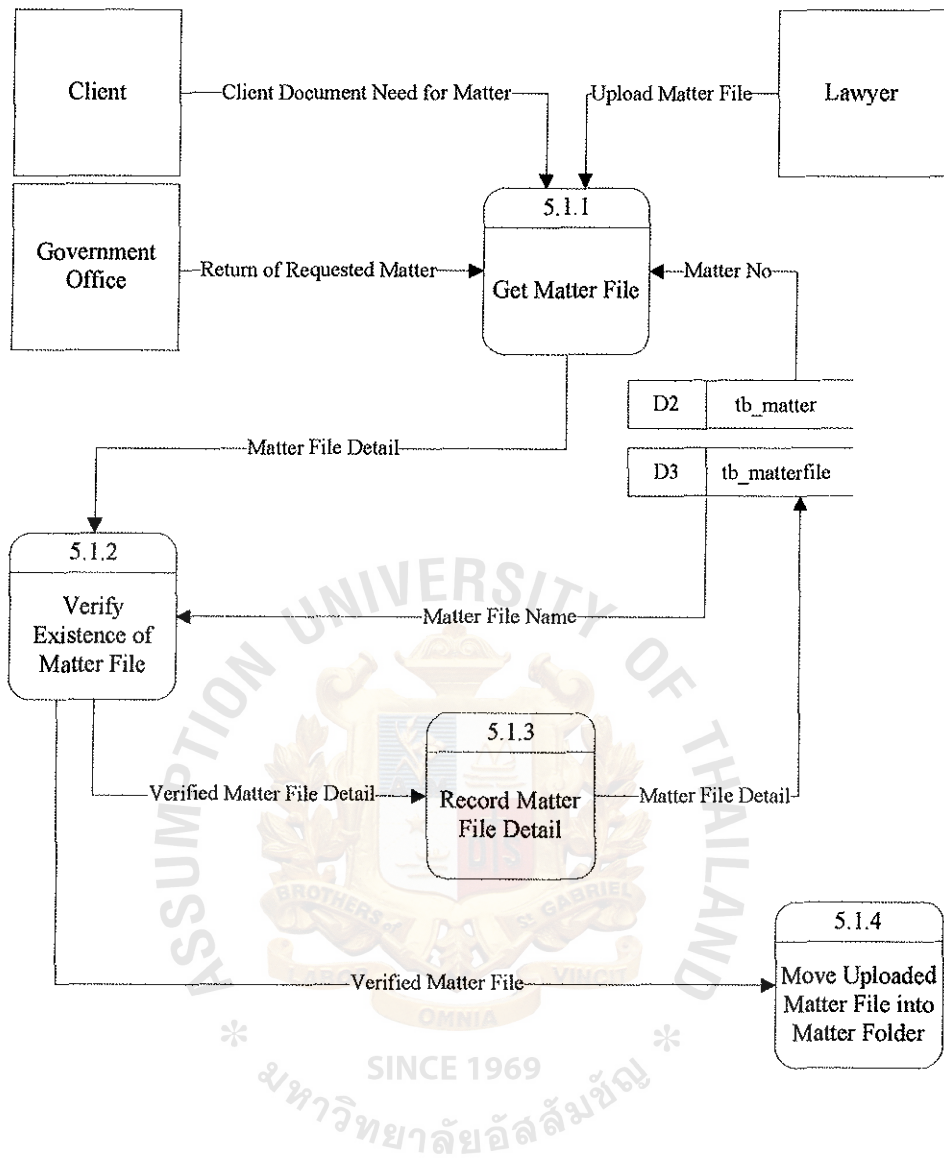


Figure B.22. Level 2 Data Flow Diagram of 5.1 Process Upload Matter File.

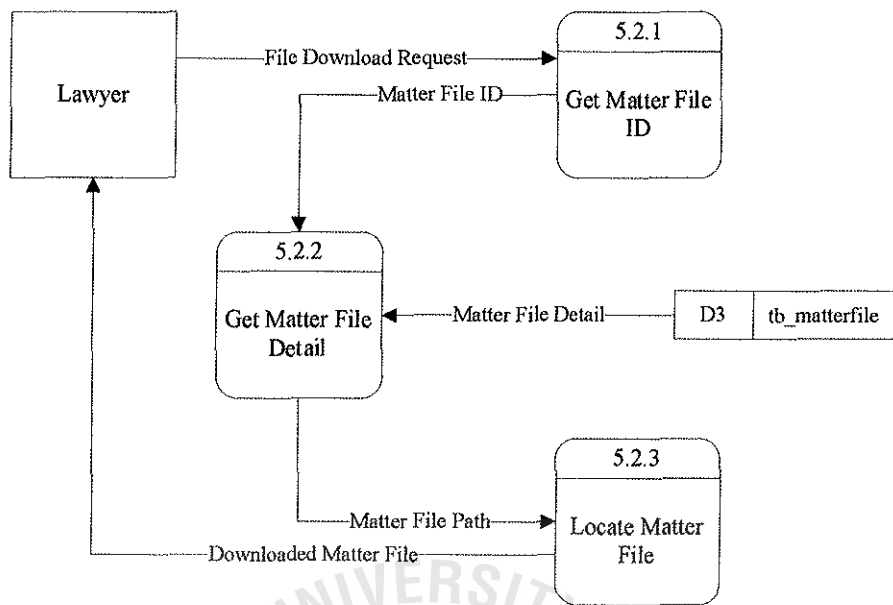


Figure B.23. Level 2 Data Flow Diagram of 5.2 Process Download Matter File.



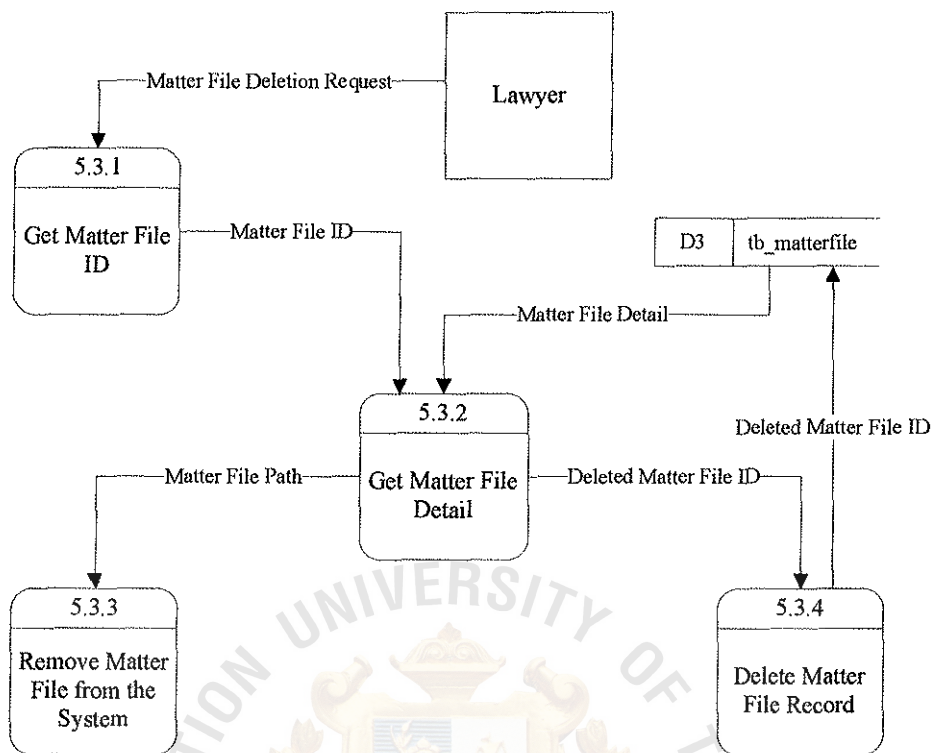


Figure B.24. Level 2 Data Flow Diagram of 5.3 Process Delete Matter File.

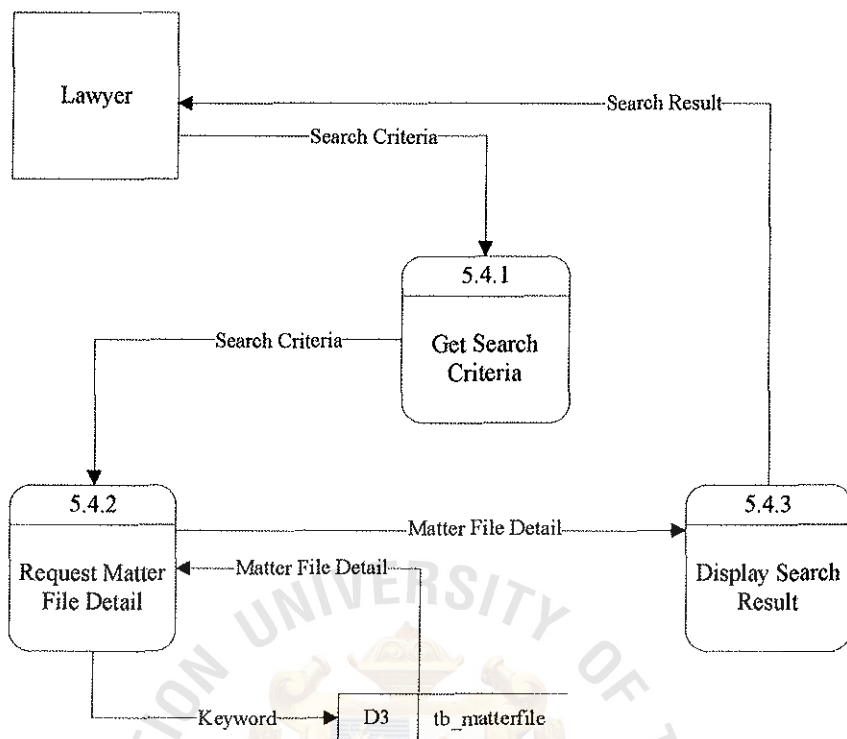


Figure B.25. Level 2 Data Flow Diagram of 5.4 Process Search Matter File.

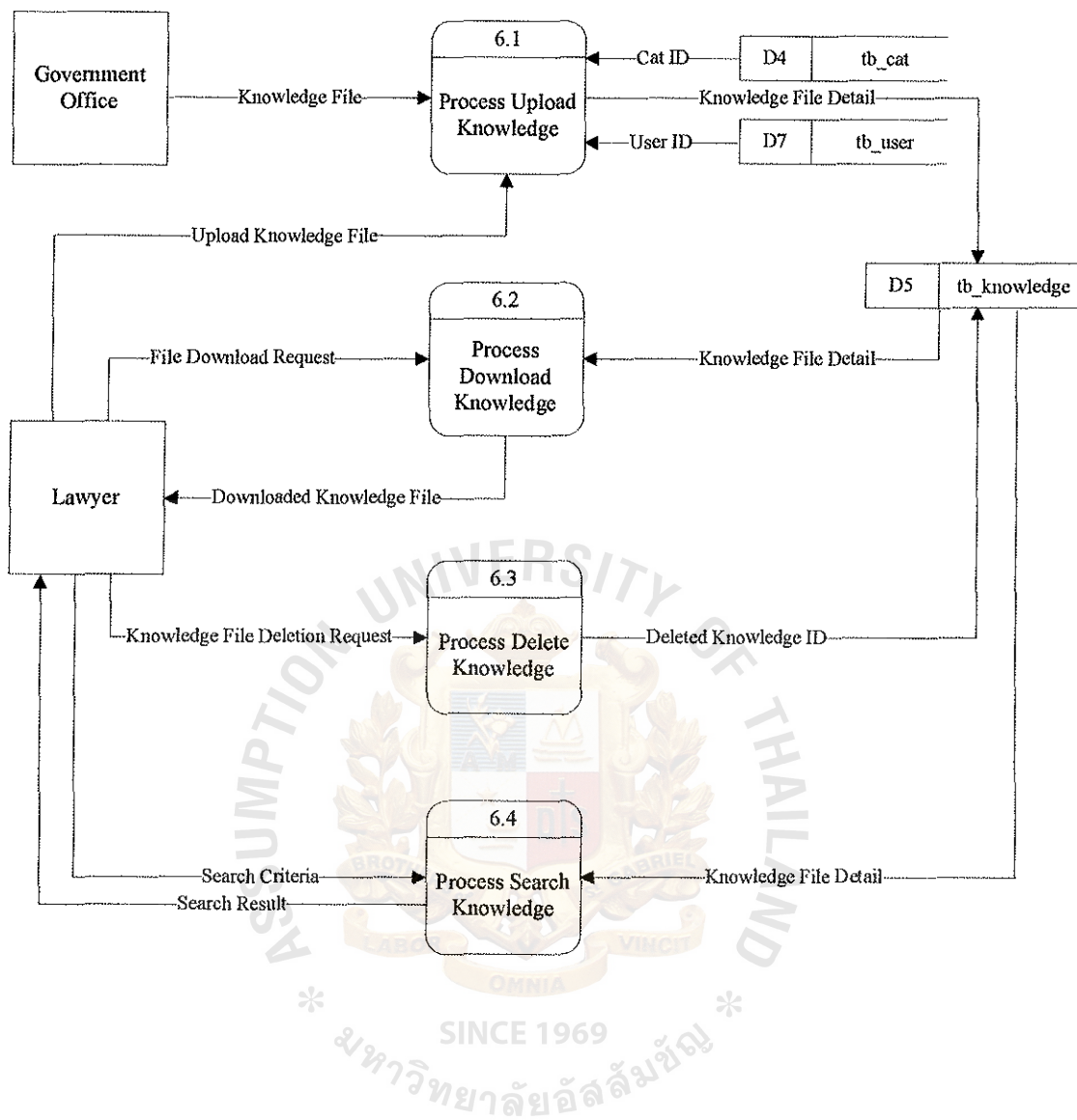


Figure B.26. Level 1 Data Flow Diagram of 6 Knowledge Base Subsystem.

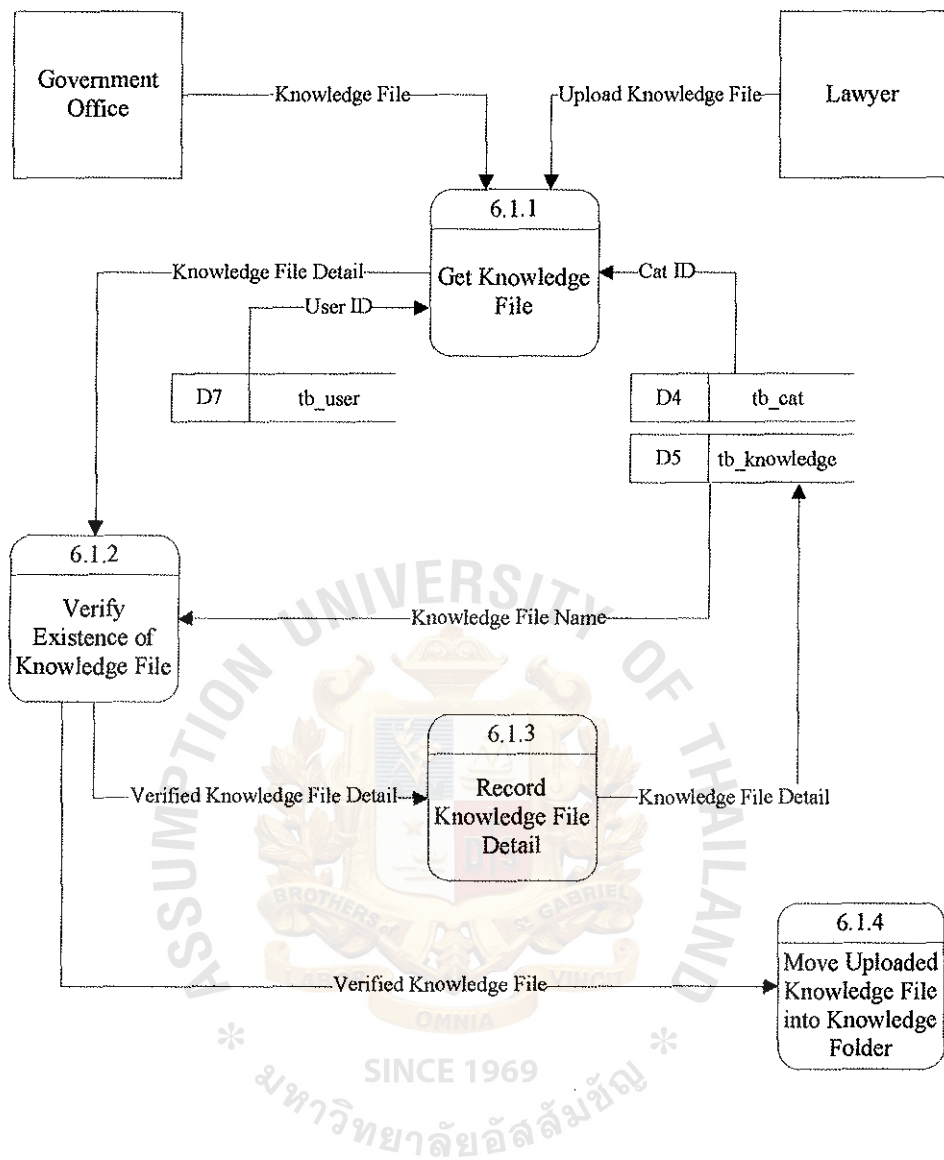


Figure B.27. Level 2 Data Flow Diagram of 6.1 Process Upload Knowledge.

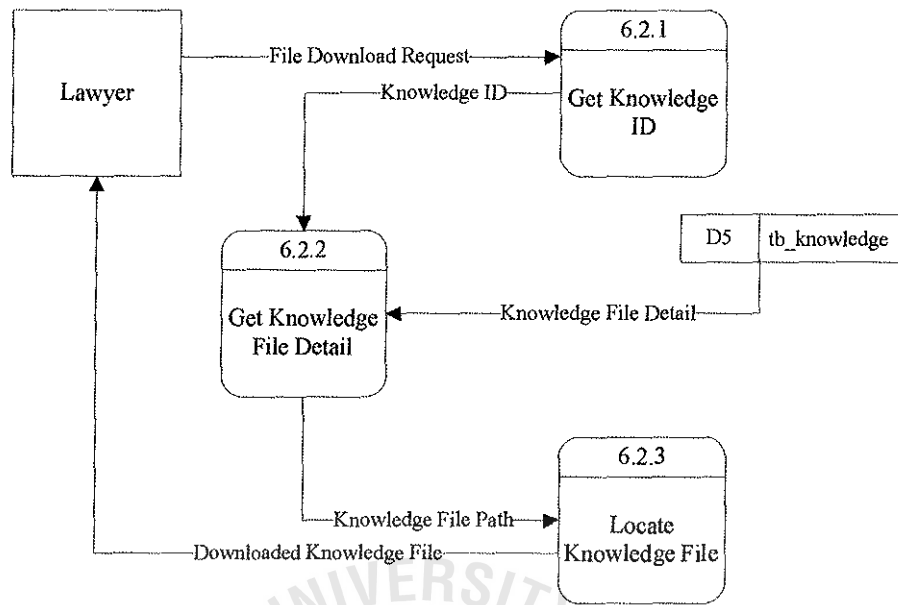


Figure B.28. Level 2 Data Flow Diagram of 6.2 Process Download Knowledge.

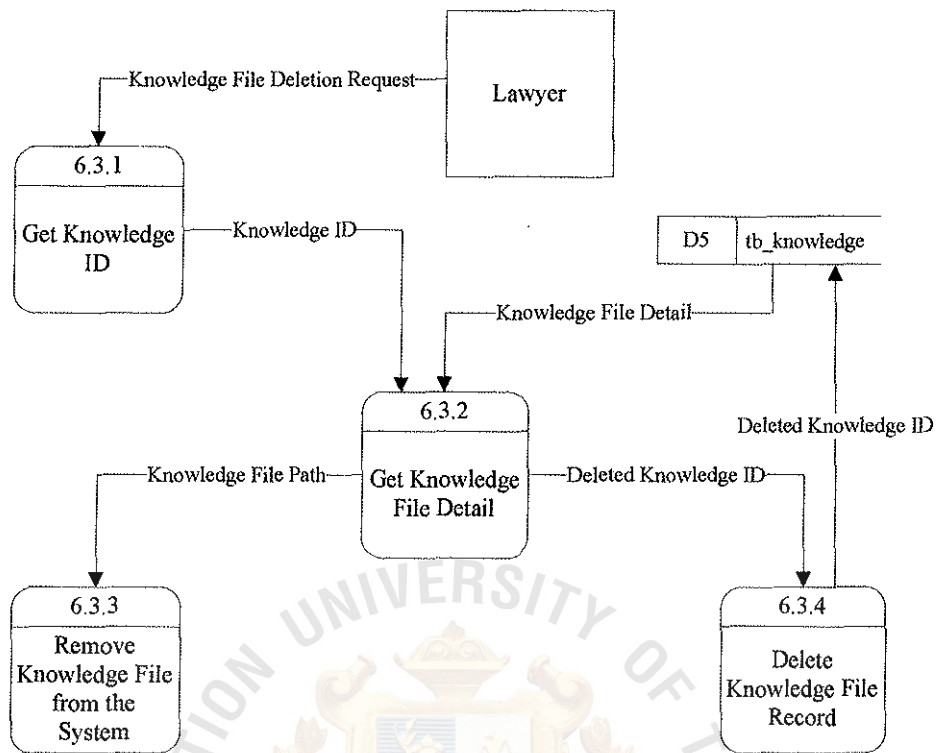


Figure B.29. Level 2 Data Flow Diagram of 6.3 Process Delete Knowledge.

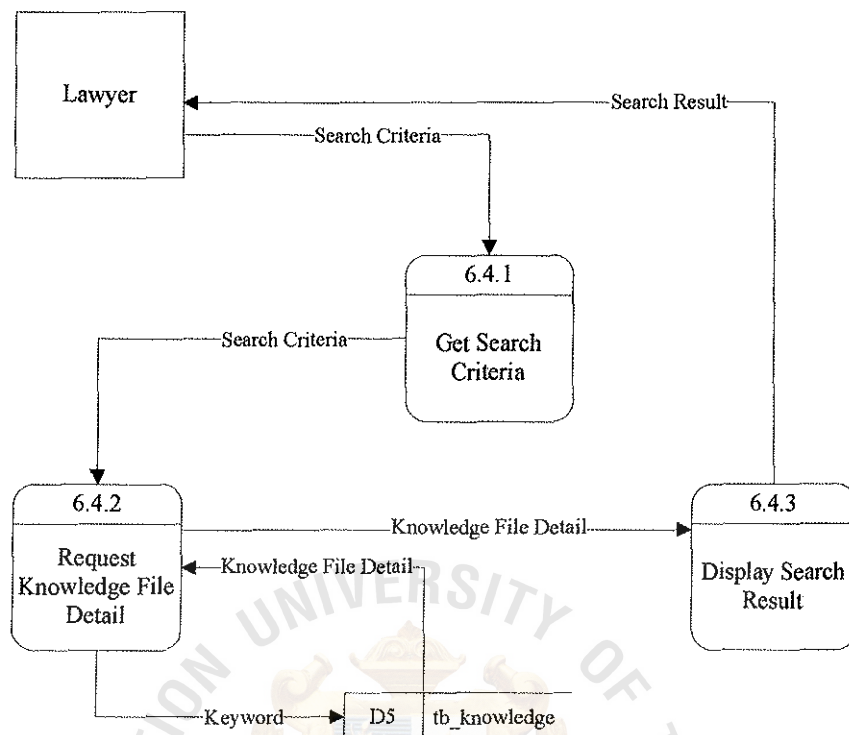


Figure B.30. Level 2 Data Flow Diagram of 6.4 Process Search Knowledge.



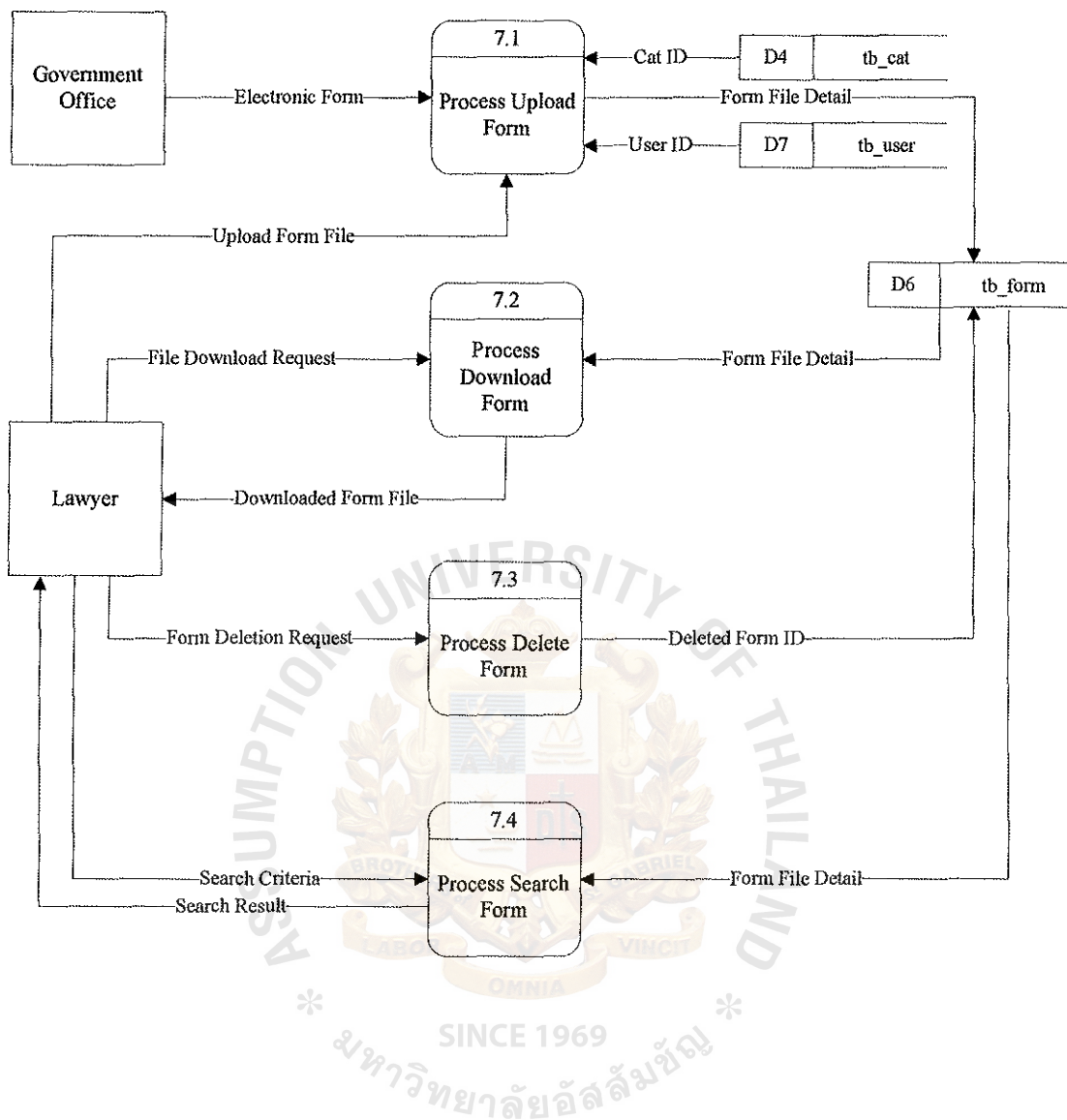


Figure B.31. Level 1 Data Flow Diagram of 7 Form Subsystem.

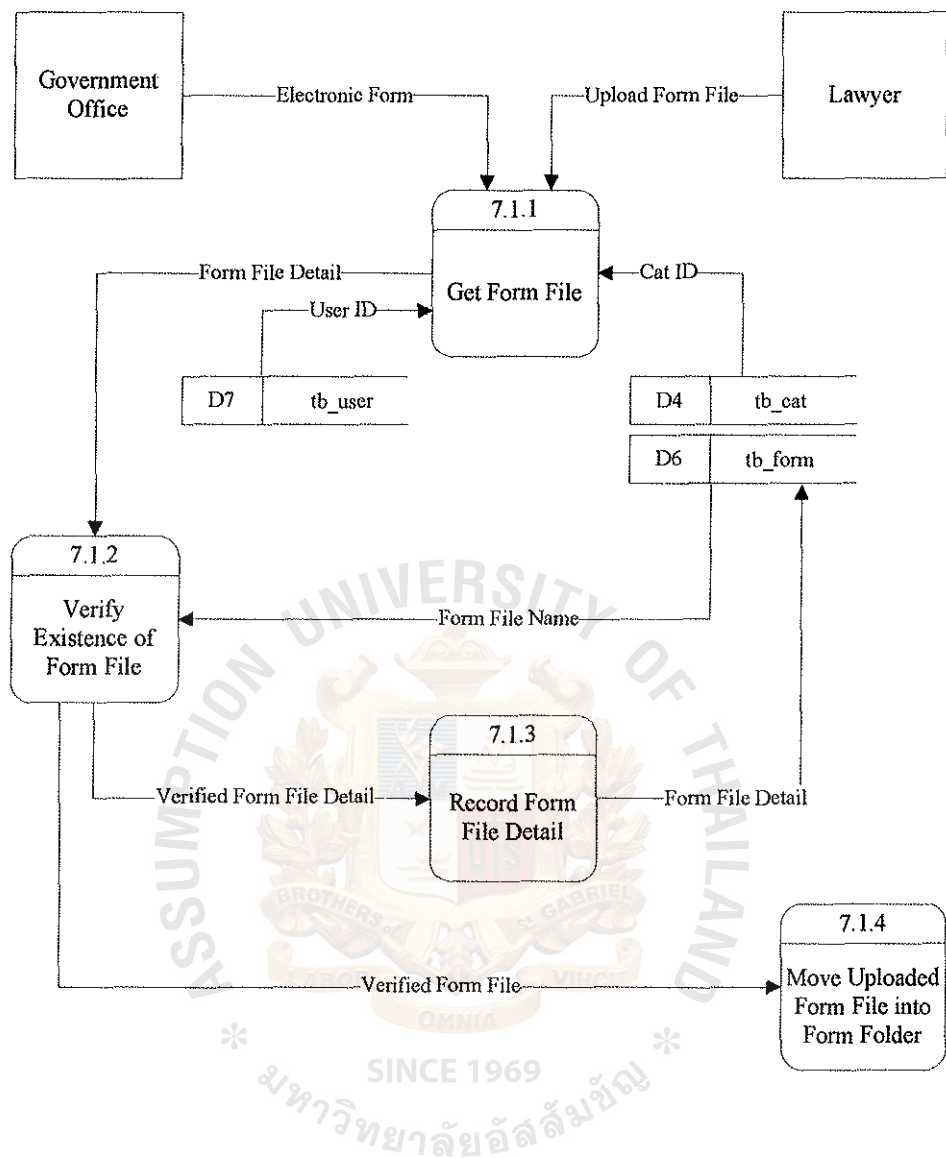


Figure B.32. Level 2 Data Flow Diagram of 7.1 Process Upload Form.

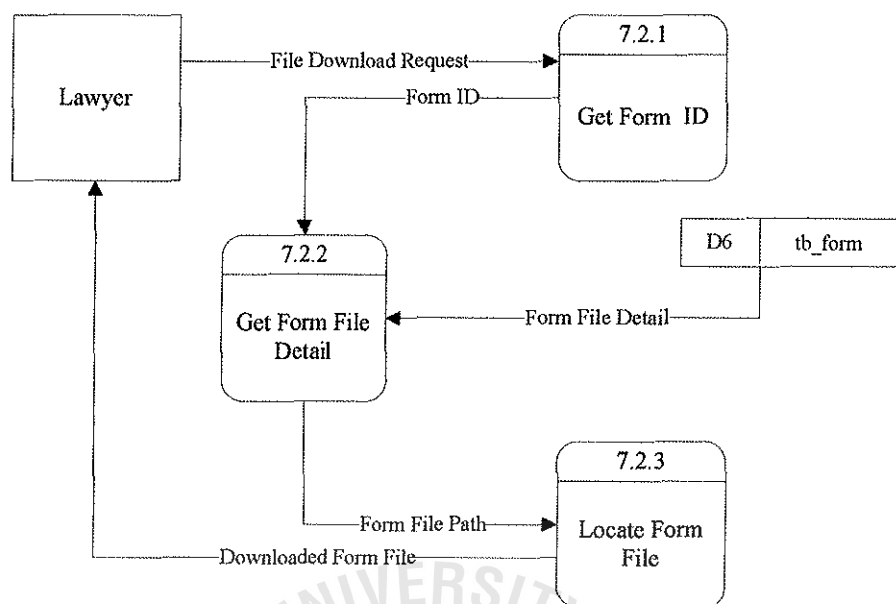


Figure B.33. Level 2 Data Flow Diagram of 7.2 Process Download Form.

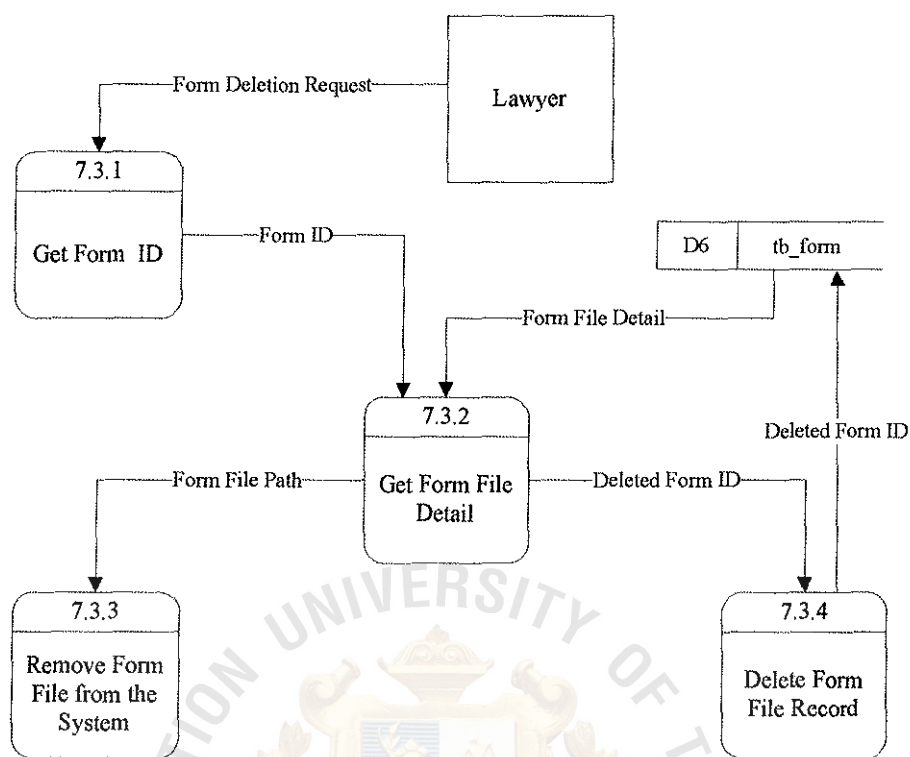


Figure B.34. Level 2 Data Flow Diagram of 7.3 Process Delete Form.

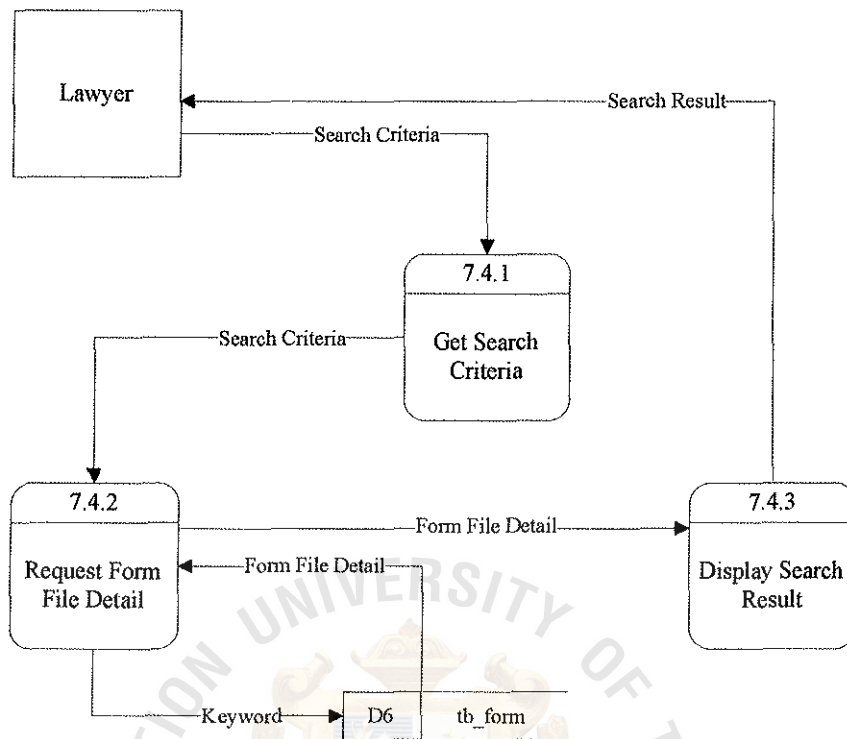


Figure B.35. Level 2 Data Flow Diagram of 7.4 Process Search Form.

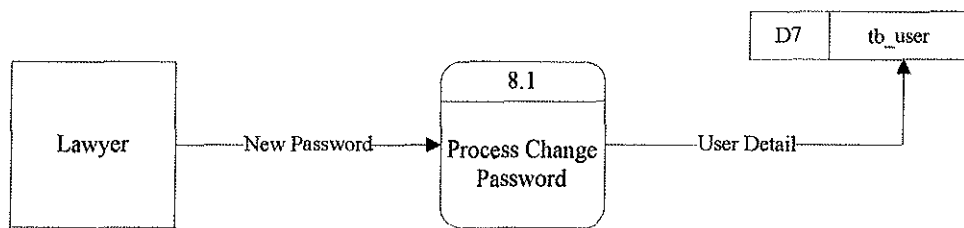


Figure B.36. Level 1 Data Flow Diagram of 8 User Information Subsystem.

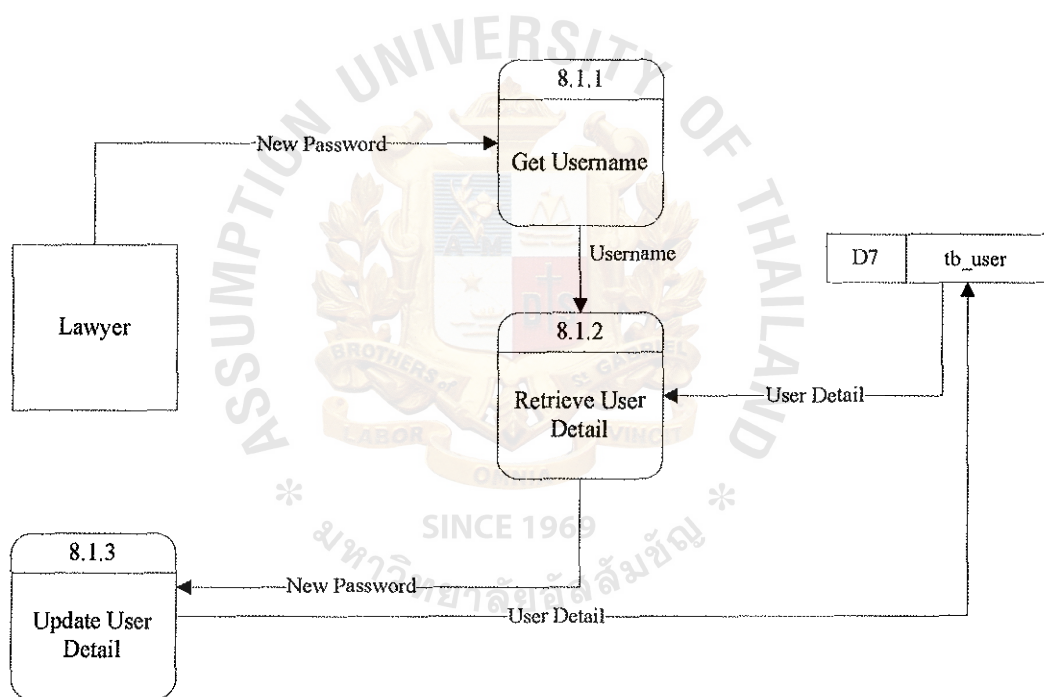


Figure B.37. Level 2 Data Flow Diagram of 8.1 Process Change Password.

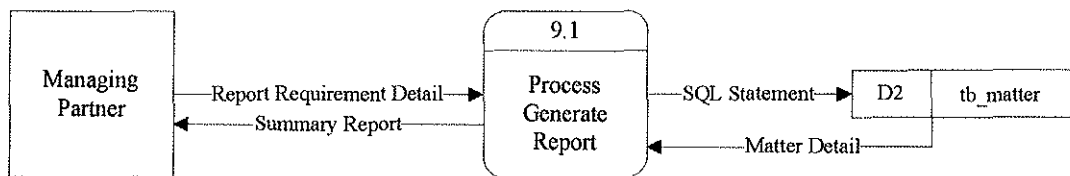


Figure B.38. Level 1 Data Flow Diagram of 9 Report Subsystem.

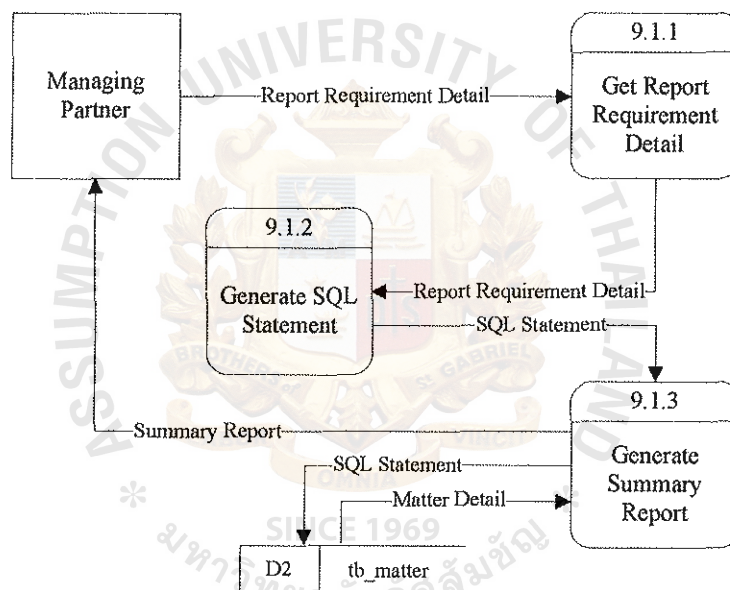


Figure B.39. Level 2 Data Flow Diagram of 9.1 Process Generate Report.





## APPENDIX C

### STRUCTURE DESIGN

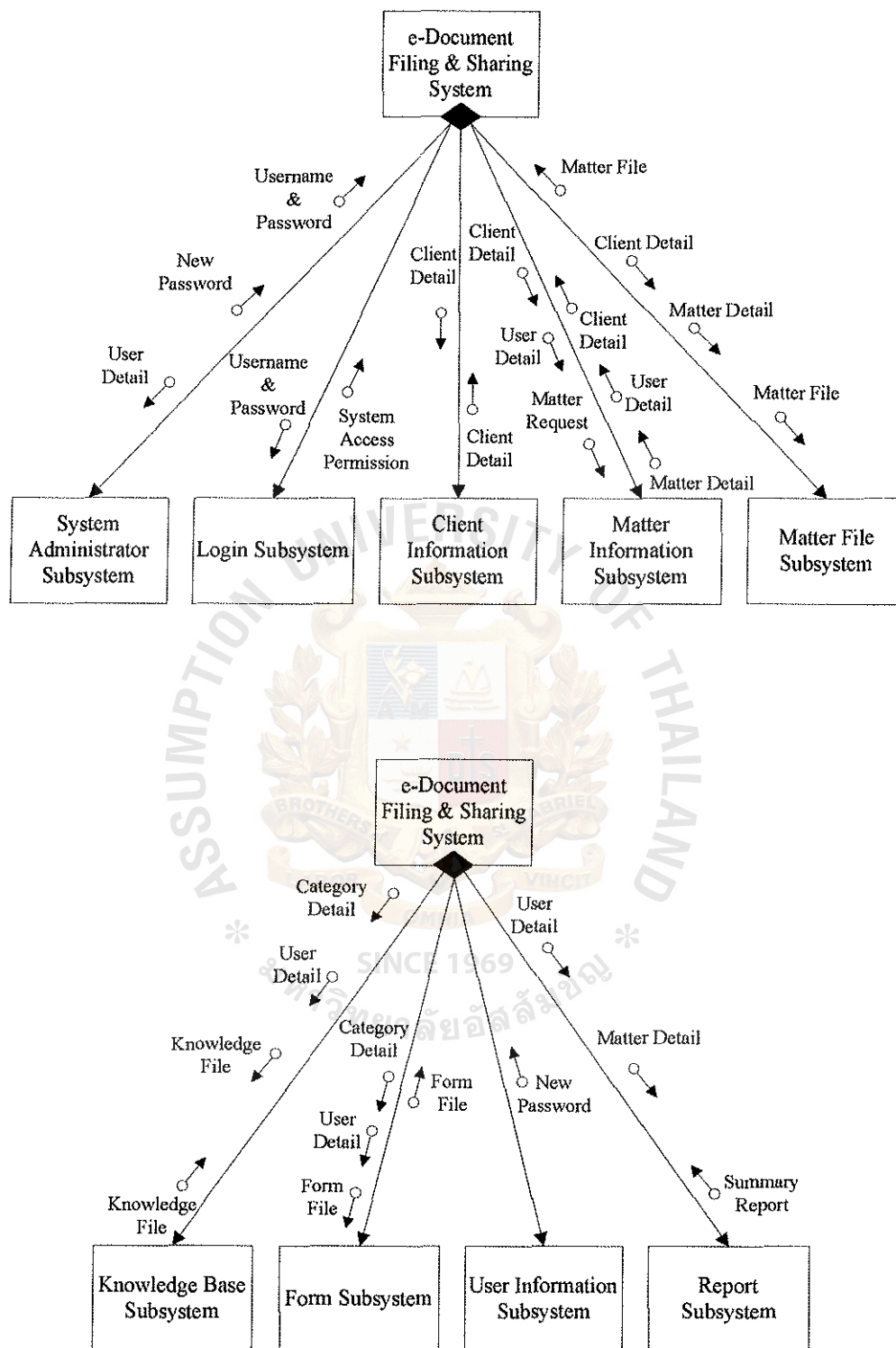


Figure C.1. Structure Chart Level 0 of e-Document Filing & Sharing System.

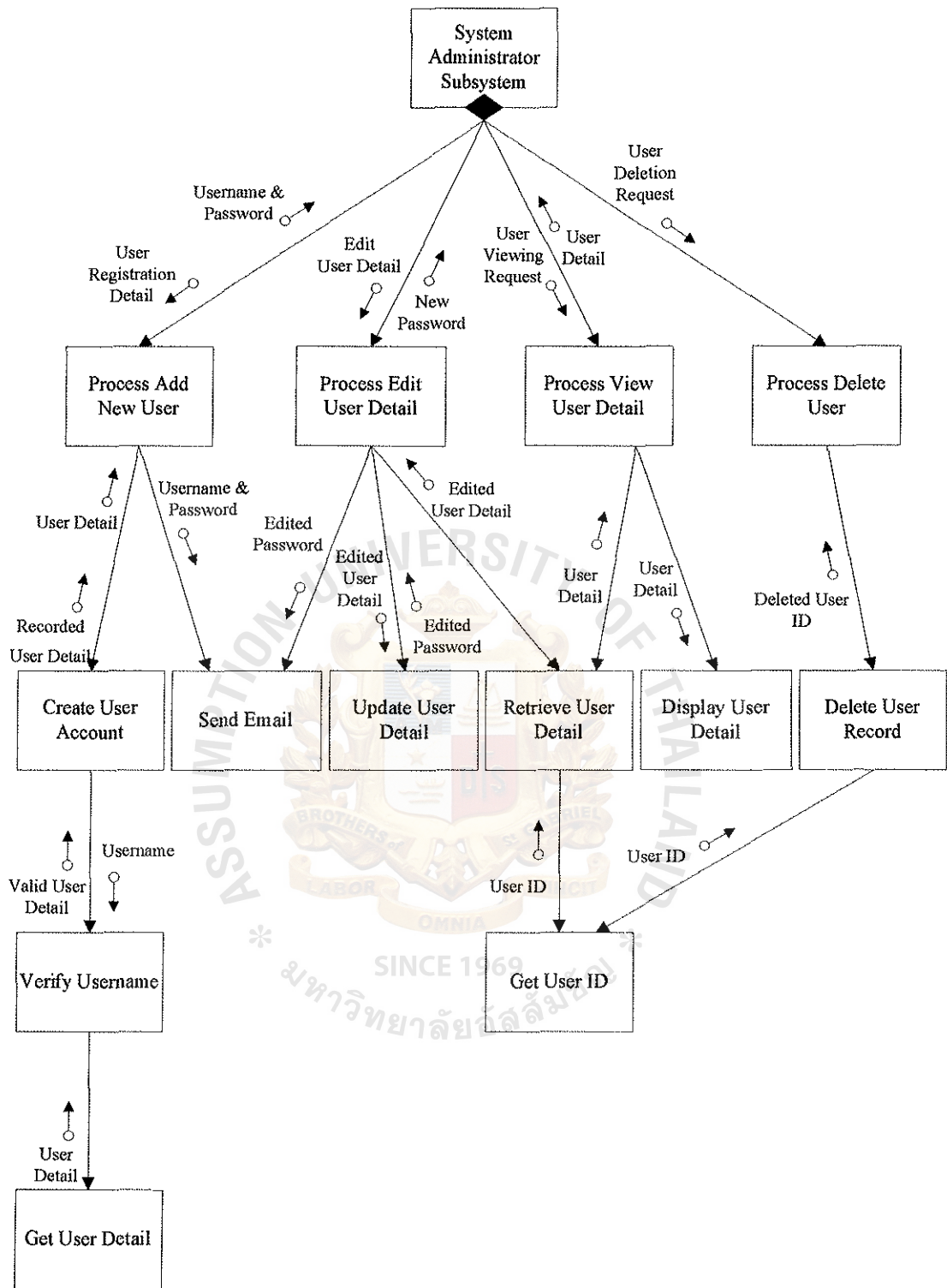


Figure C.2. Structure Chart Level 1.1 of System Administrator Subsystem.

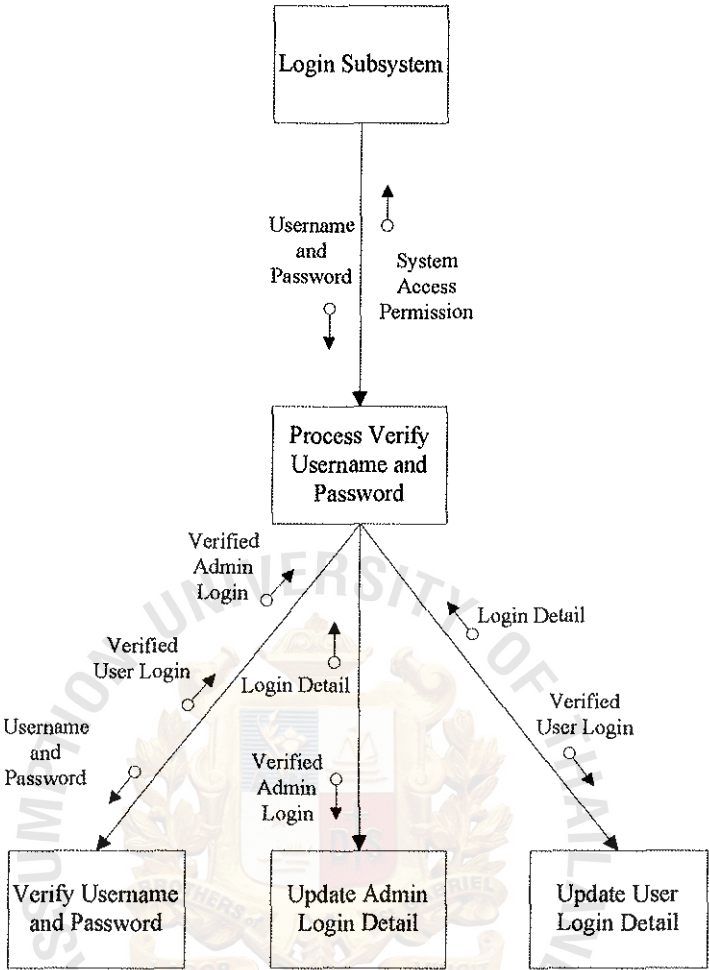


Figure C.3. Structure Chart Level 1.2 of Login Subsystem.

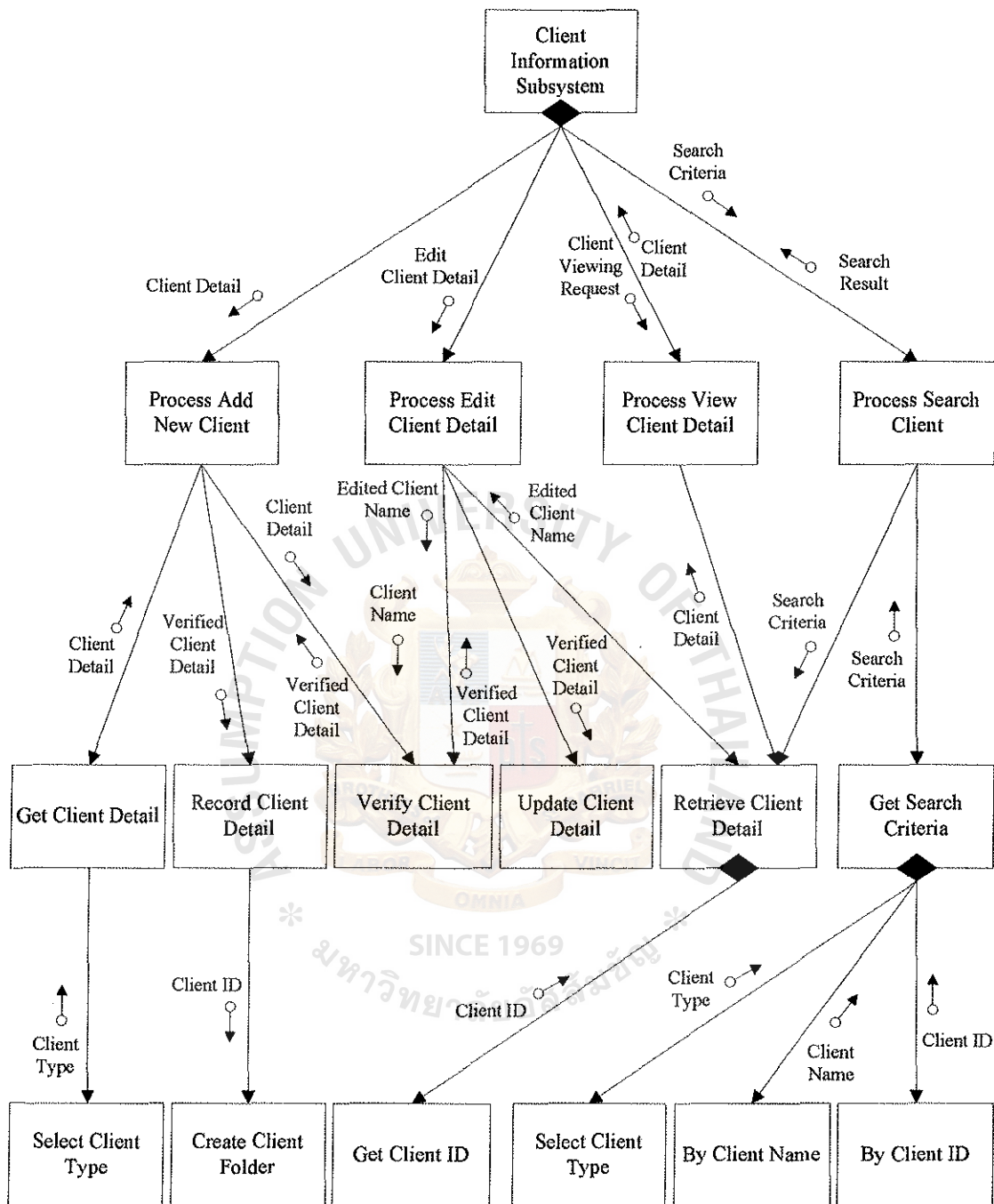


Figure C.4. Structure Chart Level 1.3 of Client Information Subsystem.

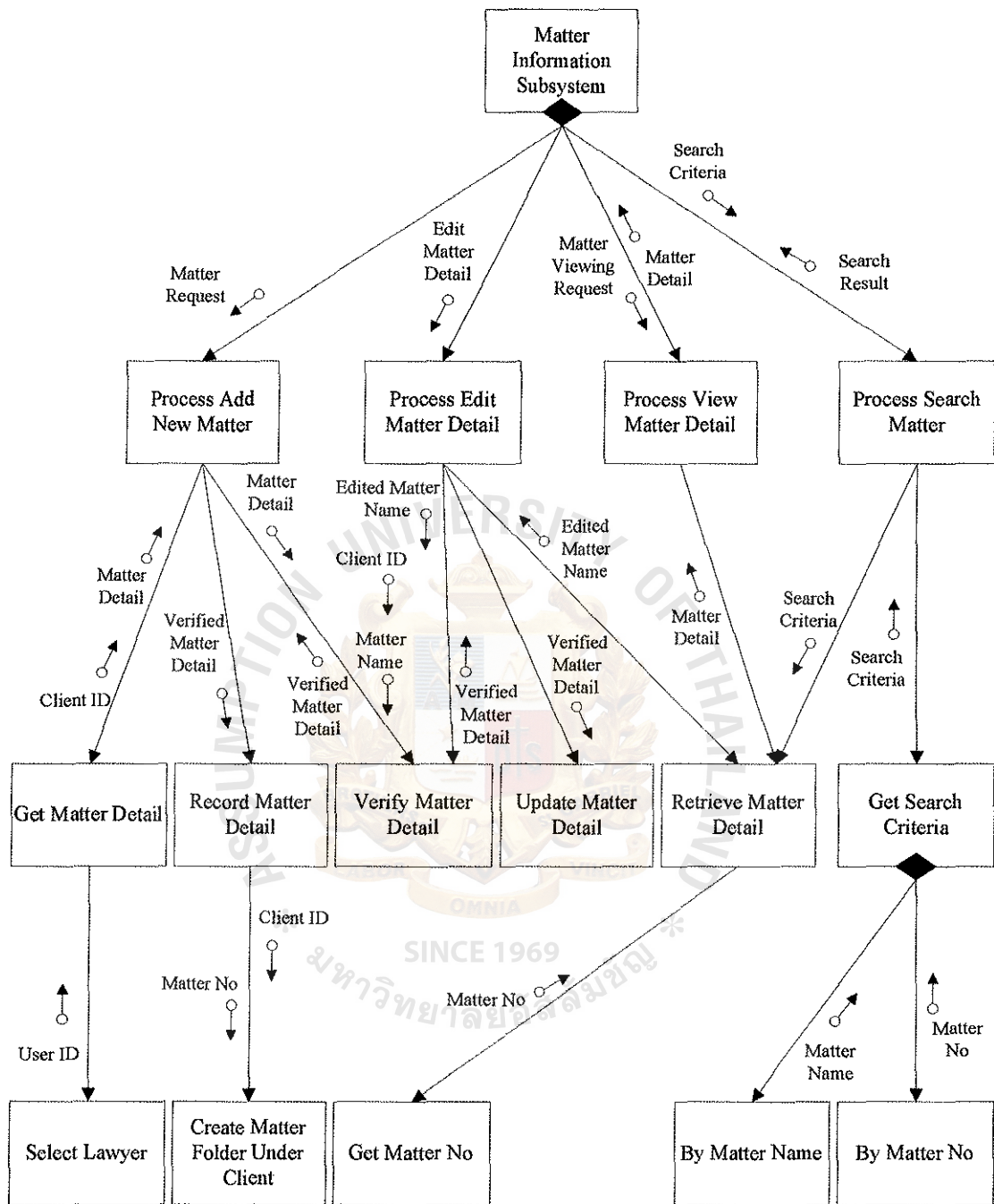


Figure C.5. Structure Chart Level 1.4 of Matter Information Subsystem.

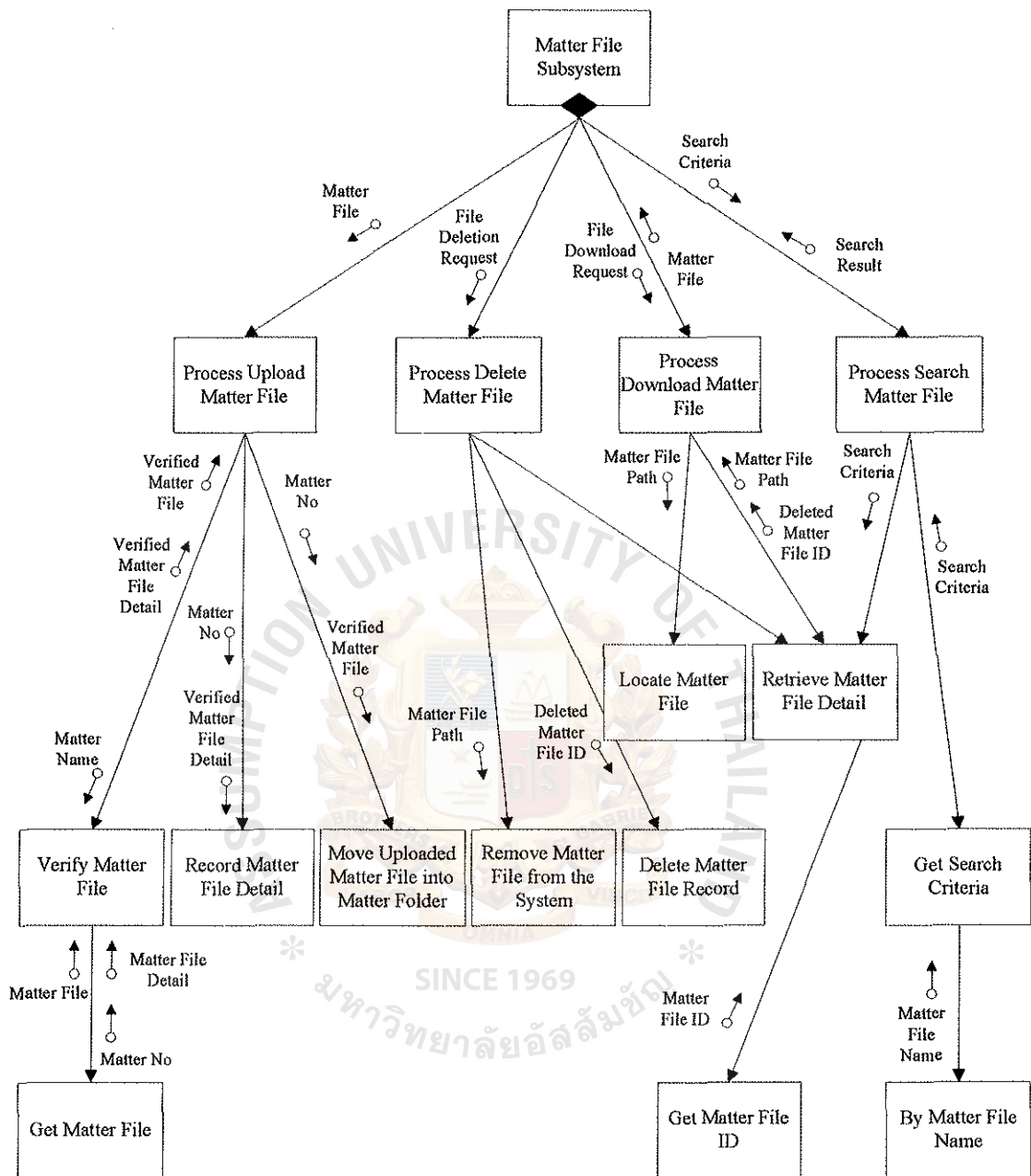


Figure C.6. Structure Chart Level 1.5 of Matter File Subsystem.



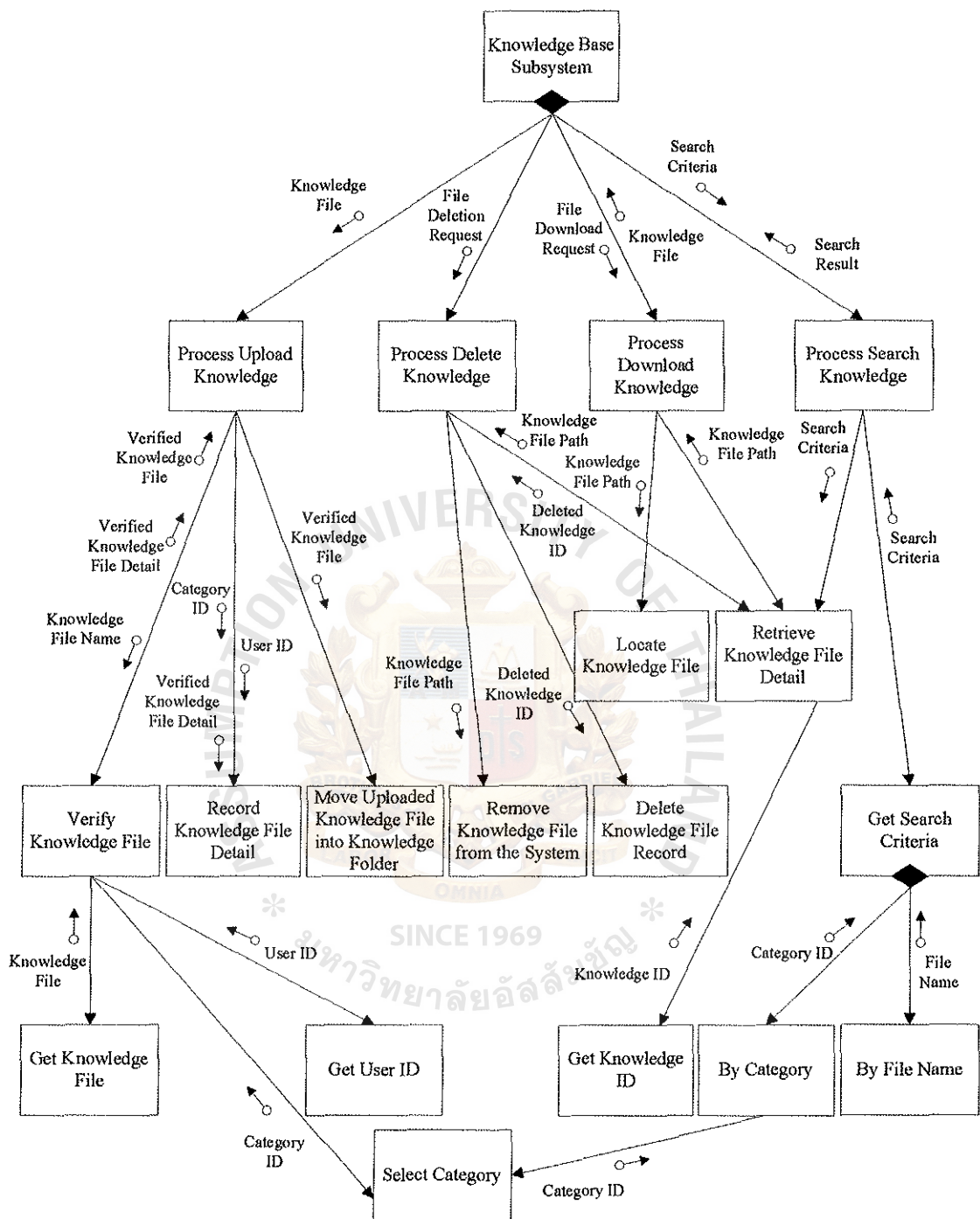


Figure C.7. Structure Chart Level 1.6 of Knowledge Base Subsystem.

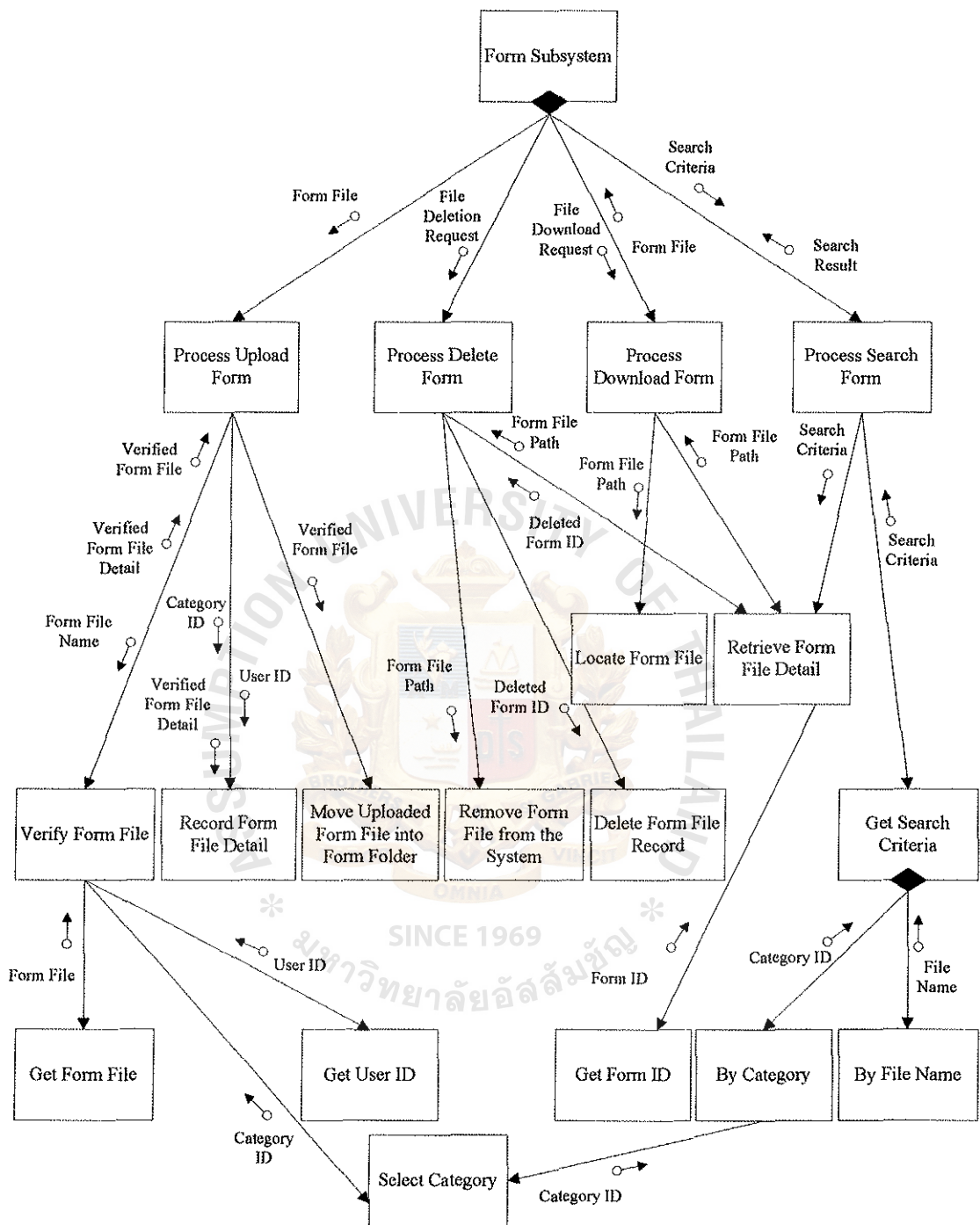


Figure C.8. Structure Chart Level 1.7 of Form Subsystem.

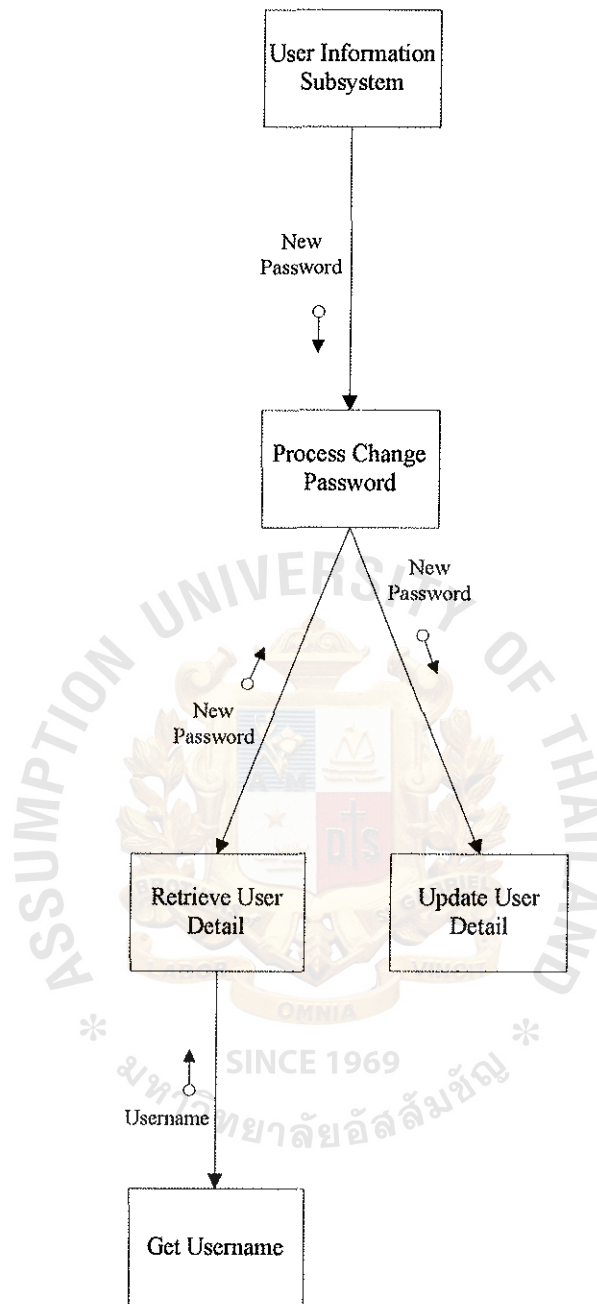


Figure C.9. Structure Chart Level 1.8 of User Information Subsystem.

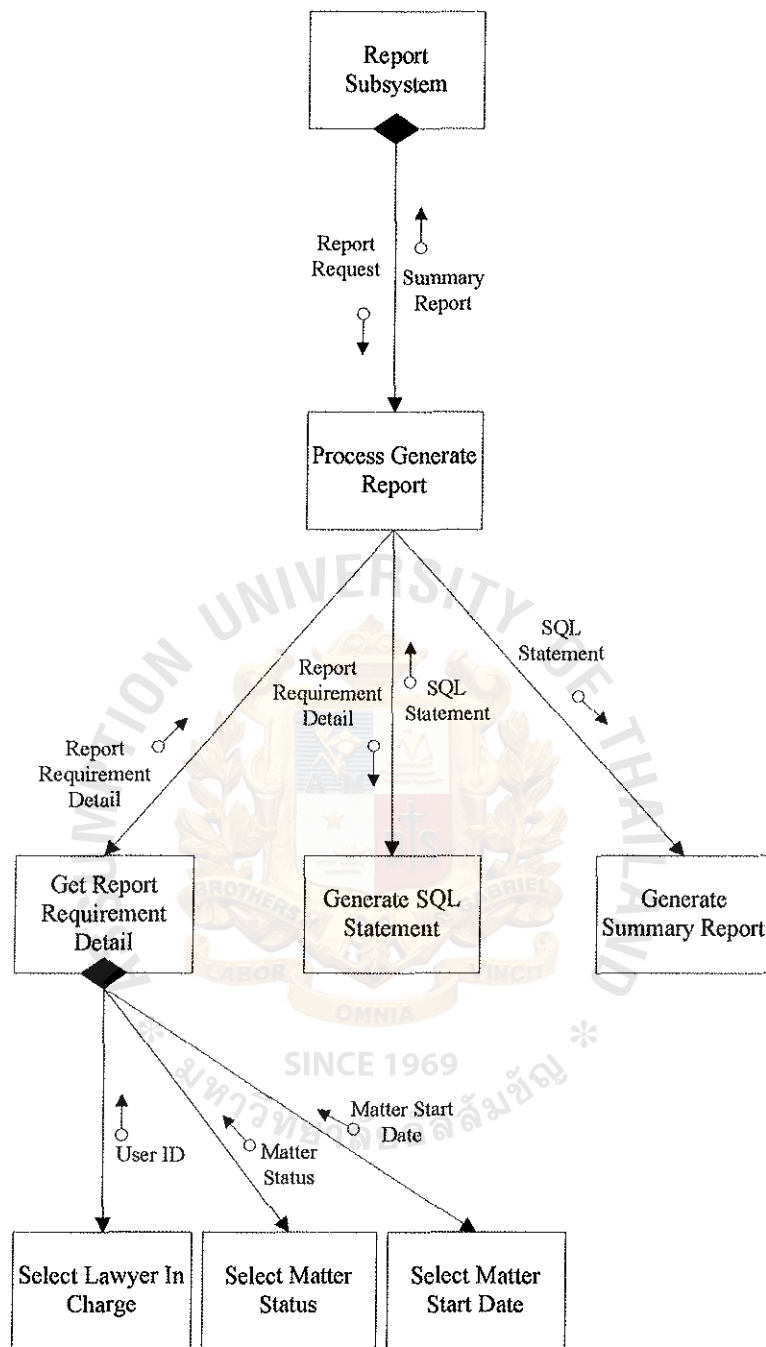


Figure C.10. Structure Chart Level 1.9 of Report Subsystem.



## **APPENDIX D**

### **PROCESS SPECIFICATION**

Table D.1. Process Specification of Process 1.1.1

| Items         | Description  |
|---------------|--|
| Process Name: | Get User Detail  |
| Data In:      | User registration detail   |
| Data Out:     | User detail  |
| Process:      | (1) Get user detail from User Registration form<br>(2) Send user detail to Verify Username process |
| Attachment:   | (1) Administrator<br>(2) Process 1.1.2   |

Table D.2. Process Specification of Process 1.1.2

| Items         | Description   |
|---------------|---|
| Process Name: | Verify Username   |
| Data In:      | User detail<br>Username   |
| Data Out:     | Valid user detail   |
| Process:      | (1) Get user detail from Get User Detail process<br>(2) Retrieve username from User database<br>(3) Send valid user detail to Create User Account process |
| Attachment:   | (1) Process 1.1.1<br>(2) User database<br>(3) Process 1.1.3   |

Table D.3. Process Specification of Process 1.1.3

| Items         | Description  |
|---------------|--|
| Process Name: | Create User Account  |
| Data In:      | Valid User Detail  |
| Data Out:     | User detail<br>Recorded user detail  |
| Process:      | (1) Get valid user detail from Verify Username process<br>(2) Record user detail into User database<br>(3) Send recorded user detail to Send Email process |
| Attachment:   | (1) Process 1.1.2<br>(2) User database<br>(3) Process 1.1.4  |

Table D.4. Process Specification of Process 1.1.4

| Items         | Description  |
|---------------|--|
| Process Name: | Send Email   |
| Data In:      | Recorded user detail   |
| Data Out:     | Username and password (to Lawyer)  |
| Process:      | (1) Get recorded user detail from Create User Account process<br>(2) Send username and password to the Lawyer via an email |
| Attachment:   | (1) Process 1.1.3<br>(2) Lawyer  |

Table D.5. Process Specification of Process 1.2.1

| Items         | Description  |
|---------------|--|
| Process Name: | Get User ID  |
| Data In:      | Edit user detail   |
| Data Out:     | User ID  |
| Process:      | (1) Get edit user detail from Edit User form<br>(2) Send user id to Retrieve User Detail process |
| Attachment:   | (1) Administrator<br>(2) Process 1.2.2   |

Table D.6. Process Specification of Process 1.2.2

| Items         | Description  |
|---------------|--|
| Process Name: | Retrieve User Detail   |
| Data In:      | User ID<br>User detail   |
| Data Out:     | Edited user detail   |
| Process:      | (1) Get user id from Get User ID process<br>(2) Retrieve user detail from User database for displaying in Edit User form and get edited user detail from Edit User form<br>(3) Send edited user detail to Update User Detail process |
| Attachment:   | (1) Process 1.2.1<br>(2) User database<br>(3) Process 1.2.3  |



Table D.7. Process Specification of Process 1.2.3

| Items         | Description   |
|---------------|---|
| Process Name: | Update User Detail  |
| Data In:      | Edited user detail  |
| Data Out:     | User detail<br>Edited password  |
| Process:      | (1) Get edited user detail from Retrieve User Detail<br>(2) Record user detail into User database<br>(3) Send edited password to Send Email process |
| Attachment:   | (1) Process 1.2.2<br>(2) User database<br>(3) Process 1.2.4   |

Table D.8. Process Specification of Process 1.2.4

| Items         | Description   |
|---------------|---|
| Process Name: | Send Email  |
| Data In:      | Edited password   |
| Data Out:     | New password  |
| Process:      | (1) Get edited password from Update User Detail process<br>(2) Send new password to the Lawyer via an email |
| Attachment:   | (1) Process 1.2.3<br>(2) Lawyer   |

Table D.9. Process Specification of Process 1.3.1

| Items         | Description  |
|---------------|--|
| Process Name: | Get User ID  |
| Data In:      | User viewing request   |
| Data Out:     | User ID  |
| Process:      | (1) Get user viewing request from view command<br>(2) Send user id to Retrieve User Detail process |
| Attachment:   | (1) Administrator<br>(2) Process 1.3.2   |

Table D.10. Process Specification of Process 1.3.2

| Items         | Description  |
|---------------|--|
| Process Name: | Retrieve User Detail   |
| Data In:      | User ID<br>User detail   |
| Data Out:     | User detail  |
| Process:      | (1) Get user id from Get User ID process<br>(2) Retrieve user detail from User database<br>(3) Send user detail to Display User Detail process |
| Attachment:   | (1) Process 1.3.1<br>(2) User database<br>(3) Process 1.3.3  |

Table D.11. Process Specification of Process 1.3.3

| Items         | Description   |
|---------------|---|
| Process Name: | Display User Detail   |
| Data In:      | User detail   |
| Data Out:     | User detail   |
| Process:      | (1) Get user detail from Retrieve User Detail process<br>(2) Display user detail on the screen to Administrator |
| Attachment:   | (1) Process 1.3.2<br>(2) Administrator  |

Table D.12. Process Specification of Process 1.4.1

| Items         | Description   |
|---------------|---|
| Process Name: | Get User ID   |
| Data In:      | User deletion request   |
| Data Out:     | User ID   |
| Process:      | (1) Get user deletion request from delete command<br>(2) Send user id to Delete User Record process |
| Attachment:   | (1) Administrator<br>(2) Process 1.4.2  |

Table D.13. Process Specification of Process 1.4.2

| Items         | Description   |
|---------------|---|
| Process Name: | Delete User Record  |
| Data In:      | User ID   |
| Data Out:     | Deleted User ID   |
| Process:      | (1) Get user id from Get User ID process<br>(2) Delete user record from User database |
| Attachment:   | (1) Process 1.4.1<br>(2) User database  |

Table D.14. Process Specification of Process 2.1.1

| Items         | Description  |
|---------------|--|
| Process Name: | Verify Username and Password   |
| Data In:      | Username and password from the user<br>Username and password from User database  |
| Data Out:     | Verified admin login<br>Verified user login  |
| Process:      | (1) Get username and password from Login form<br>(2) Retrieve username and password from User database<br>(3) Send verified admin login to Update Admin Login Detail process<br>(4) Send verified user login to Update User Login Detail process |
| Attachment:   | (1) Administrator<br>(2) Lawyer<br>(3) User database<br>(4) Process 2.1.2<br>(5) Process 2.1.3   |

Table D.15. Process Specification of Process 2.1.2

| Items         | Description   |
|---------------|---|
| Process Name: | Update Admin Login Detail   |
| Data In:      | Verified admin login  |
| Data Out:     | Login detail<br>System access permission  |
| Process:      | (1) Get verified admin login from Verified Username and Password process<br>(2) Record login detail into User database<br>(3) Grant system access permission to admin tools |
| Attachment:   | (1) Process 2.1.1<br>(2) User database<br>(3) Administrator   |

Table D.16. Process Specification of Process 2.1.3

| Items         | Description   |
|---------------|---|
| Process Name: | Update User Login Detail  |
| Data In:      | Verified user login   |
| Data Out:     | Login detail<br>System access permission  |
| Process:      | (1) Get verified user login from Verified Username and Password process<br>(2) Record login detail into User database<br>(3) Grant system access permission to user tools |
| Attachment:   | (1) Process 2.1.1<br>(2) User database<br>(3) Administrator   |

Table D.17. Process Specification of Process 3.1.1

| Items         | Description   |
|---------------|---|
| Process Name: | Get Client Detail   |
| Data In:      | Client detail   |
| Data Out:     | Corporate client detail<br>Individual client detail   |
| Process:      | (1) Get client detail from Add New Client form<br>(2) If client type equal to "Corporate". Send corporate client detail to Verify Existence of Corporate Client process<br>(3) If client type equal to "Individual". Send individual client detail to Verify Existence of Individual Client process |
| Attachment:   | (1) Client<br>(2) Process 3.1.2<br>(3) Process 3.1.3  |

Table D.18. Process Specification of Process 3.1.2

| Items         | Description  |
|---------------|--|
| Process Name: | Verify Existence of Corporate Client   |
| Data In:      | Corporate client detail<br>Company name  |
| Data Out:     | Verified corporate client detail   |
| Process:      | (1) Get corporate client detail from Get Client Detail process<br>(2) Retrieve company name from Corporate database<br>(3) Send verified corporate client detail to Record Client Detail process |
| Attachment:   | (1) Process 3.1.1<br>(2) Corporate database<br>(3) Process 3.1.4   |

Table D.19. Process Specification of Process 3.1.3

| Items         | Description  |
|---------------|--|
| Process Name: | Verify Existence of Individual Client  |
| Data In:      | Individual client detail<br>Individual name  |
| Data Out:     | Verified individual client detail  |
| Process:      | (1) Get individual client detail from Get Client Detail process<br>(2) Retrieve individual name from Individual database<br>(3) Send verified individual client detail to Record Client Detail process |
| Attachment:   | (1) Process 3.1.1<br>(2) Individual database<br>(3) Process 3.1.4  |

Table D.20. Process Specification of Process 3.1.4

| Items         | Description   |
|---------------|---|
| Process Name: | Record Client Detail  |
| Data In:      | Verified corporate client detail<br>Verified individual client detail   |
| Data Out:     | Client detail<br>Corporate detail<br>Individual detail<br>Client ID   |
| Process:      | (1) Get verified corporate client detail from Verify Existence of Corporate Client process<br>(2) Get verified individual client detail from Verify Existence of Individual Client process<br>(3) Record client detail into Client database<br>(4) Record corporate detail into Corporate database<br>(5) Record individual detail into Individual database<br>(6) Send client id to Create Client Folder process |
| Attachment:   | (1) Process 3.1.2<br>(2) Process 3.1.3<br>(3) Client database<br>(4) Corporate database<br>(5) Individual database<br>(6) Process 3.1.5   |



Table D.21. Process Specification of Process 3.1.5

| Items         | Description   |
|---------------|---|
| Process Name: | Create Client Folder  |
| Data In:      | Client ID   |
| Data Out:     | -   |
| Process:      | (1) Get client id from Record Client Detail process<br>(2) Create client folder named after client id |
| Attachment:   | (1) Process 3.1.4   |

Table D.22. Process Specification of Process 3.2.1

| Items         | Description  |
|---------------|--|
| Process Name: | Get Client ID  |
| Data In:      | Edit client detail   |
| Data Out:     | Client ID  |
| Process:      | (1) Get edit client detail from Edit Client form<br>(2) If client type equal to "Corporate". Send client id to Retrieve Corporate Client Detail process<br>(3) If client type equal to "Individual". Send client id to Retrieve Individual Client Detail process |
| Attachment:   | (1) Lawyer<br>(2) Process 3.2.2<br>(3) Process 3.2.3   |



Table D.23. Process Specification of Process 3.2.2

| Items         | Description   |
|---------------|---|
| Process Name: | Retrieve Corporate Client Detail  |
| Data In:      | Client ID<br>Client detail<br>Corporate detail  |
| Data Out:     | Edited company name   |
| Process:      | (1) Get client id from Get Client ID process<br>(2) Retrieve client detail from Client database for displaying in Edit Client form and get edited client detail from Edit Client form<br>(3) Retrieve corporate detail from Corporate database for displaying in Edit Client form and get edited corporate detail from Edit Client form<br>(4) Send edited company name to Verify Duplication of Company Name process |
| Attachment:   | (1) Process 3.2.1<br>(2) Client database<br>(3) Corporate database<br>(4) Process 3.2.4   |

Table D.24. Process Specification of Process 3.2.3

| Items         | Description  |
|---------------|--|
| Process Name: | Retrieve Individual Client Detail  |
| Data In:      | Client ID<br>Client detail<br>Individual detail  |
| Data Out:     | Edited individual name   |
| Process:      | (1) Get client id from Get Client ID process<br>(2) Retrieve client detail from Client database for displaying in Edit Client form and get edited client detail from Edit Client form<br>(3) Retrieve individual detail from Individual database for displaying in Edit Client form and get edited individual detail from Edit Client form<br>(4) Send edited individual name to Verify Duplication of Individual Name process |
| Attachment:   | (1) Process 3.2.1<br>(2) Client database<br>(3) Individual database<br>(4) Process 3.2.5   |

Table D.25. Process Specification of Process 3.2.4

| Items         | Description   |
|---------------|---|
| Process Name: | Verify Duplication of Company Name  |
| Data In:      | Edited company name<br>Company name   |
| Data Out:     | Verified corporate client detail  |
| Process:      | (1) Get edited company name from Retrieve Corporate Client Detail process<br>(2) Retrieve company name from Corporate database<br>(3) Send verified corporate client detail to Update Corporate Client Detail process |
| Attachment:   | (1) Process 3.2.2<br>(2) Corporate database<br>(3) Process 3.2.6  |

Table D.26. Process Specification of Process 3.2.5

| Items         | Description   |
|---------------|---|
| Process Name: | Verify Duplication of Individual Name   |
| Data In:      | Edited Individual name<br>Individual name   |
| Data Out:     | Verified individual client detail   |
| Process:      | (1) Get edited individual name from Retrieve Individual Client Detail process<br>(2) Retrieve individual name from Individual database<br>(3) Send verified individual client detail to Update Individual Client Detail process |
| Attachment:   | (1) Process 3.2.3<br>(2) Individual database<br>(3) Process 3.2.7   |

Table D.27. Process Specification of Process 3.2.6

| Items         | Description  |
|---------------|--|
| Process Name: | Update Corporate Client Detail   |
| Data In:      | Verified corporate client detail   |
| Data Out:     | Client detail<br>Corporate detail  |
| Process:      | (1) Get verified corporate client detail from Verify Duplication of Company Name process<br>(2) Record client detail into Client database<br>(3) Record corporate detail into Corporate database |
| Attachment:   | (1) Process 3.2.4<br>(2) Client database<br>(3) Corporate database   |

Table D.28. Process Specification of Process 3.2.7

| Items         | Description  |
|---------------|--|
| Process Name: | Update Individual Client Detail  |
| Data In:      | Verified individual client detail  |
| Data Out:     | Client detail<br>Individual detail   |
| Process:      | (1) Get verified individual client detail from Verify Duplication of Individual Name process<br>(2) Record client detail into Client database<br>(3) Record individual detail into Individual database |
| Attachment:   | (1) Process 3.2.5<br>(2) Client database<br>(3) Individual database  |

Table D.29. Process Specification of Process 3.3.1

| Items         | Description  |
|---------------|--|
| Process Name: | Get Client ID  |
| Data In:      | Client viewing request   |
| Data Out:     | Client ID  |
| Process:      | (1) Get client viewing request from view command<br>(2) If posted client type equal to "Corporate". Send client id to Retrieve Corporate Client Detail<br>(3) If posted client type equal to "Individual". Send client id to Retrieve Individual Client Detail |
| Attachment:   | (1) Lawyer<br>(2) Process 3.3.2<br>(3) Process 3.3.3   |

Table D.30. Process Specification of Process 3.3.2

| Items         | Description   |
|---------------|---|
| Process Name: | Retrieve Corporate Client Detail  |
| Data In:      | Client ID<br>Client detail<br>Corporate detail  |
| Data Out:     | Client detail   |
| Process:      | (1) Get client id from Get Client ID process<br>(2) Retrieve client detail from Client database<br>(3) Retrieve corporate detail from Corporate database<br>(4) Send client detail to Display Client Detail process |
| Attachment:   | (1) Process 3.3.1<br>(2) Client database<br>(3) Corporate database<br>(4) Process 3.3.4   |

Table D.31. Process Specification of Process 3.3.3

| Items         | Description   |
|---------------|---|
| Process Name: | Retrieve Individual Client Detail   |
| Data In:      | Client ID<br>Client detail<br>Individual detail   |
| Data Out:     | Client detail   |
| Process:      | (1) Get client id from Get Client ID process<br>(2) Retrieve client detail from Client database<br>(3) Retrieve individual detail from Individual database<br>(4) Send client detail to Display Client Detail process |
| Attachment:   | (1) Process 3.3.1<br>(2) Client database<br>(3) Individual database<br>(4) Process 3.3.4  |

Table D.32. Process Specification of Process 3.3.4

| Items         | Description  |
|---------------|--|
| Process Name: | Display Client Detail  |
| Data In:      | Client detail  |
| Data Out:     | Client detail  |
| Process:      | (1) Get client detail from Retrieve Corporate Client Detail process<br>(2) Get client detail from Retrieve Individual Client Detail process<br>(3) Display client detail on the screen to Lawyer |
| Attachment:   | (1) Process 3.3.2<br>(2) Process 3.3.3<br>(3) Lawyer   |

Table D.33. Process Specification of Process 3.4.1

| Items         | Description   |
|---------------|---|
| Process Name: | Get Search Criteria   |
| Data In:      | Search criteria i.e.<br>- client type<br>- client id<br>- client name   |
| Data Out:     | Search criteria   |
| Process:      | (1) Get search criteria from Client Search form<br>(2) If selected client type equal to "Corporate". Send search criteria to Request Corporate Client Detail process<br>(3) If selected client type equal to "Individual". Send search criteria to Request Individual Client Detail process |
| Attachment:   | (1) Lawyer<br>(2) Process 3.4.2<br>(3) Process 3.4.3  |

Table D.34. Process Specification of Process 3.4.2

| Items         | Description  |
|---------------|--|
| Process Name: | Request Corporate Client Detail  |
| Data In:      | Search criteria i.e.<br>- client type<br>- client id<br>- client name<br>Corporate detail  |
| Data Out:     | Keyword<br>Corporate client detail   |
| Process:      | (1) Get search criteria from Get Search Criteria process<br>(2) Compare keyword with recorded value in Corporate database<br>(3) Retrieve corporate detail from Corporate database according to input keyword<br>(4) Send corporate client detail to Display Search Result process |
| Attachment:   | (1) Process 3.4.1<br>(2) Corporate database<br>(3) Process 3.4.4   |



Table D.35. Process Specification of Process 3.4.3

| Items         | Description  |
|---------------|--|
| Process Name: | Request Individual Client Detail   |
| Data In:      | Search criteria i.e.<br>- client type<br>- client id<br>- client name<br>Individual detail   |
| Data Out:     | Keyword<br>Individual client detail  |
| Process:      | (1) Get search criteria from Get Search Criteria process<br>(2) Compare keyword with recorded value in Individual database<br>(3) Retrieve individual detail from Individual database according to input keyword<br>(4) Send individual client detail to Display Search Result process |
| Attachment:   | (1) Process 3.4.1<br>(2) Individual database<br>(3) Process 3.4.4  |

Table D.36. Process Specification of Process 3.4.4

| Items         | Description   |
|---------------|---|
| Process Name: | Display Search Result   |
| Data In:      | Corporate client detail<br>Individual client detail   |
| Data Out:     | Search result   |
| Process:      | (1) Get corporate client detail from Request Corporate Client Detail process<br>(2) Get individual client detail from Request Individual Client Detail process<br>(3) Display search result on the screen to Lawyer |
| Attachment:   | (1) Process 3.4.2<br>(2) Process 3.4.3<br>(3) Lawyer  |



Table D.37. Process Specification of Process 4.1.1

| Items         | Description   |
|---------------|---|
| Process Name: | Get Matter Detail   |
| Data In:      | Matter request<br>Client ID<br>User ID  |
| Data Out:     | Matter detail   |
| Process:      | (1) Get matter request from Add New Matter form<br>(2) Get client id from Add New Matter form<br>(3) Get user id from Add New Matter form<br>(4) Send matter detail to Verify Existence of Matter process |
| Attachment:   | (1) Client<br>(2) Client database<br>(3) User database<br>(4) Process 4.1.2   |

Table D.38. Process Specification of Process 4.1.2

| Items         | Description   |
|---------------|---|
| Process Name: | Verify Existence of Matter  |
| Data In:      | Matter detail<br>Client id<br>Matter name   |
| Data Out:     | Verified matter detail  |
| Process:      | (1) Get matter detail from Get Matter Detail process<br>(2) Get client id from Client database<br>(3) Get matter name from Matter database<br>(4) Send verified matter detail to Record Matter Detail process |
| Attachment:   | (1) Process 4.1.1<br>(2) Client database<br>(3) Matter database<br>(4) Process 4.1.3  |

Table D.39. Process Specification of Process 4.1.3

| Items         | Description   |
|---------------|---|
| Process Name: | Record Matter Detail  |
| Data In:      | Verified matter detail  |
| Data Out:     | Matter detail<br>Client ID<br>Matter No   |
| Process:      | (1) Get verified matter detail from Verify Existence of Matter process<br>(2) Record matter detail into Matter database<br>(3) Send client id to Create Matter Folder under Client process<br>(4) Send matter no to Create Matter Folder under Client process |
| Attachment:   | (1) Process 4.1.2<br>(2) Matter database<br>(3) Process 4.1.4   |

Table D.40. Process Specification of Process 4.1.4

| Items         | Description  |
|---------------|--|
| Process Name: | Create Matter Folder under Client  |
| Data In:      | Client ID<br>Matter No   |
| Data Out:     | -  |
| Process:      | (1) Get client id from Record Matter Detail process<br>(2) Get matter no from Record Matter Detail process<br>(3) Create matter folder named after matter no under client folder |
| Attachment:   | (1) Process 4.1.3  |

Table D.41. Process Specification of Process 4.2.1

| Items         | Description  |
|---------------|--|
| Process Name: | Get Matter No  |
| Data In:      | Edit Matter Detail   |
| Data Out:     | Matter No  |
| Process:      | (1) Get edit matter detail from Edit Matter form<br>(2) Send matter no to Retrieve Matter Detail process |
| Attachment:   | (1) Lawyer<br>(2) Process 4.2.2  |

Table D.42. Process Specification of Process 4.2.2

| Items         | Description   |
|---------------|---|
| Process Name: | Retrieve Matter Detail  |
| Data In:      | Matter No<br>Matter detail  |
| Data Out:     | Edited matter name  |
| Process:      | (1) Get matter no from Get Matter No process<br>(2) Retrieve matter detail from Matter database for displaying in Edit Matter form and get edited matter detail from Edit Matter form<br>(3) Send edited matter name to Verify Duplication of Matter Name process |
| Attachment:   | (1) Process 4.2.1<br>(2) Matter database<br>(3) Process 4.2.3   |

Table D.43. Process Specification of Process 4.2.3

| Items         | Description   |
|---------------|---|
| Process Name: | Verify Duplication of Matter Name   |
| Data In:      | Edited matter name<br>Matter name   |
| Data Out:     | Verified matter detail  |
| Process:      | (1) * Get edited matter name from Retrieve Matter Detail process<br>(2) Get matter name from Matter database<br>(3) Send verified matter detail to Update Matter Detail process |
| Attachment:   | (1) Process 4.2.2<br>(2) Matter database<br>(3) Process 4.2.4   |

Table D.44. Process Specification of Process 4.2.4

| Items         | Description  |
|---------------|--|
| Process Name: | Update Matter Detail   |
| Data In:      | Verified matter detail   |
| Data Out:     | Matter detail  |
| Process:      | (1) Get verified matter detail from Verify Duplication of Matter Name process<br>(2) Update matter detail in Matter database |
| Attachment:   | (1) Process 4.2.3<br>(2) Matter database   |

Table D.45. Process Specification of Process 4.3.1

| Items         | Description  |
|---------------|--|
| Process Name: | Get Matter No  |
| Data In:      | Matter viewing request   |
| Data Out:     | Matter No  |
| Process:      | (1) Get matter viewing request from view command<br>(2) Send matter no to Retrieve Matter Detail process |
| Attachment:   | (1) Lawyer<br>(2) Process 4.3.2  |

Table D.46. Process Specification of Process 4.3.2

| Items         | Description   |
|---------------|---|
| Process Name: | Retrieve Matter Detail  |
| Data In:      | Matter No<br>Matter detail  |
| Data Out:     | Matter detail   |
| Process:      | (1) Get matter no from Get Matte No process<br>(2) Retrieve matter detail from Matter database<br>(3) Send matter detail to Display Matter Detail process |
| Attachment:   | (1) Process 4.3.1<br>(2) Matter database<br>(3) Process 4.3.3   |

Table D.47. Process Specification of Process 4.3.3

| Items         | Description  |
|---------------|--|
| Process Name: | Display Matter Detail  |
| Data In:      | Matter detail  |
| Data Out:     | Matter detail  |
| Process:      | (1) Get matter detail from Retrieve Matter Detail process<br>(2) Display matter detail on the screen to Lawyer |
| Attachment:   | (1) Process 4.3.2<br>(2) Lawyer  |

Table D.48. Process Specification of Process 4.4.1

| Items         | Description  |
|---------------|--|
| Process Name: | Get Search Criteria  |
| Data In:      | Search criteria i.e.<br>- matter no<br>- matter name   |
| Data Out:     | Search criteria  |
| Process:      | (1) Get search criteria from Matter Search form<br>(2) Send search criteria to Request Matter Detail process |
| Attachment:   | (1) Lawyer<br>(2) Process 4.4.2  |

Table D.49. Process Specification of Process 4.4.2

| Items         | Description   |
|---------------|---|
| Process Name: | Request Matter Detail   |
| Data In:      | Search criteria i.e.<br>- matter no<br>- matter name<br>Matter detail   |
| Data Out:     | Keyword<br>Matter detail  |
| Process:      | (1) Get search criteria from Get Search Criteria process<br>(2) Compare keyword with recorded value in Matter database<br>(3) Retrieve matter detail from matter database according to input keyword<br>(4) Send matter detail to Display Search Result process |
| Attachment:   | (1) Process 4.4.1<br>(2) Matter database<br>(3) Process 4.4.3   |

Table D.50. Process Specification of Process 4.4.3

| Items         | Description   |
|---------------|---|
| Process Name: | Display Search Result   |
| Data In:      | Matter detail   |
| Data Out:     | Search result   |
| Process:      | (1) Get matter detail from Request Matter Detail process<br>(2) Display search result on the screen to Lawyer |
| Attachment:   | (1) Process 4.4.2<br>(2) Lawyer   |



Table D.51. Process Specification of Process 5.1.1

| Items         | Description  |
|---------------|--|
| Process Name: | Get Matter File  |
| Data In:      | Client document needed for matter<br>Return of requested matter<br>Upload matter file<br>Matter No   |
| Data Out:     | Matter detail  |
| Process:      | (1) Get matter file from Add New Matter File form<br>(2) Get matter no from Add New Matter File form<br>(3) Send matter file detail to Verify Existence of Matter File process |
| Attachment:   | (1) Client<br>(2) Government Office<br>(3) Lawyer<br>(4) Matter database   |

Table D.52. Process Specification of Process 5.1.2

| Items         | Description   |
|---------------|---|
| Process Name: | Verify Existence of Matter File   |
| Data In:      | Matter file detail<br>Matter file name  |
| Data Out:     | Verified matter file detail<br>Verified matter file   |
| Process:      | (1) Get matter file detail from Get Matter File process<br>(2) Get matter file name from Matter File database<br>(3) Send verified matter file detail to Record Matter File Detail process<br>(4) Send verified matter file to Move Uploaded Matter File into Matter Folder process |
| Attachment:   | (1) Process 5.1.1<br>(2) Matter File database<br>(3) Process 5.1.3<br>(4) Process 5.1.4   |



Table D.53. Process Specification of Process 5.1.3

| Items         | Description   |
|---------------|---|
| Process Name: | Record Matter File Detail   |
| Data In:      | Verified matter file detail   |
| Data Out:     | Matter file detail  |
| Process:      | (1) Get verified matter file detail from Verify Existence of Matter File process<br>(2) Record matter file detail into Matter File database |
| Attachment:   | (1) Process 5.1.2<br>(2) Matter File database   |

Table D.54. Process Specification of Process 5.1.4

| Items         | Description   |
|---------------|---|
| Process Name: | Move Uploaded Matter File into Matter Folder  |
| Data In:      | Verified matter file  |
| Data Out:     | -   |
| Process:      | (1) Get verified matter file from Verify Existence of Matter File process<br>(2) Move verified matter file into Matter folder |
| Attachment:   | (1) Process 5.1.2   |

Table D.55. Process Specification of Process 5.2.1

| Items         | Description  |
|---------------|--|
| Process Name: | Get Matter File ID   |
| Data In:      | File download request  |
| Data Out:     | Matter File ID   |
| Process:      | (1) Get file download request from download command<br>(2) Send matter file id to Get Matter File Detail process |
| Attachment:   | (1) Lawyer<br>(2) Process 5.2.2  |

Table D.56. Process Specification of Process 5.2.2

| Items         | Description   |
|---------------|---|
| Process Name: | Get Matter File Detail  |
| Data In:      | Matter File ID<br>Matter file detail  |
| Data Out:     | Matter file path  |
| Process:      | (1) Get matter file id from Get Matter File ID process<br>(2) Get matter file detail from Matter File database<br>(3) Send generated matter file path to Locate Matter File process |
| Attachment:   | (1) Process 5.2.1<br>(2) Matter File database<br>(3) Process 5.2.3  |

Table D.57. Process Specification of Process 5.2.3

| Items         | Description   |
|---------------|---|
| Process Name: | Locate Matter File  |
| Data In:      | Matter file path  |
| Data Out:     | Downloaded matter file  |
| Process:      | (1) Get matter file path from Get Matter File Detail process<br>(2) Retrieve requested matter file and send to Lawyer |
| Attachment:   | (1) Process 5.2.2<br>(2) Lawyer   |

Table D.58. Process Specification of Process 5.3.1

| Items         | Description   |
|---------------|---|
| Process Name: | Get Matter File ID  |
| Data In:      | Matter file deletion request  |
| Data Out:     | Matter File ID  |
| Process:      | (1) Get matter file deletion request from delete command<br>(2) Send matter file id to Get Matter File Detail process |
| Attachment:   | (1) Lawyer<br>(2) Process 5.3.2   |

Table D.59. Process Specification of Process 5.3.2

| Items         | Description   |
|---------------|---|
| Process Name: | Get Matte File Detail   |
| Data In:      | Matter File ID<br>Matter file detail  |
| Data Out:     | Matter file path<br>Deleted matter file id  |
| Process:      | (1) Get matter file id from Get Matter File ID process<br>(2) Get matter file detail from Matter File database<br>(3) Send deleted matter file id to Delete Matter File Record process<br>(4) Send generated matter file path to Remove Matter File from the system |
| Attachment:   | (1) Process 5.3.1<br>(2) Matter File database<br>(3) Process 5.3.3<br>(4) Process 5.3.4   |

Table D.60. Process Specification of Process 5.3.3

| Items         | Description  |
|---------------|--|
| Process Name: | Remove Matter File from the System   |
| Data In:      | Matter file path   |
| Data Out:     | -  |
| Process:      | (1) Get matter file path from Get Matter File Detail process<br>(2) Remove requested matter file from the system |
| Attachment:   | (1) Process 5.3.2  |

Table D.61. Process Specification of Process 5.3.4

| Items         | Description   |
|---------------|---|
| Process Name: | Delete Matter File Record   |
| Data In:      | Deleted matter file id  |
| Data Out:     | Deleted matter file id  |
| Process:      | (1) Get deleted matter file id from Get Matter File Detail process<br>(2) Delete matter file record from Matter File database |
| Attachment:   | (1) Process 5.3.2<br>(2) Matter File database   |

Table D.62. Process Specification of Process 5.4.1

| Items         | Description  |
|---------------|--|
| Process Name: | Get Search Criteria  |
| Data In:      | Search criteria i.e.<br>- matter file name   |
| Data Out:     | Search criteria  |
| Process:      | (1) Get search criteria from Matter File Search form<br>(2) Send search criteria to Request Matter File Detail process |
| Attachment:   | (3) Lawyer<br>(4) Process 5.4.2  |

Table D.63. Process Specification of Process 5.4.2

| Items         | Description   |
|---------------|---|
| Process Name: | Request Matter File Detail  |
| Data In:      | Search criteria i.e.<br>- matter file name<br>Matter file detail  |
| Data Out:     | Keyword<br>Matter File detail   |
| Process:      | (1) Get search criteria from Get Search Criteria process<br>(2) Compare keyword with recorded value in Matter File database<br>(3) Retrieve matter file detail from matter file database according to input keyword<br>(4) Send matter file detail to Display Search Result process |
| Attachment:   | (1) Process 5.4.1<br>(2) Matter File database<br>(3) Process 5.4.3  |

Table D.64. Process Specification of Process 5.4.3

| Items         | Description   |
|---------------|---|
| Process Name: | Display Search Result   |
| Data In:      | Matter file detail  |
| Data Out:     | Search result   |
| Process:      | (1) Get matter file detail from Request Matter File Detail process<br>(2) Display search result on the screen to Lawyer |
| Attachment:   | (1) Process 5.4.2<br>(2) Lawyer   |

Table D.65. Process Specification of Process 6.1.1

| Items         | Description   |
|---------------|---|
| Process Name: | Get Knowledge File  |
| Data In:      | Knowledge file<br>Upload knowledge file<br>Category ID<br>User ID   |
| Data Out:     | Knowledge file detail   |
| Process:      | (1) Get knowledge file from Add New Knowledge File form<br>(2) Get category id from Add New Knowledge File form<br>(3) Get user id from Add New Knowledge File form<br>(4) Send knowledge file detail to Verify Existence of Knowledge File process |
| Attachment:   | (1) Government Office<br>(2) Lawyer<br>(3) Category database<br>(4) User database<br>(5) Process 6.1.2  |

Table D.66. Process Specification of Process 6.1.2

| Item          | Description  |
|---------------|--|
| Process Name: | Verify Existence of Knowledge File   |
| Data In:      | Knowledge file detail<br>Knowledge file name   |
| Data Out:     | Verified knowledge file detail<br>Verified knowledge file  |
| Process:      | (1) Get knowledge file detail from Get Knowledge File process<br>(2) Get knowledge file name from Knowledge File database<br>(3) Send verified knowledge file detail to Record Knowledge File Detail process<br>(4) Send verified knowledge file to Move Uploaded Knowledge File into Knowledge Folder process |
| Attachment:   | (1) Process 6.1.1<br>(2) Knowledge database<br>(3) Process 6.1.3<br>(4) Process 6.1.4  |

Table D.67. Process Specification of Process 6.1.3

| Items         | Description  |
|---------------|--|
| Process Name: | Record Knowledge File Detail   |
| Data In:      | Verified knowledge file detail   |
| Data Out:     | Knowledge file detail  |
| Process:      | (1) Get verified knowledge file detail from Verify Existence of Knowledge File process<br>(2) Record knowledge file detail into Knowledge database |
| Attachment:   | (1) Process 6.1.2<br>(2) Knowledge database  |



Table D.68. Process Specification of Process 6.1.4

| Items         | Description   |
|---------------|---|
| Process Name: | Move Uploaded Knowledge File into Knowledge Folder  |
| Data In:      | Verified knowledge file   |
| Data Out:     | -   |
| Process:      | (1) Get verified knowledge file from Verify Existence of Knowledge File process<br>(2) Move verified knowledge file into Knowledge folder |
| Attachment:   | (1) Process 6.1.2   |

Table D.69. Process Specification of Process 6.2.1

| Items         | Description   |
|---------------|---|
| Process Name: | Get Knowledge ID  |
| Data In:      | File download request   |
| Data Out:     | Knowledge ID  |
| Process:      | (1) Get file download request from download command<br>(2) Send knowledge id to Get Knowledge File Detail process |
| Attachment:   | (1) Lawyer<br>(2) Process 6.2.2   |

Table D.70. Process Specification of Process 6.2.2

| Items         | Description  |
|---------------|--|
| Process Name: | Get Knowledge File Detail  |
| Data In:      | Knowledge ID<br>Knowledge file detail  |
| Data Out:     | Matter file path   |
| Process:      | (1) Get knowledge id from Get Knowledge ID process<br>(2) Get knowledge file detail from Knowledge database<br>(3) Send generated knowledge file path to Locate Knowledge File process |
| Attachment:   | (1) Process 6.2.1<br>(2) Knowledge database<br>(3) Process 6.2.3   |



Table D.71. Process Specification of Process 6.2.3

| Items         | Description  |
|---------------|--|
| Process Name: | Locate Knowledge File  |
| Data In:      | Knowledge file path  |
| Data Out:     | Downloaded knowledge file  |
| Process:      | (1) Get knowledge file path from Get Knowledge File Detail process<br>(2) Retrieve requested knowledge file and send to Lawyer |
| Attachment:   | (1) Process 6.2.2<br>(2) Lawyer  |

Table D.72. Process Specification of Process 6.3.1

| Items         | Description   |
|---------------|---|
| Process Name: | Get Knowledge ID  |
| Data In:      | Knowledge file deletion request   |
| Data Out:     | Knowledge ID  |
| Process:      | (1) Get knowledge file deletion request from delete command<br>(2) Send knowledge id to Get Knowledge File Detail process |
| Attachment:   | (1) Lawyer<br>(2) Process 6.3.2   |

Table D.73. Process Specification of Process 6.3.2

| Items         | Description   |
|---------------|---|
| Process Name: | Get Knowledge File Detail   |
| Data In:      | Knowledge ID<br>Knowledge file detail   |
| Data Out:     | Knowledge file path<br>Deleted knowledge id   |
| Process:      | (1) Get knowledge id from Get Knowledge ID process<br>(2) Get knowledge file detail from Knowledge database<br>(3) Send deleted knowledge id to Delete Knowledge File Record process<br>(4) Send generated knowledge file path to Remove Knowledge File from the system process |
| Attachment:   | (1) Process 6.3.1<br>(2) Knowledge database<br>(3) Process 6.3.3<br>(4) Process 6.3.4   |

Table D.74. Process Specification of Process 6.3.3

| Items         | Description   |
|---------------|---|
| Process Name: | Remove Knowledge File from the System   |
| Data In:      | Knowledge file path   |
| Data Out:     | -   |
| Process:      | (1) Get knowledge file path from Get Knowledge File Detail process<br>(2) Remove requested knowledge file from the system |
| Attachment:   | (1) Process 6.3.2   |

Table D.75. Process Specification of Process 6.3.4

| Items         | Description   |
|---------------|---|
| Process Name: | Delete Knowledge File Record  |
| Data In:      | Deleted knowledge id  |
| Data Out:     | Deleted knowledge id  |
| Process:      | (1) Get deleted knowledge id from Get Knowledge File Detail process<br>(2) Delete knowledge file record from Knowledge database |
| Attachment:   | (1) Process 6.3.2<br>(2) Knowledge database   |

Table D.76. Process Specification of Process 6.4.1

| Items         | Description   |
|---------------|---|
| Process Name: | Get Search Criteria   |
| Data In:      | Search criteria i.e.<br>- category id<br>- knowledge file name  |
| Data Out:     | Search criteria   |
| Process:      | (1) Get search criteria from Knowledge Search form<br>(2) Send search criteria to Request Knowledge File Detail process |
| Attachment:   | (1) Lawyer<br>(2) Process 6.4.2   |

Table D.77. Process Specification of Process 6.4.2

| Items         | Description   |
|---------------|---|
| Process Name: | Request Knowledge File Detail   |
| Data In:      | Search criteria i.e.<br>- category id<br>- knowledge file name<br>Knowledge file detail   |
| Data Out:     | Keyword<br>Knowledge file detail  |
| Process:      | (1) Get search criteria from Get Search Criteria process<br>(2) Compare keyword with recorded value in Knowledge database<br>(3) Retrieve knowledge file detail from Knowledge database according to input keyword<br>(4) Send knowledge file detail to Display Search Result process |
| Attachment:   | (1) Process 6.4.1<br>(2) Knowledge database<br>(3) Process 6.4.3  |

Table D.78. Process Specification of Process 6.4.3

| Items         | Description   |
|---------------|---|
| Process Name: | Display Search Result   |
| Data In:      | Knowledge file detail   |
| Data Out:     | Search result   |
| Process:      | (1) Get knowledge file detail from Request Knowledge File Detail process<br>(2) Display search result on the screen to Lawyer |
| Attachment:   | (1) Process 6.4.2<br>(2) Lawyer   |

**Table D.79. Process Specification of Process 7.1.1**

| Items         | Description  |
|---------------|--|
| Process Name: | Get Form File  |
| Data In:      | Electronic form<br>Upload form file<br>Category ID<br>User ID  |
| Data Out:     | Form file detail   |
| Process:      | (1) Get form file from Add New Form form<br>(2) Get category id from Add New Form form<br>(3) Get user id from Add New Form form<br>(4) Send form file detail to Verify Existence of Form File process |
| Attachment:   | (1) Government Office<br>(2) Lawyer<br>(3) Category database<br>(4) User database<br>(5) Process 7.1.2   |

**Table D.80. Process Specification of Process 7.1.2**

| Item          | Description  |
|---------------|--|
| Process Name: | Verify Existence of Form File  |
| Data In:      | Form file detail<br>Form file name   |
| Data Out:     | Verified form file detail<br>Verified form file  |
| Process:      | (1) Get form file detail from Get Form File process<br>(2) Get form file name from Form database<br>(3) Send verified form file detail to Record Form File Detail process<br>(4) Send verified form file to Move Uploaded Form File into Form Folder process |
| Attachment:   | (1) Process 7.1.1<br>(2) Form database<br>(3) Process 7.1.3<br>(4) Process 7.1.4   |

Table D.81. Process Specification of Process 7.1.3

| Items         | Description  |
|---------------|--|
| Process Name: | Record Form File Detail  |
| Data In:      | Verified form file detail  |
| Data Out:     | Form file detail   |
| Process:      | (1) Get verified form file detail from Verify Existence of Form File process<br>(2) Record form file detail into Form database |
| Attachment:   | (1) Process 7.1.2<br>(2) Form database   |

Table D.82. Process Specification of Process 7.1.4

| Items         | Description   |
|---------------|---|
| Process Name: | Move Uploaded Form File into Form Folder  |
| Data In:      | Verified form file  |
| Data Out:     | -   |
| Process:      | (1) Get verified form file from Verify Existence of Form File process<br>(2) Move verified form file into Form folder |
| Attachment:   | (1) Process 7.1.2   |

Table D.83. Process Specification of Process 7.2.1

| Items         | Description   |
|---------------|---|
| Process Name: | Get Form ID   |
| Data In:      | File download request   |
| Data Out:     | Form ID   |
| Process:      | (1) Get file download request from download command<br>(2) Send form id to Get Form File Detail process |
| Attachment:   | (1) Lawyer<br>(2) Process 7.2.2   |

Table D.84. Process Specification of Process 7.2.2

| Items         | Description  |
|---------------|--|
| Process Name: | Get Form File Detail   |
| Data In:      | Form ID<br>Form file detail  |
| Data Out:     | Form file path   |
| Process:      | (1) Get form id from Get Form ID process<br>(2) Get form file detail from Form database<br>(3) Send generated form file path to Locate Form File process |
| Attachment:   | (1) Process 7.2.1<br>(2) Form database<br>(3) Process 7.2.3  |

Table D.85. Process Specification of Process 7.2.3

| Items         | Description   |
|---------------|---|
| Process Name: | Locate Form File  |
| Data In:      | Form file path  |
| Data Out:     | Downloaded form file  |
| Process:      | (1) Get form file path from Get Form File Detail process<br>(2) Retrieve requested form file and send to Lawyer |
| Attachment:   | (1) Process 7.2.2<br>(2) Lawyer   |

Table D.86. Process Specification of Process 7.3.1

| Items         | Description   |
|---------------|---|
| Process Name: | Get Form ID   |
| Data In:      | Form deletion request   |
| Data Out:     | Form ID   |
| Process:      | (1) Get form deletion request from delete command<br>(2) Send form id to Get Form File Detail process |
| Attachment:   | (1) Lawyer<br>(2) Process 7.3.2   |



Table D.87. Process Specification of Process 7.3.2

| Items         | Description   |
|---------------|---|
| Process Name: | Get Form File Detail  |
| Data In:      | Form ID<br>Form file detail   |
| Data Out:     | Form file path<br>Deleted form id   |
| Process:      | (1) Get form id from Get Form ID process<br>(2) Get form file detail from Form database<br>(3) Send deleted form id to Delete Form File Record process<br>(4) Send generated form file path to Remove Form File from the system process |
| Attachment:   | (1) Process 7.3.1<br>(2) Form database<br>(3) Process 7.3.3<br>(4) Process 7.3.4  |

Table D.88. Process Specification of Process 7.3.3

| Items         | Description  |
|---------------|--|
| Process Name: | Remove Form File from the System   |
| Data In:      | Form file path   |
| Data Out:     | -  |
| Process:      | (1) Get form file path from Get Form File Detail process<br>(2) Remove requested form file from the system |
| Attachment:   | (1) Process 7.3.2  |

Table D.89. Process Specification of Process 7.3.4

| Items         | Description   |
|---------------|---|
| Process Name: | Delete Form File Record   |
| Data In:      | Deleted form id   |
| Data Out:     | Deleted form id   |
| Process:      | (1) Get deleted form id from Get Form File Detail process<br>(2) Delete form file record from Form database |
| Attachment:   | (1) Process 7.3.2<br>(2) Form database  |

Table D.90. Process Specification of Process 7.4.1

| Items         | Description   |
|---------------|---|
| Process Name: | Get Search Criteria   |
| Data In:      | Search criteria i.e.<br>- category id<br>- form name  |
| Data Out:     | Search criteria   |
| Process:      | (1) Get search criteria from Form Search form<br>(2) Send search criteria to Request Form File Detail process |
| Attachment:   | (1) Lawyer<br>(2) Process 7.4.2   |

Table D.91. Process Specification of Process 7.4.2

| Items         | Description   |
|---------------|---|
| Process Name: | Request Form File Detail  |
| Data In:      | Search criteria i.e.<br>- category id<br>- form name<br>Form file detail  |
| Data Out:     | Keyword<br>Form file detail   |
| Process:      | (1) Get search criteria from Get Search Criteria process<br>(2) Compare keyword with recorded value in Form database<br>(3) Retrieve form file detail from Form database according to input keyword<br>(4) Send form file detail to Display Search Result process |
| Attachment:   | (1) Process 7.4.1<br>(2) Form database<br>(3) Process 7.4.3   |

Table D.92. Process Specification of Process 7.4.3

| Items         | Description   |
|---------------|---|
| Process Name: | Display Search Result   |
| Data In:      | Form file detail  |
| Data Out:     | Search result   |
| Process:      | (1) Get form file detail from Request Form File Detail process<br>(2) Display search result on the screen to Lawyer |
| Attachment:   | (1) Process 7.4.2<br>(2) Lawyer   |

Table D.93. Process Specification of Process 8.1.1

| Items         | Description   |
|---------------|---|
| Process Name: | Get Username  |
| Data In:      | New password  |
| Data Out:     | Username  |
| Process:      | (1) Get new password from Change Password form<br>(2) Send username retrieved from Change Password form to Retrieve User Detail process |
| Attachment:   | (1) Lawyer<br>(2) Process 8.1.2   |

Table D.94. Process Specification of Process 8.1.2

| Items         | Description  |
|---------------|--|
| Process Name: | Retrieve User Detail   |
| Data In:      | Username<br>User detail  |
| Data Out:     | New password   |
| Process:      | (1) Get username from Get Username process<br>(2) Retrieve user detail from User database for displaying in Change Password form and get edited user detail from Change Password form<br>(3) Send new password to Update User Detail process |
| Attachment:   | (1) Process 8.1.1<br>(2) User database<br>(3) Process 8.1.3  |

Table D.95. Process Specification of Process 8.1.3

| Items         | Description   |
|---------------|---|
| Process Name: | Update User Detail  |
| Data In:      | New password  |
| Data Out:     | User Detail   |
| Process:      | (1) Get new password from Retrieve User Detail process<br>(2) Update user detail into User database |
| Attachment:   | (1) Process 8.1.2<br>(2) User database  |

Table D.96. Process Specification of Process 9.1.1

| Items         | Description   |
|---------------|---|
| Process Name: | Get Report Requirement Detail   |
| Data In:      | Report requirement Detail   |
| Data Out:     | Report requirement detail   |
| Process:      | (1) Get report requirement detail from Generate Summary Report form<br>(2) Send report requirement detail to Generate SQL Statement process |
| Attachment:   | (1) Managing Partner<br>(2) Process 9.1.2   |

Table D.97. Process Specification of Process 9.1.2

| Items         | Description  |
|---------------|--|
| Process Name: | Generate SQL Statement   |
| Data In:      | Report requirement Detail  |
| Data Out:     | SQL Statement  |
| Process:      | (1) Get report requirement detail from Get Report Requirement Detail process<br>(2) Send generated SQL statement based on report requirement detail to Generate Summary Report process |
| Attachment:   | (1) Process 9.1.1<br>(2) Process 9.1.3   |

Table D.98. Process Specification of Process 9.1.3

| Items         | Description  |
|---------------|--|
| Process Name: | Generate Summary Report  |
| Data In:      | SQL Statement  |
| Data Out:     | Summary report   |
| Process:      | (1) Get SQL statement from Generate SQL Statement process<br>(2) Query SQL statement from Matter database<br>(3) Retrieve matter detail based on SQL statement<br>(4) Display summary report based on submitted report requirement on the screen to Managing Partner |
| Attachment:   | (1) Process 9.1.2<br>(2) Matter database<br>(3) Managing Partner   |





**APPENDIX E**  
**DATABASE DESIGN**

Table E.1. Structure of Client Table.

| Name               | Type    | Length | Key Type    | Foreign Key to                    | Check |
|--------------------|---------|--------|-------------|-----------------------------------|-------|
| client_id          | Int     | 10     | Primary key | Corporate<br>Individual<br>Matter | -     |
| client_type        | VarChar | 10     | Attribute   | -                                 | -     |
| client_address     | VarChar | 100    | Attribute   | -                                 | -     |
| client_subdistrict | VarChar | 20     | Attribute   | -                                 | -     |
| client_district    | VarChar | 20     | Attribute   | -                                 | -     |
| client_city        | VarChar | 20     | Attribute   | -                                 | -     |
| client_zip_code    | VarChar | 10     | Attribute   | -                                 | -     |
| client_country     | VarChar | 20     | Attribute   | -                                 | -     |
| client_tel         | VarChar | 15     | Attribute   | -                                 | -     |
| client_fax         | VarChar | 15     | Attribute   | -                                 | -     |
| client_mobile      | VarChar | 15     | Attribute   | -                                 | -     |
| client_email       | VarChar | 80     | Attribute   | -                                 | -     |

Table E.2. Structure of Corporate Table.

| Name               | Type     | Length | Key Type                   | Foreign Key to | Check |
|--------------------|----------|--------|----------------------------|----------------|-------|
| client_id          | Int      | 10     | Primary key<br>Foreign key | -              | -     |
| com_name           | VarChar  | 100    | Attribute                  | -              | -     |
| com_biz_act        | VarChar  | 255    | Attribute                  | -              | -     |
| com_date_reg       | DateTime | -      | Attribute                  | -              | -     |
| com_reg_no         | VarChar  | 30     | Attribute                  | -              | -     |
| com_tax_no         | VarChar  | 20     | Attribute                  | -              | -     |
| com_vat_no         | VarChar  | 20     | Attribute                  | -              | -     |
| com_auth_sig       | VarChar  | 255    | Attribute                  | -              | -     |
| com_reg_cap        | VarChar  | 10     | Attribute                  | -              | -     |
| com_paid_up_cap    | VarChar  | 10     | Attribute                  | -              | -     |
| com_num_share      | VarChar  | 10     | Attribute                  | -              | -     |
| com_ordinary_share | VarChar  | 10     | Attribute                  | -              | -     |
| com_pref_share     | VarChar  | 10     | Attribute                  | -              | -     |



Table E.3. Structure of Individual Table.

| Name                         | Type     | Length | Key Type                   | Foreign Key to | Check |
|------------------------------|----------|--------|----------------------------|----------------|-------|
| client_id                    | Int      | 10     | Primary key<br>Foreign key | -              | -     |
| indiv_name                   | VarChar  | 50     | Attribute                  | -              | -     |
| indiv_lastname               | VarChar  | 50     | Attribute                  | -              | -     |
| indiv_nationality            | VarChar  | 20     | Attribute                  | -              | -     |
| indiv_birth_date             | DateTime | -      | Attribute                  | -              | -     |
| indiv_married_status         | VarChar  | 15     | Attribute                  | -              | -     |
| indiv_passport_no            | VarChar  | 30     | Attribute                  | -              | -     |
| indiv_passport_issue_date    | DateTime | -      | Attribute                  | -              | -     |
| indiv_passport_expire_date   | DateTime | -      | Attribute                  | -              | -     |
| indiv_visa_no                | VarChar  | 30     | Attribute                  | -              | -     |
| indiv_visa_issue_date        | DateTime | -      | Attribute                  | -              | -     |
| indiv_visa_expire_date       | DateTime | -      | Attribute                  | -              | -     |
| indiv_reentry_no             | VarChar  | 30     | Attribute                  | -              | -     |
| indiv_reentry_issue_date     | DateTime | -      | Attribute                  | -              | -     |
| indiv_reentry_expire_date    | DateTime | -      | Attribute                  | -              | -     |
| indiv_workpermit_no          | VarChar  | 30     | Attribute                  | -              | -     |
| indiv_workpermit_issue_date  | DateTime | -      | Attribute                  | -              | -     |
| indiv_workpermit_expire_date | DateTime | -      | Attribute                  | -              | -     |

Table E.4. Structure of Matter Table.

| Name              | Type     | Length | Key Type    | Foreign Key to | Check |
|-------------------|----------|--------|-------------|----------------|-------|
| matter_no         | Int      | 10     | Primary key | Matter File    | -     |
| client_id         | Int      | 10     | Foreign key | -              | -     |
| user_id           | Int      | 5      | Foreign key | -              | -     |
| matter_name       | VarChar  | 100    | Attribute   | -              | -     |
| matter_startdate  | DateTime | -      | Attribute   | -              | -     |
| matter_finishdate | DateTime | -      | Attribute   | -              | -     |
| matter_stauts     | VarChar  | 10     | Attribute   | -              | -     |

Table E.5. Structure of Matter\_File Table.

| Name            | Type    | Length | Key Type    | Foreign Key to | Check |
|-----------------|---------|--------|-------------|----------------|-------|
| matterfile_id   | Int     | 5      | Primary key | -              | -     |
| matter_no       | Int     | 10     | Foreign key | -              | -     |
| matterfile_file | VarChar | 100    | Attribute   | -              | -     |
| matterfile_type | VarChar | 40     | Attribute   | -              | -     |

Table E.6. Structure of Category Table.

| Name     | Type    | Length | Key Type    | Foreign Key to | Check |
|----------|---------|--------|-------------|----------------|-------|
| cat_id   | Int     | 5      | Primary key | Knowledge Form | -     |
| cat_name | VarChar | 50     | Attribute   | -              | -     |

Table E.7. Structure of Knowledge Table.

| Name               | Type    | Length | Key Type    | Foreign Key to | Check |
|--------------------|---------|--------|-------------|----------------|-------|
| knowledge_id       | Int     | 5      | Primary key | -              | -     |
| user_id            | Int     | 7      | Foreign key | -              | -     |
| cat_id             | Int     | 5      | Foreign key | -              | -     |
| knowledge_file     | VarChar | 100    | Attribute   | -              | -     |
| knowledge filetype | VarChar | 40     | Attribute   | -              | -     |

Table E.8. Structure of Form Table.

| Name          | Type    | Length | Key Type    | Foreign Key to | Check |
|---------------|---------|--------|-------------|----------------|-------|
| form_id       | Int     | 5      | Primary key | -              | -     |
| user_id       | Int     | 7      | Foreign key | -              | -     |
| cat_id        | Int     | 5      | Foreign key | -              | -     |
| form_file     | VarChar | 100    | Attribute   | -              | -     |
| form filetype | VarChar | 40     | Attribute   | -              | -     |

Table E.9. Structure of User Table.

| Name      | Type    | Length | Key Type    | Foreign Key to | Check |
|-----------|---------|--------|-------------|----------------|-------|
| user_id   | Int     | 5      | Primary key | -              | -     |
| username  | VarChar | 40     | Attribute   | -              | -     |
| password  | VarChar | 40     | Attribute   | -              | -     |
| email     | VarChar | 45     | Attribute   | -              | -     |
| firstname | VarChar | 100    | Attribute   | -              | -     |
| lastname  | VarChar | 100    | Attribute   | -              | -     |
| position  | VarChar | 50     | Attribute   | -              | -     |
| lastlog   | VarChar | 28     | Attribute   | -              | -     |
| dtnow     | VarChar | 28     | Attribute   | -              | -     |





**APPENDIX F**  
**DATA DICTIONARY**

## DATA DICTIONARY

Table F.1. Data Dictionary of Database of e-Document Filing and Sharing System.

| Field Name         | Meaning   |
|--------------------|---|
| cat_id             | Category identifier number                                    |
| cat_name           | Category name   |
| client_address     | Client address start from address number to road              |
| client_city        | City name of client   |
| client_country     | Country name of client  |
| client_district    | District name of client                                       |
| client_email       | Client email address  |
| client_fax         | Client fax number   |
| client_id          | Client identifier number                                      |
| client_mobile      | Client mobile phone number                                    |
| client_subdistrict | Sub-district name of client                                   |
| client_tel         | Client telephone number                                       |
| client_type        | Types of client which are “Corporate” and “Individual” types. |
| client_zip_code    | Client zip code   |
| com_auth_sig       | Company authorized signature                                  |
| com_biz_act        | Company business activities                                   |
| com_date_reg       | Company date of incorporation                                 |
| com_name           | Company name  |
| com_num_share      | Company’s total numbers of share                              |
| com_ordinary_share | Company’s numbers of ordinary share                           |
| com_paid_up_cap    | Company’s paid up capital in Thai baht                        |
| com_pref_share     | Company’s numbers of preference share                         |
| com_reg_cap        | Company’s registered capital in Thai baht                     |
| com_reg_no         | Company registration number                                   |
| com_tax_no         | Company’s tax id number                                       |
| com_vat_no         | Company’s VAT registration number                             |
| Dtnow              | Current date and time the user login to the system            |
| Email              | User email address  |
| firstname          | User first name   |
| form_file          | Form file name  |

Table F.1. Data Dictionary of Database of e-Document Filing and Sharing System (Continued).

| Field Name                   | Meaning  |
|------------------------------|--|
| form_filetype                | Form file type   |
| form_id                      | Form file identifier number                                    |
| Hacker                       | IP address and date time of unauthorized user                  |
| indiv_birth_date             | Individual client date of birth                                |
| indiv_lastname               | Individual client last name                                    |
| indiv_married_status         | Individual client married status                               |
| indiv_name                   | Individual client first name                                   |
| indiv_nationality            | Individual client nationality                                  |
| indiv_passport_expire_date   | Individual client passport expired date                        |
| indiv_passport_issue_date    | Individual client passport issued date                         |
| indiv_passport_no            | Individual client passport number                              |
| indiv_reentry_expire_date    | Individual client re-entry expired date                        |
| indiv_reentry_issue_date     | Individual client re-entry issued date                         |
| indiv_reentry_no             | Individual client re-entry number                              |
| indiv_visa_expire_date       | Individual client visa expired date                            |
| indiv_visa_issue_date        | Individual client visa issued date                             |
| indiv_visa_no                | Individual client visa number                                  |
| indiv_workpermit_expire_date | Individual client work permit expired date                     |
| indiv_workpermit_issue_date  | Individual client work permit issued date                      |
| indiv_workpermit_no          | Individual client work permit number                           |
| knowledge_file               | Knowledge file name  |
| knowledge_filetype           | Knowledge file type  |
| knowledge_id                 | Knowledge file identifier number                               |
| lastlog                      | Date and time of the last time user logged in to the system    |
| lastname                     | User last name   |
| matter_finishdate            | Date that matter has been done                                 |
| matter_name                  | Matter name  |
| matter_no                    | Matter identifier number                                       |
| matter_startdate             | Date that matter has been requested                            |
| matter_stauts                | Matter status which are "In Progress", "Done" and "Cancelled". |
| matterfile_file              | Matter file name   |

Table F.1. Data Dictionary of Database of e-Document Filing and Sharing System (Continued).

| Field Name      | Meaning                       |
|-----------------|-------------------------------|
| matterfile_id   | Matter file identifier number |
| matterfile_type | Matter file type              |
| password        | Login password of user        |
| position        | User's job position           |
| user_id         | User identifier number        |
| username        | User login name               |







**APPENDIX G**  
**USER INTERFACE DESIGN**

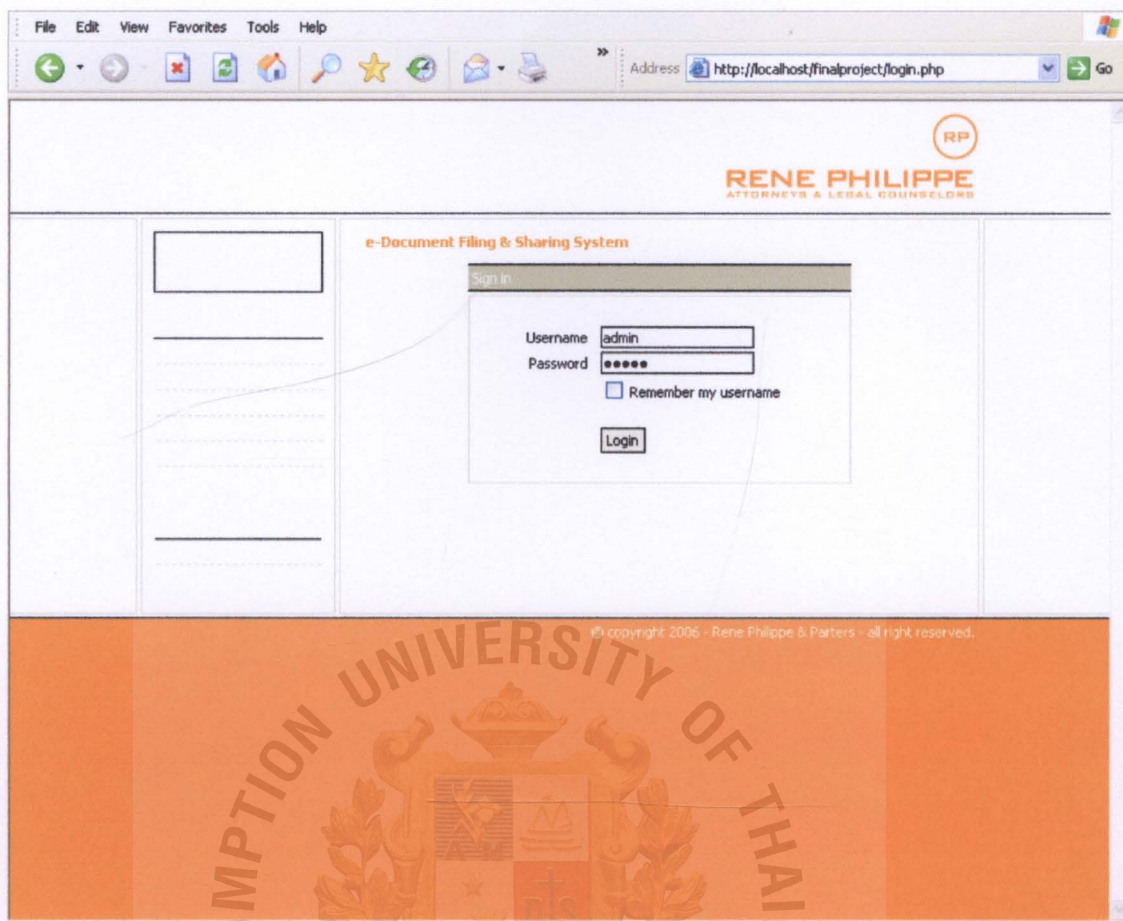


Figure G.1. Login Screen.

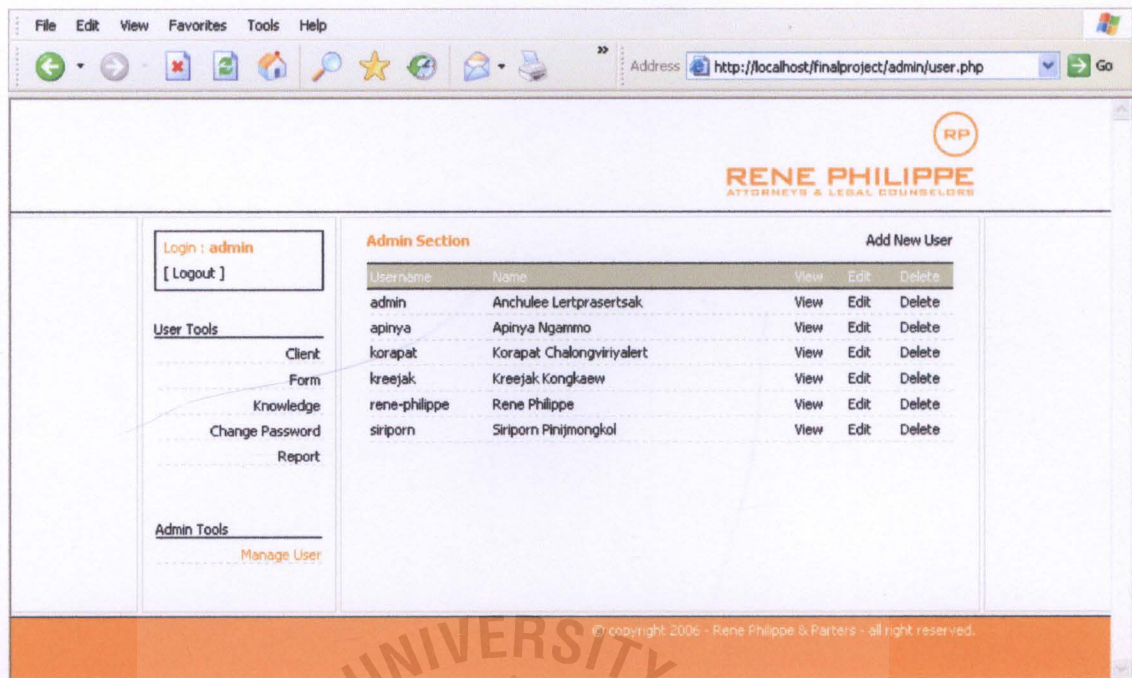


Figure G.2. Main Screen of Admin Section.

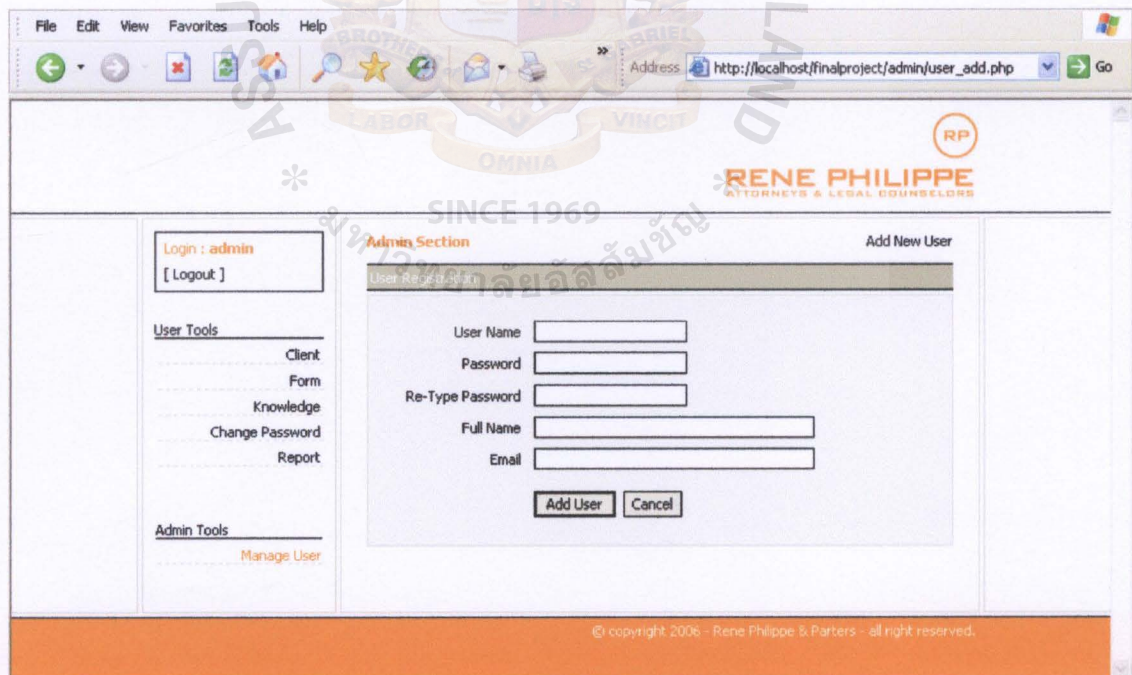


Figure G.3. User Registration Screen of Admin Section.



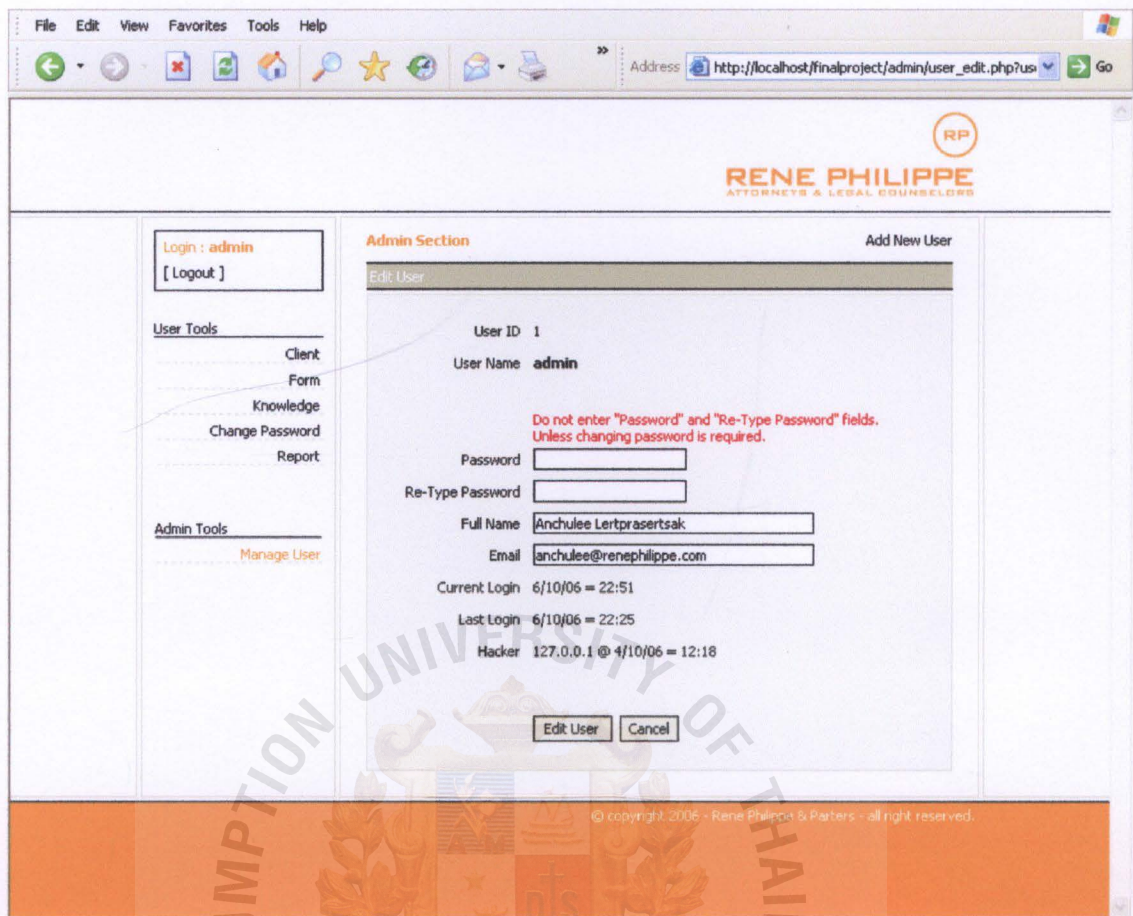


Figure G.4. Edit User Screen of Admin Section.

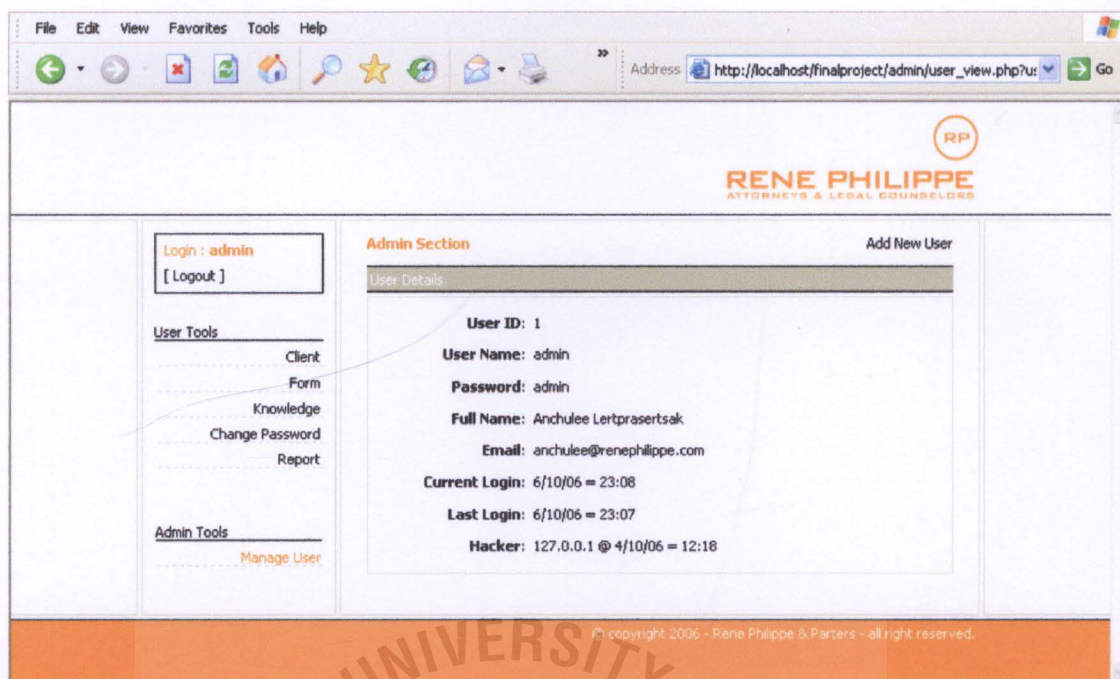


Figure G.5. View User Detail Screen of Admin Section.

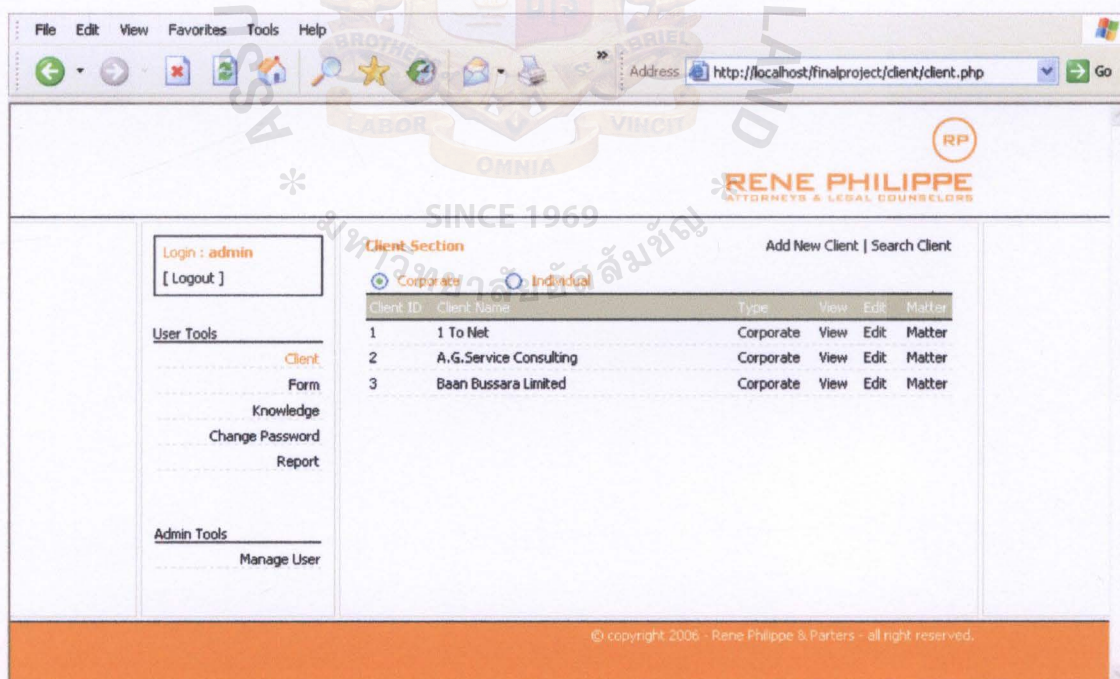


Figure G.6. Main Screen of Client Section.



File Edit View Favorites Tools Help

Address [http://localhost/finalproject/client/client\\_add.php](http://localhost/finalproject/client/client_add.php) Go

**RENE PHILIPPE**  
ATTORNEYS & LEGAL COUNSELORS

RP

Client Section Add New Client | Search Client

Add New Client

☐ Corporate ☐ Individual (Please select client type before proceeding)

**Corporate Client Detail**

Company Name   
 Business Activities   
 Registration No.  Register Date   
 Tax ID No.  Vat No.   
 Authorized Signature   
 Registered Capital  Paid Up Capital   
 Number of Shares   
 Ordinary Shares  Preference Shares   
 Address   
 Sub-District  District   
 City  Zip Code  Country   
 Tel  Fax  Mobile   
 Email   
 Add Client Reset

**Individual Client Detail**

First Name   
 Last Name   
 Nationality  Date of Birth   
 Married Status ☒ Single ☐ Married ☐ Divorce  
 Passport No.   
 Passport Issue Date  Expired Date   
 Visa No.   
 Visa Issue Date  Expired Date   
 Re-entry Permit No.   
 Re-entry Issue Date  Expired Date   
 Work Permit No.   
 Work Issue Date  Expired Date   
 Address   
 Sub-District  District   
 City  Zip Code  Country   
 Tel  Fax  Mobile   
 Email   
 Add Client Reset

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Figure G.7. Add New Client Screen of Client Section.

File Edit View Favorites Tools Help

Address [http://localhost/finalproject/client/client\\_edit\\_corp.pl](http://localhost/finalproject/client/client_edit_corp.pl) Go

**RENE PHILIPPE**  
ATTORNEYS & LEGAL COUNSELLORS

Client Section Add New Client | Search Client

**Edit Client**

Client ID: 1

Client Type: ☒ Corporate ☐ Individual

Company Name:

Business Activities:

Registration No:  Register Date:

Tax ID No:  Vat No:

Authorized Signature:

Registered Capital:  Paid Up Capital:

Number of Shares:

Ordinary Shares:  Preference Shares:

Address:   
 Sub-District:  District:   
 City:  Zip Code:  Country:

Tel:  Fax:  Mobile:   
 Email:

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Figure G.8.\* Edit Corporate Client Detail Screen of Client Section.



File Edit View Favorites Tools Help

Address http://localhost/finalproject/client/client\_edit\_indiv.p Go

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ATTORNEYS & LEGAL COUNSELORS

RP

Client Section Add New Client | Search Client

Edit Client

Client ID: 5

Client Type ☐ Corporate ☒ Individual

First Name: Philippe

Last Name: Roland Macheal delome

Nationality: French Date of Birth: [Calendar Icon]

Married Status ☒ Single ☐ Married ☐ Divorce

Passport No.: [Text Box]

Passport Issue Date: [Calendar Icon] Expired Date: [Calendar Icon]

Visa No.: [Text Box]

Visa Issue Date: [Calendar Icon] Expired Date: [Calendar Icon]

Re-entry Permit No.: [Text Box]

Re-entry Issue Date: [Calendar Icon] Expired Date: [Calendar Icon]

Work Permit No.: 20938/2544

Work Issue Date: 27-02-2001 [Calendar Icon] Expired Date: 26-02-2003 [Calendar Icon]

Address: [Text Box]

Sub-District: [Text Box] District: [Text Box]

City: [Text Box] Zip Code: [Text Box] Country: [Text Box]

Tel: [Text Box] Fax: [Text Box] Mobile: [Text Box]

Email: [Text Box]

Edit Client Cancel

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SINCE 1969

Figure G.9. Edit Individual Client Detail Screen of Client Section.

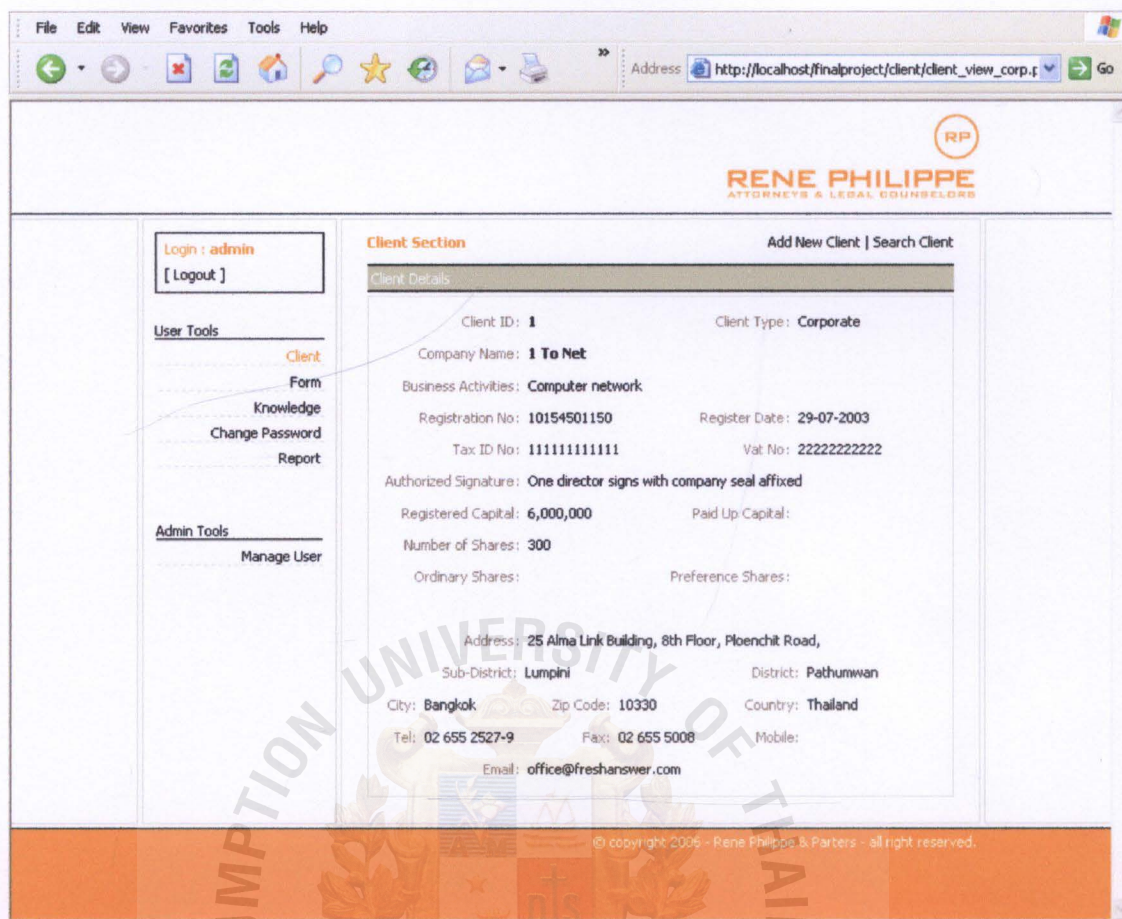


Figure G.10. View Corporate Client Detail Screen of Client Section.



File Edit View Favorites Tools Help

Address [http://localhost/finalproject/client/client\\_view\\_indiv.i](http://localhost/finalproject/client/client_view_indiv.i) Go

**RENE PHILIPPE**  
ATTORNEYS & LEGAL COUNSELORS

RP

Login : admin  
[ Logout ]

**User Tools**

Client  
Form  
Knowledge  
Change Password  
Report

**Admin Tools**

Manage User

**Client Section** Add New Client | Search Client

**Client Details**

Client ID: 5 Client Type: Individual

Name - Last Name: **Philippe Roland Macheal delome**

Nationality: French Date of Birth:

Married Status: Single

Passport No:

Passport Issue Date: Expired Date:

Visa No:

Visa Issue Date: Expired Date:

Re-entry No:

Re-entry Issue Date: Expired Date:

Work Permit No: **ร0938/2544**

Work Issue Date: 27-02-2001 Expired Date: 26-02-2003

Address:

Sub-District: District:

City: Zip Code: Country:

Tel: Fax: Mobile:

Email:

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Figure G.11.\* View Individual Client Detail Screen of Client Section.

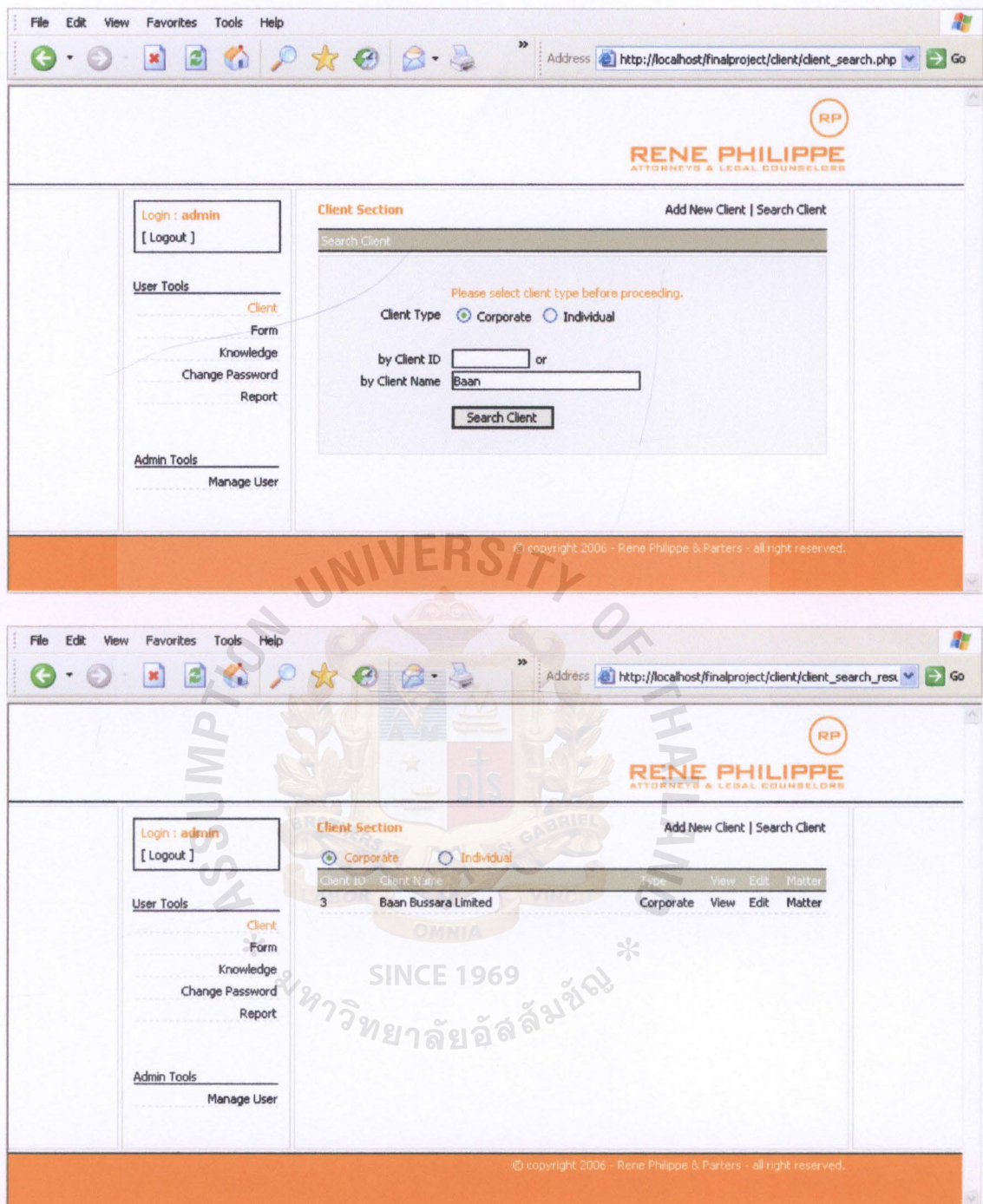


Figure G.12. Search Client Screen of Client Section.



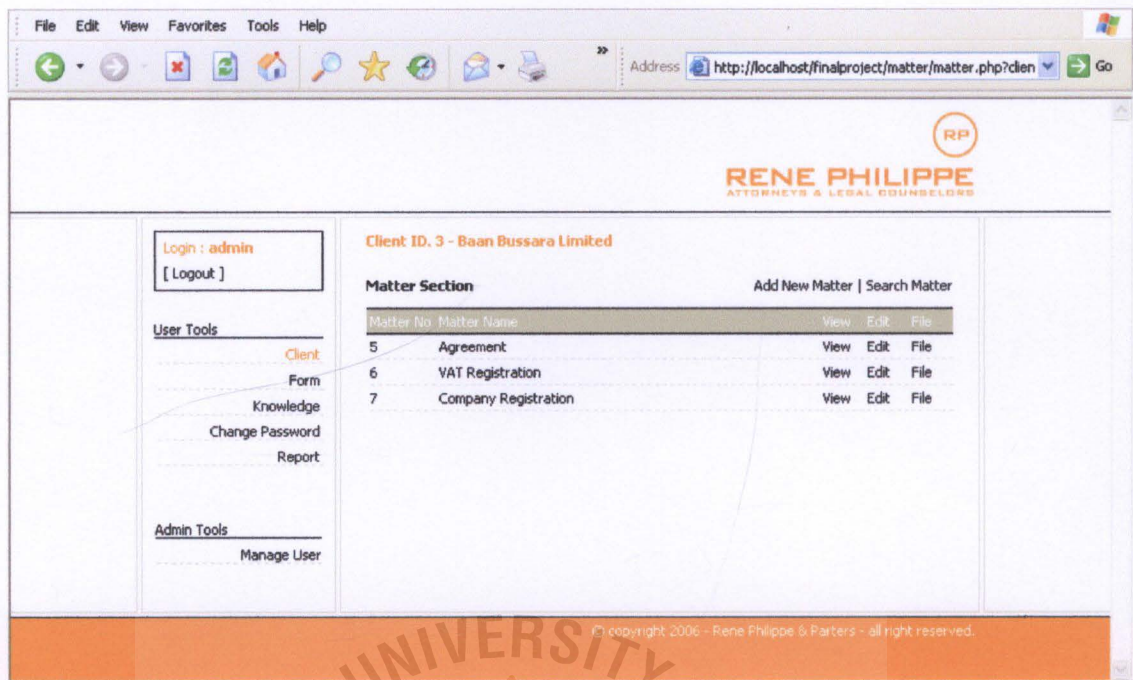


Figure G.13. Matter Main Screen of Matter Section.

File Edit View Favorites Tools Help

Address [http://localhost/finalproject/matter/matter\\_add.php](http://localhost/finalproject/matter/matter_add.php) Go

**RENE PHILIPPE**  
ATTORNEYS & LEGAL COUNSELLORS

Client ID: 3 - Baan Bussara Limited

**Matter Section** Add New Matter | Search Matter

**Add New Matter**

Matter Name

Matter Start Date

Matter Finished Date

Lawyer In Charge

Matter Status ☒ In Progress ☐ Done ☐ Cancelled

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Figure G.14. Add New Matter Screen of Matter Section.



File Edit View Favorites Tools Help

Address [http://localhost/finalproject/matter/matter\\_edit.php](http://localhost/finalproject/matter/matter_edit.php) Go

**RENE PHILIPPE**  
ATTORNEYS & LEGAL COUNSELLORS

Client ID: 3 - Baan Bussara Limited

**Matter Section** [Add New Matter](#) | [Search Matter](#)

**Edit Matter**

Matter No 11

Matter Name

Matter Start Date

Matter Finished Date

Lawyer In Charge

Matter Status ☐ In Progress ☒ Done ☐ Cancelled

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Figure G.15. Edit Matter Detail Screen of Matter Section.



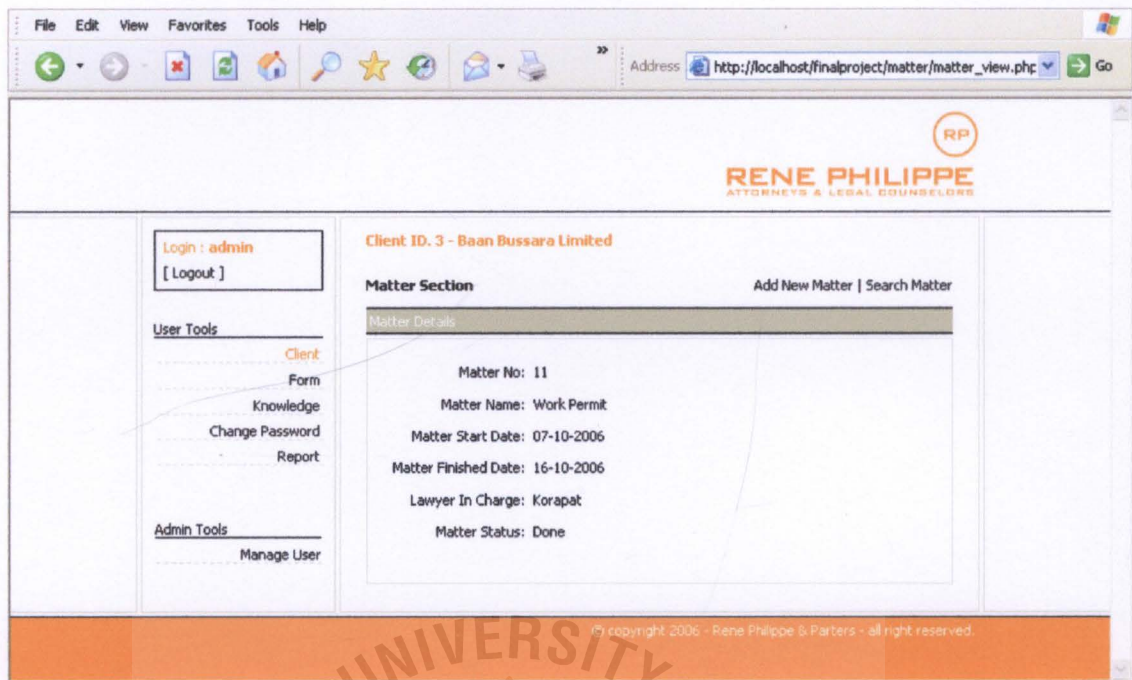


Figure G.16. View Matter Detail Screen of Matter Section.

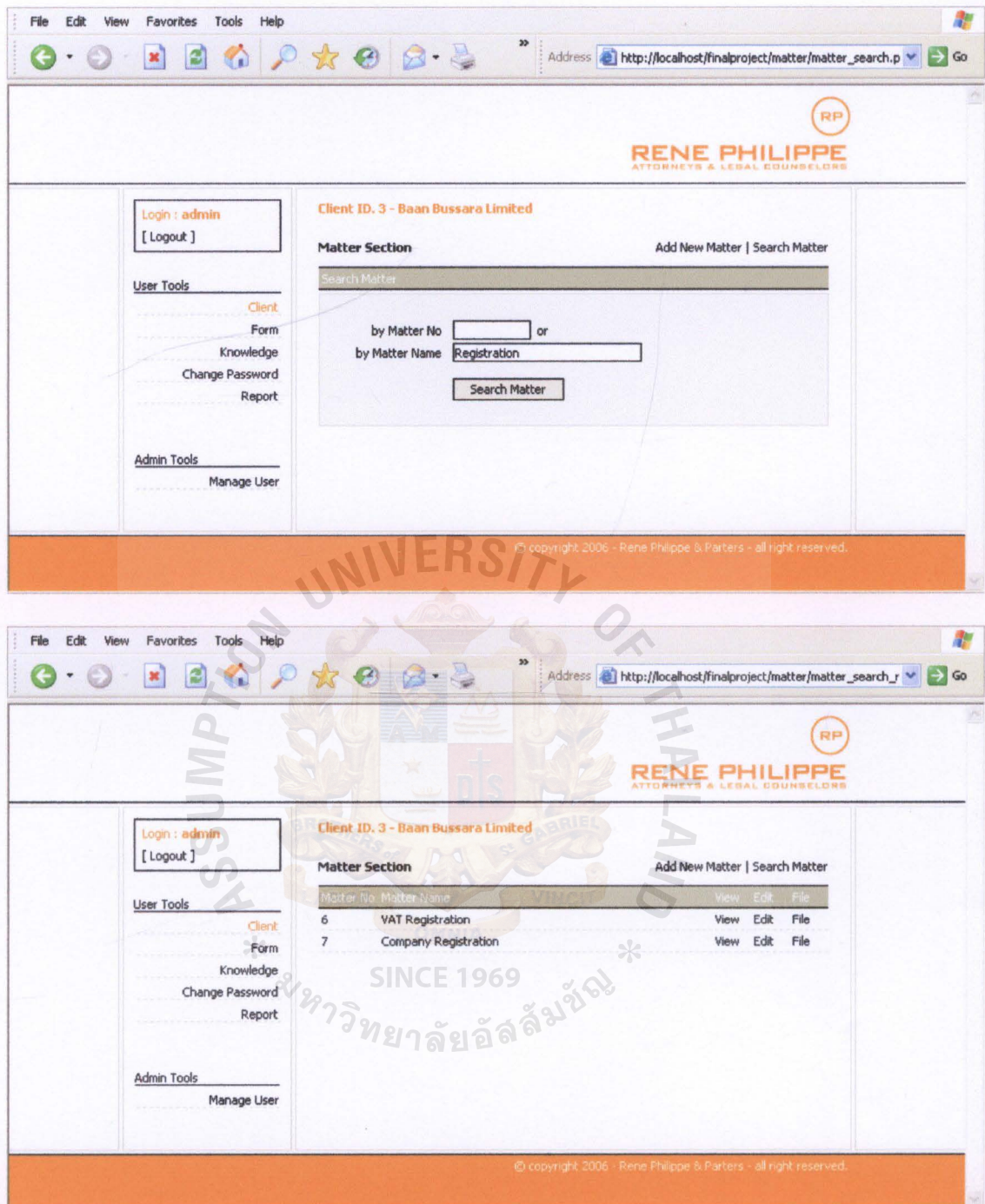


Figure G.17. Search Matter Screen of Matter Section.



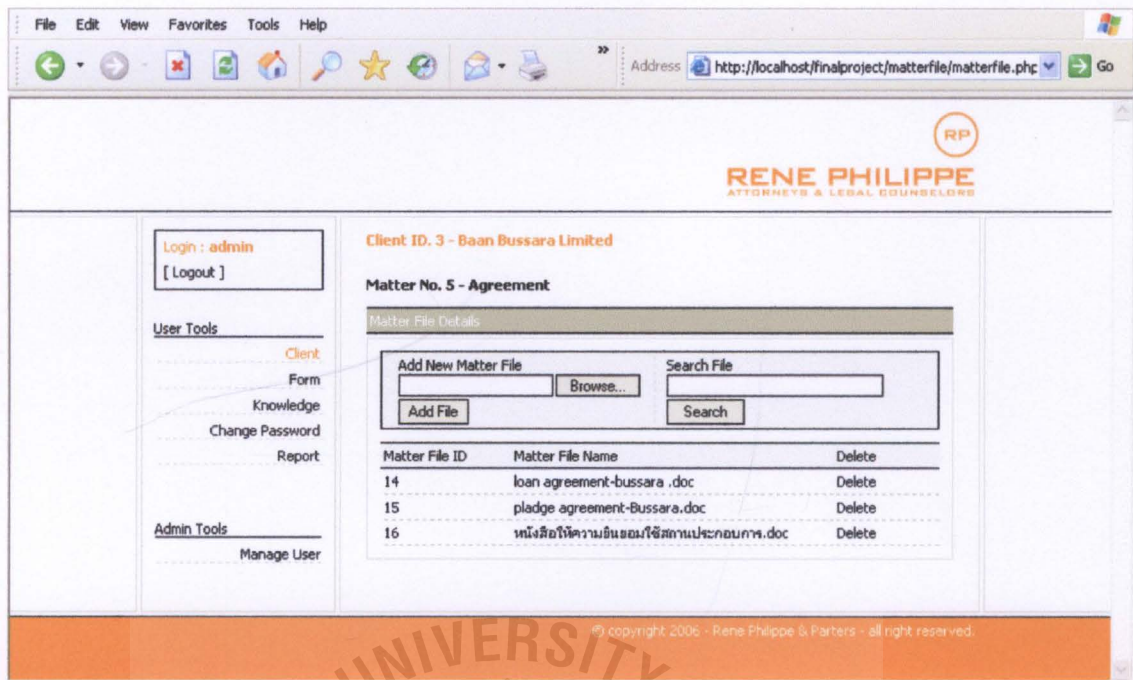


Figure G.18. Matter File Main Screen of Matter File Section.

**RENE PHILIPPE**  
ATTORNEYS & LEGAL COUNSELLORS

File Edit View Favorites Tools Help

Address: http://localhost/finalproject/knowledge/knowledge.p Go

RP

Login : admin  
[ Logout ]

User Tools

- Client
- Form
- Knowledge
- Change Password
- Report

Admin Tools

- Manage User

Knowledge Section

Add Knowledge File | Search Knowledge File

| K. ID | Knowledge Name  | Knowledge Category | Delete |
|-------|---|--------------------|--------|
| 6     | alien business.doc  | Corporate          | Delete |
| 7     | การขอตั้งสำนักงานผู้แทนของได้บุคคลต่าง<br>ประเทศในธุรกิจการค้าระหว่างประเทศ.doc | Corporate          | Delete |
| 8     | คำสั่งกรมพัฒนาธุรกิจ-nominee.pdf  | Corporate          | Delete |
| 11    | Required information for the application of<br>factory license.doc              | Factory            | Delete |
| 9     | การประกอบกิจการโรงงาน.doc   | Factory            | Delete |
| 10    | ข้อมูลที่ต้องการสอบถามเพิ่มเติมเกี่ยวกับการขอ<br>ใบอนุญาตประกอบกิจการโรงงาน.doc | Factory            | Delete |
| 15    | หลักเกณฑ์นำสิ่งโดยไม่ขึ้นทะเบียน.doc  | Food and Drug      | Delete |
| 12    | คู่มือการขึ้นทะเบียนสำเนา.doc   | Food and Drug      | Delete |
| 13    | ฉบับที่ ๑๖ ( พ.ศ. ๒๕๒๕ ).doc  | Food and Drug      | Delete |
| 14    | ฉบับที่ ๑๘ ( พ.ศ. ๒๕๒๕ ).doc  | Food and Drug      | Delete |
| 16    | Expenses for land transaction.xls   | Land Department    | Delete |
| 19    | Required Document for Transaction with Land<br>Department.doc                   | Land Department    | Delete |
| 18    | Required documents for condominium<br>registration.doc                          | Land Department    | Delete |
| 17    | Tax & Fees for Land Dept..doc   | Land Department    | Delete |
| 1     | ResidenceEng.dot  | Visa               | Delete |
| 2     | TM7ForeignPressEng.dot  | Visa               | Delete |
| 3     | TM7non-immigrantEng.dot   | Visa               | Delete |
| 4     | TM9WorkEng.dot  | Visa               | Delete |
| 5     | WP12Eng.dot   | Work Permit        | Delete |

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Figure G.19. Knowledge Main Screen of Knowledge Section.



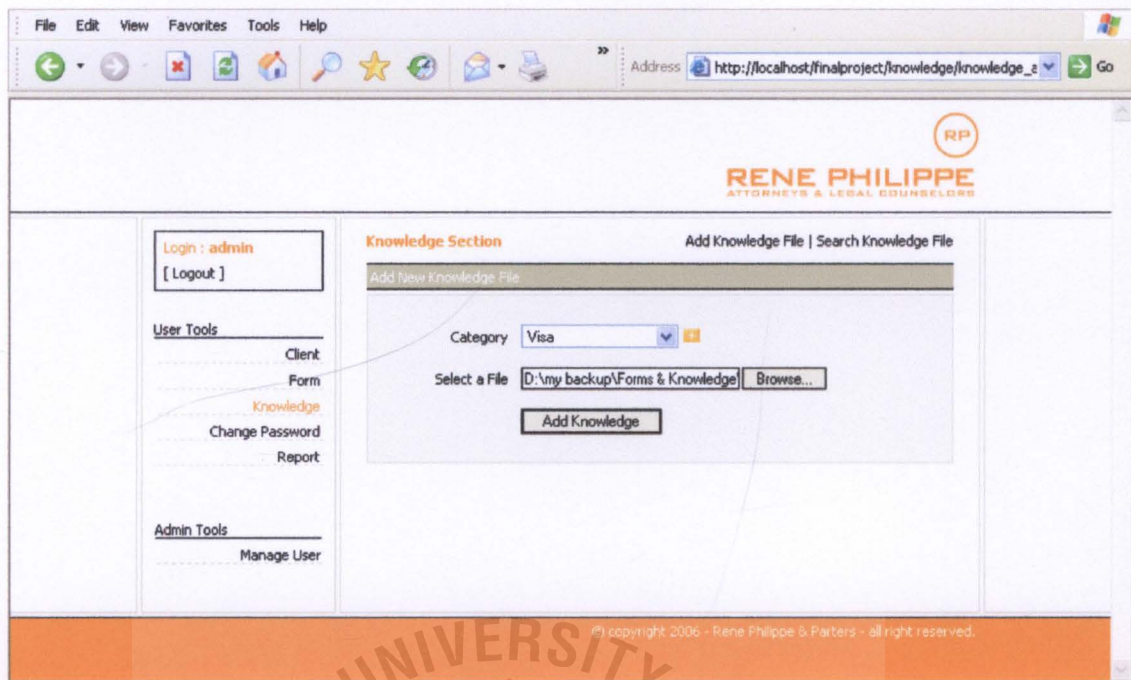


Figure G.20. Upload Knowledge Screen of Knowledge Section.

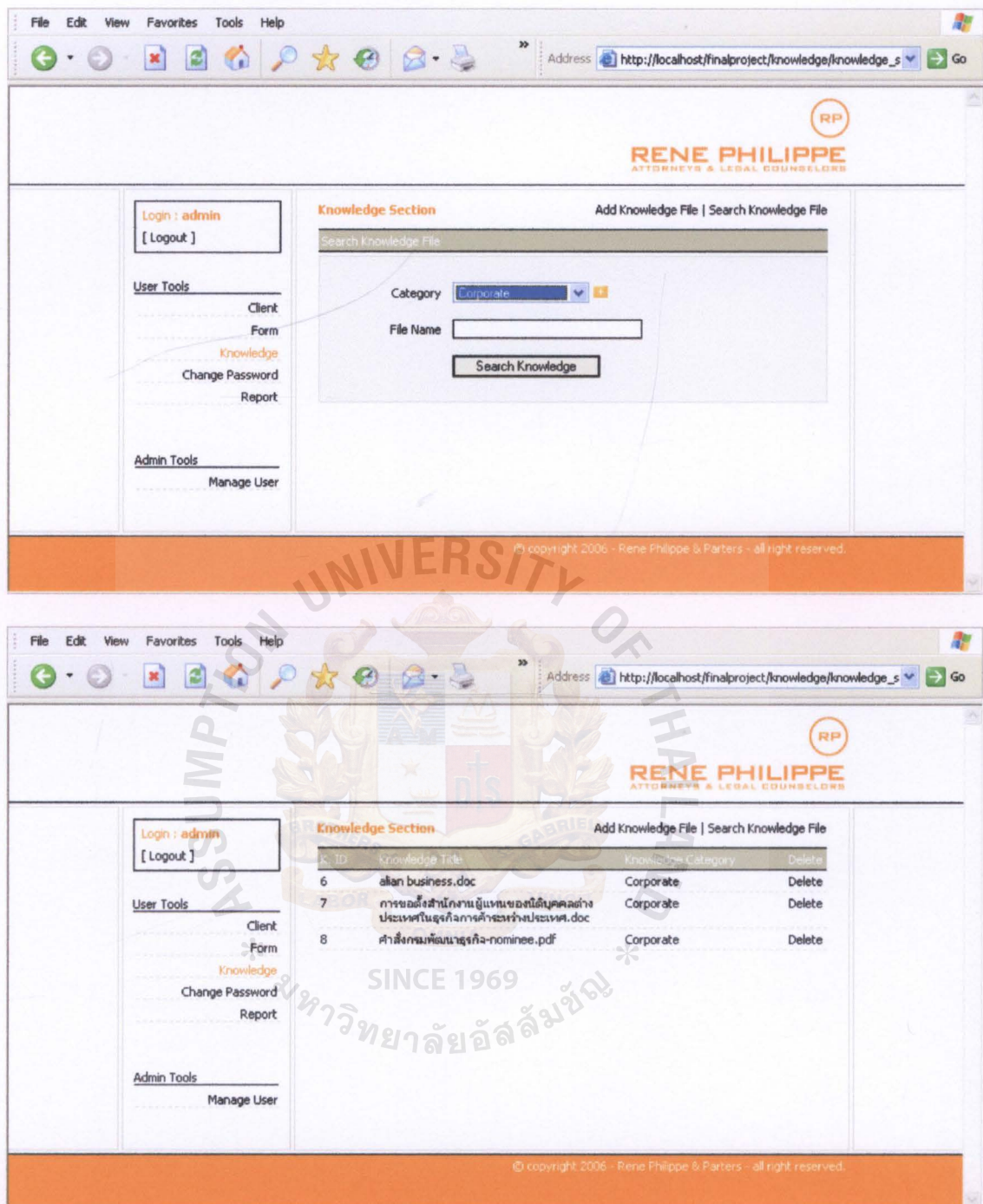


Figure G.21. Search Knowledge Screen of Knowledge Section.



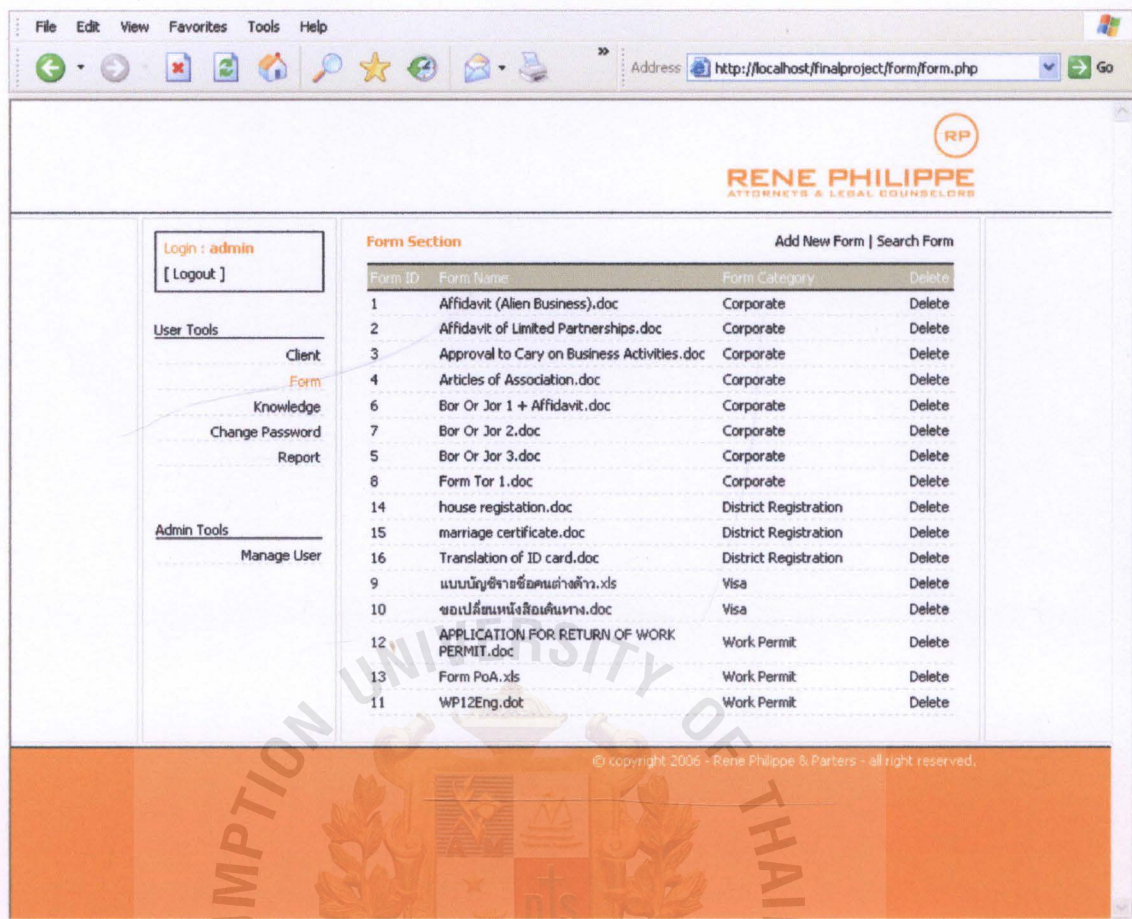


Figure G.22. Form Main Screen of Form Section.



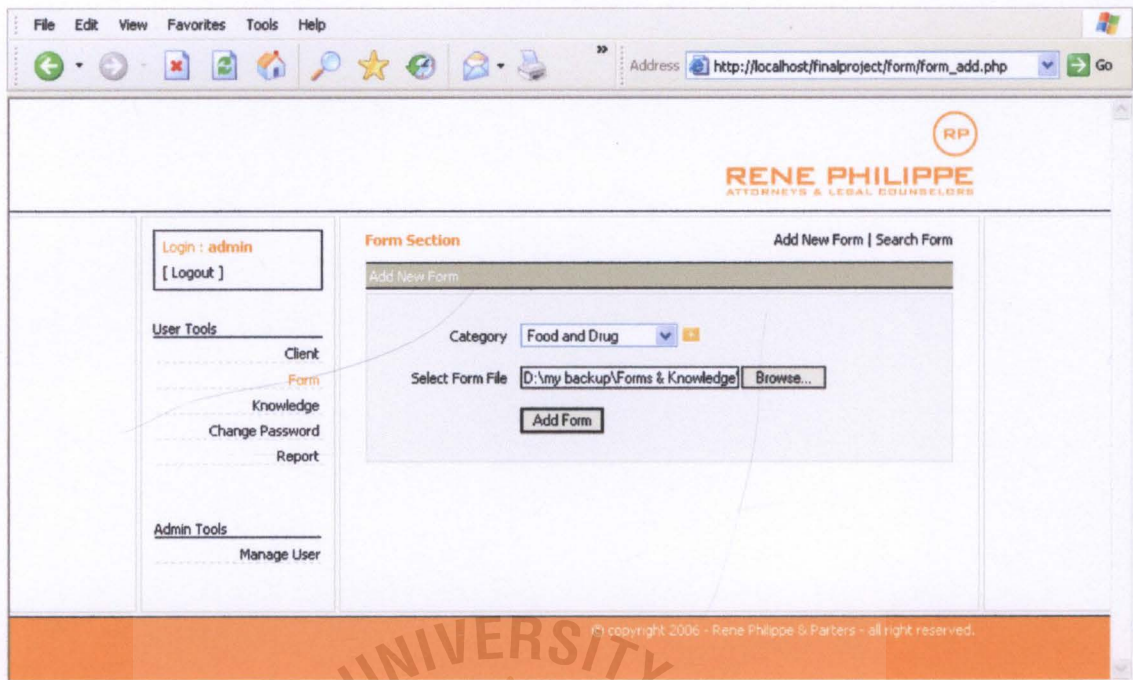


Figure G.23. Upload Form Screen of Form Section.

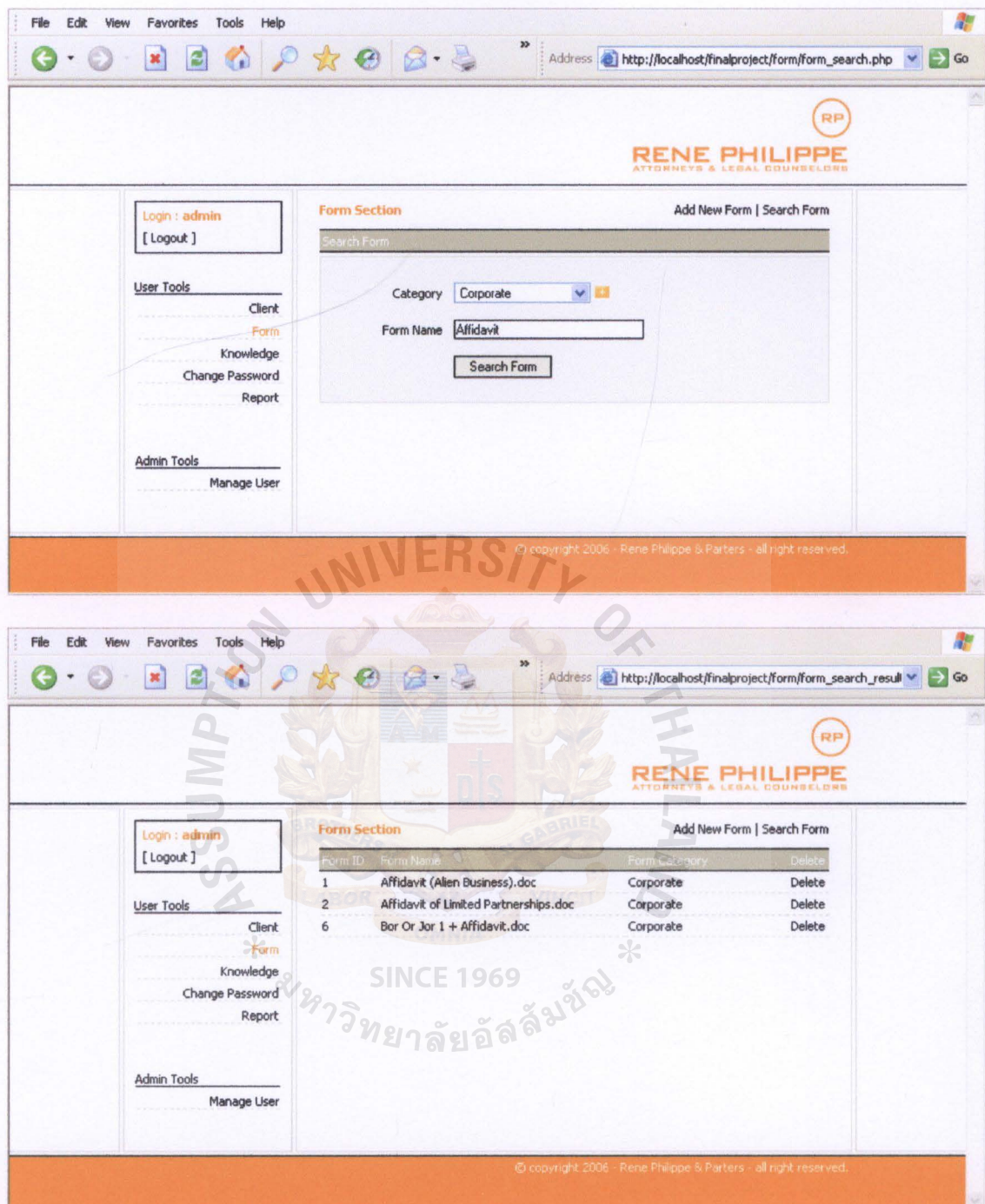


Figure G.24. Search Form Screen of Form Section.



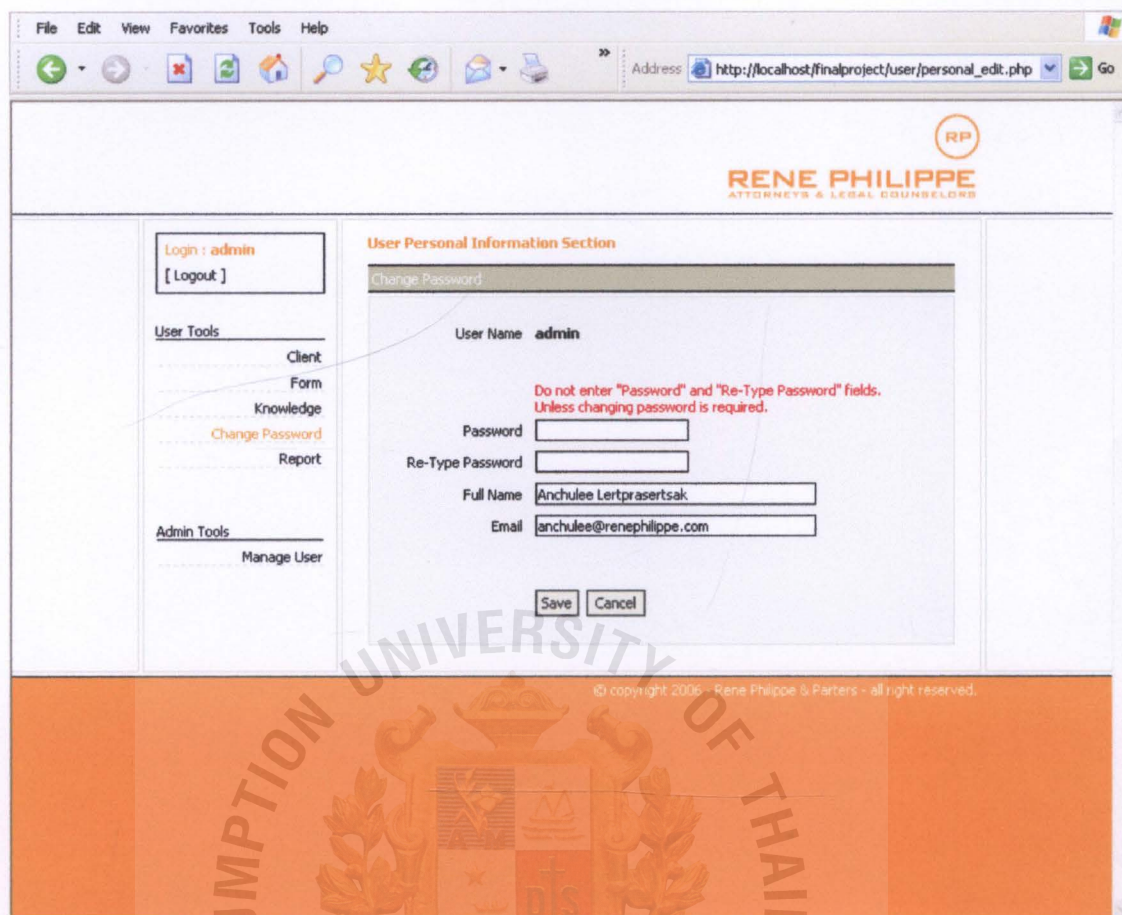


Figure G.25. Change Password Screen of User Personal Information Section.

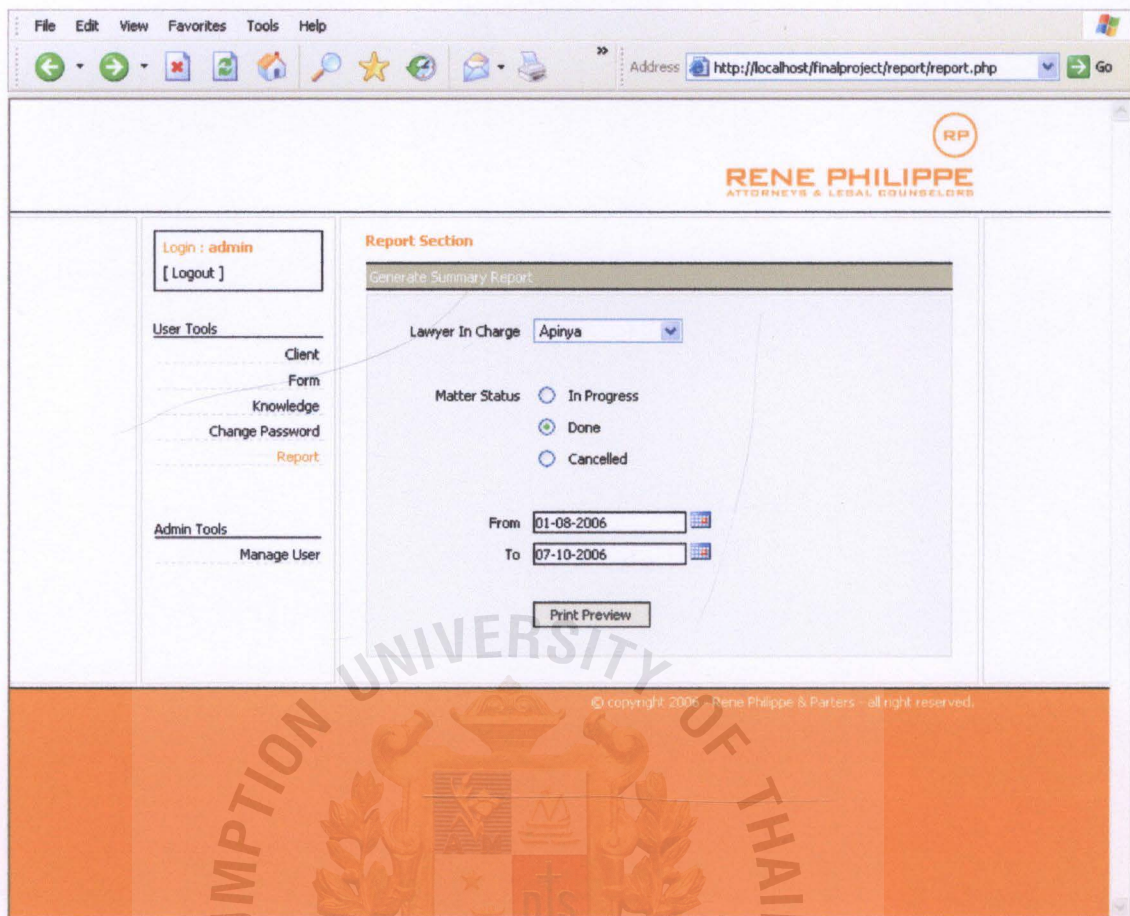


Figure G.26. Generate Summary Report Main Screen of Report Section.



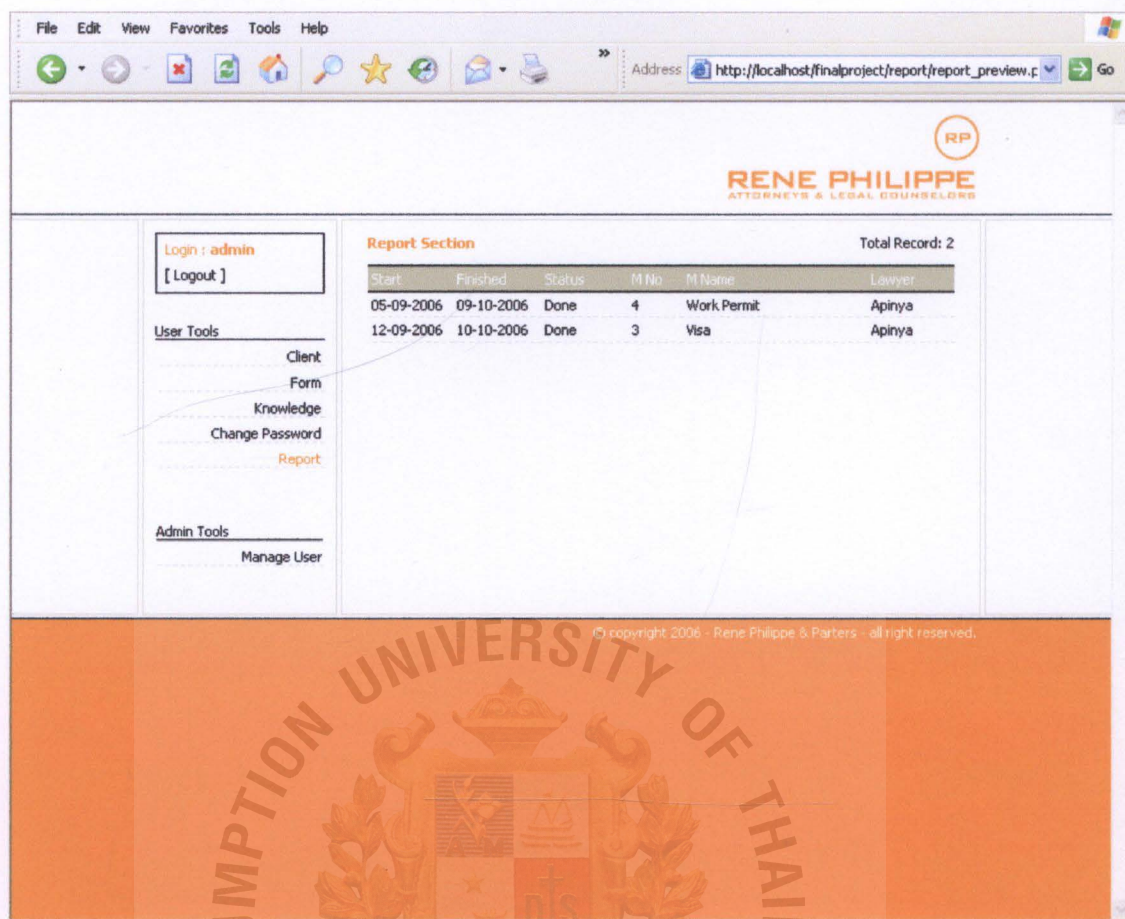


Figure G.27. Summary Report Print Preview Screen of Report Section.



**APPENDIX H**  
**OUTPUT DESIGN**



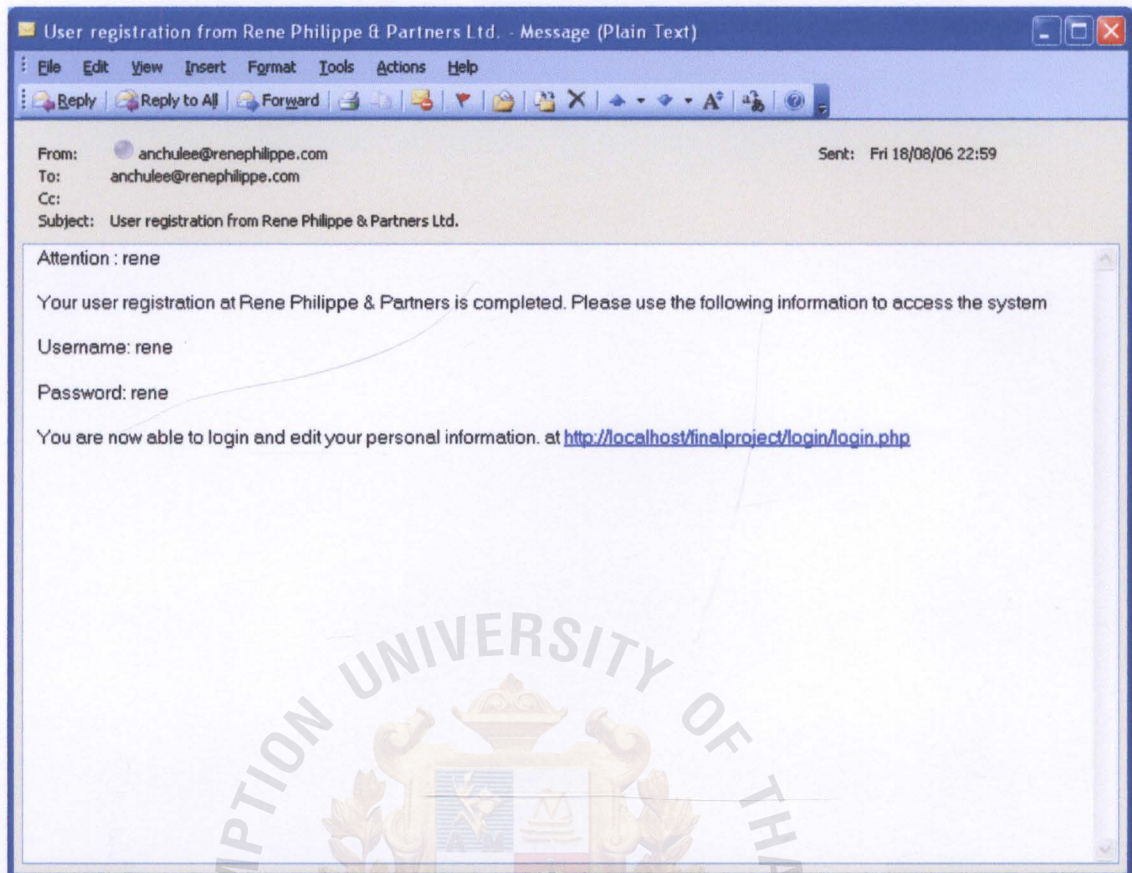


Figure H.1. User Registration Confirmation Email Output From User Registration Process.



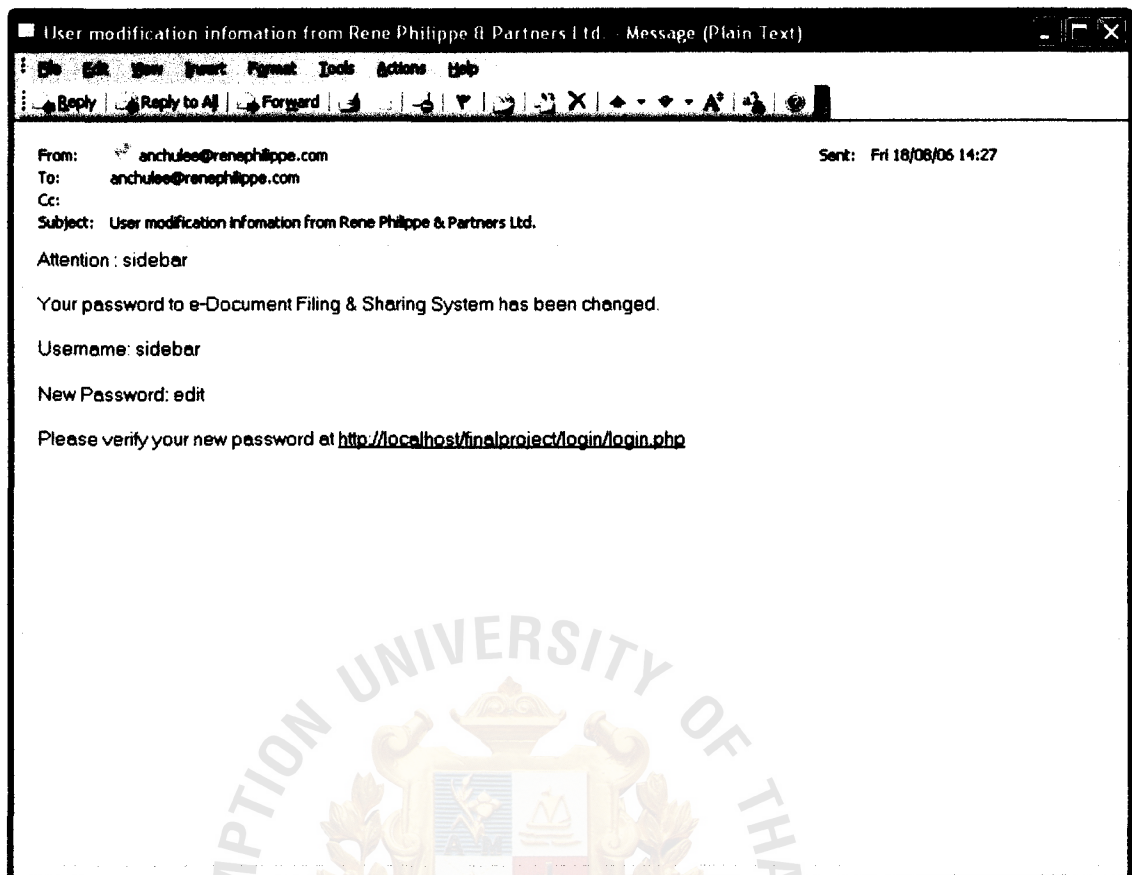


Figure H.2. New Password Notification Email Output From Edit User Detail Process.

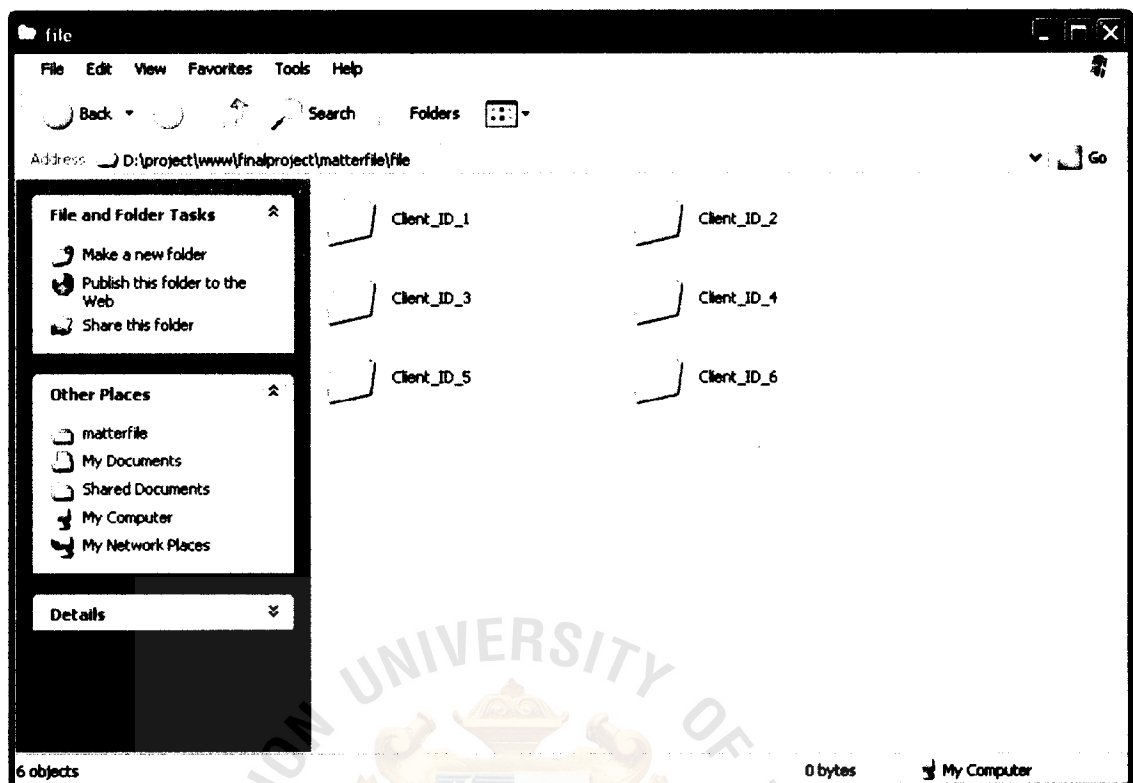


Figure H.3. Automatically Generated Client Folder Output From Add New Client Process.

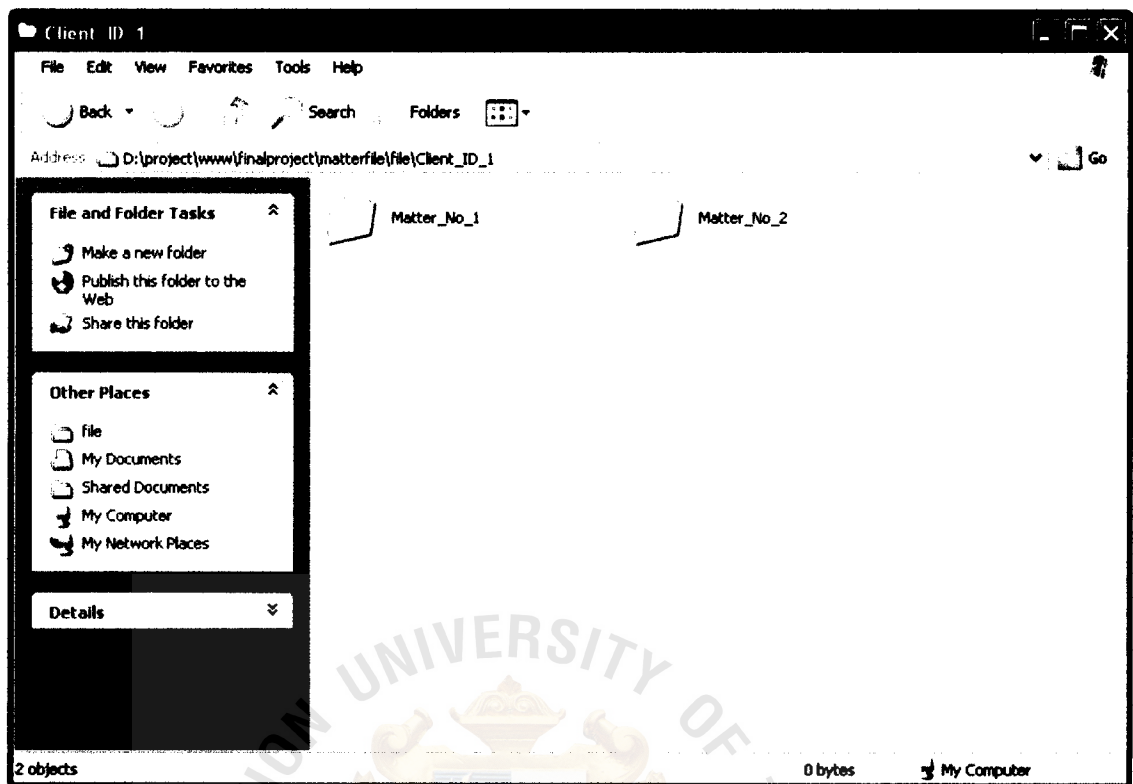


Figure H.4. Automatically Generated Mater Folder Output From Add New Matter Process.

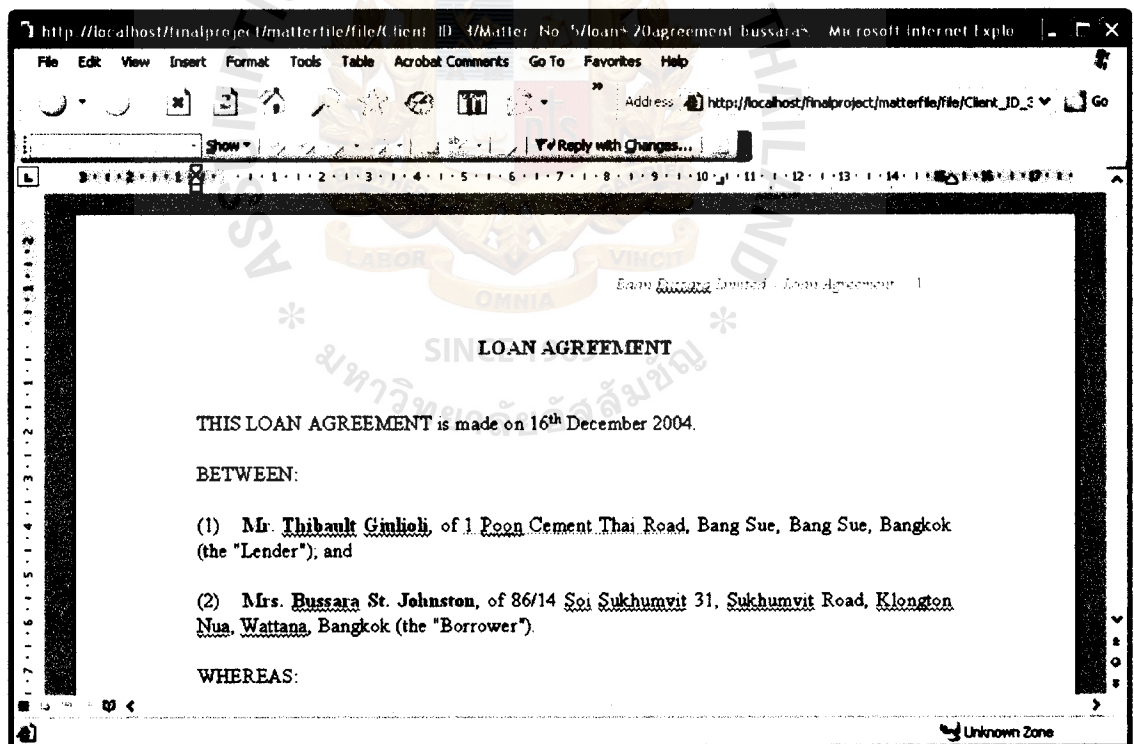
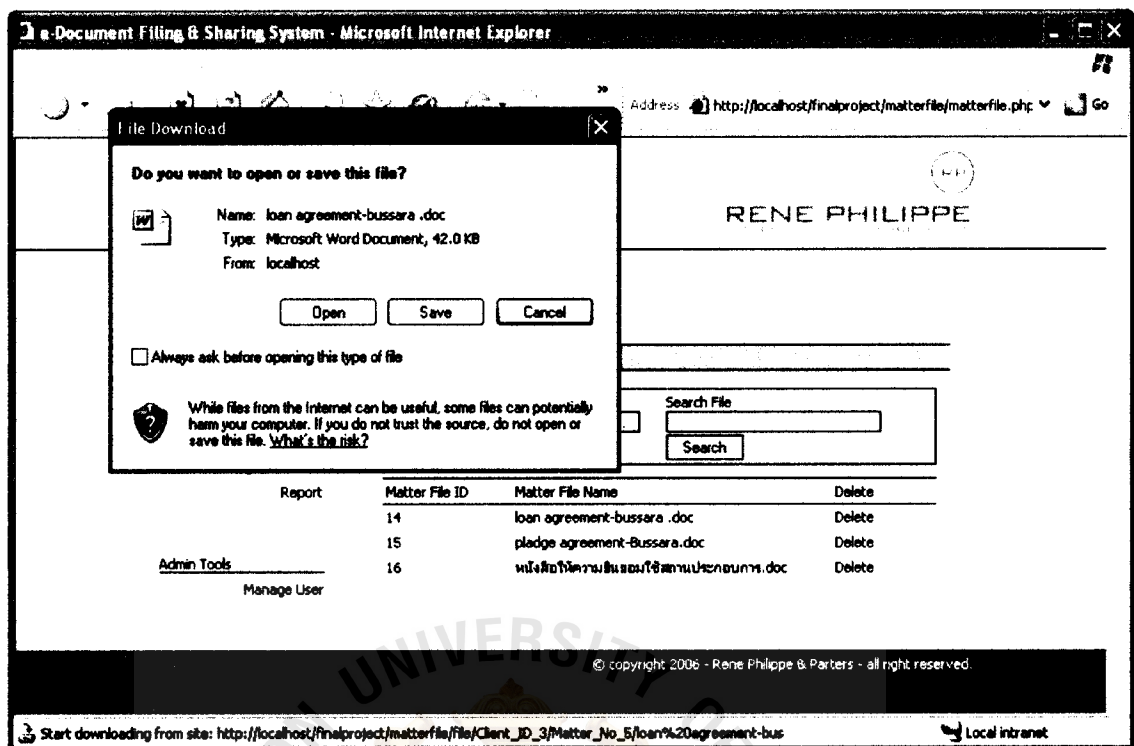
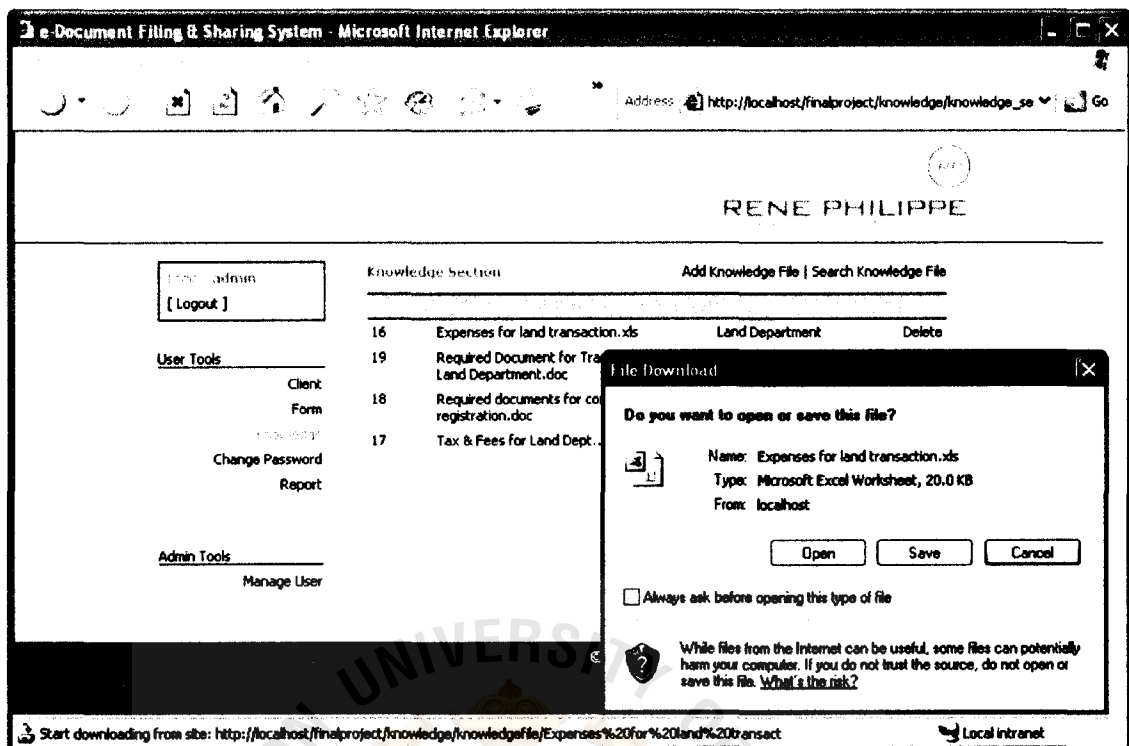


Figure H.5. Matter File Output From Download Matter File Process.



http://localhost/finalproject/fknowledge/knowledgefile/Expenses%20for%20land%20transaction.xls - Microsoft Internet Explorer

|    | A                        | B               | C  | D                       | E                      | F                          | G | H | I |
|----|--------------------------|-----------------|--|-------------------------|------------------------|----------------------------|---|---|---|
| 1  | Fee for Land transaction |                 |  |                         |                        |                            |   |   |   |
| 2  | Transaction              | Application fee | Registration fee   | Duty stamp              | Special Business Tax   | With Holding Tax           |   |   |   |
| 3  |                          |                 |  |                         |                        |                            |   |   |   |
| 4  | Sale                     | 5 Baht/plot     | 2% of assessed value   | Purchase Price/200 Baht | 3.3% of assessed value | Check with land department |   |   |   |
| 5  |                          |                 |  |                         |                        |                            |   |   |   |
| 6  |                          |                 |  |                         |                        |                            |   |   |   |
| 7  |                          |                 |  |                         |                        |                            |   |   |   |
| 8  | Give                     | 5 Baht/ plot    | 2% of assessed value   | Purchase Price/200 Baht | 3.3% of assessed value | Check with land department |   |   |   |
| 9  |                          |                 | 0.5% of assessed value for parents & children or between spouses |                         |                        |                            |   |   |   |
| 10 |                          |                 |  |                         |                        |                            |   |   |   |
| 11 |                          |                 |  |                         |                        |                            |   |   |   |
| 12 |                          |                 |  |                         |                        |                            |   |   |   |
| 13 |                          |                 |  |                         |                        |                            |   |   |   |
| 14 |                          |                 |  |                         |                        |                            |   |   |   |
| 15 | Succession               | 5 Baht/ Plot    | 2% of assessed value   | None                    | None                   | None                       |   |   |   |
| 16 |                          |                 | 0.5% of assessed value for parents & children or between         |                         |                        |                            |   |   |   |
| 17 |                          |                 |  |                         |                        |                            |   |   |   |
| 18 |                          |                 |  |                         |                        |                            |   |   |   |
| 19 |                          |                 |  |                         |                        |                            |   |   |   |

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Figure H.6. Knowledge File Output From Download Knowledge Process.

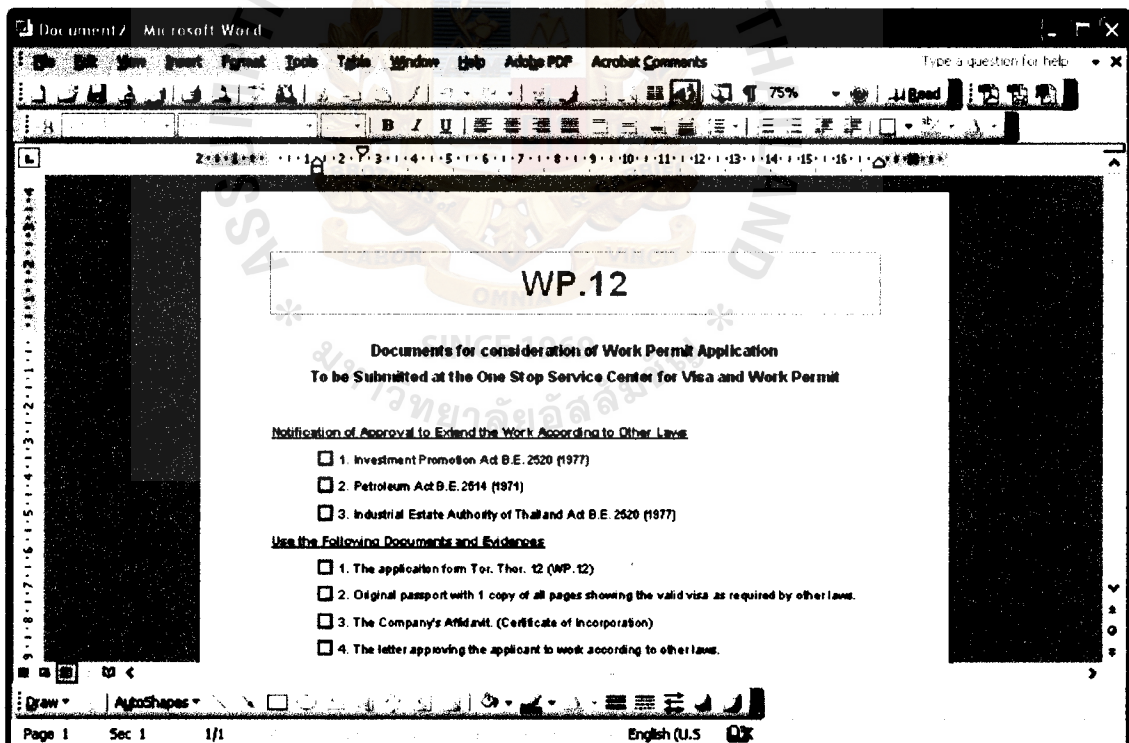
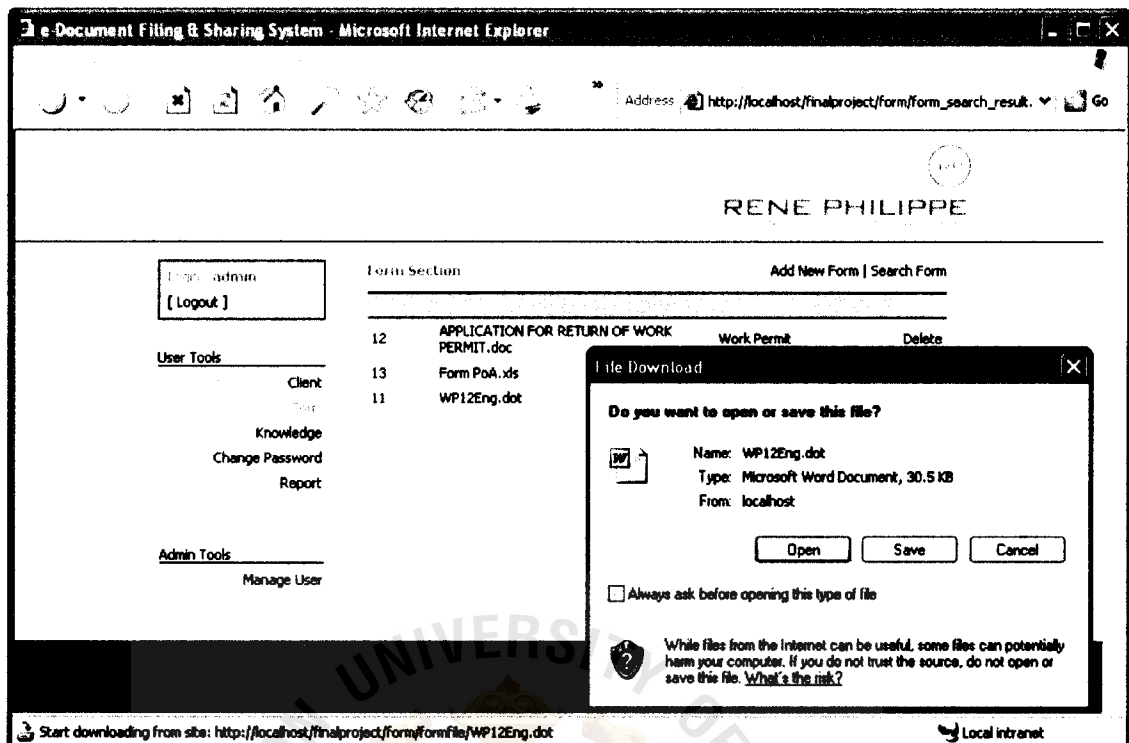


Figure H.7. Form File Output From Download Form Process.

File Edit View Favorites Tools Help

Address http://localhost/finalproject/report/report.php Go

RENE PHILIPPE

Logout Admin [Logout]

User Tools

Client  
Form  
Knowledge  
Change Password  
Report

Admin Tools

Manage User

Report Section

Lawyer In Charge [Korapat] ▼

Matter Status ☐ In Progress ☐ Done ☐ Cancelled

From [ ] [ ]

To [ ] [ ]

Print Preview

Report Section Total Record: 4

|            |            |             |    |                       |         |
|------------|------------|-------------|----|-----------------------|---------|
| 07-01-2003 | 13-01-2003 | Done        | 9  | Return of Work Permit | Korapat |
| 04-09-2006 | 04-09-2006 | Done        | 7  | Company Registration  | Korapat |
| 20-09-2006 | -          | In Progress | 5  | Agreement             | Korapat |
| 07-10-2006 | 16-10-2006 | Done        | 11 | Work Permit           | Korapat |

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Figure H.8. Matter Request Report By Lawyer In Charge Output From Generate Summary Report Process.



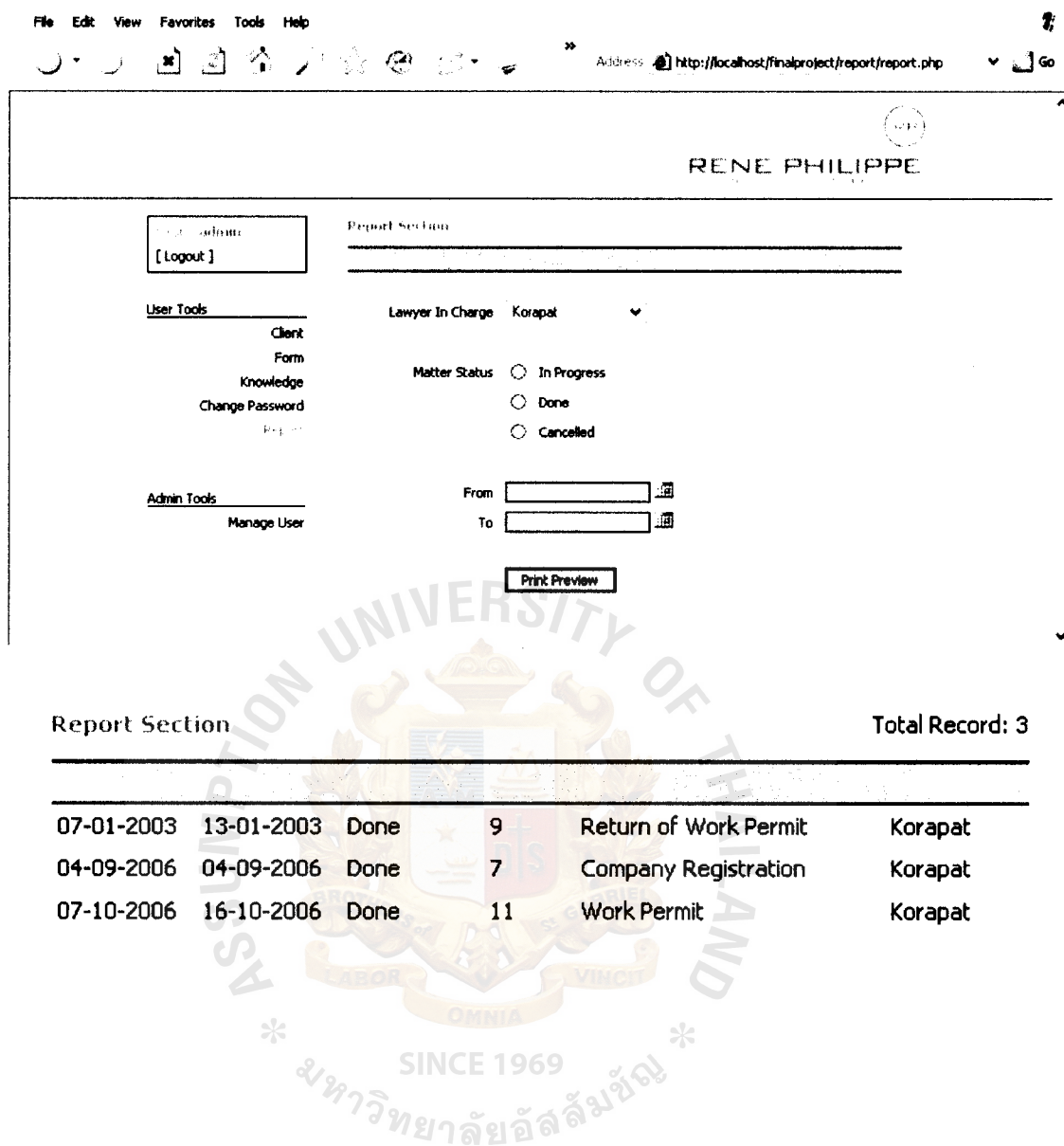


Figure H.9. Matter Request Report By Lawyer In Charge and Matter Status Output  
From Generate Summary Report Process.

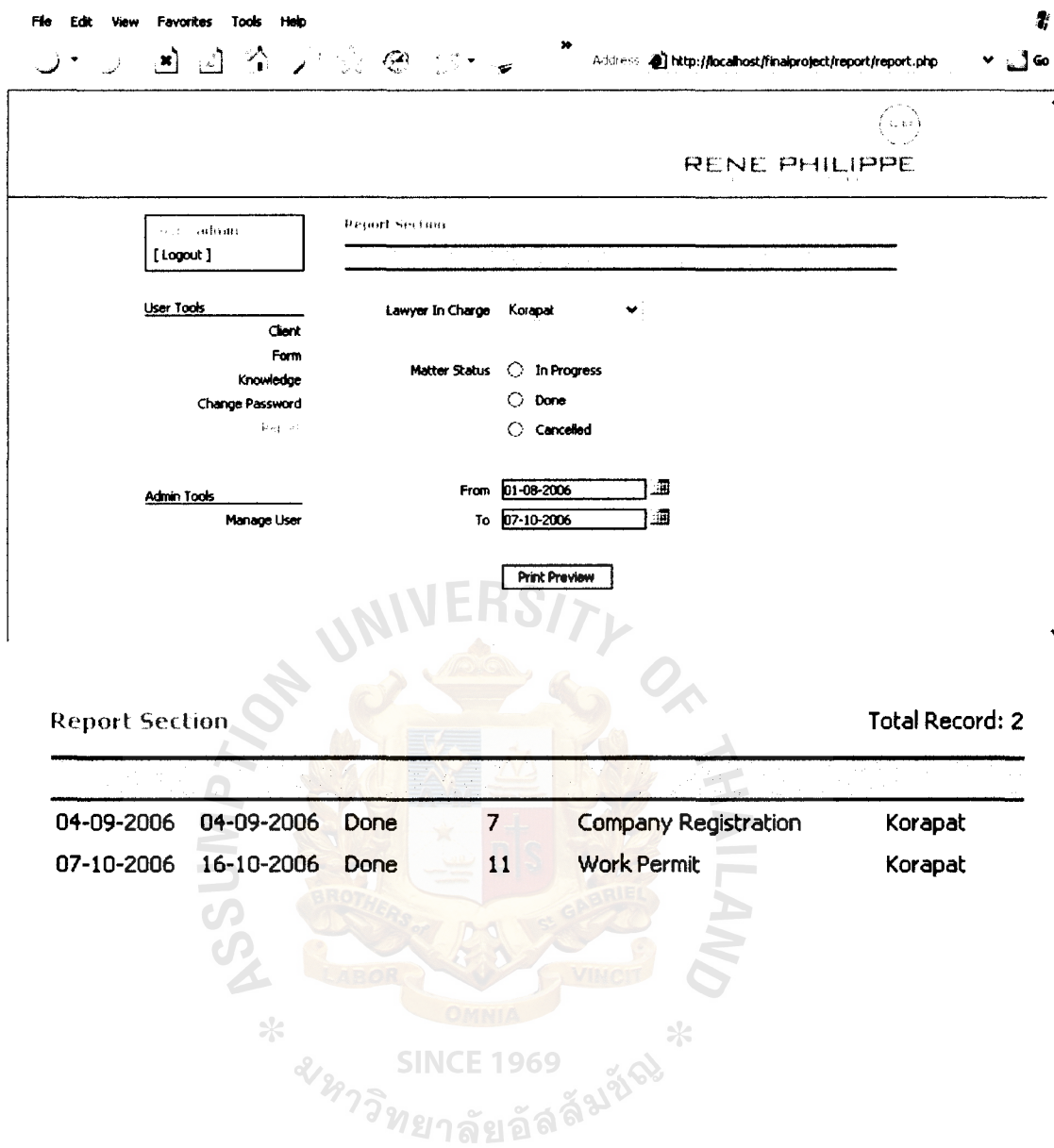


Figure H.10. Matter Request Report By Lawyer In Charge, Matter Status and Matter Request Period Output From Generate Summary Report Process.

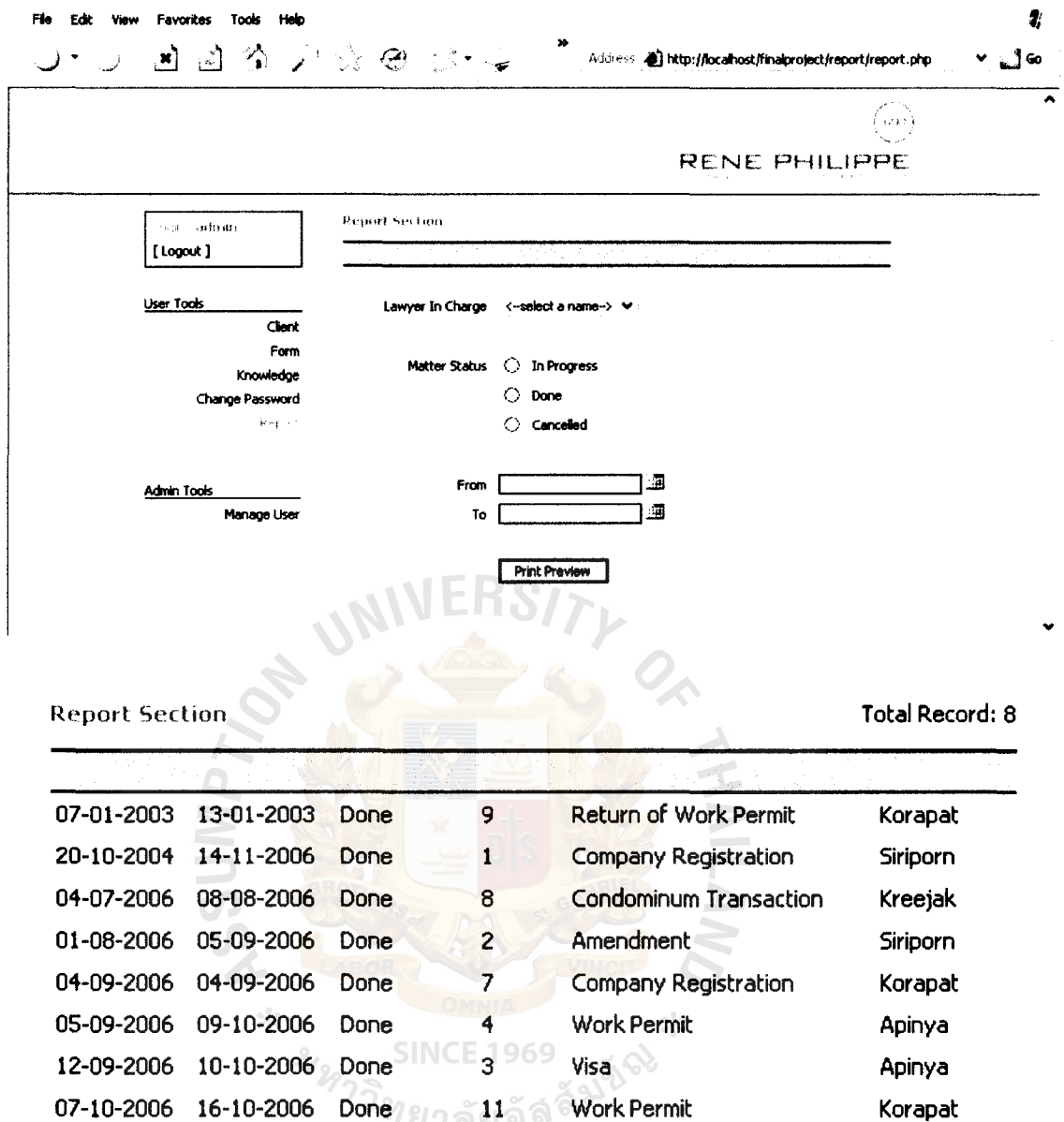


Figure H.11. Matter Request Report By Matter Status Output From Generate Summary Report Process.

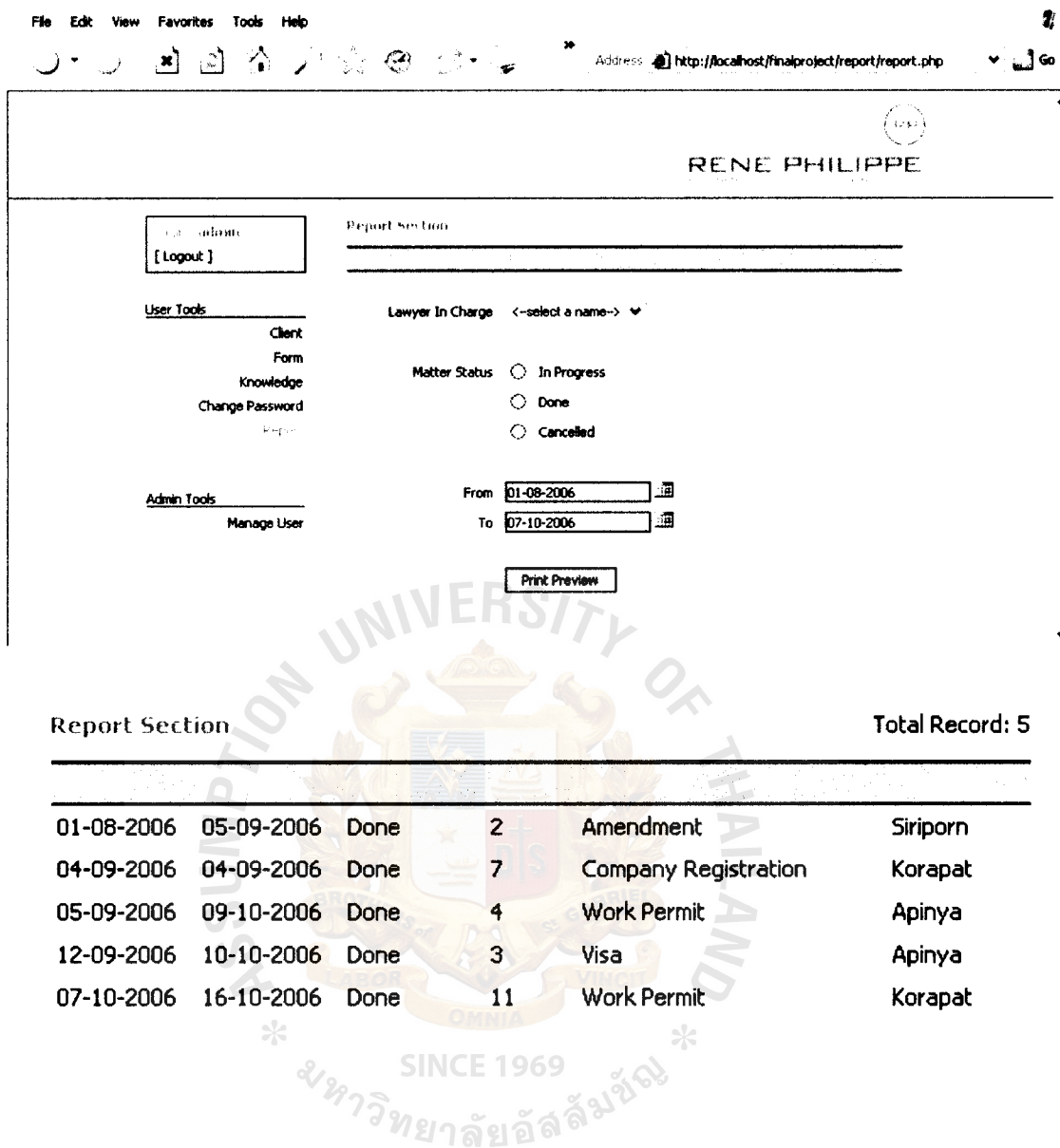


Figure H.12. Matter Request Report By Matter Status and Matter Request Period  
Output From Generate Summary Report Process.

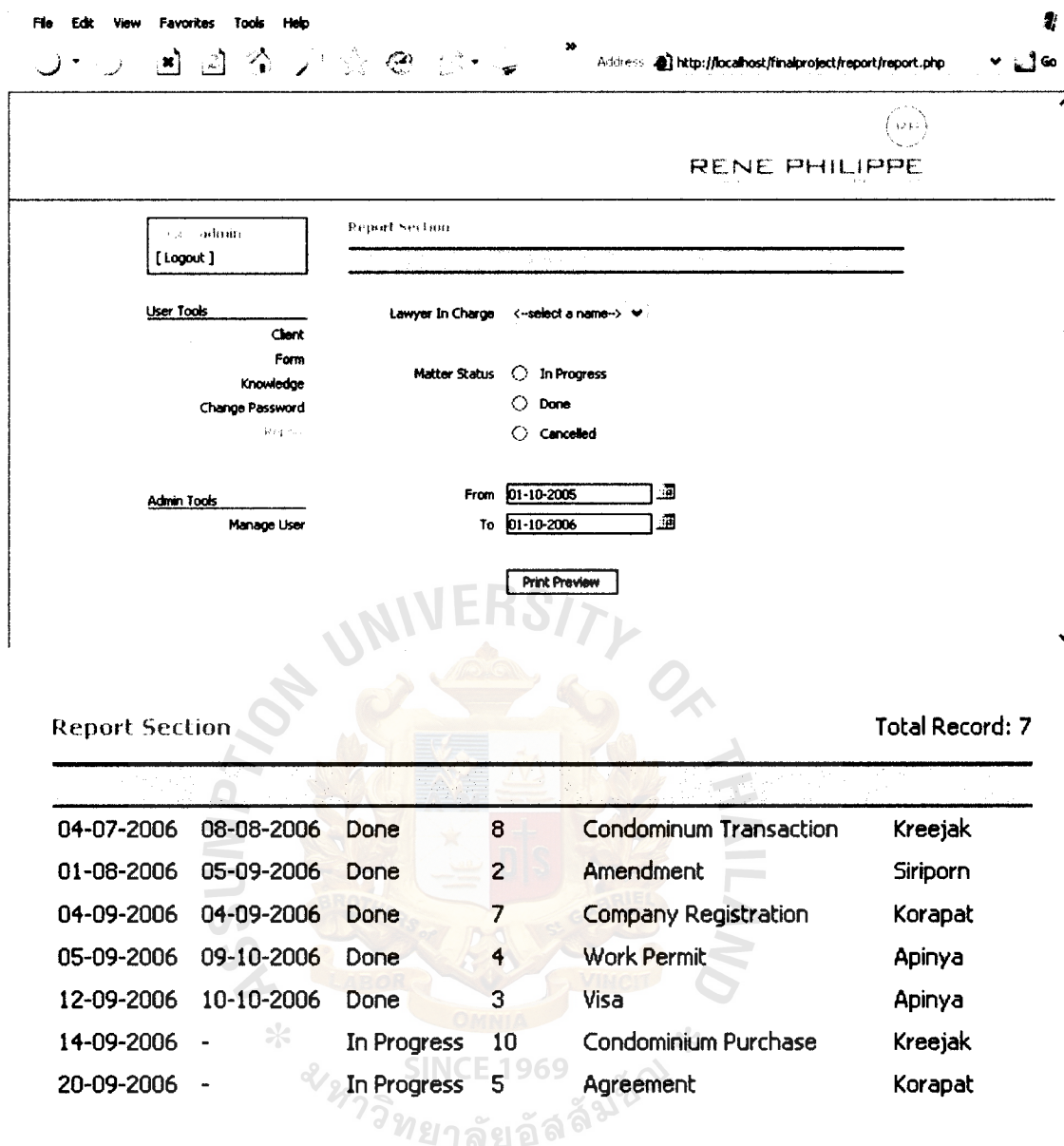


Figure H.13. Matter Request Report By Matter Request Period Output From  
Generate Summary Report Process.



**APPENDIX I**  
**COST-BENEFIT ANALYSIS**



Table I.1. Cost of Existing System, Baht.

| Cost Item   | Year 1           | Year 2           | Year 3           | Year 4           | Year 5           |
|---|------------------|------------------|------------------|------------------|------------------|
| <b>Development cost:</b>                              |                  |                  |                  |                  |                  |
| Hardware cost:  |                  |                  |                  |                  |                  |
| 0Server (@90,000)                                     | -                | -                | -                | -                | -                |
| 0Client (@22,500)                                     | -                | -                | -                | -                | -                |
| 0Wireless access point (@4,500)                       | -                | -                | -                | -                | -                |
| 0UPS (@5,500)   | -                | -                | -                | -                | -                |
| 0Wireless card (@2,500)                               | -                | -                | -                | -                | -                |
| <b>Total Hardware Cost:</b>                           | -                | -                | -                | -                | -                |
| Software cost:  |                  |                  |                  |                  |                  |
| 0Server operating system                              | -                | -                | -                | -                | -                |
| 0Client operating system (@5,000)                     | -                | -                | -                | -                | -                |
| 0Database management system                           | -                | -                | -                | -                | -                |
| 0Software development environment                     | -                | -                | -                | -                | -                |
| <b>Total Software Cost:</b>                           | -                | -                | -                | -                | -                |
| Personnel:  |                  |                  |                  |                  |                  |
| 0System analyst (3 month @ 30,000 baht)               | -                | -                | -                | -                | -                |
| 0Programmer (3 month @ 20,000 baht)                   | -                | -                | -                | -                | -                |
| 0Database specialist (1.5 month @ 20,000 baht)        | -                | -                | -                | -                | -                |
| 0Network specialist (1.5 month @ 20,000 baht)         | -                | -                | -                | -                | -                |
| <b>Total Personnel Cost</b>                           | -                | -                | -                | -                | -                |
| Implementation Cost:                                  |                  |                  |                  |                  |                  |
| Training cost   | -                | -                | -                | -                | -                |
| Setup cost  | -                | -                | -                | -                | -                |
| <b>Total Implementation Cost:</b>                     | -                | -                | -                | -                | -                |
| <b>Total Development Cost:</b>                        | -                | -                | -                | -                | -                |
| <b>Operating Cost (Annual):</b>                       |                  |                  |                  |                  |                  |
| User:   |                  |                  |                  |                  |                  |
| 2Senior lawyer (33,500 baht / month / person)         | 804,000          | 844,200          | 886,410          | 930,731          | 977,267          |
| 5Lawyer (12,000 baht / month / person)                | 720,000          | 756,000          | 793,800          | 832,440          | 874,062          |
| 2Administrative officer (7,000 baht / month / person) | 168,000          | 176,400          | 185,220          | 194,481          | 204,205          |
| <b>Total Software Cost:</b>                           | <b>1,692,000</b> | <b>1,776,600</b> | <b>1,865,430</b> | <b>1,957,612</b> | <b>2,055,534</b> |
| System Support:                                       |                  |                  |                  |                  |                  |
| 0Programmer (22,500 baht / month)                     | -                | -                | -                | -                | -                |
| 0Database administrator (19,500 baht / month)         | -                | -                | -                | -                | -                |
| 0Network administrator (19,500 baht / month)          | 234,000          | 245,700          | 257,985          | 270,884          | 284,428          |
| <b>Total system support cost:</b>                     | <b>234,000</b>   | <b>245,700</b>   | <b>257,985</b>   | <b>270,884</b>   | <b>284,428</b>   |
| Office Supplies & Miscellaneous Cost:                 |                  |                  |                  |                  |                  |
| Stationary (4,000 baht / month)                       | 48,000           | 50,400           | 52,920           | 55,566           | 58,344           |
| Paper (3,500 baht / month)                            | 42,000           | 46,200           | 50,820           | 55,902           | 61,492           |
| Utility (5,000 baht / month)                          | 60,000           | 66,000           | 72,600           | 79,860           | 87,846           |
| Miscellaneous expense (5,000 baht / month)            | 60,000           | 60,000           | 60,000           | 60,000           | 60,000           |
| <b>Total supplies cost:</b>                           | <b>210,000</b>   | <b>222,600</b>   | <b>236,340</b>   | <b>251,328</b>   | <b>267,682</b>   |
| Maintenance cost:                                     |                  |                  |                  |                  |                  |
| Hardware maintenance                                  | -                | -                | -                | -                | -                |
| Software maintenance                                  | -                | -                | -                | -                | -                |
| <b>Total maintenance cost:</b>                        | -                | -                | -                | -                | -                |
| <b>Total Operating Cost (Annual):</b>                 | <b>2,136,000</b> | <b>2,244,900</b> | <b>2,359,755</b> | <b>2,479,824</b> | <b>2,607,644</b> |
| <b>Total Cost:</b>                                    | <b>2,136,000</b> | <b>2,244,900</b> | <b>2,359,755</b> | <b>2,479,824</b> | <b>2,607,644</b> |

Table I.2. Cost of Candidate System 1, Baht.

| Cost Item   | Year 1           | Year 2           | Year 3           | Year 4           | Year 5           |
|---|------------------|------------------|------------------|------------------|------------------|
| <b>Development cost:</b>                              |                  |                  |                  |                  |                  |
| <b>Hardware cost:</b>                                 |                  |                  |                  |                  |                  |
| 1Server (@90,000)                                     | 90,000           | -                | -                | -                | -                |
| 6Client (@22,500)                                     | 135,000          | -                | -                | -                | -                |
| 1Wireless access point (@4,500)                       | 4,500            | -                | -                | -                | -                |
| 1UPS (@5,500)   | 5,500            | -                | -                | -                | -                |
| 7Wireless card (@2,500)                               | 17,500           | -                | -                | -                | -                |
| <b>Total Hardware Cost:</b>                           | <b>252,500</b>   | -                | -                | -                | -                |
| <b>Software cost:</b>                                 |                  |                  |                  |                  |                  |
| 1Server operating system                              | 5,000            | -                | -                | -                | -                |
| 6Client operating system (@5,000)                     | 60,000           | -                | -                | -                | -                |
| 1Database management system                           | 70,690           | -                | -                | -                | -                |
| 0Software development environment                     | 51,700           | -                | -                | -                | -                |
| <b>Total Software Cost:</b>                           | <b>187,390</b>   | -                | -                | -                | -                |
| <b>Personnel:</b>                                     |                  |                  |                  |                  |                  |
| 1System analyst (3 month @ 30,000 baht)               | 90,000           | -                | -                | -                | -                |
| 2Programmer (3 month @ 20,000 baht)                   | 120,000          | -                | -                | -                | -                |
| 0.5Database specialist (1.5 month @ 20,000 baht)      | 15,000           | -                | -                | -                | -                |
| 0.5Network specialist (1.5 month @ 20,000 baht)       | 15,000           | -                | -                | -                | -                |
| <b>Total Personnel Cost</b>                           | <b>240,000</b>   | -                | -                | -                | -                |
| <b>Implementation Cost:</b>                           |                  |                  |                  |                  |                  |
| Training cost   | 25,000           | -                | -                | -                | -                |
| Setup cost  | 5,000            | -                | -                | -                | -                |
| <b>Total Implementation Cost:</b>                     | <b>30,000</b>    | -                | -                | -                | -                |
| <b>Total Development Cost:</b>                        | <b>709,890</b>   | -                | -                | -                | -                |
| <b>Operating Cost (Annual):</b>                       |                  |                  |                  |                  |                  |
| <b>User:</b>  |                  |                  |                  |                  |                  |
| 2Senior lawyer (33,500 baht / month / person)         | 804,000          | 844,200          | 886,410          | 930,731          | 977,267          |
| 4Lawyer (12,000 baht / month / person)                | 576,000          | 604,800          | 635,040          | 666,792          | 700,132          |
| 1Administrative officer (7,000 baht / month / person) | 84,000           | 88,200           | 92,610           | 97,240           | 102,102          |
| <b>Total Software Cost:</b>                           | <b>1,464,000</b> | <b>1,537,200</b> | <b>1,614,060</b> | <b>1,694,763</b> | <b>1,779,501</b> |
| <b>System Support:</b>                                |                  |                  |                  |                  |                  |
| 0.33Programmer (25,000 baht / month)                  | 99,000           | 103,950          | 109,147          | 114,604          | 120,334          |
| 0.33Database administrator (25,000 baht / month)      | 99,000           | 103,950          | 109,147          | 114,604          | 120,334          |
| 0.33Network administrator (25,000 baht / month)       | 99,000           | 103,950          | 109,147          | 114,604          | 120,334          |
| <b>Total system support cost:</b>                     | <b>297,000</b>   | <b>311,850</b>   | <b>327,441</b>   | <b>343,812</b>   | <b>361,002</b>   |
| <b>Office Supplies &amp; Miscellaneous Cost:</b>      |                  |                  |                  |                  |                  |
| Stationary (2,000 baht / month)                       | 24,000           | 25,200           | 26,460           | 27,783           | 29,172           |
| Paper (2,500 baht / month)                            | 30,000           | 33,000           | 36,300           | 39,930           | 43,923           |
| Utility (5,000 baht / month)                          | 60,000           | 66,000           | 72,600           | 79,860           | 87,846           |
| Miscellaneous expense (2,000 baht / month)            | 24,000           | 24,000           | 24,000           | 24,000           | 24,000           |
| <b>Total supplies cost:</b>                           | <b>138,000</b>   | <b>148,200</b>   | <b>159,360</b>   | <b>171,573</b>   | <b>184,941</b>   |
| <b>Maintenance cost:</b>                              |                  |                  |                  |                  |                  |
| Hardware maintenance                                  | 3,500            | 4,025            | 4,629            | 5,323            | 6,122            |
| Software maintenance                                  | 2,000            | 2,000            | 2,000            | 2,000            | 2,000            |
| <b>Total maintenance cost:</b>                        | <b>5,500</b>     | <b>6,025</b>     | <b>6,629</b>     | <b>7,323</b>     | <b>8,122</b>     |
| <b>Total Operating Cost (Annual):</b>                 | <b>1,904,500</b> | <b>2,003,275</b> | <b>2,107,490</b> | <b>2,217,471</b> | <b>2,333,566</b> |
| <b>Total Cost:</b>                                    | <b>2,614,390</b> | <b>2,003,275</b> | <b>2,107,490</b> | <b>2,217,471</b> | <b>2,333,566</b> |

Table I.3. Cost of Candidate System 2, Baht.

| Cost Item   | Year 1           | Year 2           | Year 3           | Year 4           | Year 5           |
|---|------------------|------------------|------------------|------------------|------------------|
| <b>Development cost:</b>                              |                  |                  |                  |                  |                  |
| <b>Hardware cost:</b>                                 |                  |                  |                  |                  |                  |
| 1Server (@90,000)                                     | 90,000           | -                | -                | -                | -                |
| 6Client (@22,500)                                     | 135,000          | -                | -                | -                | -                |
| 1Wireless access point (@4,500)                       | 4,500            | -                | -                | -                | -                |
| 1UPS (@5,500)   | 5,500            | -                | -                | -                | -                |
| 7Wireless card (@2,500)                               | 17,500           | -                | -                | -                | -                |
| <b>Total Hardware Cost:</b>                           | <b>252,500</b>   | -                | -                | -                | -                |
| <b>Software cost:</b>                                 |                  |                  |                  |                  |                  |
| 1Server operating system                              | 5,000            | -                | -                | -                | -                |
| 6Client operating system (@5,000)                     | 60,000           | -                | -                | -                | -                |
| 1Database management system                           | 70,690           | -                | -                | -                | -                |
| 0Software development environment                     | 51,700           | -                | -                | -                | -                |
| <b>Total Software Cost:</b>                           | <b>187,390</b>   | -                | -                | -                | -                |
| <b>Personnel:</b>                                     |                  |                  |                  |                  |                  |
| 1System analyst (3 month @ 30,000 baht)               | 90,000           | -                | -                | -                | -                |
| 0Programmer (3 month @ 20,000 baht)                   | -                | -                | -                | -                | -                |
| 0.5Database specialist (1.5 month @ 20,000 baht)      | 15,000           | -                | -                | -                | -                |
| 0.5Network specialist (1.5 month @ 20,000 baht)       | 15,000           | -                | -                | -                | -                |
| <b>Total Personnel Cost</b>                           | <b>120,000</b>   | -                | -                | -                | -                |
| <b>Implementation Cost:</b>                           |                  |                  |                  |                  |                  |
| Training cost   | 30,000           | -                | -                | -                | -                |
| Setup cost  | 5,000            | -                | -                | -                | -                |
| <b>Total Implementation Cost:</b>                     | <b>35,000</b>    | -                | -                | -                | -                |
| <b>Total Development Cost:</b>                        | <b>594,890</b>   | -                | -                | -                | -                |
| <b>Operating Cost (Annual):</b>                       |                  |                  |                  |                  |                  |
| <b>User:</b>  |                  |                  |                  |                  |                  |
| 2Senior lawyer (33,500 baht / month / person)         | 804,000          | 844,200          | 886,410          | 930,731          | 977,267          |
| 4Lawyer (12,000 baht / month / person)                | 576,000          | 604,800          | 635,040          | 666,792          | 700,132          |
| 1Administrative officer (7,000 baht / month / person) | 84,000           | 88,200           | 92,610           | 97,240           | 102,102          |
| <b>Total Software Cost:</b>                           | <b>1,464,000</b> | <b>1,537,200</b> | <b>1,614,060</b> | <b>1,694,763</b> | <b>1,779,501</b> |
| <b>System Support:</b>                                |                  |                  |                  |                  |                  |
| 0.33Programmer (25,000 baht / month)                  | 99,000           | 103,950          | 109,147          | 114,604          | 120,334          |
| 0.33Database administrator (25,000 baht / month)      | 99,000           | 103,950          | 109,147          | 114,604          | 120,334          |
| 0.33Network administrator (25,000 baht / month)       | 99,000           | 103,950          | 109,147          | 114,604          | 120,334          |
| <b>Total system support cost:</b>                     | <b>297,000</b>   | <b>311,850</b>   | <b>327,441</b>   | <b>343,812</b>   | <b>361,002</b>   |
| <b>Office Supplies &amp; Miscellaneous Cost:</b>      |                  |                  |                  |                  |                  |
| Stationary (2,000 baht / month)                       | 24,000           | 25,200           | 26,460           | 27,783           | 29,172           |
| Paper (2,500 baht / month)                            | 30,000           | 33,000           | 36,300           | 39,930           | 43,923           |
| Utility (5,000 baht / month)                          | 60,000           | 66,000           | 72,600           | 79,860           | 87,846           |
| Miscellaneous expanse (2,000 baht / month)            | 24,000           | 24,000           | 24,000           | 24,000           | 24,000           |
| <b>Total supplies cost:</b>                           | <b>138,000</b>   | <b>148,200</b>   | <b>159,360</b>   | <b>171,573</b>   | <b>184,941</b>   |
| <b>Maintenance cost:</b>                              |                  |                  |                  |                  |                  |
| Hardware maintenance                                  | 3,500            | 4,025            | 4,629            | 5,323            | 6,122            |
| Software maintenance                                  | 2,000            | 2,000            | 2,000            | 2,000            | 2,000            |
| <b>Total maintenance cost:</b>                        | <b>5,500</b>     | <b>6,025</b>     | <b>6,629</b>     | <b>7,323</b>     | <b>8,122</b>     |
| <b>Total Operating Cost (Annual):</b>                 | <b>1,904,500</b> | <b>2,003,275</b> | <b>2,107,490</b> | <b>2,217,471</b> | <b>2,333,566</b> |
| <b>Total Cost:</b>                                    | <b>2,499,390</b> | <b>2,003,275</b> | <b>2,107,490</b> | <b>2,217,471</b> | <b>2,333,566</b> |

Table I.4. Cost of Candidate System 3, Baht.

| Cost Item   | Year 1           | Year 2           | Year 3           | Year 4           | Year 5           |
|---|------------------|------------------|------------------|------------------|------------------|
| <b>Development cost:</b>                              |                  |                  |                  |                  |                  |
| <b>Hardware cost:</b>                                 |                  |                  |                  |                  |                  |
| 1Server (@90,000)                                     | 90,000           | -                | -                | -                | -                |
| 6Client (@22,500)                                     | 135,000          | -                | -                | -                | -                |
| 1Wireless access point (@4,500)                       | 4,500            | -                | -                | -                | -                |
| 1UPS (@5,500)   | 5,500            | -                | -                | -                | -                |
| 7Wireless card (@2,500)                               | 17,500           | -                | -                | -                | -                |
| <b>Total Hardware Cost:</b>                           | <b>252,500</b>   | -                | -                | -                | -                |
| <b>Software cost:</b>                                 |                  |                  |                  |                  |                  |
| 1Server operating system                              | 5,000            | -                | -                | -                | -                |
| 6Client operating system (@5,000)                     | 60,000           | -                | -                | -                | -                |
| 1Database management system                           | -                | -                | -                | -                | -                |
| 0Software development environment                     | -                | -                | -                | -                | -                |
| <b>Total Software Cost:</b>                           | <b>65,000</b>    | -                | -                | -                | -                |
| <b>Personnel:</b>                                     |                  |                  |                  |                  |                  |
| 1System analyst (3 month @ 30,000 baht)               | 90,000           | -                | -                | -                | -                |
| 0Programmer (3 month @ 20,000 baht)                   | -                | -                | -                | -                | -                |
| 0.5Database specialist (1.5 month @ 20,000 baht)      | 15,000           | -                | -                | -                | -                |
| 0.5Network specialist (1.5 month @ 20,000 baht)       | 15,000           | -                | -                | -                | -                |
| <b>Total Personnel Cost</b>                           | <b>120,000</b>   | -                | -                | -                | -                |
| <b>Implementation Cost:</b>                           |                  |                  |                  |                  |                  |
| Training cost   | 10,000           | -                | -                | -                | -                |
| Setup cost  | 5,000            | -                | -                | -                | -                |
| <b>Total Implementation Cost:</b>                     | <b>15,000</b>    | -                | -                | -                | -                |
| <b>Total Development Cost:</b>                        | <b>452,500</b>   | -                | -                | -                | -                |
| <b>Operating Cost (Annual):</b>                       |                  |                  |                  |                  |                  |
| <b>User:</b>  |                  |                  |                  |                  |                  |
| 2Senior lawyer (33,500 baht / month / person)         | 804,000          | 844,200          | 886,410          | 930,731          | 977,267          |
| 4Lawyer (12,000 baht / month / person)                | 576,000          | 604,800          | 635,040          | 666,792          | 700,132          |
| 1Administrative officer (7,000 baht / month / person) | 84,000           | 88,200           | 92,610           | 97,240           | 102,102          |
| <b>Total Software Cost:</b>                           | <b>1,464,000</b> | <b>1,537,200</b> | <b>1,614,060</b> | <b>1,694,763</b> | <b>1,779,501</b> |
| <b>System Support:</b>                                |                  |                  |                  |                  |                  |
| 0.33Programmer (25,000 baht / month)                  | 99,000           | 103,950          | 109,147          | 114,604          | 120,334          |
| 0.33Database administrator (25,000 baht / month)      | 99,000           | 103,950          | 109,147          | 114,604          | 120,334          |
| 0.33Network administrator (25,000 baht / month)       | 99,000           | 103,950          | 109,147          | 114,604          | 120,334          |
| <b>Total system support cost:</b>                     | <b>297,000</b>   | <b>311,850</b>   | <b>327,441</b>   | <b>343,812</b>   | <b>361,002</b>   |
| <b>Office Supplies &amp; Miscellaneous Cost:</b>      |                  |                  |                  |                  |                  |
| Stationary (2,000 baht / month)                       | 24,000           | 25,200           | 26,460           | 27,783           | 29,172           |
| Paper (2,500 baht / month)                            | 30,000           | 33,000           | 36,300           | 39,930           | 43,923           |
| Utility (5,000 baht / month)                          | 60,000           | 66,000           | 72,600           | 79,860           | 87,846           |
| Miscellaneous expanse (2,000 baht / month)            | 24,000           | 24,000           | 24,000           | 24,000           | 24,000           |
| <b>Total supplies cost:</b>                           | <b>138,000</b>   | <b>148,200</b>   | <b>159,360</b>   | <b>171,573</b>   | <b>184,941</b>   |
| <b>Maintenance cost:</b>                              |                  |                  |                  |                  |                  |
| Hardware maintenance                                  | 3,500            | 4,025            | 4,629            | 5,323            | 6,122            |
| Software maintenance                                  | -                | -                | -                | -                | -                |
| <b>Total maintenance cost:</b>                        | <b>3,500</b>     | <b>4,025</b>     | <b>4,629</b>     | <b>5,323</b>     | <b>6,122</b>     |
| <b>Total Operating Cost (Annual):</b>                 | <b>1,902,500</b> | <b>2,001,275</b> | <b>2,105,490</b> | <b>2,215,471</b> | <b>2,311,566</b> |
| <b>Total Cost:</b>                                    | <b>2,355,000</b> | <b>2,001,275</b> | <b>2,105,490</b> | <b>2,215,471</b> | <b>2,311,566</b> |

Table I.5. Benefit of Proposed System, Baht.

| Benefit Item  | Year 1           | Year 2           | Year 3           | Year 4           | Year 5           |
|---|------------------|------------------|------------------|------------------|------------------|
| Employment reduction  |                  |                  |                  |                  |                  |
| 1 Lawyer (12,000 baht / month)  | 144,000          | 151,200          | 158,760          | 166,698          | 175,033          |
| 1 Administrative officer (7,000 baht per month)   | 252,000          | 264,600          | 277,830          | 291,722          | 306,308          |
| Office supplies & miscellaneous saving  |                  |                  |                  |                  |                  |
| Stationary (2,000 baht / month)   | 24,000           | 25,200           | 26,460           | 27,783           | 29,172           |
| Paper (1,000 baht / month)  | 12,000           | 13,200           | 14,520           | 15,972           | 17,569           |
| Miscellaneous expense (3,000 baht / month)  | 36,000           | 36,000           | 36,000           | 36,000           | 36,000           |
| Increasing staff productivity (80,000 baht / month)   | 960,000          | 1,104,082        | 1,269,789        | 1,460,336        | 1,679,512        |
| Reducing 3 hours lost just looking for information<br>(average cost 108 baht / hour / person) | 544,320          | 571,536          | 600,113          | 630,119          | 661,625          |
| <b>Total benefit</b>  | <b>1,972,320</b> | <b>2,165,818</b> | <b>2,383,472</b> | <b>2,628,630</b> | <b>2,905,219</b> |

Table I.6. Payback Period of Candidate System 1, Baht.

| Candidate 1                             | Year 0   | Year 1     | Year 2     | Year 3     | Year 4     | Year 5      |
|---|----------|------------|------------|------------|------------|-------------|
| Development Cost                        | -709,890 | -          | -          | -          | -          | -           |
| Annual Operating Cost                   | -        | -1,904,500 | -2,003,275 | -2,107,490 | -2,217,471 | -2,333,566  |
| Discount Factor 2%                      | 1.000    | 0.980      | 0.961      | 0.942      | 0.924      | 0.906       |
| Time-adjusted Cost                      | -709,890 | -1,866,410 | -1,925,147 | -1,985,255 | -2,048,943 | -2,114,210  |
| Cumulative Time-adjusted Cost           | -709,890 | -2,576,300 | -4,501,447 | -6,486,702 | -8,535,645 | -10,649,855 |
| Benefit from New System                 | -        | 1,972,320  | 2,165,818  | 2,383,472  | 2,628,630  | 2,905,219   |
| Discount Factor 2%                      | 1.000    | 0.980      | 0.961      | 0.942      | 0.924      | 0.906       |
| Time-adjusted Benefit                   | -        | 1,932,873  | 2,081,351  | 2,245,230  | 2,428,854  | 2,632,128   |
| Cumulative Time-adjusted Benefit        | -        | 1,932,873  | 4,014,223  | 6,259,454  | 8,688,308  | 11,320,436  |
| Cumulative Time-adjusted Benefit - Cost | -709,890 | -643,427   | -487,951   | -227,248   | 152,663    | 670,581     |

Table I.7. Payback Period of Candidate System 2, Baht.

| Candidate 2                             | Year 0   | Year 1     | Year 2     | Year 3     | Year 4     | Year 5      |
|---|----------|------------|------------|------------|------------|-------------|
| Development Cost                        | -594,890 | -          | -          | -          | -          | -           |
| Annual Operating Cost                   | -        | -1,904,500 | -2,003,275 | -2,107,490 | -2,217,471 | -2,333,566  |
| Discount Factor 2%                      | 1.000    | 0.980      | 0.961      | 0.942      | 0.924      | 0.906       |
| Time-adjusted Cost                      | -594,890 | -1,866,410 | -1,925,147 | -1,985,255 | -2,048,943 | -2,114,210  |
| Cumulative Time-adjusted Cost           | -594,890 | -2,461,300 | -4,386,447 | -6,371,702 | -8,420,645 | -10,534,855 |
| Benefit from New System                 | -        | 1,972,320  | 2,165,818  | 2,383,472  | 2,628,630  | 2,905,219   |
| Discount Factor 2%                      | 1.000    | 0.980      | 0.961      | 0.942      | 0.924      | 0.906       |
| Time-adjusted Benefit                   | -        | 1,932,873  | 2,081,351  | 2,245,230  | 2,428,854  | 2,632,128   |
| Cumulative Time-adjusted Benefit        | -        | 1,932,873  | 4,014,223  | 6,259,454  | 8,688,308  | 11,320,436  |
| Cumulative Time-adjusted Benefit - Cost | -594,890 | -528,427   | -372,224   | -112,248   | 267,663    | 785,581     |

Table I.8. Payback Period of Candidate System 3, Baht.

| Candidate 3                             | Year 0   | Year 1     | Year 2     | Year 3     | Year 4     | Year 5      |
|---|----------|------------|------------|------------|------------|-------------|
| Development Cost                        | -452,500 | -          | -          | -          | -          | -           |
| Annual Operating Cost                   | -        | -1,902,500 | -2,001,275 | -2,105,490 | -2,215,471 | -2,311,566  |
| Discount Factor 2%                      | 1.000    | 0.980      | 0.961      | 0.942      | 0.924      | 0.906       |
| Time-adjusted Cost                      | -452,500 | -1,864,450 | -1,923,225 | -1,983,371 | -2,047,095 | -2,094,278  |
| Cumulative Time-adjusted Cost           | -452,500 | -2,316,950 | -4,240,175 | -6,223,546 | -8,270,641 | -10,364,919 |
| Benefit from New System                 | -        | 1,972,320  | 2,165,818  | 2,383,472  | 2,628,630  | 2,905,219   |
| Discount Factor 2%                      | 1.000    | 0.980      | 0.961      | 0.942      | 0.924      | 0.906       |
| Time-adjusted Benefit                   | -        | 1,932,873  | 2,081,351  | 2,245,230  | 2,428,854  | 2,632,128   |
| Cumulative Time-adjusted Benefit        | -        | 1,932,873  | 4,014,224  | 6,259,454  | 8,688,308  | 11,320,436  |
| Cumulative Time-adjusted Benefit - Cost | -452,500 | -384,077   | -225,951   | 25,908     | 417,667    | 955,517     |



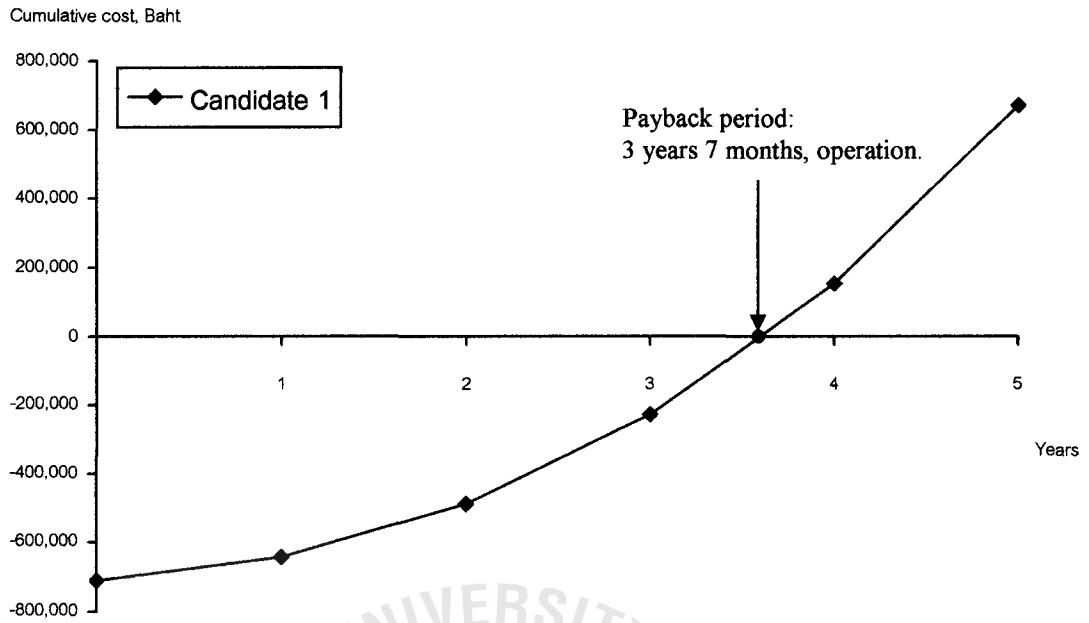


Figure I.1. Payback Period of Candidate System 1.

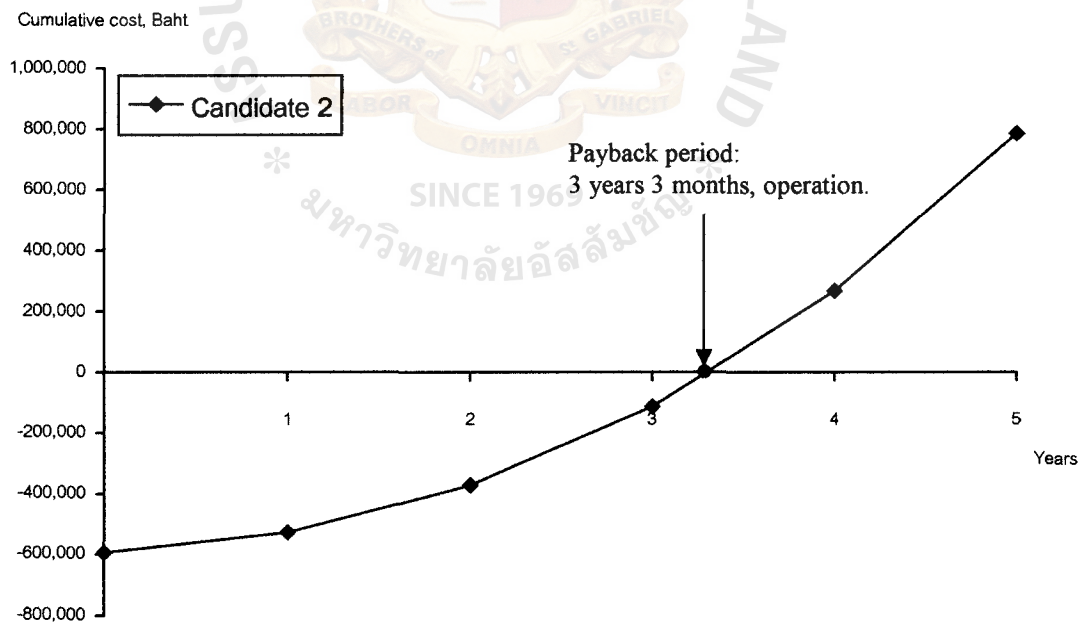


Figure I.2. Payback Period of Candidate System 2.

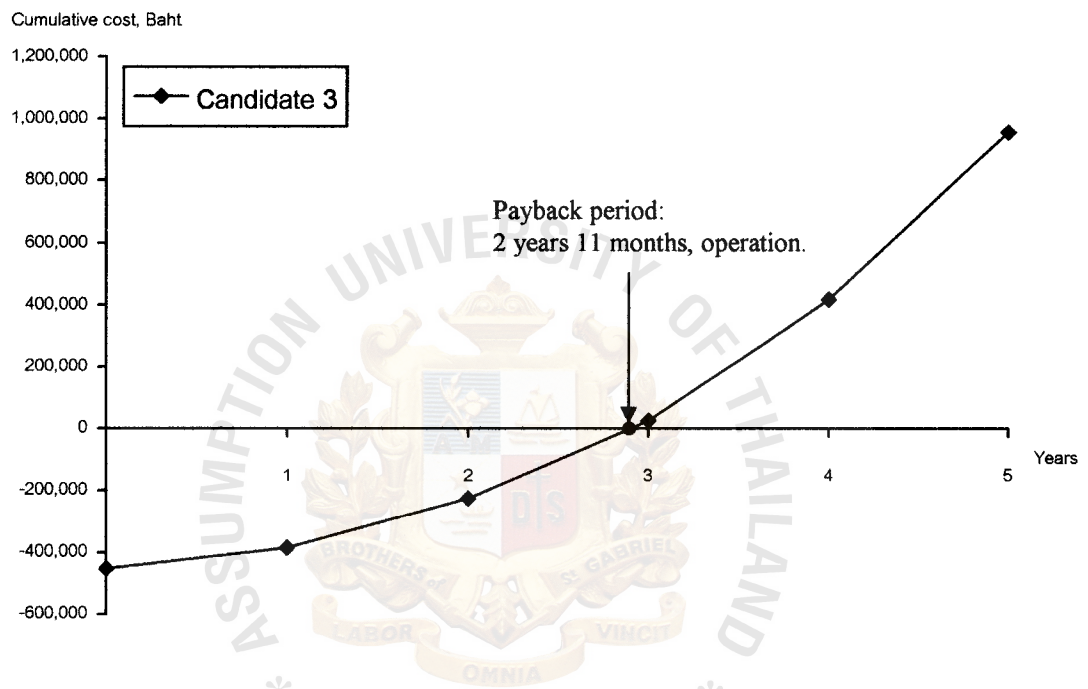


Figure I.3. Payback Period of Candidate System 3.

Table I.9. Net Present Value of Candidate System 1, Baht.

| Candidate 1                             | Year 0   | Year 1     | Year 2     | Year 3     | Year 4     | Year 5      |
|---|----------|------------|------------|------------|------------|-------------|
| Development Cost                        | -709,890 | -          | -          | -          | -          | -           |
| Annual Operating Cost                   | -        | -1,904,500 | -2,003,275 | -2,107,490 | -2,217,471 | -2,333,566  |
| Discount Factor 2%                      | 1.000    | 0.980      | 0.961      | 0.942      | 0.924      | 0.906       |
| Present Value of Annual Cost            | -709,890 | -1,866,410 | -1,925,147 | -1,985,255 | -2,048,943 | -2,114,210  |
| Total Present Value of Lifetime Cost    |          |            |            |            |            | -10,649,855 |
| Benefit from New System                 | -        | 1,972,320  | 2,165,818  | 2,383,472  | 2,628,630  | 2,905,219   |
| Discount Factor 2%                      | 1.000    | 0.980      | 0.961      | 0.942      | 0.924      | 0.906       |
| Present Value of Annual Benefit         | -        | 1,932,873  | 2,081,351  | 2,245,230  | 2,428,854  | 2,632,128   |
| Total Present Value of Lifetime Benefit |          |            |            |            |            | 11,320,436  |
| Net Present Value of Candidate 1        |          |            |            |            |            | 670,581     |

Table I.10. Net Present Value of Candidate System 2, Baht.

| Candidate 2                             | Year 0   | Year 1     | Year 2     | Year 3     | Year 4     | Year 5      |
|---|----------|------------|------------|------------|------------|-------------|
| Development Cost                        | -594,890 | -          | -          | -          | -          | -           |
| Annual Operating Cost                   | -        | -1,904,500 | -2,003,275 | -2,107,490 | -2,217,471 | -2,333,566  |
| Discount Factor 2%                      | 1.000    | 0.980      | 0.961      | 0.942      | 0.924      | 0.906       |
| Present Value of Annual Cost            | -594,890 | -1,866,410 | -1,925,147 | -1,985,255 | -2,048,943 | -2,114,210  |
| Total Present Value of Lifetime Cost    |          |            |            |            |            | -10,534,855 |
| Benefit from New System                 | -        | 1,972,320  | 2,165,818  | 2,383,472  | 2,628,630  | 2,905,219   |
| Discount Factor 2%                      | 1.000    | 0.980      | 0.961      | 0.942      | 0.924      | 0.906       |
| Present Value of Annual Benefit         | -        | 1,932,873  | 2,081,351  | 2,245,230  | 2,428,854  | 2,632,128   |
| Total Present Value of Lifetime Benefit |          |            |            |            |            | 11,320,436  |
| Net Present Value of Candidate 2        |          |            |            |            |            | 785,581     |

Table I.11. Net Present Value of Candidate System 3, Baht.

| Candidate 3                             | Year 0   | Year 1     | Year 2     | Year 3     | Year 4     | Year 5      |
|---|----------|------------|------------|------------|------------|-------------|
| Development Cost                        | -452,500 | -          | -          | -          | -          | -           |
| Annual Operating Cost                   | -        | -1,902,500 | -2,001,275 | -2,105,490 | -2,215,471 | -2,311,566  |
| Discount Factor 2%                      | 1.000    | 0.980      | 0.961      | 0.942      | 0.924      | 0.906       |
| Present Value of Annual Cost            | -452,500 | -1,864,450 | -1,923,225 | -1,983,371 | -2,047,095 | -2,094,278  |
| Total Present Value of Lifetime Cost    |          |            |            |            |            | -10,364,919 |
| Benefit from New System                 | -        | 1,972,320  | 2,165,818  | 2,383,472  | 2,628,630  | 2,905,219   |
| Discount Factor 2%                      | 1.000    | 0.980      | 0.961      | 0.942      | 0.924      | 0.906       |
| Present Value of Annual Benefit         | -        | 1,932,873  | 2,081,351  | 2,245,230  | 2,428,854  | 2,632,128   |
| Total Present Value of Lifetime Benefit |          |            |            |            |            | 11,320,436  |
| Net Present Value of Candidate 3        |          |            |            |            |            | 955,517     |

## **BIBLIOGRAPHY**

1. Jeffrey L. Whitten and Lonnie D. Benthley. System Analysis and Design Methods, Published by Irwin McGraw Hill, 2000.
2. Alan Dennis and David Tegarden. Systems Analysis and Design with UML, Published by Wiley, John & Sons, Incorporated, 2004.
3. Peter Lavin. Object-Oriented PHP: Concepts, Techniques, and Code, Published by No Starch Press, 2006.
4. David Lane and Hugh E. Williams. Web Database Applications with PHP and MySQL, 2nd Edition, Published by O'Reilly.
5. Larry Ullman. PHP and MySQL for Dynamic Web Sties, Published by Pearson Education, 2005.
6. Elizabeth Gandy and Simon Stobart. JavaScript: Creating Dynamic Web Pages, Published by Lexden Publishing Limited.
7. David Flanagan. JavaScript: The Definitive Guide, Fifth Edition, Published by O'Reilly, 2006.
8. Nicholas C. Zakas. Professional JavaScript for Web Developers, Published by Wiley, John & Sons, Incorporated, 2005.
9. Goldman, James E., Phillip T. Rawles, and Julie R. Mariga. Client/server Information Systems: A Business-oriented Approach. NY: John Wiley & Sons, Inc., 1999.
10. Laudon, Kenneth and Jane P. Laudon. Management Information System. NJ: Prentice Hall International, 2000.
11. McLeod, Ray and George Schell. Management Information Systems, 8<sup>th</sup> edition.
12. Diehr, George. Database management, Glenview, IL: Scott, Foresman, c1989.
13. Terry Halpin and T.A. Halpin. Information Modeling and Relational Databases, Published by Elsevier Science & Technology Books, 2001.
14. Paulraj Ponniah. Database Design and Development: An Essential Guide for IT Professionals with Visible Analyst, Published by Wiley, John & Sons, Incorporated, 2005.
15. Janice Reynolds. The Complete E-Commerce Book: Desing, Build, and Maintain a Successful Web-Based Busniess, Published by C M P Books, 2004.



